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Associated and predictive factors of quality of life in patients with temporal lobe epilepsy

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ABSTRACT

Objective: Identifying the factors that are correlated with and predictive of reduced quality of life (QOL) is essential to optimize the treatment of epilepsy and the management of comorbidities.
Methods: We analyzed the independent associations between the Quality of Life in Epilepsy-31 (QOLIE-31) inventory and the demographic, clinical, psychiatric, and cognitive variables of 47 consecutive patients with temporal lobe epilepsy (TLE). Predictors of the correlated variables were analyzed by multiple linear regression analysis.
Results: The QOLIE-31 total score was positively correlated with occupational status and Mini-Mental State Examination (MMSE) scores ($r = 0.290$ and 0.295, respectively; $P < 0.05$) and negatively correlated with the duration of seizures, adverse effects of antiepileptic drugs (AEDs), and the Pittsburgh Sleep Quality Inventory (PSQI), Self-rating Anxiety Scale (SAS), and Self-rating Depression Scale (SDS) scores ($r = -0.357$, 0.321, 0.328, −0.672, and −0.565, respectively; $P < 0.05$; $P < 0.01$ for the SAS and SDS). In the final multivariate regression model, anxiety, long durations of seizures, adverse effects of AEDs, and depression explained approximately 60.6% (adjusted $R^2 = 0.606$, R coefficient = 0.800) of the QOLIE-31 overall score variance.
Conclusion: Anxiety, long durations of seizures, adverse effects of AEDs, and depression were significant predictors of QOL, and these variables had relatively high prediction capacities for the overall QOLIE-31 in the regression model. Comorbid anxiety is the most powerful negative determinant of the QOLIE-31.

1. Introduction

People with epilepsy (PWE) suffer from poor quality of life (QOL) as a result of frequent seizures, cognitive dysfunction, and a high risk of psychiatric comorbidities [1–3]. The objective of epilepsy treatment concerns not only seizure control but also the minimization of the effects of the disease and the side effects of antiepileptic drugs (AEDs) on the daily lives of PWE.

Recent studies have shown that the variables that may influence QOL in patients are either demographic or disease-related and include age [4, 5], gender [5], years of education [6], occupational status [7], onset age [8], duration of seizures [9], kinds of AEDs [10], adverse effects of AEDs [9], frequency of seizures [11, 12], seizure lateralization [13], and hippocampal sclerosis [13].

In previous studies, psychiatric comorbidities such as anxiety, depression, and mood disorders have been shown to be strong predictors of QOL [10, 14]. Anxious and depressive symptoms are the major psychiatric comorbidities found in PWE; these symptoms severely affect QOL in PWE [12, 14, 15].

Cognitive deficits are common in PWE and are associated with lower QOL [16–18]. It has been reported that cognitive domains such as general intelligence [19], memory [20], executive functioning [21], and linguistic function [19] are affected in PWE, thus contributing to the worsening of QOL.

Previous studies reported QOL in mixed groups of PWE [22]. Temporal lobe epilepsy (TLE), as the most common type of partial epilepsy, affects over 70% of PWE. Investigations of QOL in patients with TLE have yielded some findings [23–25], but because of the disparity in methodologies and the diversity in the investigated factors, the independent determinants of QOL in TLE remain to be elucidated. Hence, the purpose of this study was to explore the independent factors of the demographic, clinical, psychiatric, and cognitive aspects that affect QOL in a group of patients with TLE and to identify the potential predictors of decreased QOL.

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2. Subjects and methods

2.1. Participants

We screened patients with epilepsy who were evaluated and documented at the Outpatient Department of Clinical Neurology of Xiangya Hospital (Hunan Province, China) in a large study examining the neuropsychological features of PWE between March 2015 and November 2017. The clinical diagnosis of TLE was made by experienced epileptologists according to seizure semiology, continuous electroencephalography (EEG), and magnetic resonance imaging (MRI). Specifically, the diagnosis included complex partial seizures of temporal lobe origin such as epigastric, autonomic, and psychic auras, in conjunction with unilateral epileptic discharges over the anterior, inferior, and mesial temporal regions on interictal scalp EEG and the absence of MRI abnormalities other than hippocampal sclerosis symptoms. The patients included should have been cognitively capable of communicating with physicians and understanding the questionnaires. In addition, there was no evidence of any psychiatric disorders that could limit the conduct of the research.

This study was approved by the Institutional Review Board prior to initiation, and consent was obtained from each patient to access their medical notes in order to collect demographic and clinical information, including age, gender, years of education, occupational status, age of onset, duration of seizures, kinds of AEDs used daily, frequency of AED use, self-reported adverse effects of AEDs, frequency of seizures, seizure lateralization, and brain imaging.

2.2. Measures

Neuropsychological evaluation and self-assessment questionnaires were conducted by trained neuropsychiatrists.

2.2.1. Quality of life evaluation

Quality of life was measured using the Chinese version of Quality of Life in Epilepsy-31 (QOLIE-31) inventory, which shows good reliability, validity, and construct validity [26]. The QOLIE-31 is an epilepsy-specific QOL instrument that has been widely adopted in different countries [27]. This inventory contains 30 items and measures QOL across seven subscale domains: seizure worry, overall QOL, emotional well-being, energy/fatigue, cognitive function, medication effects, and social function. Each domain was scored by calculating the mean score of the responses to the questions corresponding to that domain. The total score was calculated by assigning different percentages to the seven scores according to the QOLIE-31 scoring manual [28], ranging from 1 to 100, with higher scores indicating better QOL.

2.2.2. Psychiatric evaluation

We utilized the Self-rating Anxiety Scale (SAS) and the Self-rating Depression Scale (SDS) to evaluate anxiety and depressive symptoms in patients with TLE. The SAS and SDS are commonly used questionnaires in PWE, the Chinese versions of which were administered in a previous study [29–31]. The SAS, as well as the SDS, is a 20-item symptom inventory, and each item is scored on a scale from 1 to 4. After being multiplied by 1.25, the total score is then converted into a standardized score ranging from 25 to 100 with higher scores reflecting higher levels of anxiety and depression. The norms in China include the following scores: mild anxiety (scores from 50 to 60) and mild depression (53–62), moderate anxiety (61–70) and moderate depression (63–72), and severe anxiety (>70) and severe depression (>72) [32].

Sleep disturbances were measured with the Pittsburgh Sleep Quality Inventory (PSQI), which evaluates subjective sleep quality over the preceding month. Each answer was rated on a 0- to 3-point scale, and the global score ranged from 0 to 21, with a higher score indicating worse sleep quality. A global sum of ≥5 was considered poor overall sleep quality, and a sum of ≥10 was considered severely disturbed sleep [33].

2.2.3. Neurocognitive evaluation

The following eleven neuropsychological tests were used to assess the comprehensive cognitive function of patients with TLE: (1) in terms of general intelligence assessment, the Montreal Cognitive Assessment (MoCA) and the Mini-Mental State Examination (MMSE) [34, 35] were used; (2) in terms of short-term memory and working memory capacity assessment, the arithmetic test of the Wechsler Adult Intelligence Scale—revised in China (WAIS-RC) [36], forward digit span test (FDST), backward digit span task (BDST) [37], and the digit symbol substitution test (DSST) [38] were used; (3) for long-term memory assessment, the knowledge test of the WAIS-RC [36] was used; (4) for attention and executive control ability assessment, the Trail Making Test A (TMT-A) and Trail Making Test B (TMT-B) [38] were used; (5) for the visual spatial analysis ability assessment, the block design test (BDT) was used; and (6) for the linguistic function assessment, the verbal fluency test (VFT, animal naming) [39] was used.

2.3. Statistical analysis

All data analyses were performed using the software package SPSS 22.0 for Windows. Descriptive statistics were calculated for all variables. Quantitative data are expressed as the mean ± standard deviation (SD) or as quartiles (e.g., 25th and 75th percentiles [P_{25} and P_{75}]) as appropriate. Qualitative data are presented and summarized as numbers and proportions.

A univariate linear regression analysis was done to explore the association between the overall QOLIE-31 scores of patients with TLE as well as each of the seven subscale domains and the demographic, clinical, psychiatric, and neuropsychological variables of the participants. Then, the independent variables that showed significant associations with the QOLIE-31 total score and the subscale domains in the linear regression analysis were included in a multiple regression model with stepwise selection (entry criterion of $P \leq 0.05$, exit criterion of $P > 0.1$) to identify good potential predictors of the overall QOLIE-31 and of each of the seven subscale domains. All statistical tests were two-tailed.

3. Results

3.1. Demographic and clinical characteristics

Fifty-one consecutive patients with TLE were enrolled and agreed to participate while four were excluded from the data analysis because of incomplete questionnaires. Ultimately, forty-seven patients (19 males and 27 with left lateralization) were studied. The participant demographics and characteristics are listed in Table 1. The mean age of the participants was 28 years ($P_{25} = 22$, $P_{75} = 33$), and the mean number of years of education was 12 ($P_{25} = 9$, $P_{75} = 15$). Most patients were unemployed and had a dependent economic condition at the time of investigation (70.2%). Regarding the clinical materials, the average age of onset and duration of seizures were 21 years ($P_{25} = 12$, $P_{75} = 27$) and 6 years ($P_{25} = 4$, $P_{75} = 14$), respectively. Treatment of this group of patients included carbamazepine, oxcarbazepine, valproic acid, lamotrigine, topiramate, and levetiracetam. A total of 55.3% of the patients took a monotherapy while 40.4% used two kinds of AEDs, and 2 subjects (4.3%) were in need of polytherapy as they were taking more than 3 kinds of AEDs to control their seizures. Most of the participants (66.0%) took AEDs twice a day. Adverse effects of AEDs were reported by the patients themselves and included gastrointestinal reactions, elevated liver enzymes, and abnormal changes in weight. Approximately a quarter of the patients experienced seizures more than once a month, and more than one-quarter (27.7%) lived with seizures daily. Symptoms of hippocampal sclerosis were shown on the brain MRI data from 17 patients.

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