



## Sexual dysfunction and associated factors in Chinese Han women with epilepsy



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### ABSTRACT

**Purpose:** Women with epilepsy (WWE) are believed to be at risk of sexual dysfunction (SD) and face many sexual challenges because of multiple factors. This study aimed to assess the factors associated with SD in Chinese Han WWE.

**Methods:** This cross-sectional study examined 112 married WWE in the Affiliated Hospital of Yangzhou University with focal (FE) or generalized epilepsy (GE) on antiepileptic drugs (AEDs), and 120 healthy controls without epilepsy, all of Chinese Han nationality. Data collection tools included the Chinese version of Female Sexual Function Index (FSFI), the Chinese version of Zung Self-Rating Anxiety Scale (SAS), the Chinese version of the Zung Self-Rating Depression Scale (SDS), the Chinese version of the revised Morisky Medication Adherence Scale (MMAS-8), and the Chinese version of the National Hospital Seizure Severity Scale (NHS3). Chi-square test, *t*-test, one-way analysis of variance (ANOVA), and binary logistic regression were used for statistical analysis.

**Results:** A high rate (70.5%) of SD was detected in WWE, with 24.2% in controls. Sexual dysfunction affected all dimensions: desire (85.7%), arousal (56.3%), lubrication (47.3%), orgasm (66.1%), satisfaction (58.9%), and pain (41.1%). Elevated rates of anxiety (40.2%) and depression (33%) and poor medication adherence (31.3%) were also found in WWE. Binary logistic regression found that poor economic status (odds ratio (OR) = 13.904, 95% confidence interval (CI): 2.025–95.472, *P* = 0.007 and OR = 6.350, 95% CI: 1.323–30.477, *P* = 0.021), anxiety (OR = 1.222, 95% CI: 1.055–1.415, *P* = 0.007), and poor medication adherence (OR = 0.297, 95% CI: 0.124–0.707, *P* = 0.006) were associated with SD.

**Conclusions:** The associated factors of SD in Chinese Han WWE are multifactorial. The WWE have higher levels of anxiety, poor family economic status, and poor medication adherence. Medical professionals should not only better control seizures but also evaluate and improve patients' sexual function so as to improve the quality of life of WWE.

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### 1. Introduction

Epilepsy is the second most common neurological disorder. Data indicate a high incidence of sexual dysfunction (SD) in women with epilepsy (WWE). Female sexual dysfunction (FSD) is reflected by impaired desire, arousal, and orgasm as well as pain associated with severe distress [1]. Studies have estimated that 20% to 60% of WWE experience SD [2–4]. Although SD is common in WWE, its etiology remains unknown and is likely to be multifactorial, involving neurological,

iatrogenic, endocrine, psychiatric, and psychosocial factors. Multiple studies reported that both epilepsy itself and the interactions of antiepileptic drugs (AEDs) cause endocrine abnormalities that are sometimes observed in WWE [5]. Indeed, studies have found SD to be more common in female patients with focal seizures, especially those originating from the right temporal lobe and involving the amygdala and its connections, with consequent dysregulation of gonadotrophin release [6]. The role of AEDs in female patients remains controversial. Antiepileptic drugs may increase a woman's risk of sexual problems because of associated side effects such as changes in sex hormones [7, 8]. New AEDs are thought to cause sexual disorders through complex and poorly understood mechanisms, mainly involving the central nervous system (CNS) imbalance in the serotonin to dopamine ratio [9]. However, it is currently considered that many other factors potentially affecting sexual function in WWE include anxiety and depression, the partner's reaction to the disease [10], stigmatization, emotional disorders, and interpersonal problems such as social isolation and poor social

**Abbreviations:** WWE, women with epilepsy; FE, focal epilepsy; GE, generalized epilepsy; AEDs, antiepileptic drugs; FSFI, Female Sexual Function Index; SAS, Zung Self-Rating Anxiety Scale; SDS, Zung Self-Rating Depression Scale; MMAS-8, revised Morisky Medication Adherence Scale; NHS3, National Hospital Seizure Severity Scale; SD, sexual dysfunction; FSD, female sexual dysfunction; CNS, central nervous system; EIAEDs, enzyme-inducing antiepileptic drugs.

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competence [11]. Medication adherence also affects sexual function in WWE [12, 13]. Related studies suggested that medication adherence and sexual function are interrelated. Improvement of sexual function could also improve compliance in women under AEDs, leading to improved quality of life. Improving medication adherence plays important roles, from relieving the disease symptoms to ameliorating female sexual function and the quality of life. These factors may be easily overlooked by medical professionals and patients. In a country with a conservative culture such as China, it seems too embarrassing for women to talk about sex, especially for WWE with high incidence of SD. Neurologists, patients, and their families have paid more attention to controlling epilepsy and selecting AEDs; insufficient attention has been paid to SD. It is worth noting that no comprehensive studies have assessed sexual problems in Chinese Han WWE. Therefore, this study aimed to detect the related factors of SD in Chinese Han WWE.

## 2. Materials and methods

### 2.1. Participants

Approval of the study was obtained from the Institutional Ethics Committee of the Affiliated Hospital of Yangzhou University. All patients who met the study criteria were enrolled at the Affiliated Hospital of Yangzhou University. Continuous convenience sampling was performed over three years between January 2015 and December 2017. The WWE group included 112 married women aged 20 to 50 years, with 72 epilepsy outpatients and 40 inpatients. Inclusion criteria consisted of (1) classifiable epilepsy (standard diagnostic procedures were used to establish diagnosis according to the International League Against Epilepsy criteria [14]) with drug therapy for at least one year, (2) regular sexual activity (for at least 3 months), (3) spouses with no other chronic illnesses which could cause SD, and (4) with elementary school education or higher. Exclusion criteria consisted of (1) other chronic illnesses that could itself cause SD, (2) pregnancy, and (3) breastfeeding. The control group included 120 healthy married controls between the ages of 20 and 50, recruited from the health center of the same hospital. They were matched for age, education level, and employment status to the experimental group. All enrolled patients and controls provided signed informed consent and allowed anonymous data collection for this study.

### 2.2. Methods

A total of 232 women were included in the current study. Data collection was performed with a form inquiring about the participants' demographic parameters, including age, educational level, employment, family monthly income, history of infertility (absence of any contraceptive measures in sexual life for 1 year or more but not pregnancy), and irregular menses. Then, disease characteristics and drug therapy details were collected for WWE. All participants were submitted to relevant scales and questionnaires (the Chinese version of the Female Sexual Function Index (FSFI), the Chinese version of the Zung Self-Rating Anxiety Scale (SAS), and the Chinese version of the Zung Self-Rating Depression Scale (SDS)). In addition, WWE were evaluated using the Chinese version of the revised Morisky Medication Adherence Scale (MMAS-8) and the Chinese version of the National Hospital Seizure Severity Scale (NHS3).

#### 2.2.1. Epilepsy-derived factors

All 112 WWE underwent magnetic resonance imaging (MRI). According to their histories, 97 of the 112 women had undergone long-term scalp video-electroencephalography (VEEG) monitoring, based on which the patients were divided into two groups: 71 patients with focal epilepsy (FE) and 41 with generalized epilepsy (GE). A total of 66/71 patients with FE and 31/41 patients with GE had undergone long-term VEEG monitoring. The patients with FE were not further

subdivided. Of the 71 patients with FE, 8 had undergone epilepsy surgery; 26 had MRI-detected lesions. In 8 of the 26, we identified some malformations of cortical development (cortical dysplasia and heterotopia of gray matter); hippocampal sclerosis was found in 3 patients, and 5 showed postinflammatory changes; 5, 2, and 3 patients showed softening stove, cavernoma, and perinatal ischemic changes, respectively. At the time of evaluation, 52 patients had been completely seizure-free for at least 3 months. The remaining 60 subjects were still experiencing seizures (31 had a seizure frequency of less than 3 times per 3 months while 29 had a seizure frequency of 3 times and above per 3 months).

#### 2.2.2. AEDs

All 112 patients were treated with AEDs. A total of 61 patients were on monotherapy, including 12 with lamotrigine (LTG), 8 with carbamazepine (CBZ), 12 with oxcarbazepine (OXC), 7 with valproate (VPA), 18 with levetiracetam (LEV), and 4 with topiramate (TPM). In all, 33 patients were receiving a combination of two AEDs, while 18 were being treated with three or more AEDs. The patients were divided into two groups according to the type of antiepileptic medication used, regardless of the number and combination. One group included 60 patients treated with enzyme-inducing AEDs (EIAEDs); the other comprised 52 patients taking non-EIAEDs. We considered CBZ, OXC, PB, phenytoin (PTH), and TPM as EIAEDs, and LTG, LEV, clonazepam (CZP), and VPA as non-EIAEDs. All WWE received the AEDs for one year or longer.

#### 2.2.3. Measurements

**2.2.3.1. Female sexual function.** The FSFI is considered the gold-standard for the assessment of women's sexual function [15]. It includes 19 items which tap into the following six dimensions: sexual desire (2 items), arousal (4 items), lubrication (4 items), orgasm (3 items), satisfaction (3 items), and pain (3 items). Except for four items (2 each in the desire and satisfaction dimensions) with scores ranging between 1 and 5, all other items have scores ranging from 0 to 5. The higher the score, the better the sexual function. Subdomain scores can be computed by summing up the relevant items and multiplying by a predefined subscale weight. The FSFI score was obtained by multiplying the sum of the scores in each dimension by a coefficient. The total score was obtained by adding the scores of all six dimensions. The maximum score was 6 for each dimension and 36 for all six dimensions. The minimum score was 1.2 for sexual desire; 0 for sexual arousal, lubrication, orgasm, and pain; 0.8 for satisfaction; and 2 for the entire scale. Final scores ranged from 2.0 to 36.0. Referring to Turkish women who are also Asian women [16], a FSFI score below 25 was considered the diagnostic criteria for SD. A score of <3.6 in the dimension of sexual desire or arousal suggested low sexual desire or arousal; <3.9 in the dimension of lubrication suggested difficulty in lubrication; <4.0 in the dimension of orgasm suggested orgasm disorder; <4.4 in the dimension of satisfaction or pain suggested satisfaction or sexual pain disorder. The Chinese version of the FSFI, which was cross-language-verified by Prof. Sun Xiaoguang, shows satisfactory internal consistencies ( $\alpha = 0.69$  to  $0.94$ ) and high test-retest reliability (correlation coefficient =  $0.80$  to  $0.86$ ) [17].

**2.2.3.2. Depression and anxiety.** To evaluate depression and anxiety, the Chinese versions of the Zung Self-Rating Anxiety Scale (SAS) [18] and the Self-Rating Depression Scale (SDS) were used [19]. The SAS and SDS are both 20-item questionnaires, with scores between 1 and 4. The frequency of symptoms within the last week was reported as rarely or occasionally, often, or always. The total score was 20–80 and multiplied by 1.25 as the standard score. The higher the score, the severer the anxiety or depression. A standard score of <50 reflected no anxiety or depression; 50–59 indicated mild anxiety or depression, 60–69 reflected moderate anxiety or depression, and 70 or more suggested severe anxiety or depression. This study took  $\geq 50$  as cutoff value to determine whether respondents have anxiety or depression. The internal

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