Epilepsy Research 135 (2017) 150–157

Contents lists available at ScienceDirect

Epilepsy Research

journal homepage: www.elsevier.com/locate/epilepsyres

Subjective sleep disturbance in Chinese adults with epilepsy: Associations with affective symptoms

Yeru Shen[a], Mengmeng Zhang[a], Yu Wang[a], Lanlan Wang[b], Xiangjun Xu[c], Gairong Xiao[a], Jing Chen[a], Ting Zhang[a], Nong Zhou[a,*]

[a] Department of Neurology, The First Affiliated Hospital of Anhui Medical University, Hefei, Anhui Province, PR China
[b] Anhui Provincial Stereotactic Neurosurgical Institute, Anhui Provincial Hospital, Hefei, Anhui Province, PR China
[c] Department of Neurology, The First Affiliated Hospital of Wannan Medical College, Wuhu, Anhui Province, PR China

ARTICLE INFO

Keywords:
Sleep disturbance
Subjective sleep quality
Affective symptoms
Depression
Anxiety
Epilepsy

ABSTRACT

Background: As well as being a very common neurological disease worldwide, epilepsy significantly impairs patients' emotional, behavioral, and cognitive functioning. Sleep disturbances are the most frequent complaint in patients with epilepsy. The present study assesses the impact of a range of affective symptoms on subjective sleep quality and sleep disturbances in Chinese adults with epilepsy.

Methods: Adults with epilepsy who visited our epilepsy clinic from July 2015 to March 2016 were enrolled in our study. Both patients and healthy controls completed the Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Insomnia Severity Index (ISI), Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory (BAI), and Mini-mental State Examination (MMSE). Subjective sleep quality and sleep disturbances were examined with regard to self-reported symptoms of depression and anxiety, seizure-related factors, and demographic factors.

Results: The PSQI scores and ISI scores of patients were significantly higher (indicating lower quality sleep and more serious insomnia) than those of the control group. Symptoms associated with depression and anxiety were independently related to impaired subjective sleep quality and insomnia. Affective symptoms explained more of the variance in PSQI scores and ISI scores than did seizure-related or demographic variables. In addition, these variables also seemed to be less powerful contributing factors to subjective sleep quality and insomnia than affective symptoms, several seizure-related factors, such as seizure control, partial seizures and duration of epilepsy, which are also significantly associated with subjective sleep quality and insomnia. In addition, use of lamotrigine (LTG) was also associated with insomnia and use of clonazepam (CZP) and phenobarbital (PB) with daytime sleepiness in patients with epilepsy.

Conclusion: Chinese adults with epilepsy have poorer self-reported subjective sleep quality and a higher prevalence of insomnia than the control group. Depressive- and anxiety-related symptoms independently exert an adverse effect on the subjective sleep quality and insomnia of patients. In addition, seizure control, partial seizures, and the duration of epilepsy affect the quality of sleep and insomnia in patients, but seem less powerful predictors of sleep quality and insomnia than affective symptoms. Early identification and treatment of affective symptoms is of great importance in improving the sleep quality and insomnia of patients with epilepsy.

1. Introduction

Epilepsy is a heterogeneous neurological condition characterized by recurrent spontaneous seizures (two or more) (Hauser et al., 1996). The prevalence of epilepsy varies with region, but studies have estimated its prevalence as ranging from 4 to 10 per 1000 people (Cowan et al., 1989; Hauser et al., 1991; Placencia et al., 1994; Rwiza et al., 1992; Wallace et al., 1998). The median prevalence of active epilepsy (being treated or exposed to seizures in the previous five years) and lifetime epilepsy are both significantly higher in developing countries (whether in urban or rural areas) than developed countries(Ngugi et al., 2010). As the largest developing country in the world, the prevalence of epilepsy in China is 5.0 per 1000 people (Chang and Wang, 2012).

Epilepsy is a chronic neurological disease, which impairs patients' emotional, behavioral, social, and cognitive functioning, and places a significant burden on wider society (Beghi, 2016). In recent years, as

* Corresponding author at: Department of Neurology, The First Affiliated Hospital of Anhui Medical University, No.210, Jixi Road, Shushan District, Hefei, Anhui Province, PR China.
E-mail address: zhounonganyi@163.com (N. Zhou).

http://dx.doi.org/10.1016/j.eplepsyres.2017.06.014
Received 21 January 2017; Received in revised form 8 June 2017; Accepted 25 June 2017
Available online 01 July 2017
0920-1211/

medical understanding has evolved from a biomedical model to a biopsychosocial model, emotional, behavioral and cognitive factors are now regarded as essential aspects of health(Alonso, 2004). Thus, clinicians have paid more attention to the wider aspects of seizure control, quality of life and mental health in patients with epilepsy, especially in cognition and psychological factors (Swinkels et al., 2005).

It is known that patients with epilepsy face several problems and symptoms that affect daily life. Sleep disturbances are the most frequent complaint in epilepsy patients (Manni and Terzaghi, 2010). Ismayilova et al. (2015) conducted a large controlled study of epilepsy patients and found poorer sleep quality and a higher incidence of disturbed sleep patterns in patients compared with the controls. In a cross-sectional questionnaire-based study conducted in Switzerland, patients with epilepsy reported a threefold higher prevalence of sleep disturbance compared with controls (30% vs. 10%, $p = 0.001$) (Khatami et al., 2006). The relationship between epilepsy and sleep disturbance is complex. On the one hand, epileptic discharges might affect sleep structure and lead to sleep disruption (Vaughn and D'Cruz, 2004). Alternatively, sleep disturbances like obstructive sleep apnea could increase the frequency of seizures (Ismayilova et al., 2015). In addition to their influence on seizure frequency, sleep disturbances have a significant negative effect on quality of life (Alanis-Guevara et al., 2005). Therefore, the assessment of sleep disturbances and their causes is of great importance for clinicians in managing epilepsy more effectively.

Many factors could cause sleep disturbances in patients with epilepsy (e.g., seizure-related factors, antiepileptic drugs). Seizures or seizure tendency itself could disturb sleep structure and so cause significant sleep disruption (Bazil and Walczak, 1997). Unterberger et al., 2015 also found poor seizure control to be an important contributing factor towards sleep disturbances in patients with epilepsy. Previous studies have reported antiepileptic drugs (AEDs), especially first-generation AEDs, have detrimental effects on sleep structure and could be responsible for sleep disturbances (Bazil, 2003). Demographic factors such as gender may also be associated with sleep complaints in patients with epilepsy. Xu et al. (2006) found that female patients were more likely to suffer sleep disturbances than males.

Previous studies based on hospital or population samples have reported a significantly higher prevalence of psychiatric disorders in patients with epilepsy compared to those without epilepsy (Ettinger et al., 2004; Gaitatzis et al., 2004; Jacoby et al., 1996; Johnson et al., 2004; Kobau et al., 2006; Tellez-Zenteno et al., 2007). Depression and anxiety are both very common affective disorders and these studies found that the prevalence of depression and anxiety in patients were 9–33% and 11–23% respectively. Psychiatric disorders have been reported to have significant detrimental effects on sleep disturbances in the general psychiatric literature (Riemann et al., 2001; Taylor et al., 2005). Several studies have also found a close link between sleep disturbances and psychiatric co-morbidity, most notably depression and anxiety, in patients with epilepsy (de Weerd et al., 2004; Khatami et al., 2006; Xu et al., 2006). For example, Xu et al. (2006) surveyed 201 patients with partial epilepsy and demonstrated that patients with concomitant depression and anxiety presented more sleep disturbances (as measured by the Medical Outcomes Study (MOS) Sleep Scale) than those without psychiatric co-morbidity. These relationships may suggest associations attributable to affective disorders. Recently, Moser et al. (2015) surveyed 32 patients with partial epilepsy who mostly had refractory seizures and found that depressive symptoms were a significant risk factor for poor subjective sleep quality.

These studies pose several problems that are addressed in this study.

First, in addition to depression, other common psychiatric disorders, such as anxiety, may be associated with sleep disturbances in patients with epilepsy. In this study, we use the Beck Anxiety Inventory (BAI) to measure anxiety in patients with epilepsy and determine the relationship between psychiatric co-morbidity and sleep disturbances. Second, previous studies have found that depression and anxiety overlap significantly (Kanner, 2009; Kessler et al., 2003). Hence, this study uses partial correlation and hierarchical regression analysis (described later) to evaluate the independent effects of depression and anxiety on sleep disturbances. Third, although studies have reported that sleep disturbances are closely associated with affective disorders in patients with epilepsy, no reported investigation has determined the prevalence of sleep disturbances and the effect of affective symptoms on sleep disturbances in Chinese adults with epilepsy. Thus, we surveyed a number of community-based Chinese patients who visited our epilepsy clinic at The First Affiliated Hospital of the Medical University of Anhui. The aims of this study were (1) to analyze sleep disturbances in Chinese adults with epilepsy, (2) to examine the clinical features and predictors of sleep disturbances in these patients, and (3) to evaluate the impact of depressive and anxiety related symptoms on sleep disturbances.

2. Methods

2.1. Subjects

We conducted a cross-sectional survey of patient-reported subjective sleep disturbance among Chinese adults with epilepsy. The study enrolled 150 consecutive patients with epilepsy attending the epilepsy clinic at The First Affiliated Hospital of the Medical University of Anhui from July 2015 to March 2016 who met the following criteria: (a) age 18 or older, no gender restriction; (b) a confirmed diagnosis of epilepsy from a neurologist according to the criteria of the 2001 International Classification of Epilepsies and Epileptic Syndromes (ILAE)(Engel, 2001); (c) we excluded those who had mental retardation (e.g., MMSE score < 27) such that it prohibited them from completing the questionnaires and cooperating with the survey; (d) we excluded those who had cardiopulmonary, metabolic diseases such as asthma or diabetes, chronic organ failure, malignant tumors and those who had a history of brain injury; (e) we excluded those who had a history of psychiatric disorder (e.g., bipolar disorder). All eligible patients were asked to complete questionnaires (described later). We collected demographic information including age, gender, marital status and epilepsy-related information including seizure type, duration of epilepsy, currently prescribed AEDs and seizure control. We divided seizures into three groups, based on seizure control: uncontrolled epilepsy, well-controlled epilepsy and poorly controlled epilepsy (Berg et al., 2001). Uncontrolled epilepsy was regarded as failure in adequate trials of two first-line AEDs, with an average of more than one seizure per month for 18 months and no seizure-free periods longer than 3 months. Epilepsy was deemed to be well controlled when the patients were free from epileptic symptoms for the whole of the previous year. Poorly controlled epilepsy was considered to be an intermediate degree of seizure control that did not meet the criteria for uncontrolled or well-controlled epilepsy. We also recruited 100 age- and gender-matched healthy controls from hospital staff and their relatives. The healthy controls were asked to complete the same questionnaires as the patient group and to provide demographic data. The study was approved by the local Ethics Committees of the First Affiliated Hospital of the Anhui Medical University and written informed consent was gained from all study participants.

2.2. Questionnaires

2.2.1. Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a self-reported questionnaire, which assesses sleep quality and disturbances in the last month (Buysse et al., 1989). It records patients' own opinions about subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication and daytime dysfunction over the last month. The sum of scores of the above seven items generates a global PSQI score. Those with a global PSQI score of 5 and above are classified as poor sleepers. The Chinese version of the PSQI has been demonstrated to be a credible psychometric measurement of sleep quality (Tsai et al.,