Analysis of Quality of Life and Anxiety in Patients with Different Forms of Epilepsy

Sreten Vićentić, MD, MSc,1 Milutin Nenadović, MD, PhD,2 Nenad Nenadović, MD,3 and Periša Simonović, MD, MSc4

1 Department of Psychiatry, General Hospital, Sabac, Serbia
2 Special Psychiatric Hospital Laza Lazarevic, Belgrade, Serbia
3 Military Medical Academy, Belgrade, Serbia
4 Institute of Mental Health, Belgrade, Serbia

ABSTRACT

Background: Anxiety symptoms may have significant implications on the quality of life of patients with epilepsy. The aim of our research is a comparative analysis of the quality of life, i.e., of the level of disability in patients with different forms of epilepsy.

Method: In this cross-sectional study, the sample consisted of three groups of 30 patients each—recently diagnosed generalized epilepsy, temporal and extratemporal epilepsy. The anxiety level in these groups was compared with the control group of 30 healthy subjects. Beck Anxiety Inventory (BAI) was used for assessment of anxiety. Level of functional disability due to anxiety was measured according to the Sheehan Disability Scale (SDS).

Results: Patients with extratemporal epilepsy had the greatest level of functional disability, while patients with generalized epilepsies had the lowest average of scores on the Sheehan scale. The correlation between the BAI and the SDS was highly statistically significant.

Conclusions: Our results clearly indicate the need for a broader concept of therapy—neurological (antiepileptic therapy) and psychiatric (pharmaco-, psycho- and social therapy) when it comes to anxiety in patients with epilepsy.

INTRODUCTION

Anxiety symptoms, especially if they are noticeable, may have significant implications on the quality of life of patients with epilepsy, primarily because of the tendency of patients with anxiety disorders to overestimate the risks associated with situations which trigger their anxiety, but underestimate their own ability to cope with anxiety (1, 2). The consequence may be a disabling combination of anticipatory anxiety, related to seizures in unfamiliar situations, causing evasive behavior and isolation. About 20-30% of patients exhibit a specific fear of attack, i.e., phobia of epileptic seizures, while the percentage of patients who are afraid to leave their home and have anticipatory anxiety is even higher (3). A more recent study looking for psychopathology in inpatients with all types of epilepsy obtained: the 1-year prevalence of anxiety disorders was 25%, and that of mood disorders, 19% (4). However, in some secondary care and specialist settings, the prevalence of anxiety disorder may exceed 50% (5). In one large study based on diagnoses in primary care records, the rate of anxiety disorders was 11% in 5,834 people who had epilepsy, compared with 5.6% in 831,163 without epilepsy (6). Excessive anxiety undermines the purpose-serving effectiveness and is disabling to all, since it disrupts coordinated behavior and successful work efficiency (7, 8). Several intertwined factors may be responsible for the increased incidence of anxiety in patients with epilepsy. A child with epilepsy is particularly vulnerable to an attack, thus an inadequate reaction of parents and/or social environment can have adverse effects on development of personality and prevent conflict resolution (9). In the case of an epilepsy onset in young adult and adult life, fear of unexpected attacks with falls, loss of consciousness and other symptoms and limited activity because of the attack, may trigger different neurotic manifestations in patients (10). Inability to control their own body and physical functions during the attack and fear of repeated attacks increase the tendency in patients to develop anxiety-depressive conditions (11). Patients with primary panic disorder may develop nocturnal panic attacks at any time of the night; they occur in the state
of alertness, and with symptoms identical to those of daily panic attacks, while patients with ictal anxiety often describe nocturnal panic. However, in these cases, panic awakens the patient from an otherwise peaceful sleep, which certainly undermines the quality of life (12, 13). Interictal anxiety, among other things, is a consequence of psychological concerns about the primary disease and its complications. Patients often worry about the risks of possible injury due to a seizure, possible brain damage, memory impairment, prognosis of epilepsy and issues related to working ability and employment (14, 15).

The theory of a common pathophysiological mechanism of anxiety attacks and epilepsy is based on the observation that epileptic activity in certain areas of the brain directly causes paroxysmal anxiety (16, 17). The amygdala seems to be a particularly important structure for the production of anxiety symptoms and epileptic discharges in partial epilepsy. Patients with partial epilepsy and anxiety symptoms have been found to have a reduced amygdala volume (18, 19).

The main hypothesis was that patients with focal temporal epilepsy and focal extratemporal epilepsies would have worse anxiety state and worse functional state than the patients with generalized epilepsy due to the theory described above. Another hypothesis was that patients with epilepsy, with pronounced anxiety, would have a higher degree of disability and thus a poorer quality of life.

The primary aim of our research was a comparative analysis of the quality of life, i.e., the level of disability in patients with generalized epilepsies, focal temporal epilepsies and focal extratemporal epilepsies, when it comes to family life, work, social life and relationships with other people. The secondary aim was the analysis of the influence of anxiety on the quality of life in patients with epilepsy.

METHODS

The sample consisted of three groups of 30 patients each with recently diagnosed generalized epilepsy, temporal lobe epilepsy and extratemporal lobe epilepsy, from the Department of Epilepsy and Clinical Neurophysiology at the Institute of Mental Health in Belgrade, type of research being the analytical cross-sectional study. The study was approved by the local ethical committee. The anxiety level in all three groups of patients with epilepsy was compared with the level of anxiety in the control group of 30 healthy subjects. Data about the precise number of seizures prior to the study showed insufficient reliability, the patients’ answers had high levels of uncertainty. Thus, we decided not to analyze that information, although it might be a factor influencing the anxiety. The questionnaires were given out before starting with medication, in the moment of definite confirmation of diagnosis of epilepsy, because our idea was to investigate the anxiety before any influence of the therapy.

All groups consisted of patients paired by age and gender, similar social status, ages from 18 to 65. The criteria for inclusion were: 1) generalized epilepsy, 2) focal epilepsy, 3) symptomatic epilepsy, 4) remote symptomatic epilepsy, 5) idiopathic epilepsy, 6) age of patients – adults from 18 to 65 years.

The exclusion criteria were: 1) existence of major depression, schizophrenia or bipolar disorder, 2) Addison’s disease, active thyroid disease or unstable diabetes, 3) existence of intensive renal, cardiological, hepatic or gastrointestinal disease, 4) existence of intensive neurological disorders, including parkinsonism and dementia, 5) pheochromocytoma, 6) urinary retention or glaucoma, 7) alcohol or drug abuse, 8) isolated seizures of any origin, 9) epilepsy in mental insufficiency. We formed our groups according to these exclusion criteria, which also relate to the functional status of patients prior to the epilepsy diagnosis.

Beck Anxiety Inventory (BAI) (20) was used for quantitative assessment of anxiety. BAI was primarily designed to measure generalized anxiety and distinguish the symptoms of anxiety from those of depression. It consists of 21 items, and the questions are ranked on a scale from 0 - 3 (0 = no, 1 = mild, 2 = moderate, 3 = severe). The maximum score is 63. Scores 0-7 correspond to minimal anxiety, 8-15 to mild, 16-25 to moderate and 26-63 to severe anxiety. Qualitative analysis of anxiety was related to determination of presence/absence of some anxiety symptoms, based on the list of comprehensive anxiety symptoms.

Level of functional disability due to anxiety was measured according to the Sheehan Disability Scale (SDS) (21). The SDS is an instrument for assessment of functional impairment of the three domains of functioning – work / school, social life and family life. All the three domains are assessed on a scale of 1 to 10. Specifically, 1-3 signifies mild, 4-6 moderate, 7-9 severe and 10 signifies extreme impairment of abilities.

Description of the numerical characteristics in our paper was done by classical methods of descriptive statistics (mean and median, standard deviation, coefficient of variation and standard error). Relative numbers are used in all the tables. In the analysis of results depending on the nature of the variables themselves Pearson’s x2-test was used in the form of tests of agreement and contin-
gency tables for comparing the differences between the frequency of nonparametric characteristics, namely for one or two features. With numerical limitations Fisher’s exact test was applied. In order to compare the average values of the parametric features we used $t$-test for two groups of data. We used analysis of variance by Fisher in order to compare the average values of parametric features for more than two sets of data. ANOVA by Kruscal-Wallis was used as an addition to the nonparametric independent samples. When analyzing the correlation properties we applied methods of single-parametric correlation and regression, and nonparametric correlation. In all the applied analytical methods, the significance level was 0.05.

**RESULTS**
Statistical analysis of demographic variables showed that age was in the range of 18-65 years, and among the examined groups there was no statistically significant difference $[F(3; 116)] = 1.309, p = 0.275$. Analysis by gender also showed that among the examined groups there was no statistically significant difference (Chi-square $= 0.133, df = 3, p = 0.988$).

The next important area of this study was to assess the degree, i.e., the level of impairment in functioning of patients with certain types of epilepsy with the Sheehan scale. Patients with extratemporal epilepsy have the greatest level of functional disability measured by the Sheehan scale, with mean score of 9.80. Slightly lower scores were demonstrated in a group of patients with temporal epilepsy (mean 8.56), while patients with generalized epilepsies have the lowest average scores on the Sheehan scale, 3.80 (Table 1). The next level of comparison was made in relation to functional disability in certain areas of functioning, including work, social life and leisure, as well as family life and home life.

From the data in Table 2 it can be concluded that there are statistically significant differences in terms of impairment of functioning in three different areas between the three groups of patients with epilepsy. Patients with extratemporal partial epilepsy have the greatest degree of occupational functioning impairment (mean score was 4.0), significantly more than patients with temporal lobe epilepsy (mean score was 2.86) and generalized epilepsy (mean score was 1.36). These differences are highly statistically significant ($F = 6.339, p <0.01$). When it comes to social life domain and leisure activities, the patients with extratemporal and temporal lobe epilepsy have a higher degree of disability than patients with generalized epilepsy. The differences were statistically significant ($F = 4.203, p <0.05$). When it comes to family life and functioning at home the patients with temporal lobe epilepsy have the largest impairment (mean 3.0), the patients with extratemporal epilepsy have a slightly smaller one (mean 2.66), while patients with generalized epilepsy have the least expressed disability in this area of functioning (mean 0.80). The differences are highly statistically significant ($F = 5.848, p <0.01$). Two main tools used in the study were the Beck Anxiety Inventory and Sheehan Disability Scale. Comparison of the results obtained from these two scales and calculated measures of linear dependence (the Pearson correlation coefficient) showed a high degree of correlation between these two instruments, and this correlation was highly statistically significant - $p <0.01$(Table 3).

**Table 1. The level of disability based on the total scores on the Sheehan scale in some form of epilepsies**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extratemporal epilepsies</td>
<td>9.80</td>
<td>8.22</td>
<td>0.00</td>
<td>27.00</td>
</tr>
<tr>
<td></td>
<td>Temporal epilepsies</td>
<td>8.57</td>
<td>8.78</td>
<td>0.00</td>
<td>30.00</td>
</tr>
<tr>
<td></td>
<td>Generalized epilepsies</td>
<td>3.80</td>
<td>4.82</td>
<td>0.00</td>
<td>23.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.39</td>
<td>7.84</td>
<td>0.00</td>
<td>30.00</td>
</tr>
</tbody>
</table>

**Table 2. Comparison of impairment of functioning in various spheres according to the group of patients with certain type of epilepsy**

<table>
<thead>
<tr>
<th>Sheehan Scale</th>
<th>Group N Mean SD F p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work</td>
<td>1 30 1.37 2.06 6.34 0.003</td>
</tr>
<tr>
<td></td>
<td>2 30 2.87 3.18</td>
</tr>
<tr>
<td></td>
<td>3 30 4.00 3.23</td>
</tr>
<tr>
<td></td>
<td>Total 90 2.74 3.04</td>
</tr>
<tr>
<td>Social life</td>
<td>1 30 1.40 1.97 4.20 0.018</td>
</tr>
<tr>
<td></td>
<td>2 30 2.80 2.82</td>
</tr>
<tr>
<td></td>
<td>3 30 3.30 2.98</td>
</tr>
<tr>
<td></td>
<td>Total 90 2.50 2.72</td>
</tr>
<tr>
<td>Family life/</td>
<td>1 30 0.80 1.27 5.85 0.004</td>
</tr>
<tr>
<td>functioning</td>
<td>2 30 3.00 3.35</td>
</tr>
<tr>
<td>at home</td>
<td>3 30 2.67 2.96</td>
</tr>
<tr>
<td></td>
<td>Total 90 2.15 2.82</td>
</tr>
</tbody>
</table>

**DISCUSSION**
Epileptic seizures can also be predicted with psychological triggers such as stress, anxiety, anger and other...
strong emotions, as well as with various mental tasks and thoughts (22). It is known that the presence of psychiatric phenomenology is an important predictor of poorer quality of life in patients with epilepsy (23-25). Our starting idea was to investigate the degree of impairment of functioning in the patients with epilepsy and to correlate these findings with the present anxiety symptoms. The Sheehan Disability Scale was used for these purposes, which is a very reliable instrument for measuring degrees of impairment of abilities in a wide range of disorders.

The analysis of the results obtained by the Sheehan Disability Scale showed that patients with extratemporal focal epilepsy and with temporal lobe epilepsy have greater functional deficits than the patients with generalized epilepsies (Tables 1, 2 and 3). In particular, patients with extratemporal epilepsy have the greatest level of functional disability measured by the Sheehan scale, with the mean score of 9.80. A group of patients with temporal epilepsy had slightly lower scores (mean 8.56), while patients with generalized epilepsies have the lowest average of scores on the Sheehan scale, i.e., 3.80. The patients with extratemporal epilepsy have the most noticeable impairments in the field of professional activities and social life, while patients with temporal lobe epilepsy have a maximum of functional interference in family functioning and home chores. Since the patients with partial epilepsies also have more pronounced general anxiety, as well as frequent and intense anxiety symptoms, it becomes clear that the share of the phenomenology of anxiety is very important in the impairment of the functioning of patients and in deteriorating the quality of life in patients with epilepsy.

Finally, high and significant correlation was found between the results obtained by the Beck Inventory and the Sheehan Scale further confirming the starting point that anxiety symptoms significantly disturb the functional ability of people with epilepsy in all the three observed domains (work, social life, family life). Anxiety and depression are significant predictors of impairment of the quality of life in patients with epilepsy (26, 27). An important factor associated with anxiety and depression is certainly the experience of stigma in these patients, especially younger ones (28-32).

To the best of our knowledge, this is the first study which analyzes anxiety in different forms of epilepsy by simultaneously using the Beck Anxiety Inventory and the Sheehan Disability Scale. As for the relation between extratemporal epilepsy, quality of life and anxiety, data in the literature are somewhat scarce. One of the possible contributions of our study lies in the results which indicate that the difference in the degree of impairment of occupational functioning in the patients with extratemporal epilepsy is highly statistically significant, in comparison to the patients with temporal and generalized epilepsy. Also, a high statistical significance was found in the variable which measures family life and functioning at home – the patients with generalized epilepsy had minimum disability in this area of functioning. Possible explanations for these values and differences in extratemporal and generalized epilepsies could be based on the fact that anxiety is not only a feature of temporal lobe seizures with involvement of the amygdala, but is also associated with seizures arising in the anterior cingulate or orbitofrontal cortex or other limbic structures (19). The involvement of the amygdala, according to the theory referred to in the Introduction, seems to be more important in the production of anxiety symptoms for partial, than generalized epilepsies.

Some limitations of the present study should be noted. The sample size was relatively small, due to short period of monitoring. We plan to undertake a large, nation-wide study, which would be designed according to experiences of the present research, but with a "follow up" instead of a cross-sectional design. In that study we also intend to measure the depression level, by means of the Beck Depression Inventory, since depression might be at least one of the reasons (except for anxiety) for the functional disability.

Several recent studies have attempted to examine the relative contribution of anxiety symptoms to reduced health-related quality of life in patients with epilepsy. In a study from South Korea, anxiety was the most significant predictor of reduced health-related quality of life, explaining 27% of the variance compared with 12% for depression (33). These findings, beside the small sample sizes, influenced us to investigate only the anxiety level in the present study.

With reference to the significant degree of anxiety in patients with temporal and extratemporal epilepsy, and considering the significant impact of anxiety on impairment of quality of life, which this research clearly shows,
it is important to determine the therapeutic approach to this problem. Antiepileptic therapy in itself would not be able to sufficiently resolve anxiety symptoms or functional deficits in these individuals. Therefore, it would be useful to add some options for anxiety and anxiety disorders treatment, which are primarily selective serotonin reuptake inhibitors – SSRI, however they may exacerbate seizures (34). In some cases, benzodiazepine anxiolytics would be used, especially in shorter therapies. It is also important to offer psychotherapy, particularly cognitive-behavioral therapy (35). Certain cognitive activities, such as performing certain mental tasks, driving or specific emotions can provoke epileptic seizures through activation of specific groups of neurons around the epileptic focus. Therapeutic countermeasures which are designed to stop the seizure activity as quickly as possible, after the registration of the attack, prevent the attack from fully developing (36). Cognitive-behavioral therapy that could be used in patients with epilepsy should primarily involve interventions that teach patients to identify such stress and control it thereby reducing the effects of stress as a potential trigger for epileptic seizures (37). Also, cognitive-behavioral strategies for “stress management” may be potentially effective in improving control of the seizures (38-40).

**CONCLUSION**

The degree of impairment of functioning was higher in patients with partial extratemporal and temporal lobe epilepsy than in those with generalized epilepsy. The differences were highly statistically significant. Also, there was a highly significant statistical correlation between the Beck Anxiety Inventory and the Sheehan Disability Scale, clearly showing the important influence of anxiety on the functional ability and quality of life in patients with epilepsy. The results of this study indicate the need for a broader concept of therapy – neurological (antiepileptic therapy) and psychiatric (pharmaco-, psycho- and social therapy) when it comes to anxiety in patients with epilepsy, i.e., an integrative approach to this problem.

**References**