

# Comorbidity of epilepsy and depression in adolescents

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## Abstract

**Objective:** Despite the availability of literary data on the comorbidity of epilepsy and depression, in adolescents this problem is almost not developed.

**Materials and Methods:** The aim: to study the comorbidity of epilepsy and depression in children. The study included 31 patients with epilepsy. The severity of depression was studied by using the Hamilton scale and ICD-10.

**Results:** Depression of varying severity was detected in 51,62 % of the examined patients 13 cases of mild, 2 moderate and 1 case of severe depression without psychotic symptoms.

**Conclusion:** In children with epilepsy, there is a high incidence of comorbidity of epilepsy and depression.

## Introduction

Epidemiological studies show that epilepsy is one of the most common neurological diseases with certain mental disorders. Around 50 million people worldwide have epilepsy, making it one of the most common neurological diseases globally. Recurrent seizures are associated with a number of harmful effects. Seizure-related deaths can account for up to 40% of all deaths in patients with chronic epilepsy. The rate of sudden death, which accounts for 7-17% of deaths among patients with epilepsy, is estimated to be 27 times higher in patients with seizures than those who do not have seizures [1]. The incidence of epilepsy in the European countries and the United States is about 40-70 cases per 100,000 population, while in developing countries the incidence is much higher. It is interesting that the incidence of epilepsy in men, especially in old and senile age, is higher than that of women [2].

In medicine, it has long been known that people suffering from epilepsy, in addition to having seizures, also find other symptoms. Around 400 BC, Hippocrates observed that "melancholy usually becomes epileptics and epileptics become melancholic" [3,4].

Some authors indicates that depression deserves special attention due to its high frequency (10-30% of patients) and the risk of suicide occurring among epileptic patients is much more frequent than the average among population [5,6]. Further, the author believes that in addition to changes in the mood as a result of primary epileptic brain dysfunction, negative social stigmatization plays an important role in the development of depression, which leads to restrictions on education, occupation, social contacts, spending of free time.

According to various authors, depressive disorder in epilepsy occurs from 22% to 58% of patients [7]. In addition, the relationship between epilepsy and depression in the literature, the treatment of combined pathology, molecular basis etc. [8-10].

## Materials and methods

Epilepsy is one of the most common neuropsychiatric diseases. In the adapted version of the ICD-10 revision (put in place by order No. 170 of the Ministry of Health of the Russian Federation of May 27, 1997) in class VI, diseases of the nervous system-disorders related to epilepsy are provided for only 15 headings (G40 Epilepsy-G40.0- G40.9; G41 Epileptic status - G41.0- G41.9). In class V, mental and behavioral disorders associated with epilepsy are treated in a 17 rubric. In other words, the number of mental and behavioral disorders associated with epilepsy is greater than that of neurological. Therefore, we consider it expedient to consider epilepsy as a neuropsychic disorder.

We examined 31 patients with G40.3 Generalized idiopathic epilepsy G 40.0 Focal epilepsy. Patients were examined in the interictal period

Patients were observed at the Children's neurological hospital of the Main Health Department of the city of Baku, Azerbaijan from January 2018 to February 2019. Patients are randomized as they go to the children's neurological hospital. Clinical characteristics of enrolled children was shown in the Table 1.

## Results

Results of this study were presented in the Table 2.

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**Table 1.** Clinical characteristics of enrolled children

Clinical characteristics	Total n = 31
Age at test (years) mean±m	14,0 ± 0,28
Gender n (%)	
male	25 (81 %)
female	6 (19 %)
Epilepsy type	
G40.3 Generalized idiopathic epilepsy	19 (62 %)
G 40.0 Focal epilepsy	12 (38 %)

**Table 2.** Results of this study

Indicators	Total n = 31
The Hamilton scale in points	
Norm 0-7	15(49%)
Depression of varying severity:	16(51%)
Mild moderate severe depression without psychotic symptoms	13(42%) 2(7%) 1(4%)
Diagnosis of depression in ICD-10	Depressive episodes (F32.0-32.2)
Epilepsy type and Depression	
Depression in Generalized idiopathic epilepsy G40.	10 (62%)
Depression in Focal epilepsy G 40.0	6 (38%)

As can be seen from Table 2, Depression of varying severity was detected in 51,62 % of the examined patients 13 cases of mild, 2 moderate and 1 case of severe depression without psychotic symptoms. Depression in Generalized idiopathic epilepsy about two times more common than in Focal epilepsy.

The data obtained by us in connection with a small number of patients and a short period of observation should be considered preliminary. The next stage of the work will be carried out on a large number of patients and longer duration of observation. Contrary to generally accepted norms, in boys with epilepsy, depression is more common than for girls.

## Discussion

From literature it is known that among people with epilepsy, depression is extremely common and is associated with intense personal suffering and a sharp decline in the quality of life [11]. According to other systematic review, 23.1% of people with epilepsy suffer from depression during the past year, compared with 6.6% in the general population [12,13]. The lifetime prevalence of depression is estimated to be 30–35% among people with epilepsy, compared with 16.2% in the general population [3,14].

The results study of Swinkels, *et al.* [15] show a higher prevalence of mood and anxiety disorders in patients with epilepsy, compared with the general population. They found that the subgroup of temporal lobe epilepsy patients, in particular, suffer from these disorders. But they cannot exclude that some methodological shortcomings in their design may have obscured more pronounced differences between the TLE and extra-TLE subgroups [15].

In TLE affective disorders are important comorbidities, primarily due to suicidal potential in all its forms, including gestures, thoughts, or successful attempts, which range from 10% to 15% in patients versus 1–1.5% in the general population [16].

According some literature data the prevalence of depression occurs 5 times more often in patients with controlled seizures and 10 times in

patients with uncontrolled. It is not known whether depression in these patients can be considered primarily as part of the primary pathology of the central nervous system or as a clear response to an epileptic disorder with all the difficulties of daily coping [17].

It is believed that the biological factors include hypometabolism in extratemporal regions, hippocampal dysfunction or atrophy, and 5-HT1A-receptor-binding abnormality among other factors [18]. As Canner noted, the presence of a psychiatric disease, in particular depression can be associated with additional difficulties in controlling seizures, which makes this form of TLE more resistant to treatment [19].

In his review article, Kanner lists the following general pathogenetic mechanisms of depression and epilepsy listed the following pathogenetic mechanisms shared by depression and epilepsy [20]:

- Abnormal CNS activity of several neurotransmitters, particularly serotonin (5-hydroxytryptamine, 5-HT), norepinephrine, dopamine, GABA, and glutamate.
- Structural changes, presenting as atrophy of temporal- and frontal-lobe structures (identified by high-resolution MRI and volumetric measurements), in the amygdala, hippocampus, entorhinal cortex, temporal lateral neocortex, as well as in the prefrontal, orbito-frontal, and mesial-frontal cortex, and to a lesser degree, of the thalamic nuclei and basal ganglia.
- Functional abnormalities (identified by positron emission tomography [PET] and single-photon emission computed tomography [SPECT]) in temporal and frontal lobes, consisting of decreased 5-HT1A binding in the mesial structures, raphe nuclei, thalamus, and cingulate gyrus.
- Abnormal function of the hypothalamic–pituitary–adrenal axis

Kanner and co-authors [21] write: “In summary, the data presented here suggest the negative impact of depressive disorders on the course and response to treatment of seizure disorders. We propose several hypotheses to explain this phenomenon. Contrary to old beliefs, the relatively high comorbidity between depression and epilepsy is not only the expression of a reactive process whereby patients face multiple obstacles associated with a life with seizures. The data presented in this review strongly suggest the existence of common neurobiologic pathogenetic mechanisms that may play a pivotal role in the high comorbidity of these two conditions. The impact of these pathogenetic mechanisms is not limited to high comorbidities but can play a major role in the worst case scenario and can respond to the pharmacological and surgical treatment of convulsive disorders in patients with seizure to lifelong depression. Whether early recognition and treatment of depressive disorders would change the impact on the higher risks that patients with depression have of developing epilepsy and on their response to therapy remains to be established”.

The lack of treatment and detection of depressive disorders in people with epilepsy has serious consequences at several levels:

1. Increased suicide risk. Depression in patients with epilepsy is associated with a significantly higher suicide rate than in the general population.
2. Negative impact on quality of life. Pharmacoresistant epilepsy showed that depression is the most powerful predictor of a decrease in the quality of life associated with health.
3. The impact on the cost and use of medical services. Depression in people with epilepsy significantly increases the health costs

associated with treating convulsive disorders. The presence and severity of depression were predictors of lower rates of disability, regardless of the duration of the convulsive disorder.

The limitation of our work: 1) a small number of patients; 2) a short time observation.

Thus, for a group of examined patients with epilepsy in more than half of cases, depression is characterized to a certain degree of severity. The study of comorbidity of epilepsy and depression is of great theoretical and practical importance. First, it will contribute to the early detection of depression. Second, prevent suicides. Third, it will help reduce refractory epilepsy. Finally, improve their quality of life for patients with epilepsy.

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## Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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