

## The Relation of Epilepsy Type with Depression and Anxiety in Children

### Çocukluk Çağı Epilepsileri ile Depresyon ve Anksiyete İlişkisi

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#### ABSTRACT

**Objective:** The aim of the current study was to determine affective disorders (anxiety and depression) in children with epilepsy and assess the role of epilepsy type.

**Methods:** The study included 56 children with idiopathic generalized epilepsy (26 girls, 30 boys, aged 6-16), 47 children with self-limited focal epilepsy (22 girls, 25 boys, aged 6-16) and 78 healthy age-, gender-, and education matched children (31 girls, 47 boys). Seizure type, seizure frequency, and duration of epilepsy were recorded. All participants completed extensive baseline neuropsychological questionnaires that included Kovac Children's Depression Inventory (CDI) and the State-Trait Anxiety Inventory for Children (STAIC).

**Results:** Children with idiopathic generalized epilepsy had higher depression, state and trait anxiety scores than healthy controls (depression scores: 9.07±7.01 vs 5.20±2.72, p=0.024, state anxiety scores: 37.53±9.34 vs 31.30±6.40, p=0.014, trait anxiety scores: 37.78±9.71 vs 33.23±5.67, p=0.032). Depression, state and trait anxiety scores were significantly higher in children with self-limited focal epilepsy than healthy controls (depression scores: 8.06±4.93 vs 5.20±2.72, p=0.028, state anxiety scores: 37.91±8.21 vs 31.30±5.67, p=0.009, trait anxiety scores: 36.74±9.703 vs 33.23±5.67, p=0.045). We found no significant differences in depression or anxiety scores between idiopathic generalized epilepsy and self-limited focal epilepsy groups. No correlation was found between seizure frequency and scale scores.

**Conclusion:** Our findings bring attention to the increased risks of affective disturbance in pediatric epilepsy. The presence of depression and anxiety in children with epilepsy had no association with epilepsy type and seizure frequency. Therefore, we did not identify epilepsy type as a predictor factor of affective disturbance.

**Keywords:** Comorbidity; depression; anxiety; childhood; epilepsy

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#### ÖZET

**Amaç:** Bu çalışmanın amacı epilepsili çocuklarda duyu durum bozukluklarının (anksiyete ve depresyon) sıklığının belirlenmesi ve duyu durum bozuklukları ile epilepsi türü ve nöbet sıklığı arasındaki ilişkiyi değerlendirmektir.

**Yöntem:** Çalışmaya en az 1 yıldır izlemde olan idiyopatik jeneralize epilepsili 56 hasta (26 kız, 30 erkek, 6-16 yaş) ve çocukluk çağı benign fokal epilepsili 47 hasta (22 kız, 25 erkek, 6-16 yaş) ile 78 sağlıklı yaş, cinsiyet ve eğitim durumları benzer olan çocuk (31 kız, 47 erkek) alındı. Nöbet tipi, nöbet sıklığı ve epilepsi süreleri kaydedildi. Tüm katılımcılar, Kovac Çocuklar için Depresyon Envanteri (CDI) ve Çocuklar İçin Durumluluk ve Süreklilik anksiyete Envanteri (STAIC) içeren kapsamlı temel nöropsikolojik anketleri doldurdu.

**Bulgular:** İdiyopatik jeneralize epilepsili çocukların depresyon, durumluluk ve süreklilik kaygı puanları istatistiksel olarak sağlıklı kontrollerden daha yüksekti (9.07±7.01 vs 5.20±2.72, p=0.024 37.53±9.34 vs 31.3±6.4, p=0.014, 37.78±9.71 vs 33.23±5.67, p=0.032). Depresyon, durumluluk ve süreklilik anksiyete puanları, çocukluk çağı benign fokal epilepsili çocuklarda sağlıklı kontrollere göre anlamlı derecede yüksekti (8.06±4.93 vs 5.20±2.72, p=0.028, 37.91±8.21 vs 31.30±5.67, p=0.009, 36.74±9.703 vs 33.23±5.67, p=0.045). İdiyopatik jeneralize epilepsi ile çocukluk çağı benign fokal epilepsi grupları arasında depresyon ve anksiyete puanları arasında anlamlı bir fark bulunmadı. Nöbet sıklığı ile ölçek puanları arasında da ilişki saptanmadı.

**Sonuç:** Bulgularımız çocukluk çağı epilepsisinde depresyon ve anksiyete risklerinin epilepsi türünden ve nöbet sıklığından bağımsız olarak arttığına dikkat çekmektedir.

**Anahtar Sözcükler:** Komorbidite, depresyon, anksiyete, çocukluk çağı, epilepsy

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## INTRODUCTION

Childhood epilepsy is highly associated with poor outcomes in psychological, social, emotional and/or cognitive conditions (1). The strongest predictors of decreased quality of life in pediatric epilepsy are often psychiatric disorders particularly depression and anxiety (2, 3). Growing literature has documented that children with epilepsy have higher rates of affective disorders and suicidal attempts than general child population (4). There is a prevalence of these neuropsychological comorbidities in 20-60% of children with epilepsy. Some studies focused on the prevalence of these affective problems while others evaluated their relationship with epilepsy characteristics or with health-related quality of life of the patients and/or their families. Neuropsychological comorbidities in epilepsy are associated with epilepsy subgroup, age of seizure onset, seizure type and frequency, administration of antiepileptic drugs. Increase in suicide rate in patients with epilepsy and depression as compared to general population is a well-documented fact. Understanding and identifying these neuropsychological comorbidities provide early intervention and improvement of developmental outcome and quality of life.

The aim of the current study was to investigate the neuropsychological comorbidities (anxiety and depression) in children with epilepsy and to assess the role of demographic and clinical variables.

## METHODS

We conducted a study of children aged between 6-16 years, admitted at the Gazi University School of Medicine, Department of Pediatric Neurology outpatient clinic between September 2014 and December 2016. Children were excluded if they had another central nervous system abnormalities or chronic disease, under 80 intelligence units from Wechsler Children's Intelligence Scale (WISC-R). The study was approved by Ethics committee. Informed consent/assent was obtained from the parents and the child. Study inclusion criteria for each subject were a diagnosis of idiopathic generalized epilepsy or self-limited focal epilepsy according to the original classification of Epileptic Seizures of the International League against Epilepsy criteria (5) and were followed up for at least 6 months. Seizure type and seizure frequency were recorded. Patients were all treated with only one antiepileptic drug. Healthy children were recruited from local elementary and middle schools. Informed consent/assent was obtained from the parents and the child.

### Procedures

**Psychological evaluation:** Patients and the control group underwent an assessment of intellectual functioning using WISC-R. All participants completed extensive baseline neuropsychological questionnaires that included Kovac Children's Depression Inventory (CDI) and the State-Trait Anxiety Inventory for Children (STAIC).

**Kovac Children's Depression Inventory (CDI):** CDI was designed by Kovacs (1980) for 7 to 17 year-old children and adolescents. It consists of 27 items and each item is scored 0,1, or 2. It quantifies a range of depressive symptoms including dysphoric mood, hedonic capacity, vegetative symptoms, self-deprecation, and inter-personal behaviors'. Total score ranges from 0 to 54. The cutoff scores of 13-19 are suggested as a screening tool for detecting depressive disorders in children and adolescents.

**State-Trait Anxiety Scale for Children (STAIC):** STAIC is a 20-item self-report rating scale for measuring state and trait anxiety. The State Anxiety scale monitors people how they feel right now, and increases in response to situational stress and declines under relaxed conditions. The Trait anxiety scale asks people to describe how they generally feel, and reflects relatively stable individual differences in anxiety proneness that are impervious to situational stress. The items are rated on a scale of 1-4. Total scores range from 20 to 80.

### Statistical analysis

Analyses were conducted using SPSS 20.0 (SPSS Inc. Chicago, IL, USA). One-way analysis (ANOVA) was used for the comparison of continuous variables, t-test and correlation analysis were used for independent groups, and chi-square analysis was used for comparison of categorical variables. A value of  $p < 0.05$  was considered statistically significant.

## RESULTS

The study included 56 children with idiopathic generalized epilepsy (26 girls, 30 boys, 12.05  $\pm$  2.9 years, aged 6-16) and 47 children with self-limited focal epilepsy (22 girls, 25 boys, 11.31  $\pm$  3.03 years, aged 6-16). The control group consisted of 78 healthy age-, gender-, and education matched children (31 girls, 47 boys) aged varied between 6-16. There were no statistically significant differences in age and gender between the groups ( $p > 0.05$ ). Table 1 describes the demographic and clinical characteristics of the patients and control group.

Children with idiopathic generalized epilepsy had higher depression, state and trait anxiety scores than healthy controls (depression scores: 9.07  $\pm$  7.01 vs 5.20  $\pm$  2.72,  $p = 0.024$ , state anxiety scores: 37.53  $\pm$  9.34 vs 31.30  $\pm$  6.40,  $p = 0.014$ , trait anxiety scores: 37.78  $\pm$  9.71 vs 33.23  $\pm$  5.67,  $p = 0.032$ ). Depression, state and trait anxiety scores were significantly higher in children with self-limited focal epilepsy than healthy controls (depression scores: 8.06  $\pm$  4.93 vs 5.20  $\pm$  2.72,  $p = 0.028$ , state anxiety scores: 37.91  $\pm$  8.21 vs 31.30  $\pm$  5.67,  $p = 0.009$ , trait anxiety scores: 36.74  $\pm$  9.703 vs 33.23  $\pm$  5.67,  $p = 0.045$ ). We found no significant differences in depression or anxiety scores between idiopathic generalized epilepsy and self-limited focal epilepsy groups. No correlation was found between seizure frequency and scale scores.

**Table 1.** Demographic and clinical characteristics of study groups

Groups		Idiopathic generalized epilepsy	Self-limited focal epilepsy	Healthy controls
	n	56	47	78
Gender	Female	26 (46.4%)	22 (46.8%)	31 (39.7%)
	Male	30 (53.6%)	25 (53.2%)	47 (60.3%)
Seizure frequency (per year)	None	31 (55.4%)	21 (45.7%)	-
	<5	18 (32.1%)	17 (36.2%)	-
	5-10	5 (8.9%)	7 (14.9%)	-
	>10	2 (3.6%)	2 (4.3%)	-

## DISCUSSION

Early identification of affective disorders is important for optimizing quality of life in children with epilepsy. The findings of the present study add to the growing literature that children with epilepsy had increased risk of depression and anxiety. Affective disorders are not only pertinent to treatment-refractory patients but are also relevant in less severe epilepsy. The advantage of our study is its ability to allow determination of a specific epilepsy type that can be used to guide treatment where a dimensional measure fails to specify a diagnosis. Caplan et al. reported that depression is more frequent in children with complex partial epilepsy and anxiety disorders are more frequent in children with generalized epilepsy (6).

Thome-Souza et al. evaluated 55 children with epilepsy and showed that children with focal seizures were found to have higher risk of attention deficit and hyperactivity disorder and depression compared with children with generalized seizures (7).

Ott et al. found no relationship between seizure type and the presence of internalizing psychopathology (8). Other studies also reported any significant relationship between scales scores and seizure type in children with epilepsy (9, 10).

In our study, children with idiopathic generalized epilepsy and self-limited focal epilepsy were found to have higher depression scores than those with healthy controls. Scores on the anxiety subscale and the frequency of both affective disorders were also higher in the idiopathic generalized epilepsy and self-limited focal epilepsy group than healthy controls. However, the differences between epilepsy groups were not statistically significant.

Therefore, we did not identify seizure type as a predictor of mood disorders. The major advantages of the present study were the sample size and inclusion of specific epilepsy types. The sample size selected for our study was adequate and larger in comparison to previous studies recording the prevalence of epilepsy using categorical measures.

We also examined the correlation between seizure frequency disease and scale scores. Seizure frequency was not found to be correlated with affective disorders. Similarly, Connolly et al. found duration of epilepsy and seizure severity were not correlated with the quality of life of children with benign rolandic epilepsy. Ettinger et al. and Baki et al. did not find any significant correlation between number of seizures and anxiety and depression scores (11-13). However, most studies have suggested that affective disturbances are associated with seizure frequency (10, 14-16). The present findings demonstrate that there is no correlation between affective disturbances and seizure frequency.

A number of studies suggested that suicidal ideation and attempts dramatically more likely to be seen in children with epilepsy than the general pediatric population (17). In our study, children with epilepsy were not found an increased risk of suicidal ideation.

The lack of longitudinal investigation was the weakness of this study. It is previously emphasized by related literature that many antiepileptic drugs correlated with occurrence of behavioral alterations included depression and anxiety (18). On the other hand antiepileptic drugs' effects on behavioral alterations could not be analyzed. Furthermore, we examined only the risk factors for anxiety and depressive disorders.

## CONCLUSION

There are a number of major clinical implications of our study. Our findings bring attention to the increased risks of affective disturbance in pediatric epilepsy. Thanks to identify these patients early, there is the potential to design targeted interventions that may improve functioning and maximize clinical outcomes in these patients. The presence of depression and anxiety in children with epilepsy has no considerable challenges to epilepsy type and seizure frequency. Therefore, we did not identify epilepsy type as a predictor factor of affective disturbance.

## Conflict of interest

No conflict of interest was declared by the authors.

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