A Comparative Study Inattentiveness, Hyperactivity, Impulsivity, Self-Esteem, Depressive Symptomatology, and Behavioral Problems in Epileptic Children*

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SUMMARY:
A COMPARATIVE STUDY: INATTENTIVENESS, HYPERACTIVITY, IMPULSIVITY, SELF-ESTEEM, DEPRESSIVE SYMPTOMATOLOGY, AND BEHAVIORAL PROBLEMS IN EPILEPTIC CHILDREN

Objective: In this study, we aimed to compare epileptic children with healthy controls to investigate rates of inattentiveness, hyperactivity, impulsivity, self-esteem, depressive symptomatology, and behavioral problems. The effects of sex, medication and EEG findings on symptomatology were also investigated. **Method:** Forty epileptic children (mean ± SD age 11.78 ± 1.76, range 7-13) and 40 healthy control of the same age, were included in the study. Inattentiveness, hyperactivity, impulsivity, and behavioral problems were evaluated with the Child and Adolescent Behavior Problems Rating Scale. The Children's Depression Inventory (parent and children form) and the Piers-Harris Self-Concept Scale were used for evaluating depressive symptomatology and self-esteem. **Results:** The epileptic children had significantly higher scores than non-epileptic children on all measures, except conduct disorder and self-esteem scores. Epileptic girls had higher self-esteem scores than epileptic boys ($p<.05$). Epileptic and non-epileptic girls were different from each others in some factor scores, but most of the scores of epileptic boys had significantly higher scores than their non-epileptic counterparts. Self-esteem scores treated with CBZ were significantly higher than VPA ($p<.05$). No factors' scores have been found significantly different between children who have tonic-clonic seizures and complex partial seizures. **Conclussions:** We concluded that our findings indicate epileptic children have more psychological problems than healthy children.

Key words: *childhood, epilepsy, psychopathology*

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ÖZET:
EPİLEPTİK ÇOCUKLARDA DİKKAT EKSİKLİĞİ HİPERAKTİVİTE BOZUKLUĞU, DAVRANIM BOZUKLUĞU, DEPRESİF BELİRTİLER VE KENDİLİK SAYGISININ ARAŞTIRILMASI

Amaç: Bu çalışmada epileptik çocuklardaki dikkatsizlik, aşırı hareketlilik, dürtüsellik, kendilik saygısı, depresif belirtiler ve davranış sorunlarının sağlıklı kontroller ile karşılaştırılması amaçlandı. Bu belirtilerin sıklığı ve şiddeti üzerine cinsiyetin, ilaç tedavisinin ve nöbet tiplerinin etkileri de incelendi. **Yöntem:** 40 epileptik çocuk (ort ± SS yaş 11.78 ± 1.76, aralık 7-13) ile yaş olarak eşleştirilmiş 40 sağlıklı kontrol çalışmaya alındı. Dikkatsizlik, aşırı hareketlilik, dürtüsellik ve davranış sorunları Çocuk ve Ergen Davranış Bozuklukları Belirti ve Sınıflandırma Ölçeği ile değerlendirildi. Depresif belirtilerin ve benlik saygısının değerlendirilmesinde Çocukluk Depresyon Ölçeği (çocuk ve anne-baba formu) ve Piers-Harris Öz Kavramı Ölçeği kullanıldı. **Bulgular:** Davranım bozukluğu ve kendilik saygısı hariç, bütün ölçümlerde epileptik çocuklar nonepileptiklere oranla anlamlı derecede yüksek puan aldılar. Epileptik kızlar daha yüksek kendilik saygısı puanlarına sahipti ($p<.05$). Epileptik kızlar ile nonepileptik kızlar karşılaştırıldığında ölçek puanları arasında bazı faktörlerde farklılık olmasına karşın, epileptik erkeklerde çoğu ölçek puanları nonepileptik erkeklere oranla anlamlı derecede daha yüksek bulundu. Kendilik saygısı puanları karbamazepin alanlarda anlamlı derecede daha yüksek olarak saptandı ($p<.05$). Kompleks parsiyel nöbet tipi ile tonik-klonik nöbet tipi arasında farklılık bulunmadı. **Tartışma:** Sonuç olarak bulgularımız, epileptik çocukların sağlıklı çocuklara oranla daha fazla psikolojik sorunlara sahip olduğunu göstermektedir.

Anahtar sözcükler: *çocukluk, epilepsi, psikopatoloji*

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INTRODUCTION

Epilepsy is defined as a chronic disorder that is a randomly reccurring symptom complex resulting from an episodic disturbance of the central nervous system function, associated with an excessive, self-limited, neuronal discharge. Epilepsy is one of the most common chronic medical problems in childhood (1).

Despite advances in diagnosis and treatment in epilepsy, many children with epilepsy have poorly functioning with an excessive incidence of psychosocial difficulties, cognitive disturbances, and behavioral problems (2, 3).

Many researchers suggest that boys and girls in the normal school population aged around 7 or 12 years who suffer from epilepsy are more likely to have cognitive deficits, inattention, hyperactivity, be-

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havioral problems, and depressive symptomatology than nonepileptic children (4-8). In addition, epileptic children have lower self-esteem than the healthy controls (9).

Problems mentioned above are influenced by many factors including sex, type of epilepsy, drug treatment, and other factors (social stigma, stressful life events, negative family attitudues, etc.) (10-13).

We hypothesized that epileptic children have more behavior problems, hyperactivity, attention deficits, emotional problems, and poor self-esteem than healthy subjects, despite adequate seizure control. In additon, these problems may be affected by many factors. The purpose of this study was to show the increase of the risk of these psychiatric and psychological problems in epileptic children. In addition, we aimed to detect the factors (sex, type of epilepsy, drug treatment) which may possibly influence these kind of risks.

SUBJECTS AND METHOD

1. The patient group: Outpatient children who with a diagnosis of epilepsy and who were being followed up in the Gülhane Military Medical Academy, Department of Child Neurology, between January and July 1997, were included in the study. The study group consisted of 40 children (20 boys, 20 girls), aged 7-13, who had been followed up for at least one year and who had being using antiepileptic drugs during this period. Subjects were excluded if they were mentally retarded, had any pervasive developmental disorders, psychosis, or manifest motor or sensory handicaps like cerebral palsy, genetic disorders, and cerebral lesions. The sociodemographic features, the age of onset of epilepsy, the duration of follow-up, the type and the frequency of the seizures, the usage of drugs, compliance, and associated diseases were detected from the chart review for each subject. EEG records were assessed by a neurologist.

2. The control group: Forty children who were referred for the common cold symptoms consisted the control group. None of the children had any psychiatric disorder or chronic illness, and they were matched with the children in the study group according to age and sex. All parents in each group gave informed consent.

1. Tests given to the parents: The parents in both groups were asked to fill up the Child and Adolescent Behavior Problems Rating Scale (14), and the Children's Depression Inventory, the parent form (15).

The Child and Adolescent Behavior Problems Rating Scale has three subscales to inquire about attention deficit hyperactivity syndrome (ADHD), oppositional defiant disorder (OPD), and conduct disorder (CD), respectively. These subscales have 41 items which include 9 inattention items, 6 hyperactivity items, 3 impulsivity items, 8 items related with OPD, and 15 items related with CD.

Children's Depression Inventory, parent form, is a parent report made up from 27 items. The parents were asked to check the statement which seemed most appropriate to their children's conditions during the last 2 weeks.

2. Tests given to the children: All children in the study and control group were asked to fill up the Children's Depression Inventory, the child form (15), and Piers-Harris Self-concept Scale (16).

Children's Depression Inventory, child form, is a child report made up from 27 items. The children were asked to point out the statement which seemed most appropriate to their conditions during the last 2 weeks.

Piers-Harris Self-concept Scale is a self report made up from 80 items to measure self-esteem.

Scores on the various scales and tests were analysed statistically by Student-t test and Mann-Whitney U test by using the SPSS for Windows 6.1.

RESULTS

The mean age of the epileptic group was 11.78 years (SD=1.76, range 7 to 13); 20 were boys and 20 were girls. There were 18 (45%) complex partial seizures, 13 (32.5%) generalized tonic-clonic seizures, and 9 (22.5%) other type of seizures (rolandic, occipital etc.). Eleven (27.5%) of the 40 epileptic children were using valproic acid (VPA) and the rest of them (72.5%) were using carbamazepine (CBZ) as therapy. The characteristics of the study group was given on Table 1.

When the scales of the epileptic children were compared with non-epileptic children, except the

scores of conduct disorder and self esteem, the epileptic children had significantly worse scores than controls on all measures. Depression reported by parents and total ADHD scores were statistically more significant (P<.01) Table 2.

When the scales of the epileptic boys were compared with the epileptic girls, except for the scores of self-esteem, epileptic boys had worse scores than epileptic girls on all measures. The epileptic girls had significantly higher self-esteem scores than the epileptic boys (P<0.05) (Table 3).

When the scales of non-epileptic boys were compared with non-epileptic girls, no difference in any of the measures was found (Table 4).

The difference between the epileptic and non-epileptic girls was not significant in any of the measures, except inattentiveness, total ADHD, and depressive scores reported by parents (Table 5).

The epileptic boys had significantly higher scores than their non-epileptic counterparts on all measures, except ODD scores (Table 6).

Children treated with VPA had higher scores in all measures compared with those on CBZ, but there were no significant differences between the drug groups except self esteem scores. Children treated with CBZ had significantly higher self-esteem score than the VPA group (P<0.05) (Table 7).

No differences in any of the measures were found between the children with complex partial and those with generalized tonic-clonic seizures (Table 8).

CONCLUSION

Table 1. The characteristics of the study group

Age (mean ± SD, year)	11.78 ± 1.76
Sex	
Boy	20
Girl	20
Type of seizures	
Generalized tonic-clonic	13 (%32.5)
Complex partial	18 (%45)
Others	9 (%22.5)
Antiepileptic drugs	
Valproic acid	11 (%27.5)
Carbamazepine29 (%72.5)	
The duration of medication (year) (mean ± SD)	2.88 ± 2.64

Table 2. The comparison of mean scores of epileptic children with non-epileptic children on all measures

Factors	Epileptic group (n=40)	Control group (n=40)	P
ADHD Subscales			
Inattentiveness	7.40 ± 5.55	3.53 ± 3.99	0.001**
Hyperactivity	3.93 ± 3.30	2.00 ± 3.04	0.008**
Impulsivity	2.98 ± 2.21	1.73 ± 2.26	0.015*
Total	14.28 ± 8.94	7.25 ± 7.40	0.0001**
Oppositional defiant disorder	7.90 ± 4.85	5.45 ± 4.38	0.02*
Conduct disorder	1.05 ± 1.43	0.63 ± 1.08	0.138
Child Depression			
Reported by children	7.98 ± 4.23	5.73 ± 4.22	0.02*
Reported by parents	8.33 ± 5.04	4.65 ± 3.62	0.0001**
Self-esteem	60.43 ± 9.62	63.30 ± 7.12	0.133

*P<.05
**P<.01

Table 3. The comparison of mean scores of epileptic boys with epileptic girls on all measures

Factors	Epileptic group (Boys n=20)	(Girls n=20)	P
ADHD Subscales			
Inattentiveness	8.10 ± 4.97	6.70 ± 6.12	0.289
Hyperactivity	4.35 ± 3.17	3.50 ± 3.46	0.268
Impulsivity	3.20 ± 1.82	2.75 ± 2.57	0.291
Total	15.60 ± 7.39	12.95 ± 10.29	0.207
Oppositional defiant disorder	7.20 ± 4.51	8.60 ± 5.17	0.422
Conduct disorder	1.40 ± 1.73	0.70 ± 0.98	0.185
Child Depression			
Reported by children	8.75 ± 4.55	7.20 ± 3.85	0.289
Reported by parents	7.95 ± 4.42	8.70 ± 5.68	0.860
Self-esteem	57.20 ± 10.06	63.65 ± 8.17	0.03*

*P<.05

Table 4. The comparison of mean scores of non-epileptic boys with non-epileptic girls on all measures

Factors	Control group (Boys n=20)	(Girls n=20)	P
ADHD Subscales			
Inattentiveness	4.30 ± 4.71	2.75 ± 3.04	0.445
Hyperactivity	1.90 ± 3.26	2.10 ± 2.88	0.340
Impulsivity	1.35 ± 1.84	2.10 ± 2.61	0.602
Total	7.55 ± 8.40	6.95 ± 7.01	0.713
Oppositional defiant disorder	4.95 ± 4.33	5.95 ± 4.47	0.414
Conduct disorder	0.45 ± 0.76	0.80 ± 1.32	0.568
Child Depression			
Reported by children	5.55 ± 3.58	5.90 ± 4.88	0.838
Reported by parents	4.95 ± 2.97	4.35 ± 4.23	0.236
Self-esteem	65.45 ± 6.19	61.15 ± 7.47	0.854

Table 5. The comparison of the epileptic and non-epileptic girls with counterparts on all measures

Factors	Girls in the epileptic group (n=20)	Girls in the control group (n=20)	P
ADHD Subscales			
Inattentiveness	6.70 ± 6.12	2.75 ± 3.04	0.016*
Hyperactivity	3.50 ± 3.46	2.10 ± 2.88	0.118
Impulsivity	2.75 ± 2.57	2.10 ± 2.61	0.289
Total	12.95 ± 10.29	6.95 ± 7.01	0.048*
Oppositional defiant disorder	8.60 ± 5.17	5.95 ± 4.47	0.132
Conduct disorder	0.70 ± 0.98	0.80 ± 1.32	0.901
Child Depression			
Reported by children	7.20 ± 3.85	5.90 ± 4.88	0.134
Reported by parents	8.70 ± 5.68	4.35 ± 4.23	0.005**
Self-esteem	63.65 ± 8.17	61.15 ± 7.47	0.322

*P<.05 **P<.01

Table 6. The comparison of the epileptic and non-epileptic boys with counterparts on all measures

Factors	Boys in the epileptic group (n=20)	Boys in the control group (n=20)	P
ADHD Subscales			
Inattentiveness	8.10 ± 4.97	4.30 ± 4.71	0.007*
Hyperactivity	4.35 ± 3.17	1.90 ± 3.26	0.003*
Impulsivity	3.20 ± 1.82	1.35 ± 1.84	0.001*
Total	15.60 ± 7.39	7.55 ± 8.40	0.001*
Oppositional defiant disorder	7.20 ± 4.51	4.95 ± 4.33	0.106
Conduct disorder	1.40 ± 1.73	0.45 ± 0.76	0.040*
Child Depression			
Reported by children	8.75 ± 4.55	5.55 ± 3.58	0.026*
Reported by parents	7.95 ± 4.42	4.95 ± 2.97	0.024*
Self-esteem	57.20 ± 10.06	65.45 ± 6.19	0.005**

*P<.05 **P<.01

Table 7. The comparison of mean scores of the epileptic children treated with CBZ and VPA on all measures

Factors	Carbamazepine medication (n=29)	Valproic acid medication (n=11)	P
ADHD Subscales			
Inattentiveness	6.79 ± 5.48	9.00 ± 5.67	0.132
Hyperactivity	3.45 ± 3.00	5.18 ± 3.87	0.159
Impulsivity	2.83 ± 2.12	3.36 ± 2.50	0.48
Total	13.03 ± 7.94	17.54 ± 10.90	0.262
Oppositional defiant disorder	7.76 ± 4.57	8.27 ± 5.73	0.988
Conduct disorder	0.90 ± 1.29	1.45 ± 1.75	0.221
Child Depression			
Reported by children	7.31 ± 4.24	9.72 ± 3.85	0.1
Reported by parents	7.82 ± 5.41	9.64 ± 3.78	0.207
Self-esteem	62.41 ± 9.48	55.18 ± 8.21	0.02*

*P<.05

Table 8. The comparison of mean scores of children treated with CBZ and VPA on all measures

Factors	Complex partial seizures (n=18)	Generalized tonic-clonic seizures (n=13)	P
ADHD Subscales			
Inattentiveness	7.72 ± 5.44	6.77 ± 5.04	0.643
Hyperactivity	2.78 ± 2.90	4.69 ± 3.84	0.174
Impulsivity	2.67 ± 2.38	3.46 ± 2.40	0.339
Total	13.11 ± 8.95	14.92 ± 9.74	0.616
Oppositional defiant disorder	8.39 ± 4.97	7.92 ± 5.04	0.747
Conduct disorder	0.89 ± 1.37	1.00 ± 1.78	0.875
Child Depression			
Reported by children	7.67 ± 4.03	7.62 ± 3.59	0.887
Reported by parents	9.22 ± 5.57	7.38 ± 4.26	0.455
Self-esteem	60.89 ± 10.88	59.33 ± 11.72	0.602

It's known that epilepsy is associated with psychological problems in children. In epileptic children, the overall interrelationships between sex, type of epilepsy, drug treatment and other factors play important roles in psychopathology. The conclusions of this study are as follows:

The first finding was that epileptic children more often have ADHD, oppositional defiant disorder, and depressive symptomotology than normal controls. These results are consistent with previous studies (17, 18). Epileptic children have intricate attentional difficulties from the clinical perspective and these intricate attentional difficulties might present clinically as ADHD. Many investigators have reported more frequent inattentiviness, overactivity, and failure of impulse control among epileptics than healthy controls (17, 18). In this study, the epileptic children were found to have significantly higher scores of ADHD than non-epileptics (P<0.01).

In many studies, it was found that behavioral disturbances were more common in epileptic children than the general population (19, 20). Although there was no statistically significant difference, epileptic children had more frequent behavioral problems in this study. This result may be due to the size of our sample.

In this study, epileptic children were also found to be more depressive than controls. Depressive scores by parent reports were higher than those by the children (P<0.01 and P<0.05, respectively). These findings are parellel to previous studies (5).

The second finding was that epileptic boys had higher scores than epileptic girls. But it was not statistically significant. Although the difference between the epileptic and non-epileptic girls was on some measures, the scores of the epileptic boys were significantly higher than their non-epileptic counterparts on the most of measures. These results are consistent with previous studies and suggest that epileptic boys, but not girls, are particularly predisposed to a range of psychiatric complications (18).

The third finding was that, CBZ and VPA medications had little difference in any of the measures, but the self-esteem of children with CBZ treatment was higher than VPA (P<0.02). Antiepileptic medications often cause dose related or idiosyncratic behavioral side effects. Sedation, cognitive impairment, and dep-

ressive mood are dose-related side effects of all antiepileptic drugs (21-24).

Regarding to the EEG findings for both boys and girls with temporal spike discharges appear to be associated with ADHD symptomatology, especially inattentiviness (25). In contrast, in this study, children with complex partial seizures were not significantly different from those with tonic-clonic seizures in any type of measures.

Several investigators suggest that depression in the epileptic children is related to low self-esteem (9). Our study has shown that in Piers-Harris Self-Concept Scale, those who scored under 60 were more depressive than those more than 60 (P<0.01).

In conclusion, epileptic children have more psychological problems in all aspects than nonepileptic controsl. At present, it is not possible to assess with any accuracy the relative contrubition of each factor to psychopathology. Nevertheless, it would seem that male sex and drug treatment can be considered important factors in identifying epileptic children at particular risk regarding these problems. We encourage further longitudinal studies that assess the impact of the factors in epileptic children.

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