

## Behavioral Problems in Iranian Epileptic Children; A Case Control Study

Maryam Aloudari<sup>1</sup>, \*Hosein Delavar Kasmaei<sup>2</sup>, Shahram Aboutalebi<sup>3</sup>, Faezeh Dehghan<sup>4</sup>, Nasrin Rahmanpour<sup>5</sup>

<sup>1</sup>Department of Psychology, Science and Research Branch, Islamic Azad University, Tehran, Iran. <sup>2</sup>Department of Neurology, Shohadaye Tajrish Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran. <sup>3</sup>Department of Neurology, Dalhousie University, Nova Scotia, Canada. <sup>4</sup>Neuroscience Department, Faculty of Advanced Technology in Medicine Science, Iran University of Medical Science, Tehran, Iran. <sup>5</sup>Department of Psychology, Allameh Tabataba'i University, Tehran, Iran.

### Abstract

#### Background

Epilepsy is among the most common neurological disorders in childhood, prevalence of which is increasing. Unpredictable and chronic nature of the disease affects physical, social and mental functions of the children and their family. This study was aimed to compare behavioral problems in epileptic children group versus healthy control group.

#### Materials and Methods

This study is a case-control one conducted from January 2013 to June 2016 in Tehran, Iran. The epileptic children in age of 7-10 years old that were diagnosed by neurologist referred to the researcher for further process. Their parents were provided with Child Behavior Checklist (CBCL) to be completed. For matching by age and gender, the healthy group was sampled after the epilepsy group. Multivariate Analysis of Variance was used for statistical analysis.

#### Results

In this study 94 children with epilepsy and 83 healthy children in age of 7-10 years old were studied. The results indicated that there were significantly higher behavioral problems in the children with epilepsy than in control group in nine categories of seclusiveness, physical complaints, anxiety and depression, social problems, thought problems, attention problems, delinquent behaviors, aggressive behaviors, and other problems. Comparison of two generalized and partial epilepsy groups indicated that there was a significant difference only in attention problems ( $p = 0.024$ ).

#### Conclusion

The present study indicates that the children with epilepsy have more behavioral problems as compared to control group. Therefore, educational and psychological interventions are necessary for supporting desirable psychosocial growth and development of such children.

**Key Words:** Behavioral Problems, Children, Epilepsy, Iran.

\*Please cite this article as: Aloudari M, Delavar Kasmaei H, Aboutalebi Sh, Dehghan F, Rahmanpour N. Behavioral Problems in Iranian Epileptic Children; A Case Control Study. *Int J Pediatr* 2017; 5(12): 6713-19. DOI: [10.22038/ijp.2017.26377.2260](https://doi.org/10.22038/ijp.2017.26377.2260)

#### \*Corresponding Author:

Hosein Delavar Kasmaei, Department of Neurology, Shohadaye Tajrish Hospital, Tajrish Square, Tehran, Iran.

Email: [hdkasmai@yahoo.com](mailto:hdkasmai@yahoo.com)

Received date: Aug.13, 2017; Accepted date: Sep.22, 2017

## 1- INTRODUCTION

With prevalence of about 3% in general population, epilepsy is one of the most common neurological disorders and is also among the most common neurological disorders in childhood, prevalence of which is increasing (1-4). Although dominant representation of epilepsy is seizure, but behavioral aspects may also be involved (5). Behavioral disorders are diagnosed when a child shows a behavior deviated from a related social norm and/or occurs with such frequency and severity, at which an adult describes the child's behavior very severe and/or very weak. In fact, a behavior is abnormal when it distorts the child's appropriate adaptation to their environment, which occurs in the child's relations with parents, peers, teachers and other environmental factors (6-11). Today, given the findings and reports indicating presence of behavioral, cognitive and social disorders among the patients with epilepsy- even those with normal intelligence, psychological and non-medicinal fields and treatments have attracted more attention.

In fact, addressing such problems during treatment will further improve health and quality of life of such patients, leading to effective psychological treatment beside drug therapies (12). Identification and diagnosis of common psychological disorders in the patients with epilepsy can lead to effective psychological treatment beside drug therapy. Although such studies were performed in other countries, conducting in different communities is still necessary. This study was aimed to compare behavioral problems in epileptic children group versus healthy control group in 7-10 years old children in Tehran, Iran.

## 2- MATERIALS AND METHODS

### 2-1. Study design

This study is a case-control one performed on epileptic children in age of 7-10 years old from January 2013 to June 2016 in Tehran, Iran. It was a multi-center study and 6 hospitals in Tehran, Iran were involved including Mofid Hospital, Children's Medical Center, Imam Hossein Hospital, Lohmane Hakim Hospital and two private medical offices. The protocol of the study was approved by ethical committee of Shahid Beheshti University of Medical Sciences in Tehran, Iran. Sampling of control group was performed after obtaining permission from Education Organization of Tehran and obtaining consent from the related authorities. All children in both groups were enrolled after signing the informed consent form by their parents. All investigators have respect to the world medical association declaration of Helsinki Ethical Principles for medical research involving human subjects.

### 2-2. Study population

Epileptic children were diagnosed and referred by neurologists. Inclusion criteria were including age range of 7-10 years old, history of idiopathic epilepsy, and attendance in ordinary schools. Accurate growth history was taken from their parents including investigation of important growth stages, special diseases and academic performance. If the children had a history of more than one time change of drugs during the recent year, delay for more than 3 months in motor and cognitive growth stages, jaundice at birth led to hospitalization, problems during delivery such as low APGAR score and anoxia, head trauma, or concomitant psychological disorders, they were excluded. For matching by age, the healthy group was randomly sampled from five schools in Tehran province, Iran. Studied children in this group were all 7-10 years old healthy children with academic performance at expected level. In order to determine the study population in this group, multistage sampling method was used. For this

purpose, one education district was considered randomly, and from among the schools, one elementary school was selected randomly, and then from among the selected schools, one classroom from first to fourth grades was randomly selected. To ensure their health, this group of children was examined by a neurologist, before entering the study.

### 2-3. Data collection

Data gathering was performed with one investigator via interviewing in the presence of the parents. Assessment tools used in this study included demographic characteristics, and Child Behavior Checklist (CBCL) (13). The parents of children were provided with Child Behavior Checklist (CBCL) to be completed. Demographic characteristics of this study included questions about age, gender, disease onset age, type of epilepsy, drugs taken, economic status of family, and the attempted treatments. CBCL that was used in current study was developed by Achenbach in 1992 in order to assess the child's adaptation to the environment, which avoids classification of the children based on a specific syndrome, but classifies a set of child's behaviors. This checklist includes 116 questions, which is widely used for clinical and research purposes. Each question may have three answers: No (0), sometimes (1) and Yes (2). Its subscales include seclusiveness, physical complaints, anxiety/depression, social problems, thought problems, attention problems, delinquent behaviors, aggressive behaviors, and other problems. Former studies conducted in clinical situations reported acceptable validity and reliability for CBCL (14, 15).

### 2-4. Ethical considerations

The protocol of the study was approved by ethical committee of Shahid Beheshti University of Medical Sciences in Tehran, Iran. Sampling of control group was performed after obtaining permission from

Education Organization of Tehran and obtaining consent from the related authorities. All children in both groups were enrolled after signing the informed consent form by their parents. All investigators have respect to the world medical association declaration of Helsinki Ethical Principles for medical research involving human subjects.

### 2-5. Statistical analysis

Depending on under-study variables and type of collected data, central tendency, dispersion and distribution of scores were used in order to describe them. In statistical analysis phase, Multivariate Analysis of Variance (MANOVA) was used for data analysis considering the nature of measurement scale and hypotheses of the study. The data obtained from measurement of different variables were described by using appropriate descriptive statistical methods such as frequency and percent, mean and standard deviation, as the case may be.

## 3- RESULTS

Finally, 94 (mean age:  $8.6 \pm 1.1$  years) patients were enrolled in case group and 83 (mean age:  $9.0 \pm 0.8$  years) students were randomly selected as control group. After examination of the data, the data related to two participants of control group were excluded from analysis as outliers. Demographic and baseline characteristics data were summarized in **Table.1**. About 57(61%) of participants suffered from generalized epilepsy, and 34 (36%) from partial epilepsy. Type of epilepsy was not specified in 3 (3.2 %) participants. More than half of the participants 52 (55.2%) had tonic-clonic epilepsy, 26 (27.7%) had complex epilepsy, and other cases were not significant. Type of epilepsy was not specified in 4 (4.3%) of the participants. Distribution of CBCL scores of healthy and epileptic participants in nine categories in behavioral problems assessment questionnaire has been shown

in **Table.2**. Considering the obtained value for F (2.645) and its significance probability (0.001), it can be concluded that the data has violated assumption of homogeneity of covariance-variance matrix. In other words, the difference between mean scores of healthy and epileptic groups is significant in 9 categories of seclusiveness, physical complaints, anxiety and depression, social problems, thought problems, attention problems, delinquent behaviors, aggressive behaviors, and other problems. Participants of healthy and epileptic groups may be separated from each other based on 9 categories of behavioral problems. Effect size of difference is weak considering the eta squared value (0.213). Considering the results of between-subjects' effects tests, it

can be concluded that there is a significant difference between mean scores of healthy and epileptic groups in 9 assessed categories. Mean values of these two groups in 9 categories indicate that mean scores of healthy group is lower than those of epileptic group. Considering the value of multiple tests, especially Wilks' Lambda (0.890) and calculated F (1.090) with degree of freedom of 9 and 79, the difference between mean scores of generalized and partial epilepsy groups was not significant in 9 assessed categories. However, univariate analyses indicate that there is a significant difference between mean scores of the participants with generalized and partial epilepsy in attention problems ( $p < 0.05$ ).

**Table 1:** Demographic characteristics of participants with Epilepsy

Characteristics of control group	Number (%)
<b>Gender</b>	
Female	39 (46.98)
Male	44 (53.01)
<b>Characteristics of epilepsy group</b>	
<b>Gender</b>	
Female	40 (42.6)
Male	54 (57.4)
<b>Duration of epilepsy diagnosis (year)</b>	
< 3	67 (71.3)
≥ 3	27 (28.7)
<b>Type of Epilepsy</b>	
Partial	34 (36.2)
Generalized	57 (60.6)
No Response	3 (3.2)
<b>Epilepsy Code</b>	
Complex	26 (27.7)
Partial with Secondary Generalization	3 (3.2)
Tonic	2 (2.1)
Clonic	1 (1.1)
Tonic-clonic	52 (55.3)
Myoclonic	1 (1.1)
Atonic	1 (1.1)
Absence	4 (4.3)
No Response	4 (4.3)

**Table-2:** Summary of descriptive indices of scores of healthy and epileptic participants in behavioral problems assessment questionnaire and its 9 categories

Variables	Control, mean $\pm$ SD (n=83)	Case, mean $\pm$ SD (n=94)	P- value
*Seclusiveness	3.17 $\pm$ 2.39	4.67 $\pm$ 3.14	0.066
Physical Complaints	1.55 $\pm$ 2.22	2.98 $\pm$ 2.80	0.072
Anxiety and Depression	5.36 $\pm$ 4.00	6.75 $\pm$ 4.79	0.025
Social Problems	3.17 $\pm$ 2.78	4.72 $\pm$ 2.97	0.068
Thought Problems	0.91 $\pm$ 1.58	1.78 $\pm$ 2.20	0.046
Attention Problems	4.40 $\pm$ 3.49	7.55 $\pm$ 4.49	0.133
Delinquent Behaviors	2.02 $\pm$ 1.90	4.04 $\pm$ 3.07	0.131
Aggressive Behaviors	7.12 $\pm$ 5.40	10.37 $\pm$ 6.33	0.069
Other Problems	6.24 $\pm$ 4.25	10.21 $\pm$ 9.49	0.113

\*: Inclination to isolation of oneself regarding social contact and relationships with other people; SD: standard deviation.

#### 4- DISCUSSION

Based on data extracted from current study, there was a difference between healthy and epileptic children in the categories of behavioral problems. There were significantly higher behavioral problems in Iranian epileptic children group than in control group that was consistent with most studies conducted earlier (16-18). Increased social problems and inability to control emotions and behaviors may be an adaptive reaction to the disease condition or reaction to psychosocial factors and biological factors (15, 19, 20).

Many factors may play role in this regard, among which mechanism of epilepsy, drugs, family-related factors, environmental factors such as economic and social class, education level of the parents can be enumerated. What should be addressed more is effect of epilepsy mechanisms on behavior because the children participated in the study showed no special disorder and deviation from natural growth according to their growth history and medical files, but they developed significantly more behavioral problems. These children are exposed to many learning problems. Holms et al. (2001) suggested that seizure could adjust and/or slow down many unique processes

occurring while growth. These processes are necessary for formation and correct function of brain. In addition, research and clinical findings indicate that seizure may cause progressive neural damage, leading to accumulative neuropsychological disabilities (21). Postictal effects are another important factor in understanding effect of seizure on cognition. Discharges on learning potential may have an intervening effect in long run (22). The most complaints in the patients with epilepsy are slow mental processing, memory deficits and attention problems. Since early seizures can induce durable defects, and increased epilepsy sensitivity and long-term exposure to abnormal neural activities during sensitive cerebral maturation periods may distract functional and structural growth changes in brain (23). Tonic-clonic and/or tonic epilepsies may negatively affect thinking abilities and intelligence in case of becoming chronic and/or due to risk of frequent head traumas (24). Based on the interview with the parents before completion of the questionnaires, and according to the conducted studies, lack of epilepsy awareness and inappropriate knowledge of the parents may lead to excessive care of the child, which in turn results in disability of the child even in performing their personal activities, gradually leading to

loss of function in the child (8, 25). Many studies and researches on atmosphere of the family and its relationship with behavioral disorders indicate that going to the extremes in such affairs as acceptance, attention, care, freedom and expectation plays a key role in development of behavioral problems in children (8). Thus, by adopting a set of measures to prevent from imposing unnecessary restrictions or excessively protecting and controlling the child and providing better adaptation of the patient and their family with the disease, quality of life of such patients may be increased. Since children account for a major part of world population and any child was born with potential human capabilities and capacities, promotion of such capabilities is highly determined by how the child is cared.

Considering high prevalence of epilepsy and behavioral and psychological disorders seen in most patients and consequently in their families, it seems necessary to identify such psychological disorders and treatments in order to prevent from consequent dysfunctions and promote appropriate cognitive, emotional and social growth. Since epilepsy is not a merely physiological disease specific to central nervous system and induces many psychological effects on lives of the child and parents, pediatric neurologists are better to pay enough attention to psychological and psychiatric aspects of the disease while visiting a child with epilepsy, and it seems necessary to further consult with the family physician, provide educational plans aimed to provide reliable and correct information on the disease, limitations and abilities of the child and also increase adaptability of such children with the disease and promote social skills in addition to medical measures and treatments.

#### **4-1. Limitations of the study**

A number of psychiatric and neuropsychiatric disorders have been found to occur at a higher rate in children with epilepsy. These include mental retardation, ADHD, etc. This Comorbid Conditions Caused that list of Sample became less and took more time to sampling.

#### **5- CONCLUSION**

Consistent with most studies conducted earlier, the present study indicates that the children with epilepsy have more behavioral problems as compared to control group. Therefore, educational and psychological interventions are necessary for supporting desirable psychosocial growth and development of such children.

#### **6- AUTHOR'S CONTRIBUTION**

All the authors have contributed to drafting/ revising the manuscript, study concept, or design, as well as data interpretation.

#### **7- CONFLICT OF INTEREST: None.**

#### **8- REFERENCES**

1. Kankirawatana P. Epilepsy awareness among school teachers in Thailand. *Epilepsia*. 1999;40:497-501.
2. Adams R, Victor M, Ropper A. *Principle of neurology* 7th ed. McGrawhill; 2005.
3. Chang BS, Lowenstein DH. Epilepsy. *The New England Journal of Medicine*. 2003;349(13):1257-66.
4. Kasmaei HD, Shabani F, Baratloo A. Meningioma Induced Temporal Lobe Epilepsy; A Case Report. *Archives of Neuroscience*. 2015;2(2):e21644.
5. Zelnik N, Sa'adi L, Silman-Stolar Z, Goikhman I. Seizure control and educational outcome in childhood-onset epilepsy. *Journal of child neurology*. 2001;16(11):820-4.

6. Reynolds CR. Behavior assessment system for children: Wiley Online Library; 2004.
7. Chakrabarti S, Fombonne E. Pervasive developmental disorders in preschool children: confirmation of high prevalence. *American Journal of Psychiatry*. 2014;162(6):1133-41.
8. Seif Naraghi M, Naderi EA. Learning Disorder. 3ed. Tehran: Amirkabir Publication; 1987.
9. Van Horn P. Child-Parent Psychotherapy. *Handbook of Infant Mental Health*. 2012:439.
10. Chess S, Hassibi M. Principles and practice of child psychiatry: Springer Science and Business Media; 2013.
11. Nakhjavan-Shahraki B, Yousefifard M, Oraii A, Sarveazad A, Hajighanbari MJ, Safari S, et al. Prediction of Clinically Important Traumatic Brain Injury in Pediatric Minor Head Trauma; proposing Pediatric Traumatic Brain Injury (PTBI) Prognostic Rule. *International Journal of Pediatrics*. 2017;5(1):4127-35.
12. Asato MR, Doss JL, Plioplys S. Clinic-friendly screening for cognitive and mental health problems in school-aged youth with epilepsy. *Epilepsy & Behavior*. 2015;48:97-102.
13. Achenbach TM, Edelbrock C. Child Behavior Checklist and Revised Child Behavior? Profile: Department of Psychiatry, University of Vermont; 1983.
14. Hossein Zadeh N, Shahbodaghi M, Jalaei S. Reliability and Validity of "Behavioral Checklist " and "Communication Attitude Test" in stuttering children and comparison with non stutters at 6-11 years old. *Journal of Modern Rehabilitation*. 2010;4(1):30-7.
15. Stores G, Wiggs L, Campling G. Sleep disorders and their relationship to psychological disturbance in children with epilepsy. *Child: care, health and development*. 1998;24(1):5-19.
16. Baki O, Erdogan A, Kantarci O, Akisik G, Kayaalp L, Yalcinkaya C. Anxiety and depression in children with epilepsy and their mothers. *Epilepsy & Behavior*. 2004;5(6):958-64.
17. Sturniolo M, Galletti F. Idiopathic epilepsy and school achievement. *Archives of disease in childhood*. 1994;70(5):424-8.
18. Jones JE, Siddarth P, Gurbani S, Shields WD, Caplan R. Cognition, academic achievement, language, and psychopathology in pediatric chronic epilepsy: Short-term outcomes. *Epilepsy and Behavior*. 2010;18(3): 211-7.
19. Matthews WS, Barabas G, Ferrari M. Emotional concomitants of childhood epilepsy. *Epilepsia*. 1982;23(6): 671-81.
20. Hoare P. The development of psychiatric disorder among schoolchildren with epilepsy. *Developmental Medicine & Child Neurology*. 1984; 26(1): 3-13.
21. Holmes GL. Pathogenesis of learning disabilities in epilepsy. *Epilepsia*. 2001; 42(s1):13-5.
22. Tasch E, Cendes F, Li LM, Dubeau F, Andermann F, Arnold DL. Neuroimaging evidence of progressive neuronal loss and dysfunction in temporal lobe epilepsy. *Annals of neurology*. 1999; 45(5): 568-76.
23. Henkin Y, Kishon Rabin L, Pratt H, Kivity S, Sadeh M, Gadoth N. Linguistic Processing in Idiopathic Generalized Epilepsy: An Auditory Event- related Potential Study. *Epilepsia*. 2003;44(9): 1207-17.
24. Smith ML, Elliott IM, Lach L. Cognitive skills in children with intractable epilepsy: comparison of surgical and nonsurgical candidates. *Epilepsia*. 2002; 43(6): 631-7.
25. Doust AV, Toghiani M, Darbanian M, Bahrapour M, Salimi S, Abedi MR, et al. he relationship between Adler's life styles and parents' parenting styles *International Journal of Psychology and Behavioral Research*. 2014; 1(4).