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Neurobehavioral disorders in a group of children suffering from idiopathic epilepsy

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Abstract

Epilepsy is a common neurological disorder in which the normal activity of the brain cells is sometimes disturbed this can result in strange sensation, emotions and behaviors. The aim of the work is to study neurobehavioral changes that occur in group of children suffering from idiopathic epilepsy. This retrospective study included 80 children and adolescents, 50 of them with age range 2-6 years (28 males and 22 females, age 42.32±10.949 months) and 30 with age range 6-18 years (17 males and 13 females, age 9.57±2.369 years), enrolled from outpatient clinic of pediatric psychiatry& neurology Benha University Hospital.All patients were subjected to a complete history taking with stress on age of onset, duration of attack, character of attack. Protocol of management response to treatment & follow up after treatment. Complete clinical examination including complete neurological examination associated with systemic examination. The child behavioral checklist Questionnaire was conducted on all the children.The results showed that there was no statistically significant difference between both groups regarding gender, type of epilepsy and regularity of treatment. There was statistically significant higher clinical internalizing withdrawn scale in group (1) in patients with 2-6 years compare to group (2) (p=0.000) and statistically significant higher borderline and clinical externalizing scales in group (2) in patients with 6-18 years compare to group (1).

Most seizures in children are provoked by somatic disorder originating outside the brain, such as high fever, infection, syncope, head trauma, hypoxia, toxin, or cardiac arrhythmia (Johnston, 2010). It is considered to be a heterogeneous condition, resulting from various causes and consisting of different syndromes and different seizure types.

Idiopathic epilepsy is likely to be an epilepsy without evident cause, no neurological disorders, free MRI, CT (Michael V.Johnston;2004).n About 50 million people worldwide have epilepsy with almost 80% of these people being in developing countries [WHO, 2001]. Epilepsy is more likely to occur in young children or people over the age of 65 years; however it can occur at any time (The National Society for Epilepsy, 2009).

Keywords: Epilepsy, cognitive and psychiatric disorders neurobehavioral, internalizing, externalizing

1 Introduction

Epilepsy is a chronic disorder characterized by recurrent unprovoked seizures of cerebral origin with motor, sensory or autonomic disturbance with or without loss of consciousness (Zarczuk, 2010). Epileptic seizures are the clinical manifestations including symptoms and signs of an abnormal, excessive, and hypersynchronous electrical discharge of the neurons in the brain (Abou-Khalil, 2008).

Seizure or convulsion is a paroxysmal, time limited change in motor activity and-or behavior that results from an abnormal electrical activity in the brain.

Epilepsy can be complicated by neurobehavioral co morbidities, which include cognitive impairment, psychiatric disorders, and social problems. Neurological co-morbiditie occur very frequently in children with epilepsy. It's include learning disabilities and developmental delay, which occur in 40-50% of children with epilepsy (Beca CB, et al.,2011), (Russ SA, et al.,2012). Nevertheless, individuals with autism and epilepsy have poorer cognitive (lower IQ), adaptive, behavioral, and social outcomes than those with autism without epilepsy, and epilepsy accounts for increased morbidity and mortality in individuals with autism (Gillberg et al., 2010).

Autism is a neurodevelopmental disorder affecting primarily social cognition but associated with language impairments, restricted interests, and repetitive behaviors. The term autism spectrum disorders (ASDs) is used interchangeably with autism and includes a broader group of children including those with autistic disorder, pervasive developmental disorders not otherwise specified, and Asperger syndrome *(*Korczyn et al., 2013).

Unlike for the conduct disorder variant, there is an impairment criterion for the oppositional defiant type: the symptoms must be maladaptive and inconsistent with the child or young person's developmental level. Where there are sufficient symptoms of a co morbid disorder to meet diagnostic criteria, ICD-10 discourages the application of a second diagnosis, and instead offers a single, combined category for the most common combinations (Timmer et al., 2010).

Findings from epidemiological investigations unequivocally demonstrate an increased prevalence of epilepsy *(*Lin et al., 2012). In addition, epidemiological studies conducted in the last thirty years have shown that behavioral disorders in children with epilepsy are 4.8 times greater than children from the general population (Plioplys et al., 2007). Findings of recent studies in children with new onset idiopathic epilepsy showed higher rates of psychopathology than healthy children (*Jones et al., 2007).*

The most frequently reported problems to be depression, anxiety, poor quality of life (Ottoman et al., 2011). Association between attention deficit hyperactivity disorder and childhood epilepsy has also been demonstrated (Rappley, 2005).The present work was aimed to study neurobehavioral changes that occur in group of children suffering from idiopathic epilepsy.

2 Patients and Methods

The following study included 80 children and adolescents who visited the outpatient clinic of Benha university hospital and who agreed to participate in the current study Collection of the studied sample took place from August 2014 to June 2015. The cases were divided as follows 50 of them with ages ranging from 2 to 6 years old (28 males and 22 females) and 30 of them with ages ranging from 6 to 18 years old (17 males and 13 females).

Exclusion criteria were

-Children younger than 2 years and elder than 18 years.

-Child with a chronic illness (eg. asthma, diabetes, cardiac disease, or migraine).

-Children not diagnosed as idiopathic epilepsy (2ry epilepsy, organic brain lesion).

-Children with Mental retardation or sensory loss.

All children and parents were subjected to:-

1.Full medical history (age, sex, education, socioeconomic state, milestones. Detailed medical history about age of onset of the epilepsy, character of the attack, recurrence and duration of the seizure, medications, protocol of management, response, regularity, causes of irregularity, side effects whether controlled or not and follow up

2.Complete clinical examination including :General and systemic examination: head and neck, extremities, chest, heart and abdomen

3.Complete neurological examination: skull, cranial nerves, motor system (power and tone), sensory, reflexes and clonus.

4.EEG was done under or had already been with the patient.

5.Assessment of the behavioral status using:-

CBCL for age 2-6 years old.

CBCL for age 6-18 years old

The Child Behavior Checklist (CBCL) is a widely used instrument that assesses behavioral problems. It is a group of questions orally administered to a parent, who rates the presence and frequency of certain behaviors on a 3-point scale (0 = not true, 1 = somewhat or sometimes true, and 2 = very true or often true). All items are written and take about 15 minutes to complete (Achenbach, 2001).An oral consent was signed by parents before the commencement of the study. Obtained results were statistically analyzed through mean, SE, T-test, Chi-square and ANOVA using SPSS V17 software computer package.

3 Results

Table1 shows the descriptive data of the study group with age range 2-6 years, their age ranged between 24 and 60 months with mean of 42.32±10.949 months. The age of onset of seizers ranged between 2 and 48 months with mean of 18.980±12.352 months. The relationship between the child and the caregiver was mother in 39 (78%), father in 8 (16%) and grandparent in 3 (6%).

Regarding type of epiliepsy in the study group with age range 2-6 years, 12 (24%) had simple partial, 11 (22%) had absence seizures, 8 (16%) had colonic seizures, 8 (16%) had myoclonic seizures, 7 (14%) had tonic seizures and 4 (8%) had idiopathic tonic colonic seizures (table2).Table 3 shows non statistically significant difference between both groups regarding gender (p=0.570).

The percentage of normal, borderline and clinical scors of child behavior chicklistin group with age 2-6 years is depicated in table 4. There was higher total internalizing clinical score (66%), withdrawn problems (52%), affective problems (38%), ADHD (36%) and ODD (36%).

Table 5 shows the percentage of normal, borderline and clinical scores of child behavior checklistin group with age 6-18 years. There was higher total internalizing clinical score (53.3%), other problems (46.7%) and DSM-scales affective problems (23.3%).

Table (1): Descriptive data of group with age ranging from 2-6 years

n=50		Min	Max	Mean	SD
Age (m)		24.00	60.00	42.320	10.949
Age of onset (m)		2.00	48.00	18.980	12.352
		Frequency		Percent	
Sex	Male	28		56.0	
	Female	22		44.0	
Accompanied person to child	Mother	39		78.0	
	Father	8		16.0	
	Grandparent	3		6.0	

Table (2): Descriptive data of group with age ranging from6-18 years

n=30		Min	Max	Mean	SD
Age (ys)		6.50	15.00	9.570	2.369
Age of onset (ys)		1.00	8.00	4.133	1.833
		Frequency		Percent	
Sex	Male	17		56.7	
	Female	13		43.3	
Accompanied person to child	Mother	22		73.3	
	Father	7		23.3	
	Grandparent	1		3.3	

Table (3): Gender difference between both groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	X	P
Gender	Male	n°	28	17	45	0.954	0.570
		%	56.0%	56.7%	56.2%		
	Female	n°	22	13	35		
		%	44.0%	43.3%	43.8%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

Table (4): Child behavior checklist in studygroup with age ranging from 2-6 years

		Normal	Borderline	Clinical
		n (%)	n (%)	n (%)
Internalizing	Emotionally	31 (62)	14 (28)	5 (10)
	Anxious depression	30 (60)	12 (24)	8 (16)
	Somatic complaints	17 (34)	22 (44)	11 (22)
	Withdrawn	20 (40)	4 (8)	26 (52)
	Total	7 (14)	10 (20)	33 (66)
Sleep problems		32 (64)	11 (22)	7 (14)
Externalizing	Attention	37 (74)	6 (12)	7 (14)
	Aggression	47 (94)	3 (6)	0
	Total	44 (88)	5 (10)	1 (2)
Other problems		33 (66)	6 (12)	11 (22)
Oriented scale	Affective problems	14 (28)	17 (34)	19 (38)
	Anxiety problems	26 (52)	19 (38)	5 (10)
	PDD	20 (40)	12 (24)	18 (36)
	ADHD	26 (52)	6 (12)	18 (36)
	ODD	50 (100)	0	0
Language development survey		50 (100)	0	0

Table 6 shows non statistically significant difference between both groups regarding type of epilepsy (p=0.577). Table 7 shows Difference in regularity of treatment in study groups and there is no statistically significant difference between both groups regarding regularity of treatment (p=0.408) (table 8). Also there is no statistically significant difference between both groups regarding internalizing scale (p=0.467) (table 9). Table 10 shows higher statistically significant clinical internalizing withdrawn scale in group (1) in patients with 2-6 years compare to group (2) (p=0.000). Non statistically significant difference was recorded between both groups regarding externalizing aggression scale (p=0.402) (table 11). Table 12 shows difference in other problem scale in study groups.

In conclusion,the results showed that there was non statistically difference between both groups regarding gender, type of epilepsy and regularity of treatment. There was statistically significant higher clinical internalizing withdrawn scale in group (1) in patients with 2-6 years compare to group (2) (p=0.000) and statistically significant higher borderline and clinical externalizing and other problem scales in group (2) in patients with 6-18 years compare to group (1).

4 Discussion

Epilepsy is a chronic neurologic disorder characterized by unprovoked recurrent seizures. Meguins, et al.,(2015) believed it to be the most comon chronic neurological disorder affecting 0.4 to 1% of the greneral population. Children with epilepsy have elevated rates of behavioral problems.It has been established that children with epilepsy have behavior problems at rates almost 5 times higher than those of the general population children(Davis et al.,2003). Studies investigating children with seizures show that behavior problems occur early in the course of the disorder and, in some children, even precede seizure onset (Jones et al., 2007).

Table (5): CHILD BEHAVIOR CHECKLIST in study group with age ranging from 6-18 years

		Normal	Borderline	Clinical
		n (%)	n (%)	n (%)
Internalizing	Anxious depression	22 (73.3)	8 (26.7)	0
	Somatic complaints	30 (100)	0	0
	Withdrawn	7 (23.3)	15 (50)	8 (26.7)
	Total	7 (23.3)	7 (23.3)	16 (53.3)
Social problems		22 (73.3)	3 (10)	5 (16.7)
Thought problems		22 (73.3)	8 (26.7)	0
Attention problems		26 (86.7)	4 (13.3)	0
Externalizing	Role breaking	27 (90)	2 (6.7)	1 (3.3)
	Aggressive behavior	27 (90)	3 (10)	0
	Total	13 (48.3)	11 (36.7)	6 (20)
Other problems		11 (36.7)	5 (16.7)	14 (46.7)
DSM scales	Affective problems	11 (36.7)	12 (40)	7 (23.3)
	Anxiety problems	24 (80)	3 (10)	3 (10)
	Somatic problems	29 (96.7)	1 (3.3)	0
	ADHD	27 (90)	3 (10)	0
	ODD	24 (80)	5 (16.7)	1 (3.3)
	CD	28 (93.3)	2 (6.7)	0
Competence	Sluggish	26 (86.7)	4 (13.3)	0
	Social	28 (93.3)	2 (6.7)	0
	School	17 (56.7)	8 (26.7)	5 (16.7)

This retrospective study included 80 children and adolescents, 50 of them with age ranging from 2-6 years (28 males and 22 females, age 42.32±10.949 months) and 30 with age ranging from 6-18 years (17 males and 13 females, age 9.57±2.369 years), enrolled from outpatient clinic of pediatric psychiatry and neurology Banha University Hospital.The aim of the work is to study neurobehavioral changes that occur in children with idiopathic epilepsy. Results of the current study show that the age of the onset of seizure in group 1 that age ranging from 2 to 6 years with mean of 18.980±12.352 months. The age of onset of seizers in group 2 ranged between 1 and 8 years with mean of 4.13±1.83 years. This comes in agreement with Jones and his collegues (2008) who reported that epilepsy affects 0.5-1% of children younger than 16 years.

Results of the current study shows that there was non statistically significant difference between both groups regarding gender (p=0.570). Although Mitaki (2011) states that males have slightly higher risk than females for developing epilepsy. Austin et al., (2007), found that neither sex of child nor child age was significantly associated with total behavior problems at any time. These findings, however, are consistent with most studies, which have not shown a relationship between age at onset and behavior problems.

Table (6): Difference in type of epilepsy in study groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	x	p
Type of epilepsy	Idiopathic tonic	n°	7	4	11	3.810	0.577
		%	14.0%	13.3%	13.8%		
	Idiopathic colonic	n°	8	8	16		
		%	16.0%	26.7%	20.0%		
	Idiopathic tonic colonic	n°	4	1	5		
		%	8.0%	3.3%	6.2%		
	Idiopathic Absence	n°	11	3	14		
		%	22.0%	10.0%	17.5%		
	Idipathic simple partial	n°	12	7	19		
		%	24.0%	23.3%	23.8%		
	Idiopathic myoclonic	n°	8	7	15		
		%	16.0%	23.3%	18.8%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

Table (7): Difference in regularity of treatment in study groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	X	P
Regularity of treatment	Regular	n°	29	19	48	0.222	0.408
		%	58.0%	63.3%	60.0%		
	Irregular	n°	21	11	32		
		%	42.0%	36.7%	40.0%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

Table (8): Difference in internalizing scale in study groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	X	P
Internalizing	Normal	n°	7	7	14	1.523	0.467
		%	14.0%	23.3%	17.5%		
	Borderline	n°	10	7	17		
		%	20.0%	23.3%	21.2%		
	Clinical	n°	33	16	49		
		%	66.0%	53.3%	61.2%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

Table (9): Difference in internalizing withdrawn scale in study groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	X	P
Internalizing withdrawn	Normal	n°	20	7	27	18.301	0.000 (HS)
		%	40.0%	23.3%	33.8%		
	Borderline	n°	4	15	19		
		%	8.0%	50.0%	23.8%		
	Clinical	n°	26	8	34		
		%	52.0%	26.7%	42.5%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

Recurrent un-controlled seizures significantly predicted behavior problems is very early in the course of seizure condition, even when key child, demographic, and seizure variables were controlled. Explanations for these findings include the possibilities that both seizures and behavior problems are caused by an underlying neurological disorder, that seizures per se disrupt behavior, or that children have negative psychological responses to seizure activity (Austin et al., 2002). Although this was not the case in the current study with both groups regarding the regularity of the treatment. Results of our study show that the percentage of normal, borderline and clinical scores of child behavior checklist in group 1 with age 2-6 years;there was higher total internalizing clinical score (66%), withdrawn problems (52%), affective problems (38%), ADHD (36%) and ODD (36%).Regarding the percentage of normal, borderline and clinical scores of child behavior checklist in group 2 with age 6-18 years; there was higher total internalizing clinical score (53.3%), other problems (46.7%) and DSM-scales affective problems (23.3%). Similar to our findings, Eom et al., (2014) found that younger age pateints showed a strong positive impact on psychosocial function in pediatric epilepsy, particularly for adaptive function and competence.

Table (10): Difference in externalizing scale in study groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	x	P
Externalizing	Normal	n°	44	13	57	18.961	0.000 (HS)
		%	88.0%	43.3%	71.2%		
	Borderline	n°	5	11	16		
		%	10.0%	36.7%	20.0%		
	Clinical	n°	1	6	7		
		%	2.0%	20.0%	8.7%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

Table (11): Difference in externalizing aggression scale in study groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	x	P
Externalizing aggression	Normal	n°	47	27	74	0.432	0.402
		%	94.0%	90.0%	92.5%		
	Borderline	n°	3	3	6		
		%	6.0%	10.0%	7.5%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

Table (12): Difference in other problem scale in study groups

			Group (1) between 2-6 ys	Group (2) between 6-18 ys	Total	X	P
Other problems	Normal	n°	33	11	44	6.881	0.320 (S)
		%	66.0%	36.7%	55.0%		
	Borderline	n°	6	5	11		
		%	12.0%	16.7%	13.8%		
	Clinical	n°	11	14	25		
		%	22.0%	46.7%	31.2%		
Total		n°	50	30	80		
		%	100.0%	100.0%	100.0%		

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