ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Cognitive Dysfunction And Neuropsychiatric Abnormalities In Primary Childhood Epilepsy

Ahmed Hosny Mohamed[1], Mohamed Yousry Abdallah[1], & Ahmed Galal Siam[1]

[1] **Pediatrics Department, Faculty of Medicine, Zagazig University**

ABSTRACT

Background: Epilepsy is one of the most prevalent, disabling, and misunderstood chronic neurologic disorders. Epilepsy is one of the most common serious neurological disorders during childhood. Many children with pilepsy are affected by various neuropsychiatric comorbidities, which significantly affect the quality of their lives. Above all, cognitive impairments, such as memory impairments ,mentals lowness, and attention deficits, are the most common comorbid disorders in epilepsy.

Aim of the Study: we aimed to diagnose early the cognitive dysfunction and neuropsychiatric abnormalities for better management.

Patients and Methods: A cohort study which carried out in Zagazig university hospitals in the pediatric neurology outpatient clinic and rehabilitation and speechcenters. 66 Children with primary epilepsy in childhood above the age of five years on treatment were equally distributed into two equal groups and were underwent general and neurological assessment, including full history and examination. Also, all of patients were assessed with the Wechsler Intelligence Scale for Children, translated into Arabic.

Results: There was no statistically significant difference between Cases group and Controls group regarding sex and age. neuropsychiatric abnormalities were present among (90.9%) of cases group. lack of concentration was present among (45.5%) of cases group. VP ranged between 14 and 37 with mean (24.73±6.06),PRrangedbetween14and33withmean(23.82±5.23), WMrangedbetween8and22withmean(16.58±3.73),PSrangedbetween 8and14withmean(11.18±1.66)andTMrangedbetween27and102with mean (74.94± 16.27). Mean value of total IQ was statistically lower among cases group than controls group. There was no statistically significant difference between type of drugs and Total IQ**.** Mean value of total IQ was statistically higher among cases on one drug than cases on two drugs or more**.**Mean value of age was statistically lower among cases on one drug than cases on two drugs or more.

Conclusion:Childhood epilepsy is associated with cognitive deficits, intellectual decline, and behavioral problems, which are multifactorial, such as age of onset, frequency, type of seizure, prolonged seizures, antiepileptic drugs, and duration of epilepsy.

Keywords: Childhood epilepsy; NeuropsychiatricAbnormalities; Cognitive Dysfunction.

1. Introduction

Epilepsy is one of the most prevalent, disabling, and misunderstood chronic neurologic disorders. It affects an estimated 69 million people worldwide, roughly 90% of them living in "developing" countries [1].

Epilepsy is one of the most common serious neurological disorders during childhood Epidemiological studies reveal that ~150 000 children sustain a first-time unprovoked seizure every year, of whom 30 000 develop epilepsy. In a recent Egyptian study, the highest

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

prevalence rate was recorded during the early and late childhood period (69.78/100 000 and 43.78/100 000, respectively) [2].

Many children with epilepsy are affected by various neuropsychiatric comorbidities, which significantly affect the quality of their lives. Above all, cognitive impairments, such as memory impairments, mental slowness, and attention deficits, are the most common comorbid disorders in epilepsy. Therefore, it is crucial to explore the factors leading to cognitive impairment. Various factors can have a debilitating effect on cognitive function in epilepsy, including underlying structural lesions and disorders that cause epilepsy, severity of epileptic activity, psychosocial factors, and surgical or pharmacological treatment of seizures [3].

While most children with epilepsy maintain stable IQ scores, there is now strong evidence that some of them slow, or even regress, in their mental development. In a community-based cohort study. Berg et al assessed and prospectively followed 198 children (aged <8 years) with new-onset epilepsy for 8–9 years [4].

In this cohort refractoriness to antiepileptic drugs (AEDs) was associated with an 11.4 point lower full-scale IQ, abnormal interictal cortical and subcortical EEG activity [5].

Cognitive functioning refers to multiple mental abilities, including learning, thinking, reasoning, remembering, problem solving, decision making, and attention [6].

In science, the term intelligence typically refers to what we could call academic or cognitive intelligence. In their book on intelligence, professors Resing and Drenth answer the question 'What is intelligence?' using the following definition: "The whole of cognitive or intellectual abilities required to obtain knowledge, and to use that knowledge in a good way to solve problems that have a well described goal and structure [7].

2. Patients and Methods

Study design*:*

A cohort study which carried out in Zagazig university hospitals in the pediatric neurology outpatient clinic and rehabilitation and speech centers.

Target cases*:*

Children with primary epilepsy in childhood above the age of five years on treatment.

Study population*:*

The sample size was calculated using open Epi according to the following, the mean IQ score among cases group was 101±15.61 and among control group was 111 ± 13.22 so at power of study 80% and C.I. 95% the sample size was calculated to be 66 subjects, 33 in each group.

Inclusion criteria:

Children with primary epilepsy in childhood above the age of five years old on antiepileptic therapy.

Exclusion criteria:

1. Children with epilepsy under the age of five years old.
2. Children with epilepsy with MRI findings like hydrocephalus, tumors, previous operation and congenital anomalies

Pilot study*:*

Before starting the actual field study, a pilot study was carried out on 10% of the studied number of children to ensure the clarity, applicability and feasibility of the study tools, and necessary modifications will be done. It also helped to estimate time needed for data collection. And detect the obstacles of the study.

Data collection and work field

Epilepticchildren in the pediatric neurology outpatient clinic ZagazigUniversity and rehabilitation and speech centers.Using Wechsler Intelligence Scale for Children in the Psychiatric Department Zagazig University.

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Administrative design*:*

The study was approved by the Ethical Committee of the faculty (IRB). An official approval for conducting the study obtained from the head of pediatric of Zagazig University.An informed consent obtained from parents of children. They reassured about the strict confidentiality of any obtained information, and that the study results used only for the purpose of research. The study procedures were free from any harmful effects on the participants as well as the service provided.

Personal data and general assessment*:*

All subjects underwent general and neurological assessment, including full history and examination, and the following data were collected: age, sex, age at epilepsy onset, duration of epilepsy, seizure type, seizure frequency, history of prolonged seizures, and drug therapy.

Wechsler Intelligence Scale*:*

All of patients were assessed with the Wechsler Intelligence Scale for Children, translated into Arabic. The scale consists of six verbal subtests (similarities, digit span, vocabulary, arithmetic, comprehension, and information) and five performance subtests (picture completion, picture arrangement, coding subtest, digit symbol, and block design.

Statistical analysis

The collected data were computed and analyzed using the SPSS program, version 16. Parametric data were expressed as mean ± SD. Nonparametric data were expressed as median, minimum, and maximum. Normality of data was first tested with the one-sample K-S test. In addition, independent t-test was used to compare means for continuous parametric variables of two different groups. In addition, the Mann-Whitney U-test (Z) was used to compare nonparametric continuous variables between two different groups.

In addition, the one-way analysis of variance test was used to compare means for continuous parametric variables between three different groups. Thereafter, two different groups were compared using the post-hoc test (least significant difference). Pearson's $\chi 2$ -test was used to compare the categorical variables between groups. A P value less than 0.05 was considered as statistically significant.

3. Results

Table 1. Comparison between Cases group and Controls group regarding sex.

			Cases group	Controls group	$\chi 2$	P. value
Sex	Female	No.	12	16	.992	.319
		%	36.4%	48.5%		
	Male	No.	21	17		
		%	63.6%	51.5%		

There was no statistically significant difference between Cases group and Controls group regarding sex.

Table 2. Comparison between Cases group and Controls group regarding age.

		Cases group	Controls group	t.test	P. value
Age	Mean ± SD	9.97± 2.15	10.70±1.42	-1.616	.111

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

There was no statistically significant difference between Cases group and Controls group regarding Age.

Table 3.duration among cases group.

	Rang	**Mean ± SD**
Duration	4 - 14	6.52± 2.29

This table shows that duration ranged between 4 and 14 with mean (6.52± 2.29).

Table 4.drugs among cases group.

		Rang	**Mean ± SD**
drug1	**clonazepam**	3	9.1
	Sodium valproate	19	57.6
	levetiracetam	4	12.1
	topiramate	5	15.2
	diazepam	1	3.0
	Valproic acid	1	3.0
Drug2		18	54.5
	clonazepam	1	3.0
	pregabaline	1	3.0
	levetiracetam	6	18.2
	topiramate	4	12.1
	oxcarbazepine	1	3.0
	Valproic acid	2	6.1
Drug3		32	97.0
	risperidone	1	3.0

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Table 5.neuropsychiatric abnormalities among cases group.

		No.	%
neuropsychiatric abnormalities	no	3	9.1
	yes	30	90.9
	lack of attention	1	3.0
	lack of concentration	15	45.5
	lack of concentration; difficulty in studying	1	3.0
	Nervousness	1	3.0
	Violence		
	panic attack		
	no	3	9.1
	panic attack	1	3.0
	violence and nervousness	3	9.1
	violence	1	3.0
neuropsychiatric abnormalities	nervous		
	decrease in mental development		
	violence urine incontinence	1	3.0
	Violence lack of concentration	4	12.1
	Violence	1	3.0

This table shows that neuropsychiatric abnormalities was present among (90.9%) of cases group. lack of concentration was present among (45.5%) of cases group.

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

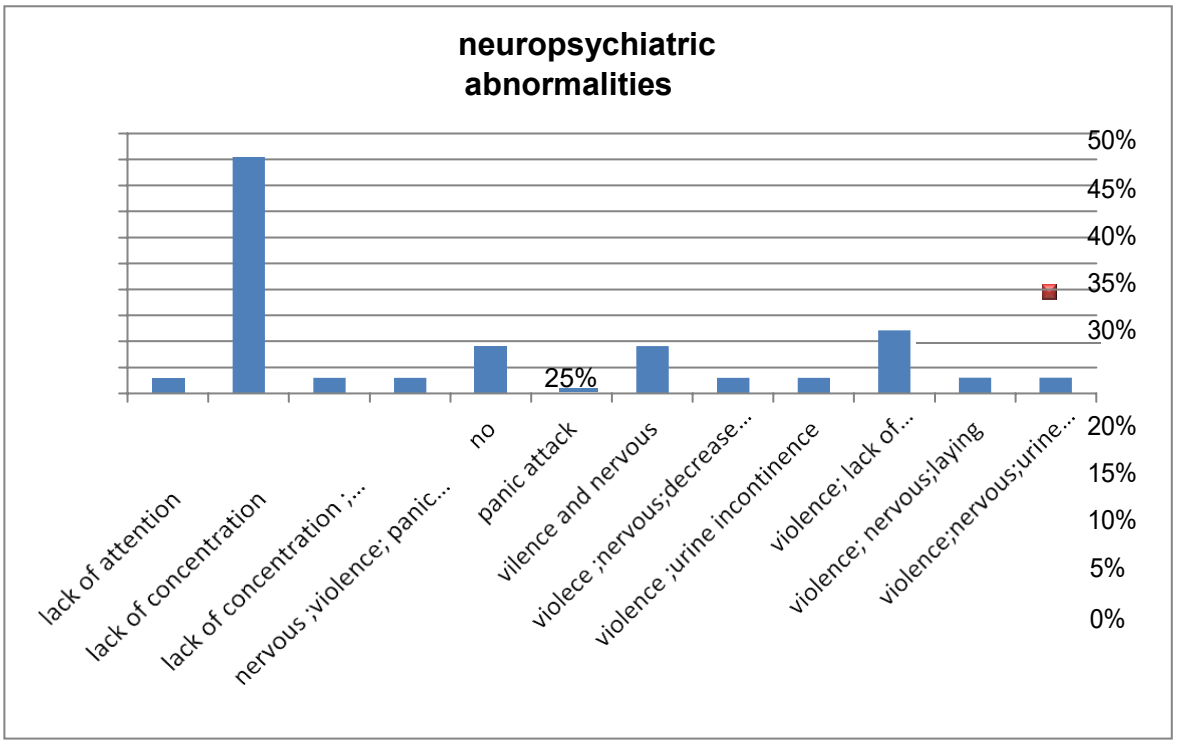

Figure 1. Neuropsychiatric abnormalities among cases group**.**

Table (6): VP, PR, WM, PS and TM among cases group.

	Rang	**Mean ± SD**
VP	12- 37	24.73± 6.06
PR	14 – 33	23.82± 5.23
WM	8- 22	16.58± 3.73
PS	8– 14	11.18± 1.66
TM	27– 102	74.94± 16.27

This table shows that VP ranged between 14 and 37 with mean (24.73± 6.06), PR ranged between 14 and 33 with mean (23.82± 5.23), WM ranged between 8 and 22 with mean (16.58± 3.73), PS ranged between 8 and 14 with mean (11.18± 1.66) and TM ranged between 27 and 102 with mean (74.94± 16.27).

Table 7. Comparison between Cases group and Controls group regarding Total IQ.

		Cases group	**Controls group**	**t.test**	**P. value**
Total IQ	**Mean ± SD**	85.30± 8.58	105.52±13.13	-7.401	.000

Mean value of total IQ was statistically lower among cases group than controls group.

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

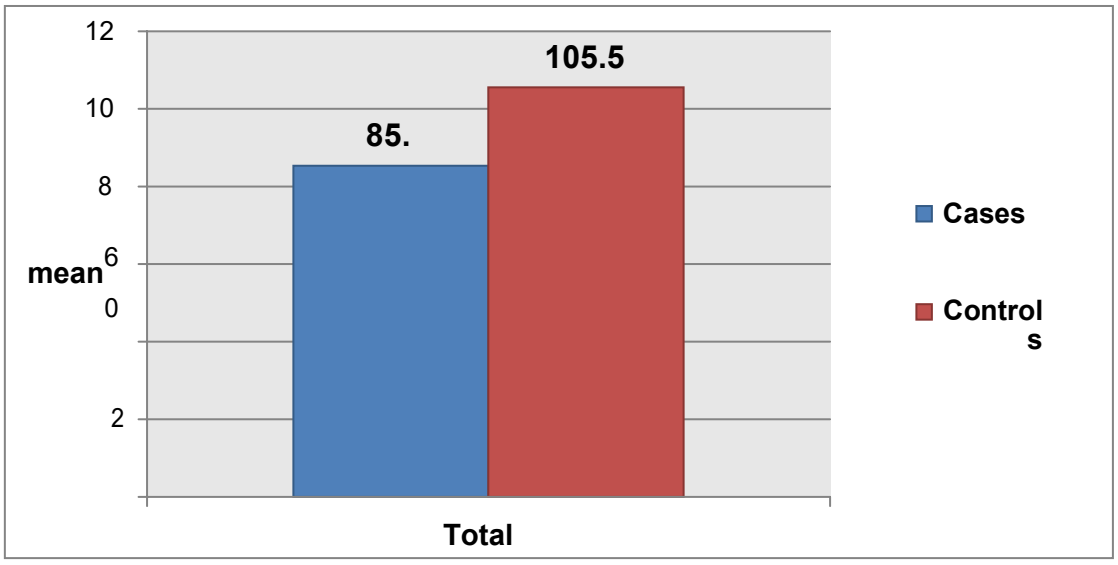

Figure 3. Comparison between Cases group and Controls group regarding Total IQ.

	Total IQ	
	r	p
age * Total IQ	-.411-	.017
duration * Total IQ	-.407-	.019
VP * Total IQ	.898	.000
PR * Total IQ	.919	.000
WM * Total IQ	.801	.000
PS * Total IQ	.348	.047
TM * Total IQ	.873	.000

Table 8. Correlation between Total IQ and other numerical variables.

This table shows that there was statistically significant positive correlation between total IQ and (VP, PR, WM, PS and TM) and negative correlation between total IQ and (age, duration).

Table 9. Comparison between male and female regarding Total IQ.

		Male	Female	t.test	P. value
Total IQ	**Mean ± SD**	85.33±9.26	85.25± 7.63	0.0254	0.979

There was no statistically significant difference between male and female regarding Total IQ.

Table 10. Relation between neuropsychiatric abnormalities and Total IQ.

		neuropsychiatric abnormalities		t.test	P. value
		No	Yes		
Total IQ	**Mean ± SD**	85.53±8.95	80.1± 2.4	2.7600	0.009

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

There was statistically significant difference between neuropsychiatric abnormalities and Total IQ.

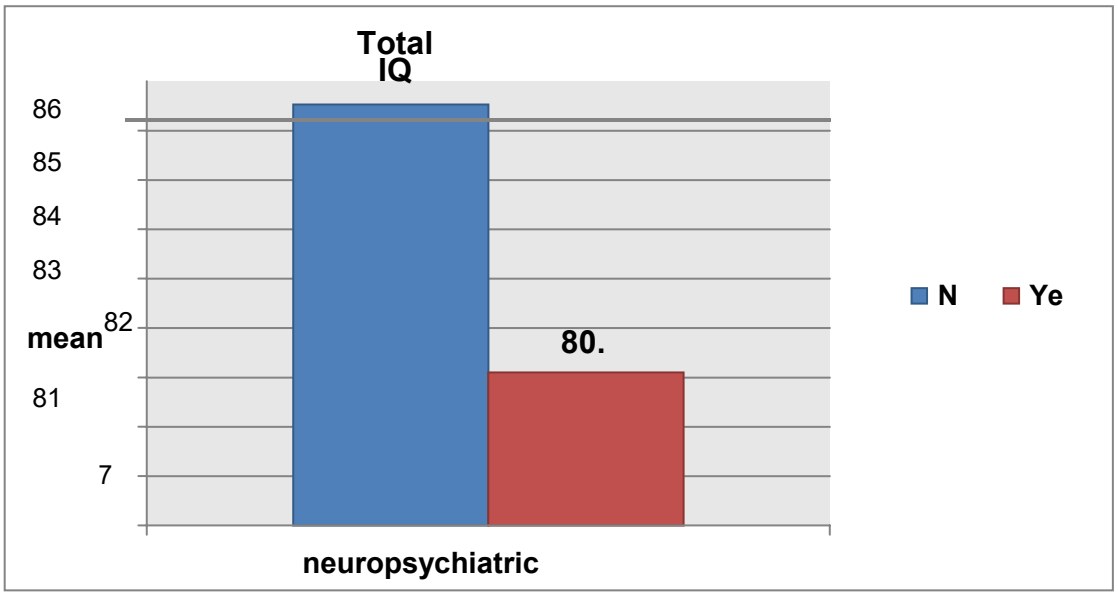

Figure 4.Relation between neuropsychiatric abnormalities and Total IQ.

Table 11. Relation between type of drugs and Total IQ**.**

		Total IQ Mean ± SD	t.test	P. value
sodium valproate	**Yes(19)**	84.26±8.90	-.806	.426
	No(14)	86.71±8.23		
levetiracetam	**Yes(10)**	84.20±8.69	-.481	.634
	No(23)	85.78±8.68		
topiramate	**Yes(10)**	84.10±7.34	-.525	.603
	No(23)	85.83±9.17		
clonazepam	**Yes(3)**	92.33±2.30	1.518	.139
	No(30)	84.60±8.67		
risperidone	**Yes(2)**	81.00±14.14	-.726	.473
	No(31)	85.58±8.40		
diazepam	**Yes(1)**	99.00±.	1.665	.106
	No(32)	84.88±8.35		
valproic acid	**Yes(3)**	80.00±3.00	-1.127-	.268
	No(30)	85.83±8.80		
oxcarbazepine	**Yes(1)**	77.00±.	-.982	.334
	No(32)	85.56±8.58		
pregabalin	**Yes(1)**	82.00±.	-.386	.702
	No(32)	85.41±8.69		

Therewasnostatisticallysignificantdifferencebetweentypeofdrugs and Total

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Table 12. Relation between type of drugs and age.

		age Mean ± SD	t.test	P. value
Sodium valproate	**Yes(19)**	10.05± 2.19	.253	.802
	No(14)	9.86± 2.17		
levetiracetam	**Yes(10)**	11.20± 2.44	2.300	.028
	No(23)	9.43± 1.83		
topiramate	**Yes(10)**	9.80± 1.87	-.294	.771
	No(23)	10.04± 2.30		
clonazepam	**Yes(3)**	10.00± 1.73	.025	.980
	No(30)	9.97± 2.22		
risperidone	**Yes(2)**	11.00± .000	.691	.495
	No(31)	9.90± 2.21		
diazepam	**Yes(1)**	7.00± .	-1.420	.166
	No(32)	10.06± 2.12		
valproic acid	**Yes(3)**	11.00± 2.00	.864	.394
	No(30)	9.87± 2.17		
oxcarbazepine	**Yes(1)**	11.00± .	.479	.635
	No(32)	9.94± 2.18		
pregabalin	**Yes(1)**	8.00± .	-.925	.362
	No(32)	10.03± 2.16		

Therewasnostatisticallysignificantdifferencebetweentypeofdrugs and age. While there was statistically significant difference between type of drugs (levetiracetam) andage

Table 13. Distribution of number of drugs among the studied cases.

		No.	%
number of drugs	**1.00**	17	51.5
	2.00	15	45.5
	3.00	1	3.0

This table shows that distribution of number of drugs among the studied cases, 1 was 17 (51.5%), 2 was 15 (45.5%) and 3 was 1 (3.0%).

Table 14. Comparison between Cases on one drug and Cases on two drugs or more regarding Total IQ.

		Cases on one drug	Cases on two drugs or more	t.test	P. value
Age	**Mean ± SD**	9.24± 2.07	10.75±2.01	-2.123	.042

Mean value of total IQ was statistically higher among cases on one drug than cases on two drugs or more (88.24, 82.19) P= 0.041.

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Table 15. Comparison between Cases on one drug and Cases on two drugs or more regarding age.

		Cases on one drug	Cases on two drugs or more	t.test	P. value
Age	**Mean ± SD**	9.24± 2.07	10.75±2.01	-2.123	.042

Mean value of age was statistically lower among cases on one drug than cases on two drugs or more (9.24, 10.75) P= 0

4. Discussion

Primary epilepsy is one of the most common and serious neurological disorder in childhood, that many children with epilepsy are affected by various neuropsychiatric comorbidities, which significantly affect the quality of their lives. Above all, cognitive impairments, such as memory impairments, mental slowness, and attention deficits, are the most common comorbid disorders in epilepsy [7].

Many children with epilepsy are affected by various neuropsychiatric comorbidities, which significantly affect the quality of their lives. Above all, cognitive impairments, such as memory impairments, mental slowness, and attention deficits, are the most common comorbid disorders in epilepsy. Therefore, it is crucial to explore the factors leading to cognitive impairment. Various factors can have a debilitating effect on cognitive function in epilepsy, including underlying structural lesions and disorders that cause epilepsy, severity of epileptic activity, psychosocial factors, and surgical or pharmacological treatment of seizures [3].

Direct comparison of children with epilepsy with typically developing children frequently shows IQ to be significantly lower in the children with epilepsy. This IQ difference is usually attributed to the effect of epilepsy on cognition. The possibility a that lower IQ in children with idiopathic epilepsies may be related to genetic factors, socio-economic status, or other familial or environmental factors has not been examined to determine whether etiologies other than the epilepsy itself affect child IQ [10].This was a Cohort study, we made study of 33 cases with primary epilepsy of different age groups, different onset and duration of the disease on antiepileptic drugs comparing them with a heathy control 33 children group with no disease and calculated their total IQ by Wechsler IQ test. It was carried out in Zagazig university hospitals in the pediatric neurology outpatient clinic.

Results of the current study showed that there was no statistically significant difference between Cases group and Controls group regarding sex. There was predominance in males 63.6% compared to females 36.4%. Mean age of cases was 9.97± 2.15 years

These results were in agreement with Cheng et al. [11] and Melbourne et al. [12] who assessed cognition in school age children who had epilepsy with predominance of males more than females (51 % and 67% versus 49% and 33% respectively. Mean age of cases were 7±1.25 and 5.5± 2 years respectively.

These results also were in accordance with the results of Sherief et al. [13]study in which there was no difference between age group and sex. The general characteristics of the studied cases were depicted in . Male patients represented 55% of cases; age ranged from 5 to 15

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

years; the mean age at disease onset was 2.96 years; epilepsy was general in 30% and focal in 70% of cases; it was General Idiopathic Epilepsy (GIE) in 16.7%; General Specific Epilepsy (GSE) in 13.3%; Focal Central Epilepsy (FCE) in 10%, Frontal Lobe Epilepsy (FLE) in 16.7% and Temporal Lobe Epilepsy (TLE) in 20%.

We found that duration of disease among cases groups 6.52± 2.29 years, while it was 2± 1.25 years in Melbourne et al study, this difference could be due to the selection criteria f patients among studied groups.

Results of the present study showed that majority of patients in case group were taking risperidone with mean 97 % followed by Sodium valproate with mean 57.6 %.

Results of the current study also, revealed that that neuropsychiatric abnormality was present among (90.9%) of cases group. Lack of concentration was present among (45.5%) of cases group.

These results were in agreement with Dharmadhikari et al. [14]who aimed to aimed measure the prevalence of various psychiatry disorders among children suffering from epilepsy, they reported that the prevalence of childhood psychiatric disorder among children with epilepsy found to be 31.2%. They also found that having a partial component (73.21%, n = 164) in seizure has more chances of psychopathology in comparison to generalized seizure (8.1%, n = 18). Among them, those having a partial component with generalization (66.96%, n = 150) had a greater prevalence of psychopathology. Mental retardation was most common psychiatric disorder among psychopathology followed by manic/depressive illness (unipolar) followed by unspecified nonorganic psychosis.

David et al. [15]found in their study on epilepsy in children that multiple behavioral problems have occurred in children with epilepsy. They reported mood fluctuations, hyperactivity, and irritability along with decreased attention span and selective difficulty with mathematics. They described distractibility, inattention, aggression, and mood lability in children with epilepsy and noted neuroticism, aggression, and hyperactivity, and thought that neuroticism was relatively more associated with absence seizuresThe high prevalence of mood disorders, autism, and ADHD in these patients is well recognized. These problems were historically considered as secondary findings; however, seizures and neurobehavioral presentations are now considered to be different biological components of specific types of epilepsy [16]**.**

Kang et al. [17]reported that the incidence of ADHD was high (45.7%) in children with epilepsy of unknown or genetic etiology, and that this disorder was significantly associated with poor performances on auditory selection attention, interference, and spatial working memory. This is consistent with other studies involving pediatric patients and demonstrates clearly that children with ADHD and epilepsy demonstrate poorer auditory attention and working memory than either epileptic children without ADHD or ADHD children without epilepsy.

Results of the current study showed that mean VP was (24.73± 6.06), PR ranged between 14 and 33 with mean (23.82± 5.23), WM ranged
between 8 and 22 with mean (16.58± 3.73), PS ranged between 8 and 14
with mean (11.18± 1.66) and TM ranged between 27 and 102 with mean (74.94± 16.27). Also, we found that the mean value of total IQ was statistically lower among cases group than the control group and there was statistically positive correlation between total IQ and (VP, PR, WM, PS and TM) and negative correlation between total IQ (age, duration).

These results were consistent with Blaise et al. [18]study who in which they found that as the group of children with symptomatic epilepsy had lower IQs when tested within two weeks after they had their first attack of seizures. The lower mean IQ scores in symptomatic

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

epileptic populations were probably caused by preexisting deficits rather than by either clinical seizures or drug therapy.

A case-control study conducted in North India demonstrated that children with generalized epilepsy have lower IQ scores than their controls with not epilepsy. A linear decline in IQ is also seen among people who developed epilepsy. Epilepsy also found more associated with male gender and that was consistent with our study. Children with ID those had family history of mental illness, mental retardation and epilepsy shown higher chances of having epilepsy [19].

Sarhan et al. [20] **s**tudy results were in agreement with our results, children with prolonged duration and earlier onset of epilepsy performed worse on Developmental Profile-3 assessment as they showed significantly delayed cognition, in addition to more attention problems and low IQ. Increased frequency associated with delayed cognitive, social, and communication development, low IQ, and attention problems were observed. Moreover, those with polytherapy were more significantly affected as regards cognition, communication, IQ, attention, social problems, thought problems, and anxiety depression.

Results of the present study showed that there was no statistically significant difference between type of drugs and Total IQ.

These results were in agreement with Sarhan et al. [20]study results, since no significant differences were found between effects of sodium valproate and carbamazepine, but a high dose of valproate was associated with higher incidence of low IQ and cognitive and attention problems. Cognition, communication, and attention were more affected in patients with generalized epilepsy in comparison with those with partial epilepsy.

Eddy et al. [18]reported that the older agents likely to have the greatest cognitive toxic potential are phenobarbital and perhaps primidone. Carbamazepine has the potential to lead to mild but sometimes significant difficulties relating to motor speed and performance on more attention- demanding tasks. The cognitive effects associated with phenytoin may be more obvious but are generally restricted to visually guided motor functions. Minimal difficulties are also likely with sodium valproate taken at low doses. Further investigation is needed, but ethosuximide may be the older drug that shows the best cognitive profile.

With regards to newer drugs, topiramate is associated with more consistent evidence of detrimental influences on cognition. Little data are available at present for zonisamide, but findings so far indicate that adverse long-term effects are possible. Study findings for tiagabine are relatively promising, with the potential for positive effects on verbal fluency and visuomotor performance, although it is unclear whether these may be the result of seizure control [18].

There is currently limited evidence of CAEs with the use of clobazam and reported ‘abnormal thinking’ in association with pregabalin requires further specification. There is only limited evidence that vigabatrin interferes with cognition and this agent may exert a range of cognition-enhancing effects, including improvements in memory and mental flexibility. However, its use is restricted owing to reported visual field defects. More favorable options may include gabapentin and oxcarbazepine, which have been associated with only minor cognitive difficulties. Based on the evidence reviewed, the agents least likely to interfere with cognitive processes are levetiracetam and lamotrigine [18].

We found that there was no statistically significant difference between type of drugs and age. While there was statistically significant difference between type of drugs (levetiracetam) and age.

These results were to some extent to the results of Eddy et al. [18]study in which they reported that the most consistent evidence of widespread positive effects on cognition is for

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

levetiracetam, which may be particularly beneficial in cases with existing cognitive limitations.

Results of the current study showed that distribution of number of drugs among the studied cases, 1 was 17 (51.5%), 2 was 15 (45.5%) and 3 was 1 (3.0%). Mean value of total IQ was statistically higher among cases on one drug than cases on two drugs or more (88.24, 82.19) P= 0.041.

These results were in accordance with Scherif et al. [11] Study in which majority of cases (45.0%) received one antiepileptic drugs, two drugs reported in 40% and three drugs in 15%; fits in the last 12 months were 0-1 in 46.7; 2-9 in 33.3% and 10 in 20.0%; total IQ score ranged from

55 to 97 (the mean was 77.96±13.26); it was normal in 33 cases (55.0%);borderline in 7 cases (11.7%); mild mental retardation in 9 cases (15.0%) and moderate to severe MR in 11 cases (18.3%).Also, in our study we found that the use of the antiepileptic drugs even single drug or multiple drugs can affect negatively of the IQ of the children especially when taken for a long period.

David et al.[13] study showed that a partial agreement with our study results. There are many methodological limitations in the literature of AED effects in children using older treatment options that have prevented firm conclusions from being drawn, and many older studies have relied solely on IQ, which tends to be an insensitive measure to all but the most significant neuropsychological impairment [19]. In addition, no comparative randomized, controlled trials have been conducted in children using newer AEDs available in the United States. The most recent generation of AEDs tend to have more favorable cognitive profiles than older treatment options, although even newer AEDs with little or no consistent neuropsychological side effects may not be completely benign cognitively.

Whether relatively small cognitive effects result in cumulative neuropsychological difficulty or decreased academic performance in children has not been properly investigated and is largely unknown. There is a critical need for appropriate prospective long-term studies of AEDs and cognitions in different applications to determine which drugs and which factors may affect school performance and social adjustment during the school years. Treating children with AEDs associated with better neuropsychological outcomes will maximize school performance, decrease the need for special services in school, and increase quality of life for both patients and their families.

5. Conclusion

Childhoodepilepsyisassociatedwithcognitivedeficits,intellectual decline, and behavioral problems, which are multifactorial, such as age of onset, frequency, type of seizure, prolonged seizures, antiepileptic drugs, and duration ofepilepsy.

Funding: No funding was received for this study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

References

[1]. El-Hagrassy, Mirret M., Ana C. Texeira-Santos, and Felipe Fregni. (2018)."Epilepsy." Clinical Trials in Neurology. Humana Press, New York, NY, 445-517.

[2]. Amir A Sarhan, 10Mostafa M Ayouty, 10Ashraf A Elsharkawy, 10Dina S

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

AbdElmagid (2015).Department of Pediatrics, Faculty of Medicine, Mansoura University, Mansoura, Egypt.

[3]. Kim, E. H., &Ko, T. S. (2016). Cognitive impairment in childhood onsetepilepsy:up-to-dateinformationaboutitscauses.Koreanjournal of pediatrics , 59(4),155–164.

[4]. Gregory L. Holmes , (2016).Department of Neurological Sciences, University of Vermont College of Medicine, Burlington, Vermon.

[5]. Gwenith G. Fisher, ... Dorey S. Chaffee, (2019). inWork Across the Lifespan, .

[6]. . Dr. Edwin van Thiel, updated February 18, (2019).

[7]. Stafstrom, C. E., &Carmant, L. (2015). Seizures and epilepsy: an overview for neuroscientists. Cold Spring Harbor perspectives in medicine, 5(6),a022426.

[8]. Walker, N. M., Jackson, D. C., Dabbs, K., Jones, J. E., Hsu, D. A., Stafstrom, C. E., Sheth, R. D., Koehn, M. A., Seidenberg, M., & Hermann, B. P. (2013).. Is lower IQ in children with epilepsy due to lower parental IQ? A controlled comparison study. Developmental medicine and child neurology, 55(3),278–282.

[9]. Cheng, Dazhi; Yan, Xiuxian; Gao, Zhijie; Xu, Keming; Zhou, Xinlin; Chen, Qian (2017). Common and distinctive patterns of cognitive dysfunction in children with benign epilepsy syndromes. Pediatric Neurology, (5),S0887899416305550–.

[10]. MelbourneChambers,R.;Morrison-Levy,N.;Chang,S.;Tapper,J.; Walker, S.; Tulloch-Reid, M. (2014). Cognition, academic achievement, and epilepsy in school-age children: A case–control study in a developing country. Epilepsy & Behavior, 33(),39–44.

[11]. Sherief M. Al-Shazely and Hani Al-Khaligy, (2014) . Intelligence QuotientinChildrenwithEpilepsy.CurrentResearchinNeuroscience, 4:10-

[12]. Dharmadhikari, A. S., & Sinha, V. K. (2017). Psychiatric Comorbidity in Children with Epilepsy: A Cross-sectional 5 Years Rural Prevalence Study. Journal of neurosciences in rural practice, 8(2),179–184.

[13]. Davies S, Heyman I, Goodman R. (2003) .A population survey of mental health problems in children with epilepsy. Dev Med Child Neurol ;45:292e5.

[14]. Kang, S. H., Yum, M. S., Kim, E. H., Kim, H. W., &Ko, T. S. (2015). Cognitive function in childhood epilepsy: importance of attentiondeficithyperactivitydisorder.Journalofclinicalneurology (Seoul, Korea), 11(1),20–25.

[15]. Blaise F. D. Bourgeois; Dr. Arthur L. Prensky; Helen S. Palkes; Barbara K. Talent; Suzanne G. Busch (1983). Intelligence in epilepsy: A prospective study in children. 14(4),438–444.

[16]. Lakhan R. (2013). Intelligence quotient is associated withepilepsy in children with intellectual disability in India. Journal of neurosciences in rural practice, 4(4),408–412.

[17]. Sarhan AA, Ayouty MM, Elsharkawy AA, AbdElmagid DS. (2015), Neurodevelopmental and neurobehavioral aspects of childhood epilepsy. Benha Med J;32:13-9.

[18]. Eddy, C. M., Rickards, H. E., &Cavanna, A. E. (2011). The cognitive impact of antiepileptic drugs. Therapeutic advances in neurological disorders, 4(6),385–407.

[19]. Fonseca Wald, E., Hendriksen, J., Drenthen, G. S., Kuijk, S., Aldenkamp, A. P., Vles, J., Vermeulen, R. J., Debeij-van Hall, M., &Klinkenberg, S. (2019). Towards a Better Understanding of Cognitive Deficits in Absence Epilepsy: a Systematic Review and Meta-Analysis. Neuropsychology review, 29(4), 421–449.