

## Study Of Depression in Attention Deficit Hyperactive Disorder Subtypes in Sample of Children Patients

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Received for publication June 16, 2020; Accepted September 4, 2020; Published online September 4, 2020.

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**doi:** 10.21608/aimj.2020.32627.1249

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### ABSTRACT

**Background:** Attention deficit hyperactivity disorder (ADHD) has three subtypes : hyperactive, inattentive and mixed types each of them has role in development and presence of depression.

**Aim of work:** To detect the association between each subtype and presences of depressive disorder.

**Patient and Methods:** This study comparative study done on ADHD patients took place at the outpatient child and adolescent psychiatric clinic at Al-Hussien University Hospital in Cairo, were recruited from January to June 2017. The children was assessed at first by Psychiatric semi-structured clinical interview then Complete medical and neurological examination, The Arabic version of MINI Kid were applied on children with ADHD.

**Results:** The total sample size at time of study was 96 child only 64 child which fit the inclusion criteria then they divided into three groups depending on the type of ADHD according to mini kid scale. Group 1 hyperactive type was 18.7%, Group 2 inattentive type was 56.3% and Group 3 mixed type was 25%. Male sex was more predominant, depression was more prevalent in inattentive type of ADHD in all the sample while inside each group depressed patients present in hyperactive group more than non-depressed patients. There was positive correlation between age and presence of depression in hyperactive type, while there was a negative correlation with the other two groups.

**Conclusion:** ADHD subtypes affect development of depression as found that The inattentive participants more susceptible for depression. Moreover, Age may be risk factor for depression in hyperactive type.

**Keywords:** Attention deficit hyperactivity disorder (ADHD); ADHD subtypes; depression; comorbidity.

**Disclosure:** The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.

**Authorship:** All authors have a substantial contribution to the article.

### INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is one of the most common diagnoses made in the field of child psychiatry. However, it appears to be more challenging to diagnose and to treat ADHD, especially when it is comorbid with depressive disorder.<sup>1</sup> Children with Attention Deficit Hyperactivity Disorder (ADHD) are 4 times more likely to develop depression than other adolescents with a 5 to 47 percent probability of having a major depressive episode,<sup>2</sup> and in another prevalence study, there was 9.4% of those with ADHD were found to have major depressive episodes.<sup>3</sup>

Children with hyperactive or mixed type of ADHD may be suspected to be confronted with more behavioral and emotional problems later on in life more than the attention-deficit type of ADHD.<sup>4</sup> On the other hand, children with attention-deficit type are more prone to social problems such as loneliness

and social isolation compared to the other two subtypes, meanwhile, they are not responding well to stimulants although they share the cognitive rhythm slowness with hyperactive and mixed types of ADHD.<sup>5</sup> So children with ADHD, attention-deficit Type, mostly have comorbid depression and/or anxiety and they may respond better to psychotherapy targeting the comorbid anxiety and/or depression than other ADHD children. Mixed type of ADHD is considered the most common type representing more than half of the diagnosed cases where patients exceeded the lower limit of diagnostic criteria on both domains.<sup>1</sup> Meeting these disorders together can complicate the diagnosis and treatment process dramatically.<sup>6</sup>

On the other hand, when a mood disorder complicates ADHD, the mood disorder must be addressed first, however, parents of ADHD children

appeared to be more annoyed with ADHD symptoms and willing to target it first in the treatment.<sup>7</sup> Nearly 25% of children with ADHD suffer from a bipolar mood disorder. Children who have bipolar disorder with ADHD are more aggressive and more prone to behavioral problems than their ADHD counterparts. While anxiety Disorder, which was found to be prevalent among girls with type 2 ADHD, is often overlooked.<sup>8</sup>

This study aimed to detect the relation between depressive disorder and each subtype of Attention Deficit Hyperactivity Disorder.

### PATIENT AND MATERIALS

Type of study: comparative study that compares the incidence of depression in each type of ADHD children

Sample:

The study took place at the outpatient child and adolescent psychiatric clinic at Al-Hussien University Hospital in Cairo. At time from January to June 2017. The total number of children patients was 96 child, age between 6 and 18 years old. The presenting complaints of children's' parents were mostly behavioral abnormalities and learning difficulties. 9 children were ruled out due to comorbid autistic spectrum disorder ASD that prevented communication, and 18 child had an organic comorbidity affected their mental state. While 5 parents refused to participate in the study and didn't give a written consent. The remaining 64 participant fulfilled diagnostic criteria for ADHD and a written consent was collected from their parents. 36% (n 23) of the sample were girls while 64% (n 41) were boys.

Tools:

The following tools were applied:

Psychiatric semi-structured clinical interview has been done for the diagnosis of ADHD disorder and to rule out other psychiatric disorders.

Complete medical and neurological examination to rule out other medical and neurological diseases.

The Arabic version of The Mini-International Neuropsychiatric Interview for Children and Adolescents (MINI Kid) is a short, structured diagnostic interview for DSM-IV and ICD-10 psychiatric disorders in children and adolescents.<sup>9</sup>

3a- at first we applied ADHD part of the MINI KID test to confirm the diagnosis of ADHD in children, this part consist of 18 questions for parents, 9 questions addressing hyperactivity and impulsivity and 9 questions addressing inattention.

3b- After confirmation of ADHD diagnosis, a nine question depression test of MINI KID was applied on children with ADHD.

Statistical analysis was conducted using SPSS (IBM SPSS for Windows, version 22.0). ANOVA and (r): Pearson Correlation coefficient were used.

### RESULTS

The total sample size was 64 child divided into three groups depending on the type of ADHD according to mini kid scale. Group (1) was 12 pt. (18.7%) hyperactive type, Group (2) was 36 pt. (56.3%) inattentive type and Group (3) was 16 pt. (25%) mixed type. Sociodemographic data appear in Table (1) show that the mean age was highest in group 3 mixed type  $9.93 \pm 2.01y$  and the lowest was group 1 hyperactive type  $8.91 \pm 3.4 y$ . according to sex the three groups were more prevalent in male than female participants, almost 2: 1. ADHD diagnosis appeared to be more prevalent among school children living in urban areas. Regarding the level of family education, we found that the inattentive type of ADHD was more prevalent in highly educated parents, while the mixed type of ADHD is more prevalent in parents with lower educational levels.

Depressive disorder found to be more present in inattentive type of ADHD in all the sample while depressive patients more than non-depressive in hyperactive type specifically as it appears in table 2.

When we studying the correlation between age and presence of depression in table 3 we found that depression increases with advance of age in hyperactive type, while there was a negative correlation with the other two groups.

While in table 4, 5, 6 The correlation between sex, education, parent's educational level and presence of depression found that a positive correlation between depression and male sex in all subtypes.

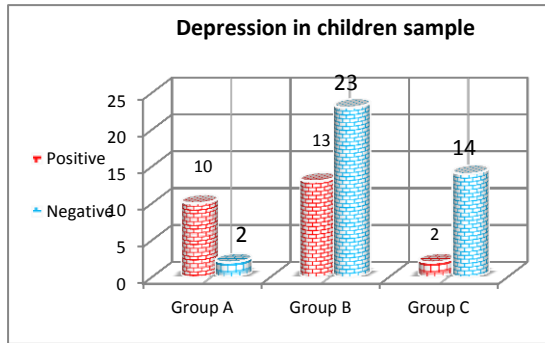
Table (7) shows a correlation between depression and residential area among three groups indicating that depression increases in the urban than the rural area. With statistical significance in mixed type.

	Total sample (N=64)	Group 1 (N=12)	Group 2 (N=36)	Group 3 (N=16)	ANOVA	
					F	P-value
Age	Mean age 9.3	Mean age $8.91 \pm 3.4 y$	Mean age $9.1 \pm 3.4 y$	Mean age $9.93 \pm 2.01y$	0.04	0.9
Sex					chi-square test (X <sup>2</sup> )	
					X <sup>2</sup>	P-value
Male	41	8	23	10	0.05	0.9
Female	23	4	13	6		
Education						
Student	57	10	33	14	0.6	0.7
illiterate	7	2	3	2		
Living area						
Urban area	45	9	24	12	0.5	0.7
Rural area	19	3	12	4		
Family educational level						
High	31	6	18	7	1.8	0.7
Middle	20	3	10	7		
Illiterate	13	3	8	2		
Presence of parents						
Both parent	22	4	13	5	0.7	0.9
Divorced	29	5	17	7		
Died father	13	3	6	4		

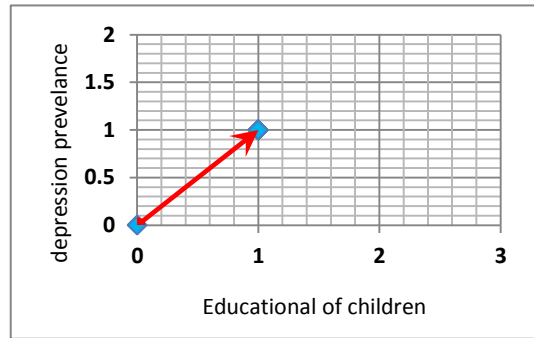
**Table 1:** Sociodemographic data for the sample

	Sample		Group 1 N = (12)		Group 2 N = (36)		Group 3 N = (16)		chi-square test (X <sup>2</sup> )	
	Dep.	No dep	Dep.	No dep.	Dep.	No dep.	Dep.	No dep.	X <sup>2</sup>	p-value
prevalence of depression	25	39	10	2	13	23	2	14	3.9	0.1

**Table 2:** Comparison between children with attention deficit hyperactivity and the incidence of depression.



**Fig.:** Comparison of all children in the study sample according to the prevalence of depressive disorder.



**Fig.:** Relationship between Depression and Education of Child Group 1.

	(r) Pearson Correlation coefficient	p-value
Group 1 (N=12)	0.3	0.2
Group 2 (N=36)	- 0.04	0.7
Group 3 (N=16)	- 0.01	0.9

**Table 3:** Study of the relationship between depression and age in the three subtypes of Attention Deficit Hyperactivity Disorder.

	(r) Pearson Correlation coefficient	p-value
Group 1 (N=12)	0.6	0.01
Group 2 (N=36)	0.1	0.5
Group 3 (N=16)	0.4	0.08

**Table 6:** A study of the relationship between depression and educational level of the family (illiteracy - intermediate education - higher education) in the three study groups.

	(r) Pearson Correlation coefficient	p-value
Group 1 (N=12)	0.3	0.3
Group 2 (N=36)	0.2	0.2
Group 3 (N=16)	0.2	0.2

**Table 4:** relationship between depression and sex among the three study groups.

	(r) Pearson Correlation coefficient	p-value
Group 1 (N=12)	0.2	0.4
Group 2 (N=36)	0.8	0.6
Group 3 (N=16)	0.6	0.006*

**Table 7:** A study of the relationship between depression and housing in the three study groups. \*P-value < 0.05 This indicates that there is a significant statistical significance

	(r) Pearson Correlation coefficient	p-value
Group 1 (N=12)	0.1	< 0.001*
Group 2 (N=36)	0.1	0.2
Group 3 (N=16)	0.4	0.09

**Table 5:** relationship between depression and educational level of the children (educated or non-educated) in the three subtypes of ADHD.

**DISCUSSION**

In this study, participants were divided into three groups as follows: Group (1) was 12 pt. (18.7%) hyperactive type, Group (2) was 36 pt. (56.3%) inattentive type and Group (3) was 16 pt. (25%) mixed type.

Mean age of participants from all groups was 9.3 ± 2.93 years old which is the average age for seeking help for all ADHD patients regardless the ADHD subtype, and age that interfere with social and academic performance. The sex difference was about 2:1 male to female which accepted as general incidence value of many other studies that male develops ADHD twice times more than female.<sup>10</sup>

We found that student ADHD participants (n 57), who visit the school, represent the majority of the sample which may reflect that symptoms of ADHD markedly interfere with educational process and due to occurrence of the complaint in two different occasions. On the other hand, absence of children from school related in some extent to negligence of their parents that leads us to give more care about this population.<sup>11</sup>

The presence of depression was about 39% of total sample, which may be explained by the effect of ADHD as disability that reflected on mood either by lack of normal social life or by more criticism faced by those children in absences of psychological awareness of that disorder.

other study show less percent like Peter Classi, et al. 2012 where the comorbid depression was (16.5%) and conclude that it has poor outcomes on ADHD children that Consistent with what has been observed in other studies, parent report of physician-diagnosed depression was associated with worse outcomes, and it predicted the largest increase in odds of more HCP visits.<sup>12</sup>

Compared with a reported formal diagnosis, a higher percentage of parents reported that their ADHD child was unhappy or depressed (27.4%) or often seemed worried (47.3%). The findings of other studies suggest that 16.5% of ADHD children with physician-diagnosed depression are likely more severely affected.<sup>13</sup>

Comparing the incidence of depression in each study group demonstrates that inattentive type was the most affected group 20.3% of total sample (36% of inattentive pt.), as they the most group in our society that blamed as if they normal children but not follow orders.

While comparing depression in each group separately we found that in group (1) hyperactive type the depressed patients were more than non-depressed, about 80% of group (1) the hyperactive type received the diagnosis of depression as they are more suffered from aggression by others mainly parents and more exposed to dangerous situations and so prohibited.

When we study factors contributing to the development of depression in each group we found that depression increases with age in the hyperactive group which may emphasize the hypothesis of increased levels of stress both with increasing age and stress resulting from problems that hyperactive patients may encounter in their families. And in general presence of depression increase with age as Academic studies indicate that depression associated

with ADHD appears to be more common among children as they age.<sup>14</sup>

Being male gender is also a contributory factor for the development of depression in all types of ADHD as males more involved in social activities and so they more apparent disable.

By analysis of data, there is statistical significance in the correlation between sex housing and development of depression in mixed type, correlation between the educational level of the family and development of depression in hyperactive and mixed type.

Another study provides further evidence that the presence of social and emotional difficulties in children with ADHD contributes to the development of depression and anxiety and subsequently lead to the functional impairment observed in this population.<sup>15</sup>

Greater awareness of these associations, together with focused efforts to identify and manage these children appropriately, could lead to improved patient outcomes (e.g., improved school attendance) and to decreased healthcare utilization.<sup>15</sup>

## CONCLUSION

The study found that there is a relationship between ADHD in children and the presence of depression. The inattentive participants were in general more susceptible for depression than participants from the other two groups. Moreover, Age may be another risk factor for increasing depression incidence in children with ADHD especially those with hyperactive subtype of ADHD. Children visiting the school are more prone to receive the diagnosis of ADHD than those with frequent absence, likewise the level of parent's education is a predictor for diagnosing depression as their sensitivity for the symptoms might be more than those with lower educational level regardless the subtype of ADHD.

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