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## Prevalence of Attention Deficit Hyperactivity Disorder among Primary School Students in Tikrit City, Iraq 2023

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### KEY WORDS:

Prevalence of ADHD in Primary School in Tikrit, ADHD in Primary School.

### ABSTRACT

The schools from which the student chosen were 6 governmental schools (3boys schools, and 3 girls schools) and 2 private mixed schools and the total sample was 400 student were selected randomly. Regarding students who included in the study, a list of questions and information will be taken from the direct teacher about the needed information as age and also questionnaire for the family was sent to fill the information related to ADHD and other general, medical and obstetrical history of the student. Data collection done through a questionnaire concerning personal and other socio-demographic information and taken from teachers and students family. Each involved student will be assessed by using a prepared questionnaire that contains the criteria for the diagnosis of ADHD, according to the American Psychiatric Association, Diagnosed and Statistical Manual of mental disorders DSM-5 Criteria for ADHD. The current study revealed that the proportion of Attention deficit hyperactivity disorder among primary school student was 57/400 (14.2%) and that the proportion of sub types of Attention deficit hyperactivity disorder were inattention disorder 27 (6.8%), Hyperactivity disorder 20 (5%), and combined form was 10 (2.5%). The frequency of Attention deficit hyperactivity disorder was most common at age 6-9 years; 32 cases (56.1%), most of cases were male 30 cases (52.6%), while female was 27 cases (47.4%).

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## INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is the most prevalent childhood psychiatric disorder, affecting approximately 5% to 7% of children worldwide. It is also more frequently associated with psychiatric comorbidities. <sup>(1)</sup> Attention deficit hyperactivity disorder is 6-8 times higher among first-degree relatives with ADHD, where 30-35% of full siblings meet the ADHD criteria. <sup>(2)</sup> A study conducted in Baghdad among school children found that (10.5%) of school children had symptoms of ADHD, the male: female ratio was 1.8:1. Of the total, 48% presented with combined type, 31% predominately hyperactive-impulsive type, and 21% predominately inattentive type <sup>(3)</sup>. Another study done in Baghdad 2020 found that the prevalence of ADHD among pupils in elementary schools was 4.75%, highest percentage of the study sample aged nine years (26%), and (56.3%) were males. Class 1 was the most represented with (26.5%), followed by class 3 with (26.3%), while class 6 was the least represented with (7%). About (93.6%) of pupils live with both parents, and (59.5%) were had enough family monthly income <sup>(4)</sup>. In Tikrit city the prevalence rate of ADHD was 8.67%, boys were mostly affected (65%), commonest age were under 9 years old (49%). Inattention subtype was mostly found in this study (38%) followed by combined (34%) and then hyperactive (28%). Positive family history was found in (43%) of cases. The education level of their mothers was intermediate or secondary school level (37%). The majority of the cases were from the middle socioeconomic status (53%), with poor school performance in (69%) of the cases <sup>(5)</sup>. All these studies showed that male gender was significantly associated with ADHD prevalence. <sup>(4)</sup> <sup>(6)</sup> The aim of this study is to evaluate the frequency of ADHD in primary school aged children.

## PATIENTS AND METHODS

This study is descriptive cross sectional study carried out in the primary schools in Tikrit city, Salah Al-Deen Directorate for Education. Clinical study was carried out from 1st October 2022 to 1st Jun 2023. The schools from which the student chosen were 6 governmental schools (3boys schools, and 3 girls schools) and 2 private mixed schools and the total sample was 400 student

were selected randomly. Regarding students who included in the study, a list of questions and information will be taken from the direct teacher about the needed information as age which will be divided into two groups: 6- < 9, and 10- 13, years, gender, and school performance depending on student marks. Also questionnaire for the family was sent to fill the information related to ADHD and other general, medical and obstetrical history of the student. Data collection done through a questionnaire concerning personal and other socio-demographic information and taken from teachers and students family. Each involved student will be assessed by using a prepared questionnaire that contains the criteria for the diagnosis of ADHD, according to the American Psychiatric Association, Diagnosed and Statistical Manual of mental disorders DSM-5 Criteria for ADHD. <sup>(7)</sup> The interpretation of diagnostic tool, done based on that the ADHD criteria have 18 items including 9 for inattention type, 9 for hyperactive, and that all of these items are used for combined type. Children who collect scores of 6 on the "inattention" will regarded to have an inattentive subtype of ADHD.

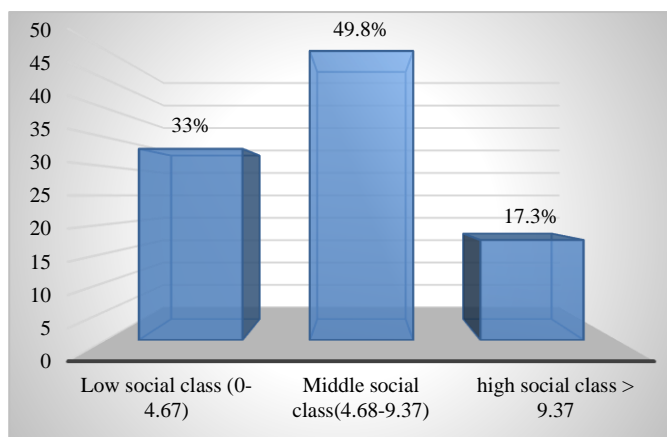
Children who collect scores of 6 on the "hyperactivity-impulsivity" will regarded to have the hyperactive subtype. Whereas children who collect scores of 6 on both inattention and hyperactive items will be considered to have a combined subtype.

## RESULTS

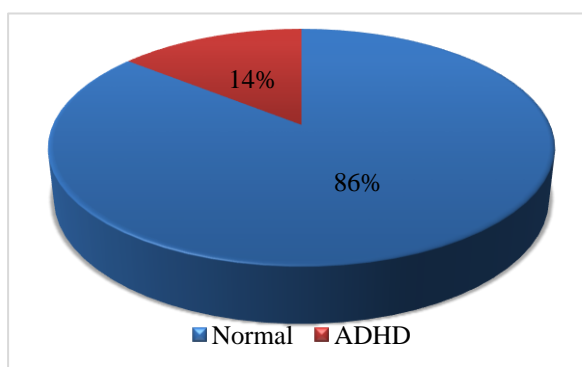
The total number of cases were 400 student. The age 6-9 years was 259 (64.8%), and those aged 10-12 years was 141 (35.3%). Male students was 194 (48.5%), and female 206 (51.5%). Most of the mothers 123 (30.8%) had primary or read and write, followed by intermediate school 90 (22.5%) as in table 1. Study sample distribution according to social class show that 132(33%) within low social class score (0-4.67), middle social class (4.68-9.37) was 199 (49.8%), and high social class (>9.37) 69 (17.3%), as shown in figure 1. The proportion of ADHD among primary school student was 57 (14.2%), as shown in figure 2. The proportion of ADHD sub-types were inattention disorder 27 (6.8%), Hyperactivity disorder 20 (5%), and combined form was 10 (2.5%), as shown in figure 3.

**Table 1.** The general characteristics of the study sample

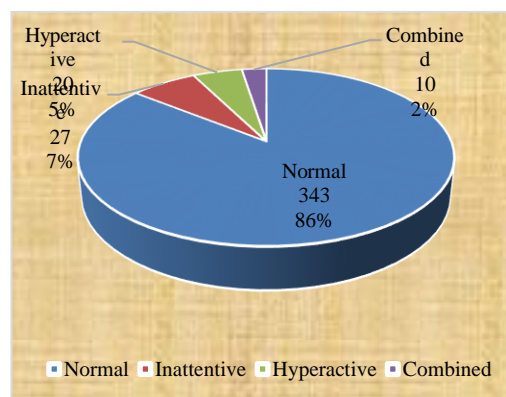
		Number	Percent
Age	6-9 years	259	64.8
	10-12 years	141	35.3
Class	1st grade	75	18.8
	2nd grade	91	22.8
	3rd grade	89	22.3
	4th grade	64	16.0
	5th grade	38	9.5
	6th grade	43	10.8
Gender	Male	194	48.5
	Female	206	51.5
	Illiterate	27	6.8
Mother education	Primary or read and write	123	30.8
	Intermediate	90	22.5
	High school or vocational	33	8.3
	Institute (2 years)	33	8.3
	College (Bachelor degree)	78	19.5
	College (Master degree)	16	4.0
	<b>Total</b>	<b>400</b>	<b>100.0</b>



**Figure 1.** No Title



**Figure 2.** The proportion of ADHD among sample of study.



**Figure 3.** The proportion of ADHD according to the subtypes.

The distribution of the study groups according to age of the student and ADHD status show that the students with ADHD at age 10-13 years was 25(43.9%) higher than that reported among non ADHD 116 students (33.8%), this relation was statistically not significant (P value > 0.05). Most of the ADHD 30 cases (52.6%) were male and 27 cases (47.4%) female in comparison to 164 student (47.8%), and 179 student (52.2%) of the normal students respectively, this relation was statistically non- significant (p value > 0.05). Most of the ADHD student had middle social class 31 cases (54.4%), followed by low social class 22 cases (38.6%), and high social class 4 cases (7%), while among normal students was 168 student (49%), 110 student (32.1%), and 65 student (19%) respectively, this relation was statistically non-significant (p value > 0.05), as shown in table 2.

Table 2. Socio-demographic characteristics of ADHD versus non-ADHD students

General Characteristics		Non ADHD		ADHD		P value(X <sup>2</sup> )
		Number	Percent	Number	Percent	
Age	6-9 years	227	66.2%	32	56.1%	0.14(2.16)
	10-13 years	116	33.8%	25	43.9%	
Sex	Male	164	47.8%	30	52.6%	0.5(0.454)
	Female	179	52.2%	27	47.4%	
Social Class	Low Social Class(0-4. 67)	110	32.1%	22	38.6%	0.08(4.9)
	Middle Social Class(4.68-9.37)	168	49.0%	31	54.4%	
	High Social Class > 9.37	65	19.0%	4	7.0%	
Total		343	100.0%	57	100.0%	

The mother education of ADHD students had higher proportion of Intermediate 16 cases (28.1%) than non ADHD student 74 (21.6%), High school or vocational 16(12.3%) versus 26(7.6%), this relation was statistically not significant (P value > 0.05). Most of the ADHD students had bad

performance; fail 21 cases (36.8%), acceptance 22 cases (38.6 %) in comparison to 28 student (8.2%), 78 student (22.7 %) respectively of the students without ADHD, this relation was statistically significant (P value < 0.05), as shown in table 4.9.

Table 3. The relation of ADHD with mother education versus non- ADHD

Family environment		Non ADHD		ADHD		P value(X <sup>2</sup> )
		Number	Percent	Number	Percent	
Mother Education	Illiterate	24	7.0%	3	5.3%	0.23(7.77)
	Primary or read & write	110	32.1%	13	22.8%	
	Intermediate	74	21.6%	16	28.1%	
	High school or vocational	26	7.6%	7	12.3%	
	Institute (2 years)	26	7.6%	7	12.3%	
	College (Bachelor degree)	67	19.5%	11	19.3%	
College (Master degree)	16	4.7%	0	0.0%		

Table 4. The Relation of ADHD with School Performance versus Non- ADHD

School performance	Non ADHD		ADHD		P value(X <sup>2</sup> )
	Number	Percent	Number	Percent	
Fail	28	8.2 %	21	36.8 %	0.001(53.24)
Acceptance	78	22.7 %	22	38.6 %	
Good	93	27.1 %	6	10.5 %	
Very Good	92	26.8 %	5	8.8 %	
Excellence	52	15.2 %	3	5.3 %	
Total	343	100 %	57	100 %	

## DISCUSSION

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neuropsychiatric disorder affecting pre-school teenagers, children, and adolescents around the world. ADHD is characterized by reduced sustained attention and hyperactivity that interferes with functioning or development. The three basic forms of ADHD described in the Diagnostic and Statistical Manual of mental disorder, Fifth Edition (DSM-5) are: predominantly

inattentive (ADHD-I), hyperactive/impulsive (ADHD-H), and combined type (ADHD-C).<sup>(8)</sup>

The etiology of ADHD is not known, however, it is a result of a complex interaction between genetic, environmental, developmental traits, and genetic factors. About 80% of ADHD are due to genetic factors. A previous study from United State indicated that TV usage, participation in sports, two-parent family structure, and family members' smoking status were significantly associated with ADHD<sup>(9)</sup>. Other researchers from

Egypt also reported associations between ADHD and factors like a low socioeconomic level, higher birth order, male gender, smoker fathers, consanguineous parents, family history of ADHD, low birth weight, artificially fed children, and pupils living with a single parent.<sup>(10,11)</sup>

Other factors that have been found to have an association with ADHD include watching TV, cyanosis, and head trauma, being male, living with a single parent, childbirth order/rank, and low family socioeconomic status.<sup>(12)</sup> The current study revealed that the proportion of ADHD among primary school student was (14.2%). This agrees with Adnan H in 2020 in Iraq-Hilla city revealed that the overall prevalence of ADHD in the study group was 14%.<sup>(13)</sup> This prevalence was less than that reported by what revealed by Yadegari N<sup>(14)</sup> in 2018 in Iranian children, who analyzed 27 articles published between the years of 2001 and 2016, and the total sample size was 15124 students whose ages ranged from 6-14 years old. The prevalence of ADHD based on parents and teachers' consensus was 12%, from parents' perspective 15.6%, and from teachers' perspective 17.2%<sup>(14)</sup>. Awadalla, NJ<sup>(15)</sup> in 2016 studied (873) primary schoolchildren were observed for ADHD by trained teachers found that the overall prevalence of ADHD suspected by teachers was 12.6%, which was higher than found by El-Tallawy HN in 2005 that 6% reported by a study in Assiut City in Egypt.<sup>(16)</sup> Homidi M<sup>(17)</sup> in 2013 found that the prevalence of ADHD was estimated to be 11.6%.

Aljadani<sup>(18)</sup> in 2023 in Saudi Population, in a Systematic Review and Meta-analysis in which fourteen studies (N = 455,334 patients) were included. The pooled prevalence of ADHD in the Saudi population was 12.4% (95% CI: 5.4%–26%). The current study revealed that the proportion of sub types of ADHD were inattention disorder 27(6.8%), Hyperactivity disorder 20(5%), and combined form was 10(2.5%). This is higher than what found by Cerrillo-Urbina<sup>(110)</sup> in 2018 revealed that the prevalence of children with probable ADHD symptoms was 5.4% (2.6% inattention subtype symptoms, 1.5% hyperactivity/impulsivity subtype symptoms, and 1.3% combined subtype symptoms). Rafi Khaleel Al-Ani, in 2021 found that Inattention subtype was mostly found in this study (38%) followed by combined (34%) and then hyperactive (28%).<sup>(19)</sup>

Yadegari N<sup>(14)</sup> in 2018 in Iranian children found that the subgroups' prevalence rates based on parents and teachers' consensus were as follows: Attention deficit was 4.2%, hyperactive impulsive (HI) was 4.1%, and combined type was 3.5% and that ADHD was more prevalent in boys than girls (7.9% versus 5.5%).<sup>(14)</sup>

Homidi M.<sup>(16)</sup> in 2013 found the subtypes results indicate: a prevalence of 6.3% for

Attention deficit, a prevalence of 2.2% for hyperactive impulsive. The third type that is the combined hyperactive/impulsive and inattentive type of ADHD has a prevalence of 3.1%. The results show that there is a difference between ADHD prevalence among primary school children due to the difference in age.

Aljadani<sup>(18)</sup> in 2023 found Inattentive disorder and Hyperactive presentations, was 2.9% and 2.5%, respectively. Regarding the combined form of ADHD was 2.5%<sup>(18)</sup>.

The current study revealed that the most of the ADHD 30 (52.6%) were male and 27(47.4%) female in comparison to 164 (47.8%), and 179 (52.2%) of the normal students respectively, in non-significant relation. This agrees with Adnan H<sup>(13)</sup> in 2020 revealed that the ADHD is more prevalent in male children with ratio 3.5:1. This agrees with Farahat T *et al*<sup>(20)</sup> in Menoufia Governorate, Egypt in 2014 found that the male:female ratio was 3.5:1. The main risk factors were neonatal problems, family history of psychiatric and medical illnesses, and male gender.<sup>(105)</sup> Furthermore, Homidi M.<sup>(17)</sup> in 2013 found the total prevalence percentage of ADHD for female students was (4.2%), and for male students was (7.4%).<sup>(17)</sup> This agrees also with Mostafae, M., *et al*<sup>(21)</sup> in Hamadan-Iran in 2016 found that the prevalence for boys was 19.4% and had significant difference with girls, which had provenance (2.4%).

The current study revealed that the most of the ADHD student had middle social class 31 (54.4%), followed by low social class 22(38.6%), and high social class 4 (7%), while among non-ADHD students was 168 (49%), 110 (32.1%), and 65 (19%), the non -ADHD respectively, in non-significant relation. This is agree with Rafi K Al-Ani<sup>(19)</sup> in 2021 revealed that the majority of the cases were from the middle socioeconomic status (53%)<sup>(19)</sup>. Cerrillo-Urbina (22) in 2018 revealed that the younger children and those with low family socioeconomic status reported a higher prevalence of probable ADHD symptoms than older children and those with medium and high family socioeconomic status<sup>(22)</sup>. Russell AE<sup>(23)</sup> in 2015 revealed that the ADHD group had proportionately more participants in the lower housing bands: council/housing association housing (17.8% in the ADHD group versus 10.1% in the no diagnosis group). Proportionately more of the families of children with ADHD reported being in financial difficulty (27.78% versus 14.44% respectively) or having a large family (7.74% versus 4.87% respectively).

The current study revealed that the mother education of ADHD students had higher proportion of intermediate education 16 (28.1%) than non ADHD 74 (21.6%), High school or vocational education 16 (12.3%) versus 26 (7.6%), in non-

significant relation. This is lower than what found by Rafi K Al-Ani <sup>(19)</sup> in 2021 who revealed that the education level of ADHD their mothers was intermediate or secondary school level (37%) <sup>(19)</sup>. This is different from Russell AE <sup>(23)</sup> in 2015 revealed that mothers of children with ADHD had slightly lower levels of education, and proportionately more of the ADHD group had incomes within the lowest two bands.

## CONCLUSIONS

The ADHD among primary school student was prevalent (14.2%). The commonest sub type was inattention disorder 27(6.8%), followed by; Hyperactivity disorder 20(5%), and combined form was 10 .(%2.5).

Aknowlegment:

To my family and to my teachers and to all whom help me in this work.

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