

The Prevalence of Attention Deficit Hyperactivity Disorder among Primary School Age Children in Al-Najaf City: A Cross-Sectional Study

Dr. Huda Nadheer Neamah¹ and Professor, Dr. Huda Ghazi Hameed²

¹M.B.CH.B, AL- Najaf Health Directorate, IRAQ

²M.B.CH.B, F.I.B.M.S, Community Medicine, Department of Family and Community Medicine, University of Kufa, Faculty of medicine. IRAQ

Abstract: Background: Attention Deficit Hyperactivity Disorder is a common neurodevelopmental disorder that occurring in children around the world including Iraq. **Objectives:** To measure the prevalence of Attention Deficit Hyperactivity Disorder among primary school children in Al-Najaf city center and its association with demographic factors for the child and family. **Methodology:** Across sectional study targeting primary school children (6-14) year old private and governorate schools, from the 1st of January to 31 December 2023.. Forty primary schools were selected by simple random sampling which represented 10% of all schools. Two hundred primary school-age children (6-14years) were selected (100 males and 100 females) using a systematic random sampling technique among all students from grades 1 to 6, choosing five students from each school. A structured questionnaire was used to assess the behavior of school children filled out by both teachers and parents after obtaining their verbal consent. This questionnaire was designed according to the formula of diagnostic criteria of attention deficit and hyperactivity disorders used by the American Psychiatric Association (APA) Statistical analysis was done using SPSS version 26, P value ≤ 0.05 was considered significant. **Results:** The overall prevalence of ADHD (combined type) among school children was 20.5%. While the prevalence of hyperactivity disorder alone was (28.5%) and the prevalence of Attention deficit disorder alone was (28.5%). ADHD is significantly more prevalent among male (27%) children than female (14%). There is a significant association between Attention Deficit Hyperactivity Disorder and unemployed father (P=0.02), father education (illiterate) (p=0.03), parents separation (P=0.0001), father smoking (P=0.004) and positive family history of Attention Deficit Hyperactivity Disorder (P=0.0001). Also, there is a significant association between Attention Deficit Hyperactivity Disorder and child order (first rank) in the family (P=0.000) bed wetting (P=0.006). **Conclusion:** Attention Deficit Hyperactivity Disorder is an important health problem and highly prevalent among pupils in AL- Najaf city.

Keywords: ADHD, APA, SES, AD.

INTRODUCTION

Attention Deficit Hyperactivity Disorder is a disorder described by hyperactivity inattention and impulsivity symptoms, influencing children overall world. ADHD is a common neurodevelopmental disorder that occurring in children around the world. (Barkley, R. A. *et al.*, 2014) The children with ADHD classically have trouble getting organized, keeping focused, making practical plans and thinking before acting. (Vaziri, S. *et al.*, 2014) It is described as chronic impairing disorder that negatively affects many aspects of a child life including academic attainment, social skills difficult child parent relationship and the wellbeing of entire family. (Dvir, Y. *et al.*, 2014) Children with ADHD typically exhibit a behavior that classified into 3 types predominantly inattentive hyperactive, impulsive type and combined type according to Diagnostic and Statical Manual of Mental Disorder fifth edition. (Urien, D. K, 2020)

Risk Factors: The evidence suggested that there is no single factor that determines the expression of ADHD. An affected child exhibits several characteristics to be clinically diagnosed as having ADHD, the behavior should be developmentally inappropriate (substantially not the same as that of

other offspring of similar age). Must started before 12 years old and must available for 6 months in minimum, must occur in two or more settings and reported as such independent observers. lastly the problem not caused by other diseases. (Urien, D. K, 2020) Many environmental factors and other factors like life style, mother smoking during pregnancy or early Life of childhood, stress among pregnant, low birth weight <1,5kg have been implicated incidence of ADHD. (Yim, G. *et al.*, 2022) Other medical problem such as hypoxemia, encephalitis, trauma, brain injury could increase the incidence of ADHD. (Yim, G. *et al.*, 2022) There was also considerable evidence from a study that indicated that incidence of ADHD was higher among first degree relative of family member suggested that ADHD could be genetic. (Thapar, A, 2018) In general ADHD symptoms may be decrease when person get older. This could be stemmed from the fact that self-control and the neural connections in the brain are seen to be more developed and less influenced during puberty. (American Psychiatric Association, 2013) The condition should be differentiated from other problems such as migraine tension headache, absence epilepsy, sleep disorder, adjustment disorders, hypothyroidism hearing problem as well

as vision problem which can impair childhood attention and academic state. (Chinawa, J. M. *et al.*, 2015) ADHD may affect all aspects of child life, indeed, it impacts not only on the child, but also on their parents and siblings causing disturbance to family and marital functioning. (King, K. *et al.*, 2016)

Effect of ADHD on the life of Individual, their Family and Community: The adverse effect of ADHD upon children and their families' changes from preschool years to primary school and adolescence with varying aspects of the disorder being more prominent at different stages. ADHD may persist into adulthood causing disruption to both professional and personal life. In addition to that ADHD has been associated with increase healthcare costs for patients and their family members. (King, K. *et al.*, 2016)

Genetics of ADHD: ADHD is a result of complex dealings between genetics, environmental and developmental traits and genetic factor are credited for determine about 80% of the cases. Results of behavioural genetics and molecular genetic studies have converged to suggest that both genetic factors contribute to the development of ADHD. Family, twin, and adoption studies provide compelling evidence that genes play a strong role in mediating susceptibility to ADHD. (Sonuga-Barke, E. J. S. *et al.*, 2023)

ADHD and Socioeconomic State of Family: Low Socioeconomic has been linked to poor health in childhood, specifically (but not limited to) an increased risk of dental caries, behavioural problems, increased risk of smoking initiation, slow growth/shorter stature, suboptimal cognitive development and low birth weight Children from socioeconomically disadvantaged backgrounds are also more at risk of mental health problems (Russell, A. E. *et al.*, 2016) Among family factors socioeconomic status (SES) is a composite reflection of material and intangible resources and position in society that represents the family economic, human and educational capital; it also important indicator of an individual objective economic status. The family stress model argues that family SES affect the member's interaction and functioning and low SES places children in developmentally high risk situation making them prone to reduce self-adaptation and problem behaviors. (Masarik, A. S. *et al.*, 2017)

Family Adversity and ADHD: Children living with single parents are five times more likely to

have ADHD than children living with both parents. This finding is in line with those of other studies showing that separation of child from one or both parents early in life associated with ADHD. Parental separation has negative effects on the child behavior due to various factors such as inconsistent parenting, more punishment, violence and criticism. (Harkness, S. *et al.*, 2020)

ADHD and First Rank Child: More often diagnosed It was found that the first born child was more than two times likely to develop ADHD than the second and above. The reason why the risk for ADHD symptoms are greater among children who are first in the birth order might be due to poor mother child attachment. The first born child has special position in some families and this may act as one of the risk factors for ADHD. (Miller, M. *et al.*, 2019) The first child may also likely encounter some problems during pregnancy and labor complication. This also agrees with reports that children who have a special position in the family and who receive over protection and spoiling are more liable to develop ADHD than other children. (Miller, M. *et al.*, 2019)

Gender difference in ADHD: ADHD is recognized to exist in male and female although the literature supports a higher prevalence in males. However, when girls are diagnosed with ADHD. they are with inattentive than boys with ADHD. (Faheem, M. *et al.*, 2022)

Smoking and ADHD: Maternal and paternal smoking during pregnancy were associated with an elevated risk of ADHD defined by hospital diagnosis, medication, and hyperactivity/inattention score, but the association was stronger for maternal smoking than for paternal smoking. Compared with children born to nonsmoking mothers and smoking fathers, children born of smoking mothers and nonsmoking fathers had a higher risk of ADHD. (Zhu, J. L. *et al.*, 2014)

ADHD and Maternal Age: ADHD was associated with young fathers or mothers at the time of birth. Health professionals working with young parents should be aware of the increased risk of ADHD in offspring. This will improve early detection; however, for the development of preventive measures and appropriate interventions, more information on the developmental pathways is needed (Chudal, R. *et al.*, 2015). The researchers found that fathers younger than 20 years had a 1.5-fold increased risk of having offspring with

ADHD as compared to fathers aged 25-29 years. Similarly mothers younger than 20 years had a 1.4-fold increased risk. Advanced maternal age was inversely associated with ADHD (When both parents were younger than 20 years, the risk of having a child with ADHD was nearly doubled (Chudal, R. *et al.*, 2015).

Low Birth Weight and ADHD: Birth weight was significantly and positively correlated with Primary Neuropsychological Functions but not with Higher-Order Neuropsychological Functions or with Hyperactivity/Impulsivity and Inattention. Both Primary and Higher-Order Neuropsychological Functions were significantly negatively correlated with Hyperactivity/Impulsivity and Inattention (Hatch, B. *et al.*, 2014).

Definition of term pregnancy: in order to facilitate data reporting, delivery of quality health care, and clinical research, it is important that all clinicians, researchers, and public health officials use both uniform labels when describing deliveries in this period and a uniform approach to determining gestational age. To address the lack of uniformity in neonatal outcomes between 37 weeks of gestation and 42 weeks of gestation, a work group was convened in late 2012 to determine whether term pregnancy should be redefined. The work group included representatives from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, the American College of Obstetricians and Gynecologists (the College), the Society for Maternal-Fetal Medicine (SMFM), and other professional societies and stakeholder organizations. The work group recommended that the label "term" be replaced by the designations *early term*, *full term*, *late term*, and *postterm* to more accurately describe deliveries occurring at or beyond 37 weeks of gestation.

Impact of ADHD:

School Performance and ADHD:-Children with ADHD show significant academic underachievement, poor academic performance, and educational problems. In terms of impairment of body functions, children with ADHD show significant decreases in estimated full-scale IQ compared with controls but score on average within the normal range (Loe, I. M. *et al.*, 2007).

Epidemiology of ADHD:

GLOBAL:-A meta-analysis of 175 research studies worldwide on ADHD prevalence in children aged 18 and under found an overall

pooled estimate of 7.2%. (Salari, N. *et al.*, 2023) The US Census Bureau estimates 1,795,734,009 people were aged 5-19 worldwide in 2013. Thus, 7.2% of this total population is 129 million—a rough estimate of the number of children worldwide who have ADHD. Based on DSM-V screening of 11,422 adults for ADHD in 10 countries in the Americas, Europe and the Middle East, the estimates of worldwide adult ADHD prevalence averaged 3.4% (Thomas, R. *et al.*, 2015).

In the United States : The estimated number of children aged 3–17 years ever diagnosed with ADHD, according to a national survey of parents, is 6 million (9.8%) using data from 2016-2019. This number includes 3–5 years: 265,000 (2%) 6–11 years 2.4 million (10%) 12–17 years: 3.3 million (13%). Boys (13%) are more likely to be diagnosed with ADHD than girls (6%). Black, non-Hispanic children and White, non-Hispanic children are more often diagnosed with ADHD (12% and 10%, respectively), than Hispanic children (8%) or Asian, non-Hispanic children (3%) (Bitsko, R. H. *et al.*, 2022; Danielson, M. L. *et al.*, 2022).

The Prevalence of ADHD in Middle East Countries:

The prevalence studies were conducted in Egypt, Palestine, Oman, Qatar, Saudi Arab, Tunisia, Lebanon, Tunisia, and Iraq. The prevalence range was as high as 19.6% and as low as 0.5% in different studies. The prevalence of DSM-V disorders among 3278 UAE's children, in 1997/1998 was 10.4% with 0.5% for ADHD. In 2003, another study in the United Arab Emirates documented a prevalence of 0.9% (almost double) among a sample of 329 children. Another study conducted in UAE and published in the same year (2004) reported an ADHD prevalence of 3% among 278 surveyed children, also suggesting an increasing trend of ADHD prevalence in the UAE. Studies conducted in Palestine revealed an ADHD prevalence of 10% in 6-11 years old children, in Egypt 7.48% in 3-5 years old, 18 in Jordan 6.2% in 6-12 years old, and in Lebanon 3.2% in 6-10 years old. All these studies showed that male gender was significantly associated with ADHD prevalence. The study from Palestine also documented a higher prevalence of ADHD among adolescents between the ages of 12-16 (11.8%) compared with that among 6-11 years old (10%). An Iraqi study conducted in 1048 adolescent aged 12-18 years revealed an ADHD prevalence of 2.6%. (Suhail, H. J, 2012) The prevalence of the hyperactive type

of ADHD was reported in studies conducted in Oman (7.8%), Saudi Arabia (1.4% and 3.5%), Tunisia (1.9%) and Egypt (6.5%). The prevalence of inattention type ADHD was consistent in studies conducted in Saudi Arabia in 2010 and 2012, and in Tunisia (Alhraiwil, N. J. *et al.*, 2015) The American Academy of pediatrics first published clinical Recommendations for diagnosis and evaluation of ADHD in Children in 2000; recommendations for treatment followed in 2001. The guidelines were revised in 2011 and published with an accompanying process of care algorithm (PoCA) providing discrete and manageable steps by which clinicians could fulfill the clinical guideline's recommendations. Since the release of the 2013 guideline, the *Diagnostic and Statistical Manual of Mental Disorders* has been revised to the fifth edition, and new ADHD-related research has been published. Since 2013, the release of new researches reflects an increased understanding and recognition of ADHD's prevalence and epidemiology; the challenges it raises for children and families; the need for a comprehensive clinical resource for the evaluation, diagnosis, and treatment of pediatric ADHD; and the barriers that impede the implementation of such a resource. (American Academy of Pediatrics, 2011) This disorder varies in prevalence in different countries. The nature of these variation is unknown, however the difference in terms of demographical, cultural aspects and parameters used for diagnosis in the studied countries could partially explain this. (Suhail, H. J, 2012) A structured questionnaire was used to assess the behavior of schoolchildren by both teachers and parents after obtaining their verbal consents. The questionnaire was translated into Arabic language by 3 well known translators. This questionnaire was designed according to the formula of diagnostic criteria of attention deficit and hyperactivity disorders used by American Academy of Pediatrics (AAP, 2011).

The questionnaire included 18 items ; 9 of them are for information about attention deficit disorder and the other 9 are for information about hyperactivity and impulsivity disorders. Each item has 4 grades :nil – sometimes – usually – always. The way used in dealing with the data in the questionnaire is by giving score for each grade such as 1 ; 2 ; 3 ; 4 respectively and the diagnosis is made when the marks of child score for each type of the disorder is equal to or more than 22.5 marks (Al-Jothery, A. H. *et al.*, 2020).

Aims of the Study: To measure the prevalence of ADHD among primary school children in Al-Najaf

City center and its association with demographic factors for the child and family.

SUBJECTS AND MATERIAL

2.1 Study Design, Setting & Time

Frame: Across sectional study targeting primary school children (6-14) year old private and governorate schools. from 1st of January to the 31st of December 2023.

The study conducted in Al-Najaf Al-Ashraf which is a city in central of Iraq about 160 km (100 mi) south of Baghdad, its estimated population was 1,471,000 people, in 2018. it is the capital of Al-Najaf governorate, it is widely considered amongst the holiest cities of shia islam. it is reputedly the burial place of Imam Ali ibn Abi Talib the cousin and son-in-law of Muhammad the last of prophets.

2.2 sample Size: The sample size will be calculated according to equation:

$$\text{Sample size}(n) = \frac{(z^2 * p * q)}{d^2} = \frac{1.96^2 * 0.14 * 0.86}{0.0025} = 185 \text{ (}^{27}\text{)}$$

P=14%.⁽²⁸⁾

2.3 Sampling Design: According to a school list obtained from the general directorate of education in Al-Najaf City. There were 400 primary schools in Al-Najaf City (277 governmental and 113 private schools) in Al Najaf_city province during the academic year 2022-2023. Forty primary schools were selected by simple random sampling which represented 10% of all schools. Two hundred primary school-age children (6-14 years) were selected (100 males and 100 females) using a systematic random sampling technique among all students from grades 1 to 6, choosing five students from each school.

2.4 Data Collection Tools:

Data collected from 1st of March to 1st of May 2023 by using 3 questionnaires:

A structured questionnaire was used to assess the behavior of school children both teachers and parents filled it after obtaining their verbal consents. This questionnaire was designed according to the formula of diagnostic criteria of attention deficit and hyperactivity disorders used by the American Psychiatric Association (APA). (Appendix 1)

1. Sociodemographic & personal information:

The family information about the education level of the mother and father (illiterate, primary, intermediate, secondary school or college), father and mother occupation the economic status of the family (poor, intermediate or rich) depending on

the income of the family, parents separation, parents smoking, family history of ADHD questions about mother during pregnancy her age ,if her pregnancy was normal, taking drugs during pregnancy, any disease during pregnancy, mode of delivery.

Also questions about the child if he was preterm, full term, breast feeding, bottle feeding,child order in family,any bed wetting,any hearing ,vision problem,any type of allergy.

2. Questionnaire for parents.

The questionnaire included 18 items ; 9 of them are for information about attention deficit disorder and the other 9 are for information about hyperactivity and impulsivity disorders. Each item has 4 grades : nil – sometimes – usually – always. The was used in dealing with the data in the questionnaire is been giving score for each grade such as 1 ; 2 ; 3 ; 4 respectively and the diagnosis is made when the marks of child score for each type of the disorder is equal to or more than 22.5 marks. The child was considered as ADHD pupil when diagnosed by both teachers and parents for each type: attention deficit, hyperactive or both (combined).(Al-Jothery, A. H. *et al.*, 2020)

3. Questionnaire for teachers.

The questionnaire included 18 items ; 9 of them are for information about attention deficit disorder and the other 9 are for information about hyperactivity and impulsivity disorders. Each item has 4 grades : nil – sometimes – usually – always. The was used in dealing with the data in the questionnaire is been giving score for each grade such as 1 ; 2 ; 3 ; 4 respectively and the diagnosis is made when the marks of child score for each type of the disorder is equal to or more than 22.5 marks. The child was considered as ADHD pupil when diagnosed by both teachers and parents for each type: attention deficit, hyperactive or both (combined). The child was considered as ADHD pupil when diagnosed by both teachers and parents for each type: attention deficit, hyperactive or both (combined). (Gill, H; Al-Jothery, A. H. *et al.*, 2020)

Information were taken from the direct teacher about the needed information another information was indirectly taken from the family. It was indirectly sent a paper with their child and received it the next day.

Participants:

Inclusion criteria: students from (6-14).

Exclusion criteria: teachers or parents who refuse to fill ADHD rating scale.A Sever cases of ADHD and cases with mental retardation. patients with chronic illnesses like epilepsy, vision problems, hearing problems, and a history of abnormal sleep patterns were excluded from the study.

2.5 Ethical Approval:

The study was approved by the Iraqi Board of Medical Specialization and Official agreement will be obtained from ministry of education to allow us entry to the schools.(Appendix2)

2.6 Descriptive and Statical Analysis:

statistical analysis were applied using statistical package for social science (SPSS).Mean+Standerd deviation was used for continuous variables ,while frequency and percentages for categorical variables,bar chart used to present the prevalence of ADHD, Chi square test was used to assess the statistical difference between variables, $p \leq 0.05$ was considered as a level of statistical significance.

RESULTS

Sociodemographic Variable of the Students:

In the current study 200 students have been involved, 100 males (50%), and 100 females (50%). The minimum age was 6 years and the maximum was 14 years. The mean age +SD was 9.2 ± 1.5 years.More than half of the students, 115 (57.5%), were (6-9) years while 85(42.5%) aged between 10-14 years old. More than half of their father had free work 107 (53.5%),152 (76%) of their mothers were housewives, and 126 (63%) had fair socioeconomic status.Parents living together for 178(89.5%) and fathers' smoking was found in 82 (41%) more details are shown in Table 1.

Table 1: Frequency distribution of different variables (sociodemographic characteristics of student and their family)

Variable	subgroup	No.	%
Sex	Male	100	50
	Female	100	50
Age group of students(years)	6-9	115	57.5
	10-14	85	42.5
Father's occupation	Employee	76	38

	Free work	107	53.5
	Retired	4	2
	Unemployed	13	6.5
Father's education	Not read and write	12	6
	Read and write	47	23.5
	Primary	45	22.5
	Secondary	43	21.5
	College	46	23
Mother's education	Higher education	7	3.5
	Not read and write	24	12
	Read and write	61	30.5
	Primary	41	20.5
	Secondary	37	18.5
Mother's Occupation	College	35	17.5
	Higher education	2	1
	employed	48	24
Economic status*	unemployed	152	76
	Poor	45	22.5
Parents living together	Fair	126	63
	Good	29	14.5
Father's smoking	Yes	178	89.5
	No	22	10.5
Mother's smoking	Yes	82	41
	No	118	59
	Yes	8	4
	No	192	96

*SES:socioeconomic status

Mother age during pregnancy for 90(45%) was between 23-31years. The percentage of mothers who experienced normal pregnancy was 176(88%). Thirty- five (46.7%) of the mothers had hypertension while 12(54.5%) chronic had DM. The number of children who born early term was

178(89%). Of the total number of children, 136(68%) were born by normal vaginal delivery, those who have a family history of ADHD their father had ADHD were 33(80%). as shown in Table 2.

Table 2: Frequency distribution of students according to their Antenatal factors and family history of ADHD

variable	NO.	subgroup	%
Mother's age during pregnancy(years)	13-22	75	37.5
	23-31	90	45
	32-40	35	17.5
*Normal pregnancy	Yes	176	88
	No	24	12
Taking drugs during pregnancy	Yes	53	26.5
	No	147	73
Maternal disease during pregnancy	Diabetes	17	22.7
	Hypertension	35	46.7
	Other disease	23	30.6
Maternal chronic illness	Yes	22	11
	No	178	89
*Type of chronic disease	Diabetes	12	54.5
	Hypertension	7	31.8
	Heart disease	3	9.2
	Thyroid disease	1	4.5
*Time of delivery	early term	178	89

	Preterm	22	11
Mode of delivery	VD	136	68
	C/S	64	32
Family history of ADHD	Yes	41	20.5
	No	159	79.5
The family member who had ADHD	Father	33	80
	Uncle	8	20

- Normal pregnancy not IVFor assistant pregnancy
- Other disease thyroid disease, heart disease, asthma
- early term pregnancy (between 37-39wk) ,
- preterm pregnancy before 36 wk

Children were born full term were 178(89%), the children weight at delivery was (normal at 3kg) for 157(78%). More than half, 105(52.5%), were breastfed, 139(69.5%) had their order in the family second and above. 19(51.4%) from the children who had allergy was due to drug allergies, as shown in Table 3.

Table 3: Frequency distribution of students according to different sociodemographic factors of students during early childhood

Variable	NO.	subgroup	%
Gestational age	Preterm(<36wk)	22	11
	Full term(>36wk)	178	89
birth weight	Normal(3kg)	157	78
	Abnormal (aboveorbelow3kg)	43	22
infant feeding	Breastfeeding	105	52.5
	Bottle feeding	47	23.5
	Mixed feeding	48	24
Child order	First	61	30.5
	Second and above	139	69.5
Any bed wetting	Yes	31	15.5
	No	169	84.5
problem Any vision	Yes	17	8.5
	No	183	91.5
Any hearing problem	Yes	10	5
	No	190	95
Presence of allergy	Yes	38	19
	No	162	81
Type of allergy	Food allergy	5	13.5
	Drug allergy	19	51.4
	Skin allergy	11	29.7
	Asthma	3	5.4

The prevalence of attention deficit was (28.5%) among study sample as shown in figure 1.

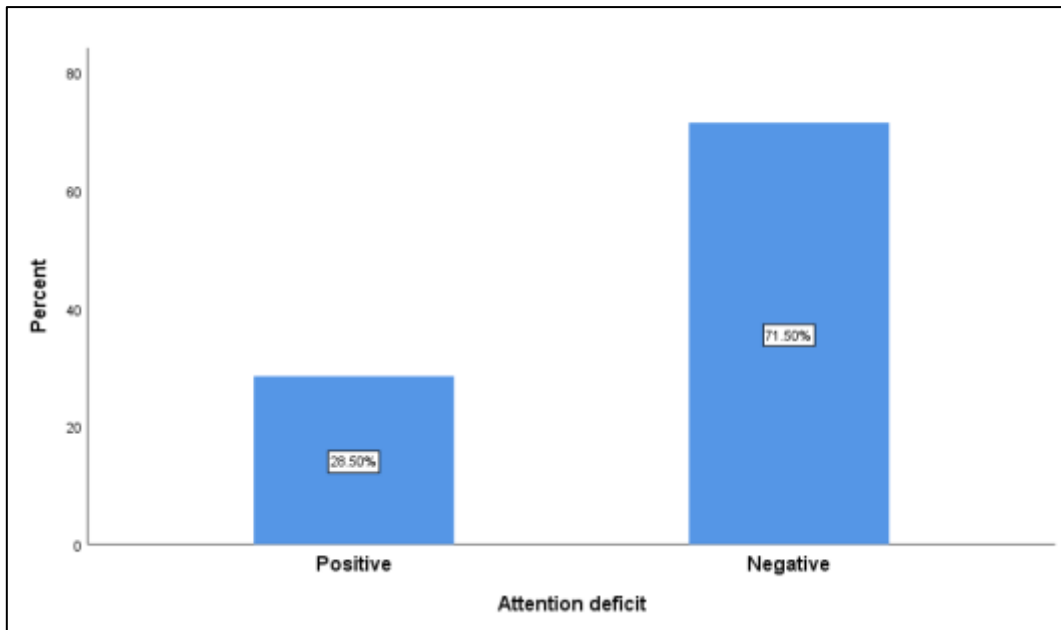


Fig 1: Prevalence of attention deficit among primary school student

Regarding the prevalence of hyperactivity disorder was (28.5%) among study sample as shown in figure 2.

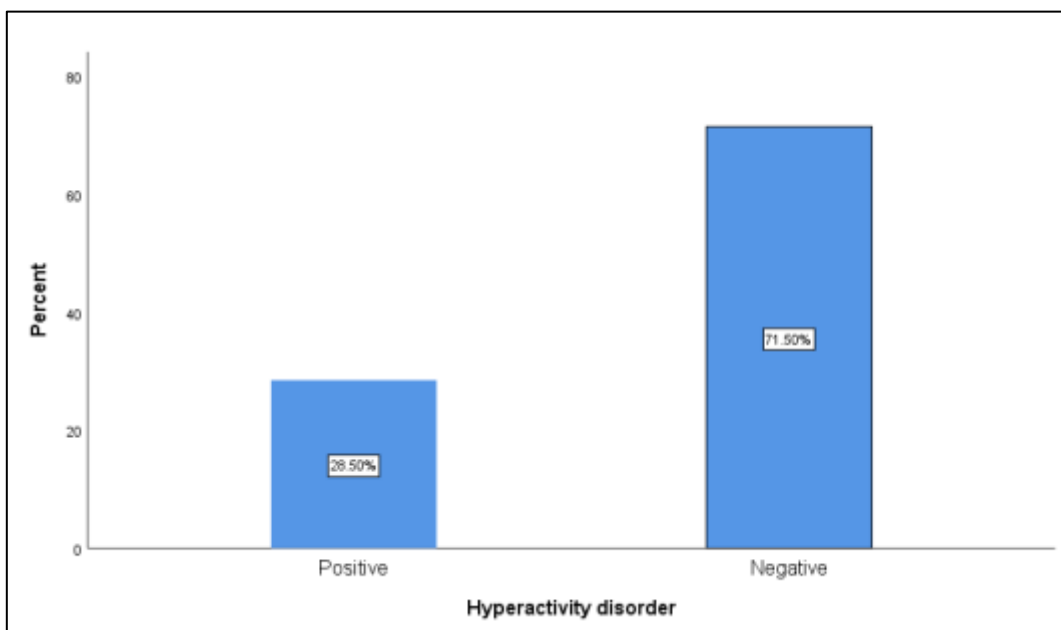


Fig 2: prevalence of hyperactivity disorder among primary school students.

while the prevalence of attention deficit hyperactivity disorder was (20.5%) among study sample as shown in figure 3

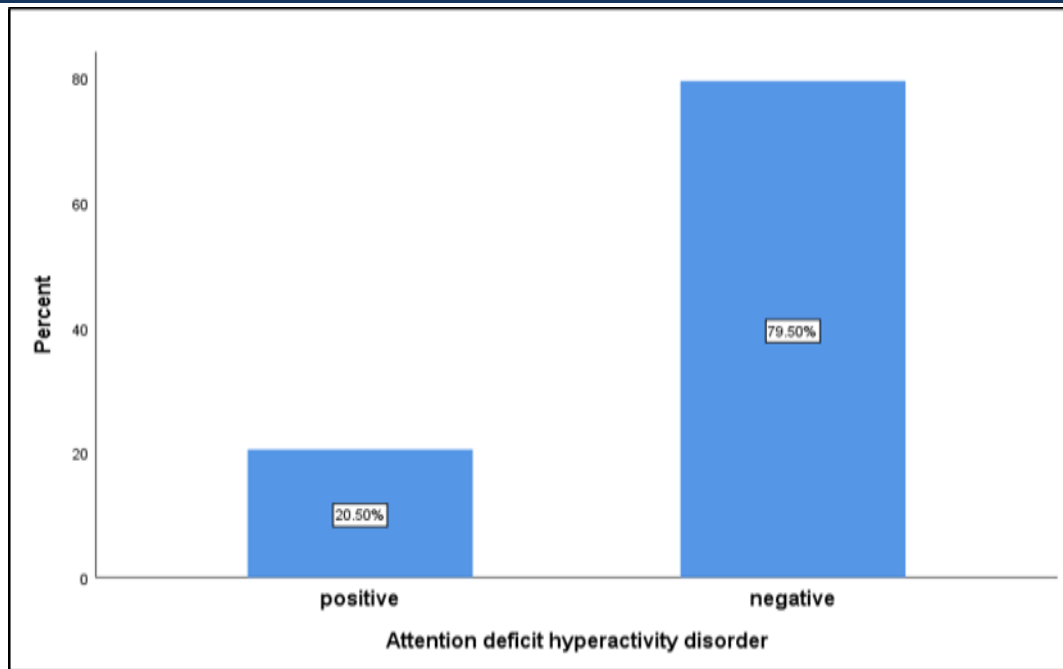


Fig3: Prevalence of attention deficit hyperactivity disorder (combined type) among primary school students.

There was a significant association between child's gender, father occupation, father education, father smoking, parents live together and family history of ADHD with ADHD. The male children had ($p=0.02$) higher percentage than female, as 27(27%) of the male children had ADHD compared to 14(14%) of females. There was a significant association between father occupation and ADHD, with a higher percentage of ADHD among children of unemployed fathers 6(46.2%), followed by children whose fathers were freework 25(23.4%), with a $P=0.02$. In regards to father education, the prevalence of ADHD was significantly decreasing with increasing level of father education ($P=0.03$). 6(50%) of the father of ADHD children illiterate, 13(27.7%) read and write, 10(22.2%) had a primary degree, 6(14%) had a secondary degree, 5(10.9%) had a college degree and 1(14.3%) of ADHD fathers had higher education. Children that their parents living together had a lower prevalence of ADHD compared to those whose parents were separated, 30(16.9%) vs. (50%) respectively. ($P=0.0001$). According to father smoking, 25(30.5%) of ADHD children had smoker fathers in contrast to 16 (13.6%) of the children of non-smoker fathers. ($P=0.004$) Family history had a significant

association with ADHD 23(56.1%) of ADHD children had a family history of ADHD while only 18(11.3%) had a negative family history with a ($P=0.0001$). From them, 21(63.6%) their fathers had a history of ADHD ($P=0.04$). Although there is no significant association between age group and ADHD, but younger children had higher prevalence than older 27(35.5%) of ADHD children in the age group 6-9 years, and 14(16.5%) of them at age 10-14 years. Mothers of ADHD were officers 6(12.5%) and 35(23%) of ADHD mothers were housewives, there is no significant association between mother occupation and ADHD. In respect to mothers education 7(29.2%) of ADHD mothers were illiterate and 16(26.2%) of ADHD mothers were read and write (not finish primary school), there is no significant association between mother education and ADHD. Mother smoking Only 3(37.5%) of ADHD children were smokers and chi square is 0.2 There is no significant association between mother smoking and ADHD. According to SES 14(31.1%) of children with low SES had ADHD, 22(17.5%) of ADHD children their families had fair SES, 5(17.2%) of children with ADHD had good SES, and there is no significant association between SES and ADHD. as shown in table 4.

Table 4: Association of Attention deficit hyperactivity disorder and different sociodemographic features of children and their families...

Variables		ADHD		Total (100%)	P
		Positive (n=41) No.(%)	Negative (n=159) No.(%)		
Age group (years)	6-9	27(35.5%)	88(76.5%)	115(100%)	0.2
	10-14	14(16.5%)	71(83.5%)	85(100%)	
sex	Male	27(27.0%)	73(73.0%)	100(100%)	0.02
	Female	14(14.0%)	86(86.0%)	100(100%)	
Father s occupation	Employed	10(13.2%)	66(86.8%)	76(100%)	0.02
	Free work	25(23.4%)	82(76.6%)	107(100%)	
	Retired	0.0(0.0%)	4(100%)	4(100%)	
	Unemployed	6(46.2%)	7(53.8%)	13(100%)	
Father s education	Illiterate	6(50%)	6(50%)	12(100%)	0.03
	Read and write	13(27.7%)	34(72.3%)	47(100%)	
	Primary	10(22.2%)	35(77.8%)	45(100%)	
	Secondary	6(14%)	37(86%)	43(100%)	
	College	5(10.9%)	41(89.1%)	46(100%)	
	Higher education	1(14.3%)	6(85.7%)	7(100%)	
Mother occupation	Employed	6(12.5%)	42(87.5%)	48(100%)	0.1
	Housewife	35(23%)	117(77%)	152(100%)	
Mother s education	Not read and write	7(29.2%)	17(70.8%)	24(100%)	0.2
	Read and write	16(26.2%)	45(73.8%)	61(100%)	
	Primary	8(19.5%)	33(80.5%)	41(100%)	
	Secondary	5(13.5%)	32(86.5%)	37(100%)	
	College	4(11.4%)	31(88.6)	35(100%)	
	Higher education	1(50%)	1(50%)	2(100%)	
parents living together	Yes	30(16.9%)	148(83.1%)	178(100%)	0.0001
	No	11(50%)	11(50%)	22(100%)	
SES	Poor	14(31.1%)	31(68.9%)	45(100%)	0.1
	Fair	22(17.5%)	104(82.5%)	126(100%)	
	Good	5(17.2%)	24(82.8%)	29(100%)	
Father s smoking	Yes	25(30.5%)	57(69.5%)	82(100%)	0.004
	No	16(13.6%)	57(69.5%)	82(100%)	
Mother s smoking	Yes	3(37.5%)	5(62.5%)	8(100%)	0.22
	No	38(19.8%)	154(80.2%)	192(100%)	
Family history of ADHD	Yes	23(56.1%)	18(43.9%)	41(100%)	0.0001
	No	18(11.3%)	141(88.7%)	159(100%)	
The family member who had ADHD	Father	21(63.6%)	12(36.4%)	33(100%)	0.04
	Uncle	2(25%)	6(75%)	8(100%)	

Table 5 shows that there was a significant association between maternal disease and ADHD (P=0.01),5(29.4%) of diabetic mother had ADHD children,2(5.7%) of Hypertensive mother had ADHD children and 8(34.85%) mother of ADHD

children had other disease. Although there was no significant association between mother age group and ADHD (P=0.4) ,18 (24%) of mother age (13-22) had ADHD children,18(20%) of ADHD children their mother age group (23-31), and

5(14.3%) at the age group (32-40). Mothers of ADHD children who had normal pregnancy were 36 (20.5%), there is no significant association between normal pregnancy and ADHD (P=0.9). Although there is no significant association between maternal administration of Duphston and ADHD during pregnancy had higher percentage of ADHD children than those who did not take 14 (26.4%) ,27(18%) respectively. Mother with chronic disease (D.M) and had ADHD children was 4(23.5%) and 2(20%) of mother of ADHD children had HTN, there is no significant

association between chronic disease of mothers and ADHD. Although the prevalence of ADHD is higher among preterm pregnancy 7(31.8%) than in early term pregnancy 34(19.1%), there is no significant association between preterm pregnancy and ADHD (P=0.1). Although there was higher prevalence of ADHD among children delivered by C/S than children delivered by NVD (26.6%), (17.6%) respectively (P=0.1) but there was no significant association between C/S and ADHD.as shown in table 5.

Table 5: Association of Attention deficit hyperactivity disorder with different sociodemographic features of participants during pregnancy.

Variables		ADHD		Total	P
		Positive (n=41) No.(%)	Negative (n=159) No.(%)		
Mother age during pregnancy (years)	13-22	18(24%)	57(72%)	75(100%)	0.4
	23-31	18(20%)	72(80%)	90(100%)	
	32-40	5(14.3%)	30(85.7%)	35(100%)	
*Normal pregnancy	Yes	36(20.5%)	140(79.5%)	176(100%)	0.9
	NO	5(20.8%)	19(79.2%)	24(100%)	
Taking drugs during pregnancy	Yes	14(26.4%)	39(73.6%)	53(100%)	0.4
	NO	27(18%)	120(82%)	147(100%)	
Maternal disease during pregnancy	DM	5(29.4%)	12(70.6%)	17(100%)	0.01
	HTN	2(5.7%)	33(94.3%)	35(100%)	
	Other disease	8(34.8%)	15(65.2%)	23(100%)	
Maternal chronic illness	Yes	3(13.6%)	19(86.4%)	22(100%)	0.3
	NO	38(21.3%)	140(78.7%)	178(100%)	
*Type of chronic illness	DM	2(16.7%)	10(83.3%)	12(100%)	0.8
	HTN	1(14.2% %)	6(85.8%)	7(100%)	
	Heart disease	0(0%)	2(100%)	2(100%)	
	Thyroid disease	0(0%)	1(100%)	1(100%)	
*Pregnancy duration	Early term	34(19.1%)	144(80.9%)	178(100%)	0.1
	preterm	7(31.8%)	15(68.2%)	22(100%)	
Mode of delivery	NVD	24(17.6%)	112(82.4%)	136(100%)	0.1
	C/S	17(26.6%)	47(73.4%)	64(100%)	

- Normal pregnancy not IVFor not assistant pregnancy
- Other disease thyroid disease, heart disease,asthma
- early term pregnancy (between 37-39wk)
- preterm pregnancy before 36 wk

Although the percent of preterm children who had ADHD is higher than full term (31.8%and 19.1%) respectively,but there is no significant association

between preterm and ADHD(P=0.1). Regarding birth weight, 17(39.5%) of children with ADHD were born with abnormal body weight (less than or more than 3kg), which is significantly higher than those with normal birth weight24 (15.3%)(P=0.0001). Children who are breastfed had lower prevelance of ADHD (15.2%) compare to bottle fed and mixed fed (31.9%,20.8%),although non significant association was found(P=0.06). The percent of

ADHD rank as the first baby in the family was 25 (41%) of and 16(20.5%) as second and more, there is a significant association between first child rank in the family and ADHD comparing to second child and more.(P=0.0001) Children with ADHD and had a history of bed wetting 12(38.7%), there is a significant association between bed wetting and ADHD.(P=0.006) The percentage of vision problem was 2(11.8%)of ADHD, hearing

problem1(10%) and had a there is no significant association (P=0.3) The children with ADHD who had allergies was 11(29.7%) but there is no significant association between allergy and ADHD(P=0.1). According to the type of allergy 9(47.4%) had drug allergies, and 3(18.2%)had skin allergies, there is no significant association between the type of allergy and ADHD, as shown in Table 6.

Table 6: Association between Attention deficit hyperactivity disorder and different sociodemographic features during early childhood of participants.

Variables		ADHD		Total (100%)	P
		Positive (n=41) No.(%)	Negative (n=159) No.(%)		
Gestational age	Preterm(<36wk)	7(31.8%)	15(68.2%)	22(100%)	0.1
	Full term(>36wk)	34(19.1%)	144(80.9%)	178(100%)	
birth weight	3Kg(normal)	24(15.3%)	133(84.7%)	157(100%)	0.0001
	<>3Kg(abnormal)	17(39.5%)	26(60.5%)	43(100%)	
Breastfeeding	Breast feeding	16(15.2%)	89(84.4%)	105(100%)	0.06
	Bottle feeding	15(31.9%)	32(68.1%)	47(100%)	
	Mixed feeding	10(20.8%)	38(79.2%)	48(100%)	
Child order	First	25(41%)	36(59%)	61(100%)	0.0001
	Second and more	16(20.5%)	123(79.5%)	139(100%)	
Any bed wetting	Yes	12(38.7%)	19(61.3%)	31(100%)	0.006
	No	29(17.2%)	140(82.8%)	169(100%)	
Any vision problem	Yes	2(11.8%)	15(88.2%)	17(100%)	0.3
	No	39(21.3%)	144(78.7%)	183(100%)	
Any hearing problem	Yes	1(10%)	9(90%)	10(100%)	0.3
	No	40(21.1%)	150(78.9%)	190(100%)	
Presence of allergy	Yes	12(31.5%)	26(68.5%)	38(100%)	0.1
	No	30(18.5%)	132(81.5%)	162(100%)	
Type of allergy	Food allergy	0(0%)	5(100%)	5(100%)	0.09
	Drug allergy	9(47.4%)	10(52.6%)	19(100%)	
	Skin allergy	3(18.2%)	9(81.8%)	11(100%)	
	Asthma	0(0%)	3(100%)	3(100%)	

DISCUSSION

ADHD is one of the most prevalent neurodevelopmental disorders among children, and it is frequently observed in school-aged students, which may provide an opportunity for early detection and management. (National Institute of Neurological Disorders and Stroke, 2012) It is described as a chronic impairing disorder that negatively affects many aspects of a child life including academic attainment, social skills difficult child parent relationship and the entire family's wellbeing (Biederman, J. *et al.*, 2006). Few studies were conducted in Iraq about the

ADHD problem that affecting children and adolescent. (Younis, M. S. *et al.*, 2014) The overall prevalence of ADHD (combined type) among school children in the early years in the current study was 20.5%. This prevalence is within the range of prevalence of ADHD in other Arab countries in Jorden (22.5%), Saudia Arabia (21.3%) (Abbasi, L. N. *et al.*, 2023; Alqahtani, M. M, 2010). These two study carried out after 2020. This prevalence is, higher than that reported by local study conducted in Hilla city Babylon Province14%. (Al-Jothery, A. H. *et al.*, 2020) ,Baghdad4.7% (Sarhan, H. A. *et al.*, 2020). Tikrit

city 8.67% (Al-Ani, R. K. *et al.*, 2021). This prevalence was higher than that reported by another study conducted among Iranian children 15.2% (Talaie, A. *et al.*, 2010). its higher than the prevalence reported in Egypt (12.6%) which was measured among children in four primary schools in AL- Mansura province (Talaie, A. *et al.*, 2010). these research carried out from (2010-2016). however, it is important to note that there is increase in the prevalence rates over time this might be explained by increase incidence of ADHD, changes in diagnostic criteria, which could have contributed to the increased number of children being diagnosed with ADHD, "increased public awareness, improved access to health services, and improved referral from primary care and communities to specialty mental health services may increase the likelihood of ADHD being identified on screening and diagnosis (Abdelnour, E. *et al.*, 2022). ADHD is more prevalent in male children than female (27%) and (14%) respectively. This finding was in the line with other studies (Al-Jothery, A. H. *et al.*, 2020 · Shoostary, M. H. *et al.*, 2010 · Shi, Y. *et al.*, 2021). Attention-deficit hyperactivity disorder (ADHD) is recognized to exist in males and females although the literature supports a higher prevalence in males. However, when girls are diagnosed with ADHD, they are more often diagnosed as predominantly inattentive than boys with ADHD. (Rucklidge, J. J, 2008; Shi, Y. *et al.*, 2021) Research has shown that boys with ADHD usually show externalized symptoms, such as running and impulsivity. Girls with ADHD, on the other hand, typically show internalized symptoms. These symptoms include inattentiveness and low self-esteem. Boys also tend to be more physically aggressive, while girls tend to be more verbally aggressive. (Shi, Y. *et al.*, 2021) We found higher prevalence of ADHD among children parents were an unemployed (46.2%). This agrees with another studies (Keilow, M. *et al.*, 2020). This study reveals that there is significant association between father education read and write (not finish primary school) and ADHD (27.7%). which is consistent with a study conducted in Norway that revealed that children whose parents did not complete high school had a roughly fourfold increased probability of having severe symptoms (Keilow, M. *et al.*, 2020; Torvik, F. A. *et al.*, 2020). Children of lowly educated parents scored higher on all outcomes and had an approximate doubling of the risk of high symptom levels. The association between maternal and paternal educational attainment and child symptoms of ADHD and

academic problems persisted after controlling for shared genetic and family environmental factors (Torvik, F. A. *et al.*, 2020.) In our study there is significant association between parents separation and ADHD (50%), this agree with another study (Heckel, L. *et al.*, 2009).

Parents of children with ADHD perceived their family environment as less supportive and more stressful. Specifically, ADHD parents viewed their families as having lower levels of interpersonal relationships., more parents of ADHD children were separated or divorced (Angeline, J. *et al.*, 2023). In Our study we find significant association between father's smoking and ADHD (30.5%) but no significant association between mother smoking and ADHD A relationship is identified between ADHD and parent's tobacco smoking habits this finding depicts the possible role of the environmental pollution (Langley, K. *et al.*, 2012). The association between father smoking and ADHD consistent with other studies. they found the association between paternal smoking exposure before/during pregnancy and offspring ADHD risk. Children whose fathers smoked before pregnancy or children whose parents were exposed to smoking before and during pregnancy were more likely to develop ADHD during childhood than those whose fathers or both parents had never been exposed to smoking. Our findings are supported by previous studies which reported that parental smoking during pregnancy increased the risk for offspring developing ADHD (Dong, T. *et al.*, 2017; Cho, Y. J. *et al.*, 2018). The adverse effects of tobacco smoke could be derived from their ingredients that are accounted to be more than four hundreds molecules. Nicotine is among them that was shown to be closely related in the neurodevelopmental disorder (Smith, A. M. *et al.*, 2010). The study revealed that there is a significant association between having ADHD problem and positive family history (56.1%), ADHD is a condition that results from the interaction among three premises, namely, genetic, environmental, and developmental traits. However, the genetic promise could cover most of the cases. (Zheng, Y. *et al.*, 2020) In our study we find significant association between father history of ADHD and ADHD among their children who has ADHD 21(63.6%), this agree with other study in Germany (Starck, M. *et al.*, 2016). As nearly half of the parents suffered from ADHD,. Besides parent-child interactions, parental ADHD symptoms might influence parental education style and also effects parent training as well as the child's

therapy outcome. In the future, parents should be screened for ADHD symptoms if they or their child receive treatment and to adjust processes and design of treatment to the symptoms. (Starck, M. *et al.*, 2016) The study shows significant association between ADHD and maternal thyroid disease (34.8%) and this consistent with a systematic review that provided moderate evidence for an association between maternal thyroid function and childhood ADHD symptoms, some evidence for an association between early-treated congenital hypothyroidism and later ADHD symptoms (Drover, S. S. M. *et al.*, 2019). The other disease in our research was asthma and there is a significant association between ADHD and maternal asthma and this consistent with other studies, they found an increased risk of ADHD among children born to mothers and fathers with asthma, with a higher risk observed for maternal asthma. Additionally, maternal and paternal asthma exacerbations before, during pregnancy or after delivery were associated with a further enhanced risk of offspring ADHD. Maternal use of antiasthma medication during pregnancy did not itself increase the risk of ADHD in children. (Liu, X. *et al.*, 2019) In our study, we find a significant association between abnormal childbirth weight and ADHD 17(39.5%), this agree with other studies that indicate an association between lower birth weight and ADHD, others indicate that children who are born with a low birth weight are also at greater risk of having a range of neuropsychological deficits, many of which overlap with those found in children with ADHD. In particular, low birth weight has been associated with difficulties on verbal fluency, working memory, and cognitive flexibility tasks, which involve aspects of executive functioning; as well as other tasks that measure expressive or receptive language, visuo-spatial reasoning, and motor control (Aarnoudse-Moens, C. S. H. *et al.*, 2009; Hatch, B. *et al.*, 2014). In this study we found that, there was significantly higher ($P < 0.001$) percent of ADHD in the first birth order 25(41%). In trial to explain the previous result; we put some suggestions as: Deficiency in experiences of mothers in dealing with their first baby that may lead to disorders in activity and attention. First birth child has a special position in some families, that may act as one of the risk factors for ADHD (e.g. over protection and spoiling (El-Tallawy, H. N. *et al.*, 2005). It was found that the first-born child was more than more likely to develop ADHD than the second and above child in the birth order in this study. This was similar with the study

conducted in Egypt (El-Tallawy, H. N. *et al.*, 2005; Reimelt, C. *et al.*, 2021). and in Ethiopia (Lola, H. M. *et al.*, 2019). In our study we found that, there was significantly association between ADHD and bed wetting 12 (38.7%) and p value $< .006$. The association between enuresis and ADHD confirms the findings of previous clinical studies (Baeyens, D. *et al.*, 2005; Chang, S. S. *et al.*, 2002) and population-based studies (Chang, S. S. *et al.*, 2002; Lee, S. D. *et al.*, 2000). in a large nationally representative sample. Although we couldn't address the explanations for this association, previous research has suggested that both enuresis and ADHD are related to delays in central nervous system maturation (Tai, H. L. *et al.*, 2007; Tariq, S. *et al.*, 2006).

CONCLUSIONS

- 1-ADHD is a highly prevalent problem among primary school children in AL-Najaf.
- 2-ADHD is more prevalent in boys.
- 3-There was a significant association between father occupation and ADHD, with a higher percentage of ADHD among children of unemployed fathers.
- 4-the prevalence of ADHD was significantly decreasing with increasing level of father education.
- 5- the prevalence is high among children with positive family history of this disorder.
- 6-The prevalence of ADHD was high in children whom parents was separated
- 7-Prevalence was high among children whom father smoker.
- 8-Prevalence was high among children whom first rank in family.

RECOMMENDATIONS

- 1-Further comprehensive large scale analytic studies are suggested to deal with this neglected mental health problem.
- 2-A close collaboration between school' authorities and parents is recommendable, and the early diagnosis is crucial.
- 3-Referring of suspected cases to psychologist.
- 4-Contacting Ministry of Education and Ministry of Health about increase public health awareness though social media ,work shops,conferences.
- 5-Providing social researcher in each school.

REFERENCES

1. Barkley, R. A. "Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment." *Guilford Publications*, (2014).
2. Vaziri, S., Kashani, F. L. & Sorati, M. "Effectiveness of family training in reducing

- symptoms of children with attention deficit hyperactivity disorder." *Procedia - Social and Behavioral Sciences*, 128 (2014): 337-342.
3. Dvir, Y., Ford, J. D., Hill, M. & Frazier, J. A. "Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities." *Harvard Review of Psychiatry*, 22.3 (2014): 149-161.
 4. Urion, D. K. "Pediatric attention deficit/hyperactivity disorder." *Nelson Textbook of Pediatrics*, 21st ed., Elsevier, Philadelphia, PA, (2020): 262-267. (Chapter 49).
 5. Yim, G., Roberts, A., Ascherio, A., Wypij, D., Kioumourtzoglou, M. A. & Weisskopf, M. G. "Smoking during pregnancy and risk of attention-deficit/hyperactivity disorder in the third generation." *Epidemiology*, 33.3 (2022): 431-440.
 6. Thapar, A. "Discoveries on the genetics of ADHD in the 21st century: New findings and their implications." *American Journal of Psychiatry*, 175.10 (2018): 943-950.
 7. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition: DSM-5*. American Psychiatric Association, Washington, (2013).
 8. Chinawa, J. M. & Obu, H. A. "Epidemiology of Attention Deficit/Hyperactivity Disorder." *ADHD - New Directions in Diagnosis and Treatment*, InTech, (2015).
 9. King, K., Alexander, D. & Seabi, J. "Siblings' perceptions of their ADHD-diagnosed sibling's impact on the family system." *International Journal of Environmental Research and Public Health*, 13.9 (2016): 910.
 10. Sonuga-Barke, E. J. S., Becker, S. P., Bölte, S., Castellanos, F. X., Franke, B., Newcorn, J. H., Nigg, J. T., Rohde, L. A. & Simonoff, E. "Annual research review: Perspectives on progress in ADHD science - from characterization to cause." *Journal of Child Psychology and Psychiatry*, 64.4 (2023): 506-532.
 11. Russell, A. E., Ford, T., Williams, R. & Russell, G. "The association between socioeconomic disadvantage and attention deficit/hyperactivity disorder (ADHD): A systematic review." *Child Psychiatry & Human Development*, 47 (2016): 440-458.
 12. Masarik, A. S. & Conger, R. D. "Stress and child development: A review of the family stress model." *Current Opinion in Psychology*, 13 (2017): 85-90.
 13. Harkness, S., Gregg, P. & Fernández-Salgado, M. "The rise in single-mother families and children's cognitive development: Evidence from three British birth cohorts." *Child Development*, 91.5 (2020): 1762-1785.
 14. Miller, M., Musser, E. D., Young, G. S., Olson, B., Steiner, R. D. & Nigg, J. T. "Sibling recurrence risk and cross-aggregation of attention-deficit/hyperactivity disorder and autism spectrum disorder." *JAMA Pediatrics*, 173.2 (2019): 147-152.
 15. Faheem, M., Akram, W., Akram, H., Khan, M. A., Siddiqui, F. A. & Majeed, I. "Gender-based differences in prevalence and effects of ADHD in adults: A systematic review." *Asian Journal of Psychiatry*, 75 (2022): 103205.
 16. Zhu, J. L., Olsen, J., Liew, Z., Li, J., Niclasen, J. & Obel, C. "Parental smoking during pregnancy and ADHD in children." *Pediatrics*, 134.2 (2014): e382-e388.
 17. Chudal, R., Joelsson, P., Gyllenberg, D., Lehti, V., Leivonen, S., Hinkka-Yli-Salomäki, S., Gissler, M. & Sourander, A. "Parental age and the risk of attention-deficit/hyperactivity disorder: A nationwide, population-based cohort study." *Journal of the American Academy of Child & Adolescent Psychiatry*, 54.6 (2015): 487-494.e1.
 18. Hatch, B., Healey, D. M. & Halperin, J. M. "Associations between birth weight and attention-deficit/hyperactivity disorder symptom severity: indirect effects via primary neuropsychological functions." *Journal of Child Psychology and Psychiatry*, 55.4 (2014): 384-392.
 19. "Definition of term pregnancy." *The American College of Obstetricians and Gynecologists Committee on Obstetric Practice and Society for Maternal-Fetal Medicine*, November 2013.
 20. Loe, I. M. & Feldman, H. M. "Academic and educational outcomes of children with ADHD." *Journal of Pediatric Psychology*, 32.6 (2007): 643-654.
 21. Salari, N., Ghasemi, H., Abdoli, N., Rahmani, A., Shiri, M. A., Hashemian, A. H., et al. "The global prevalence of ADHD in children and adolescents: a systematic review and meta-analysis." *Italian Journal of Pediatrics*, 49 (2023): 48.
 22. Thomas, R., Sanders, S., Doust, J., Beller, E. & Glasziou, P. "Prevalence of attention-deficit/hyperactivity disorder: A systematic review and meta-analysis." *Pediatrics*, 135.4 (2015): e994-1001.

23. Bitsko, R. H., Claussen, A. H., Lichstein, J., Black, L. I., Jones, S. E., Danielson, M. L., *et al.* "Mental health surveillance among children - United States, 2013-2019." *MMWR Supplements*, 71.2 (2022): 1-42.
24. Danielson, M. L., Holbrook, J. R., Newsome, K., Charania, S. N., McCord, R. F., Kogan, M. D. & Blumberg, S. J. "State-level estimates of the prevalence of parent-reported ADHD diagnosis and treatment among U.S. children and adolescents, 2016-2019." *Journal of Attention Disorders*, (2022).
25. Alhraiwil, N. J., Ali, A., Househ, M. S., Al-Shehri, A. M. & El-Metwally, A. A. "Systematic review of the epidemiology of attention deficit hyperactivity disorder in Arab countries." *Neurosciences (Riyadh)*, 20.2 (2015): 137-144.
26. Suhail, H. J. "Prevalence of mental disorders among adolescents of secondary schools in Diwaniya governorate." *Al-Qadisiah Medical Journal*, 13 (2012): 18-27.
27. American Academy of Pediatrics, Subcommittee on Attention-Deficit/Hyperactivity Disorder, Steering Committee on Quality Improvement and Management. "ADHD: Clinical guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents." *Pediatrics*, 128.5 (2011): 1007-1022.
28. Gill, H., McLeod, S., Duerksen, K. & Szafran, O. "Factors influencing medical students' choice of family medicine." *Canadian Family Physician*, 58.11 (2012): e649-e657.
29. Al-Jothery, A. H. & Baiee, H. A. "Epidemiological aspects of ADHD among pupils in Al-Hilla city, Babylon province, Iraq." *Medico-Legal Update*, 20.1 (2020): 978-983.
30. American Psychiatric Association. "Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition: DSM-5." Washington: American Psychiatric Association, (2013).
31. National Institute of Neurological Disorders and Stroke. *National Institute of Health* (2012).
32. Biederman, J., Monuteaux, M. C., Mick, E., Spencer, T., Wilens, T. E., Silva, J. M., *et al.* "Young adult outcome of attention deficit hyperactivity disorder: A controlled 10-year follow-up study." *Psychological Medicine*, 36.2 (2006): 167-179.
33. Younis, M. S., Sadiq, B. D. & Alsaidy, A. M. "Clinical types and associated maternal factors of attention deficit/hyperactivity disorder (ADHD)." *Journal of the Faculty of Medicine, Baghdad*, 56.2 (2014): 169-172.
34. Alqahtani, M. M. "Attention-deficit hyperactive disorder in school-aged children in Saudi Arabia." *European Journal of Pediatrics*, 169 (2010): 1113-1117.
35. Sarhan, H. A. & Sachit, K. R. "Screening for Attention Deficit Hyperactivity Disorder at Elementary Schools in Baghdad City." *Iraqi National Journal of Nursing Specialty*, 33.2 (2020): 13-21.
36. Abbasi, L. N., Mazzawi, T., Abasi, L., Haj Ali, S., Alqudah, A. & Al-Taiar, H. "The prevalence and associated factors of attention deficit hyperactivity disorder among primary school children in Amman, Jordan." *Cureus*, 15.4 (2023): e37856.
37. Al-Ani, R. K., Al-Sumiadai, M., Abdulla, A. & Sarhat, A. R. "Prevalence of attention deficit hyperactivity disorder among primary school children in Tikrit City, Iraq." *Al-Anbar Medical Journal*, 17.1 (2021): 25-29.
38. Talaei, A., Mokhber, N., Abdollahian, E., Bordbar, M. R. & Salari, E. "Attention deficit/hyperactivity disorder: A survey on prevalence rate among male subjects in elementary school (7 to 9 years old) in Iran." *Journal of Attention Disorders*, 13.4 (2010): 386-390.
39. Awadalla, N. J., Ali, O. F., Elshaer, S. & Eissa, M. "Role of school teachers in identifying attention deficit hyperactivity disorder among primary school children in Mansoura, Egypt." *Eastern Mediterranean Health Journal*, 22.8 (2016): 586-595.
40. Abdelnour, E., Jansen, M. O. & Gold, J. A. "ADHD diagnostic trends: Increased recognition or overdiagnosis?" *Missouri Medicine*, 119.5 (2022): 467-473.
41. Shooshtary, M. H., Chimeh, N., Najafi, M., Mohamadi, M. R., Yousefi-Nourae, R. & Rahimi-Mvagher, A. "The prevalence of attention deficit hyperactivity disorder in Iran: A systematic review." *Iranian Journal of Psychiatry*, 5.3 (2010): 88-92.
42. Rucklidge, J. J. "Gender differences in ADHD: Implications for psychosocial treatments." *Expert Review of Neurotherapeutics*, 8.4 (2008): 643-655.
43. Shi, Y., Hunter Guevara, L. R., Dykhoff, H. J., Sangaralingham, L. R., Phelan, S., Zaccariello, M. J. & Warner, D. O. "Racial disparities in

- diagnosis of attention-deficit/hyperactivity disorder in a US national birth cohort." *JAMA Network Open*, 4.3 (2021): e210321.
44. Keilow, M., Wu, C. & Obel, C. "Cumulative social disadvantage and risk of attention deficit hyperactivity disorder: Results from a nationwide cohort study." *SSM - Population Health*, 10 (2020): 100548.
 45. Torvik, F. A., Eilertsen, E. M., McAdams, T. A., Gustavson, K., Zachrisson, H. D., Brandlistuen, R., *et al.* "Mechanisms linking parental educational attainment with child ADHD, depression, and academic problems: A study of extended families in The Norwegian Mother, Father and Child Cohort Study." *Journal of Child Psychology and Psychiatry*, 61.9 (2020): 1009-1018.
 46. Heckel, L., Clarke, A., McCarthy, R., Selikowitz, M. & Barry, R. "The relationship between divorce and the psychological well-being of children with ADHD: Differences in age, gender, and subtype." *Emotional and Behavioural Difficulties*, 14.1 (2009): 49-68.
 47. Angeline, J. & Rathnasabapathy, M. "Understanding women's suffering and psychological well-being: Exploring biopsychosocial factors in mothers of children with ADHD - A case study." *Frontiers in Public Health*, 11 (2023): 1279499.
 48. Langley, K., Heron, J., Smith, G. D. & Thapar, A. "Maternal and paternal smoking during pregnancy and risk of ADHD symptoms in offspring: Testing for intrauterine effects." *American Journal of Epidemiology*, 176 (2012): 261-268.
 49. Dong, T., Hu, W., Zhou, X., Lin, H., Lan, L., Hang, B., Lv, W., Geng, Q. & Xia, Y. "Prenatal exposure to maternal smoking during pregnancy and attention-deficit/hyperactivity disorder in offspring: A meta-analysis." *Reproductive Toxicology*, 76 (2018): 63-70.
 50. Cho, Y. J., Choi, R., Park, S. & Kwon, J. W. "Parental smoking and depression, and attention-deficit hyperactivity disorder in children and adolescents: Korean national health and nutrition examination survey 2005–2014." *Asia-Pacific Psychiatry*, 10 (2018): e12327.
 51. Smith, A. M., Dwoskin, L. P. & Pauly, J. R. "Early exposure to nicotine during critical periods of brain development: Mechanisms and consequences." *Journal of Pediatric Biochemistry*, 1.2 (2010): 125–141.
 52. Zheng, Y., Pingault, J. B., Unger, J. B. & Rijdsdijk, F. "Genetic and environmental influences on attention-deficit/hyperactivity disorder symptoms in Chinese adolescents: A longitudinal twin study." *European Child & Adolescent Psychiatry*, 29.2 (2020): 205-216.
 53. Starck, M., Grünwald, J. & Schlarb, A. A. "Occurrence of ADHD in parents of ADHD children in a clinical sample." *Neuropsychiatric Disease and Treatment*, 12 (2016): 581-588.
 54. Drover, S. S. M., Villanger, G. D., Aase, H., Skogheim, T. S., Longnecker, M. P., Zoeller, R. T., Reichborn-Kjennerud, T., Knudsen, G. P., Zeiner, P. & Engel, S. M. "Maternal thyroid function during pregnancy or neonatal thyroid function and attention deficit hyperactivity disorder: A systematic review." *Epidemiology*, 30.1 (2019): 130-144.
 55. Liu, X., Dalsgaard, S., Munk-Olsen, T., Li, J., Wright, R. J. & Momen, N. C. "Parental asthma occurrence, exacerbations and risk of attention-deficit/hyperactivity disorder." *Brain, Behavior, and Immunity*, 82 (2019): 302-308.
 56. Aarnoudse-Moens, C. S. H., Weisglas-Kuperus, N., van Goudoever, J. B. & Oosterlaan, J. "Meta-analysis of neurobehavioral outcomes in very preterm and/or very low birth weight children." *Pediatrics*, 124.2 (2009): 717–728.
 57. Hatch, B., Healey, D. M. & Halperin, J. M. "Associations between birth weight and attention-deficit/hyperactivity disorder symptom severity: Indirect effects via primary neuropsychological functions." *Journal of Child Psychology and Psychiatry*, 55.4 (2014): 384-392.
 58. El-Tallawy, H. N., Hassan, W. A., El-Behary, A. A. & Shehata, G. A. "Prevalence of attention deficit hyperactivity disorder among elementary schools children in Assiut City, Egypt." *Egyptian Journal of Neurology, Psychiatry and Neurosurgery*, 42.2 (2005): 517–526.
 59. Reimelt, C., Wolff, N., Hölling, H., Mogwitz, S., Ehrlich, S., Martini, J. & Roessner, V. "Siblings and Birth Order - Are They Important for the Occurrence of ADHD?" *Journal of Attention Disorders*, 25.1 (2021): 81-90.
 60. Lola, H. M., Belete, H., Gebeyehu, A., Zerihun, A., Yimer, S. & Leta, K. "Attention Deficit Hyperactivity Disorder (ADHD) among Children Aged 6 to 17 Years Old Living in Girja District, Rural Ethiopia." *Behavioural Neurology*, 2019 (2019): 1753580.

61. Baeyens, D., Roeyers, H., Vande Walle, J. & Hoebeke, P. "Behavioural problems and attention-deficit hyperactivity disorder in children with enuresis: A literature review." *European Journal of Pediatrics*, 164 (2005): 665–672.
62. Chang, S. S., Ng, C. F. & Wong, S. N. "Behavioural problems in children and parenting stress associated with primary nocturnal enuresis in Hong Kong." *Acta Paediatrica*, 91 (2002): 475–479.
63. Lee, S. D., Sohn, D. W., Lee, J. Z., Park, N. C. & Chung, M. K. "An epidemiological study of enuresis in Korean children." *BJU International*, 85 (2000): 869–873.
64. Liu, X., Sun, Z., Uchiyama, M., Li, Y. & Okawa, M. "Attaining nocturnal urinary control, nocturnal enuresis, and behavioral problems in Chinese children aged 6 through 16 years." *Journal of the American Academy of Child and Adolescent Psychiatry*, 39 (2000): 1557–1564.
65. Tai, H. L., Chang, Y. J., Chang, S. C., Chen, G. D., Chang, C. P. & Chou, M. C. "The epidemiology and factors associated with nocturnal enuresis and its severity in primary school children in Taiwan." *Acta Paediatrica*, 96 (2007): 242–245.
66. Tariq, S. "AL-Karagully: Attention Deficit Hyperactivity Disorder: An overlooked problem in children." *Iraqi Journal of Medical Science*, 5.1 (2006): 48-54.

Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:

Neamah, H.N. and Hameed, H.G. "The Prevalence of Attention Deficit Hyperactivity Disorder among Primary School Age Children in Al-Najaf City: A Cross-Sectional Study." *Sarcouncil Journal of Medicine and Surgery* 3.6 (2024): pp 47-64.