Zagazig University Medical Journal
www.zumj.journals.ekb.eg
https://doi.org/10.21608/zumj.2025.353139.3799 Volume 31, Issue 3, March. 2025
Manuscript ZUMJ-2501-3799
DOI: 10.21608/ZUMJ.2025.353139.3799
ORIGINAL ARTICLE

The Prevalence and Associated Risk Factors of Attention Deficit Hyperactivity Disorder Among Elementary School Students in Saadian - Minya El Qamh District

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Submit Date 14-01-2025
Revise Date 06-02-2025
Accept Date 07-02-2025

ABSTRACT

Background: Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental issue that is frequently seen in children. Numerous risk factors, including genetics, environmental variables, maternal stressors, and low birth weight, have been demonstrated to enhance the prevalence of ADHD despite the fact that the exact cause is still unknown. This work aimed to assess the prevalence of ADHD in addition to identifying its associated risk factors among elementary school students in the Saadian-Minya El Qamh District.

Methods: This cross-sectional study was performed on 246 participants, selected randomly from 135 elementary schools. A structured clinical interview with the children, their parents, and teachers was done. A comprehensive psychiatric and medical history was taken to explore the risk factors of ADHD. The long Arabic version of Conner's Comprehensive Behavior Rating Scale (Conner's CBRS) was used as a screening test for ADHD. The Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-5) criteria was used as a diagnostic tool for ADHD.

Results:The mean age of our study participants was 8.51 years. ADHD was detected in 21.5% of the studied participants according to DSM-5 criteria. There was a statistically significant increase in ADHD frequency among male participants and among those with medication intake, a positive family history of ADHD, a lack of family support, family stressors, and legal concerns in the family. Also, there was a statistically significant increase in the frequency of mental health problems, sleep problems, grade retention, absenteeism, and learning problems among participants with ADHD. Binary logistic regression analysis for significant predictors of ADHD showed that the positive family history and family stressors increased the risk of ADHD by 7.303 and 4.168, respectively.

Conclusion: Among elementary school students, ADHD is a problematic issue. Family history and family stressors were important risk factors. Raising awareness and advocating for successful solutions for this specific problem is crucial.

Keywords: Attention Deficit Hyperactivity Disorder (ADHD); Children; Prevalence; Risk factors.

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is considered a common neurodevelopmental disorder described by persistent challenges related to inattention and hyperactivity, as well as impulsive behaviors, which can impact various aspects of daily life [1].

The development of ADHD has been associated with non-genetic neurological factors that influence brain development or result in brain injury. While the role of pregnancy and birth complications remains debated, strong evidence suggests that low birth weight (less than 2,500 g) and prenatal exposure to alcohol or tobacco significantly elevate the risk of ADHD. Additionally, conditions such as traumatic brain injury, hypoxic-anoxic brain injury, and epilepsy are known to further increase the likelihood of developing ADHD [2].

Children with ADHD are often physically hyperactive, engage in play for shorter durations, struggle with social skills, and exhibit inconsistent behaviors. They are easily distracted, face difficulties in school, lack motivation to improve, are often rejected by peers, and experience low self-esteem [3]. The Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-5) classifies ADHD into three presentations: predominantly inattentive, predominantly hyperactive/impulsive, and combined. The predominantly inattentive type is defined by six or more of 11 symptoms related to inattention. The hyperactive/impulsive type requires six or more of nine symptoms linked to hyperactivity and impulsivity. The combined type is diagnosed when both sets of criteria are met. Additionally, a partial remission category is included for cases where full criteria were previously met, but fewer symptoms persist, still causing noticeable functional impairment [4].

The estimated prevalence of ADHD in Europe varies between 3.2% and 7.5% [5]. This rate is significantly higher in Arab countries, varying considerably between 1.3% and 16% [6]. In Egypt, the incidence ranges from 16.2% to 20.9% among Egyptian children [7].

Doctors, educators, and parents must work together effectively to diagnose and treat ADHD. Doctors' diagnoses are heavily influenced by parental and educator reports of their children's actions. Teachers and parents who observe signs of ADHD early can shorten the time it takes to diagnose the disorder, which in turn allows for earlier intervention and better long-term results [6].

ADHD affects the family unit, raising the family's burden and reducing both the children's and parents' quality of life (QoL). Research indicates that ADHD creates considerable economic, social, and emotional strain on caregivers. In terms of family dynamics, studies have observed that children with ADHD often experience conflicted interactions with their parents, accompanied by dysfunctional parenting styles [8].

Parents' understanding of ADHD is crucial in determining how they assist their child, impacting factors like diagnosis, treatment decisions, and adherence to treatment plans [9]. To our knowledge, there was no previous research assessing the prevalence of ADHD and its associated risk factors among elementary school students at Minya El-Qamh District. Improving the health of individuals with ADHD when diagnosed early could result in substantial financial savings for families and society, potentially reducing this financial burden. So, this work aimed to evaluate the prevalence of ADHD in addition to identifying the associated risk factors among elementary school students in the Saadian-Minya El Qamh District.

METHODS

This cross-sectional study was conducted in the elementary schools in Minya El-Qamh District, Sharkia Governorate, Egypt. There were 135 elementary schools, divided into 15 urban and 105 rural schools. As the ratio between urban and rural schools is 1:7, one urban school and seven rural ones were selected randomly to be our study setting .

Elementary school students aged 6 to 12 years of both sexes whose parents agreed to participate in the study were included. Students with other conditions that could mimic ADHD (e.g., neurological abnormalities, vision, and hearing abnormalities) were excluded.

The sample size was calculated by the Open-Epi program based on the following data: The total number of elementary school students in Minya El-Qamh District was 104,084 students. The expected frequency was 20%, based on a previous study [10]. The confidence limit was set at 5%, the design effect at 1, and the confidence interval at 95%. Based on these parameters, the sample size was determined to be 246 students. The calculated sample size was divided equally among the selected schools. Considering the 1:7 ratio between urban and rural schools, 31 students were selected randomly from the urban schools, while the remaining students were chosen equally from the

seven rural schools. Random selection from student lists of each school was done.

Structured Clinical Interview: The structured clinical interview for the diagnosis of ADHD consisted of five parts .

1. Identification

The first part focused on identifying and collecting demographic and social data such as age, sex, residence, religion, and social class. Social class was assessed using the scale described by Fahmy et al. [11].

2. Comprehensive psychiatric and medical history

The second part explored comprehensive psychiatric and medical history to identify risk factors for ADHD. The medical history included details on birth weight and the use of past (e.g., iron, long-acting penicillin, calcium, and vitamin D) and current medications (e.g., iron, long-acting penicillin, and Tegretol). Social history explored the family's social and financial support systems, along with any significant family stressors. Family history reviewed occurrences of ADHD, other mental health conditions, or legal issues within the family. Psychiatric history captured symptoms of comorbid conditions as reported by parents or caregivers, such as learning difficulties, depression, anxiety, and sleep disturbances. Additionally, school performance was assessed, focusing on academic progress, absenteeism, grade retention, use of special education services, and referrals for behavioral or legal concerns.

٣. Physical examination

The third part involved a detailed physical examination to exclude other conditions that could mimic ADHD. This included a comprehensive cardiac examination, neurologic assessment, and vision and hearing screenings. It was performed in a private room in the school. Inspection, palpation, auscultation, and blood pressure measurement were done. Also, cranial nerves, the motor system, the sensory system, reflexes, gait, balance, vision, and hearing were examined.

٤. The long Arabic version of Conner's Comprehensive Behavior Rating Scale (Conner's CBRS)

The fourth part utilized the long Arabic version of Conner's Comprehensive Behavior Rating Scale (CBRS) as a screening tool for ADHD. This scale has two forms, one designed for parents and another for teachers. The parent version contains 48 items divided into six dimensions, while the teacher version contains 28 items distributed across four dimensions. Each item is scored on a scale from 0 to 3, where "0" means never and "3" indicates very often. The total scores from all dimensions are compared to age-group norms to obtain standardized scores called T-scores [12]. A T-score below 60 indicates the absence of ADHD, a T-score above 60 indicates ADHD, and a T-score above 70 suggests more severe symptoms [13]. Cronbach's alpha coefficients of the Conner Parent Rating Scale ranged from 0.57 to 0.90, and test-retest reliability values ranged from 0.34 to 0.73 [14]. Cronbach's alpha coefficients of the Conner Teacher Rating Scale ranged from 0.73 to 0.95 for males and from 0.76 to 0.94 for females, suggesting that these scales have excellent internal reliability [15].

٥. Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-5)

The fifth part of the structured clinical interview applied the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) criteria to diagnose ADHD by asking the parents after thoroughly clarifying all questions to them. According to the DSM-5, ADHD symptoms are divided into two categories: inattention, which includes 11 symptoms, and hyperactivity/impulsivity, which consists of 9 symptoms. ADHD is categorized into three presentations. The predominantly inattentive presentation requires six or more of the 11 inattention symptoms to be present. The predominantly hyperactive/impulsive presentation of ADHD is characterized by six or more of the nine symptoms related to hyperactivity and impulsivity. The combined presentation is diagnosed when the criteria for both inattention and hyperactivity/impulsivity are fulfilled. The DSM-5 specifies that these symptoms must be present in at least two different settings (such as at home, school, or work, with friends or relatives, or in other activities). Symptoms persist for at least six months and have an onset before the age of 12. Moreover, the symptoms have caused significant impairment in social, academic, or occupational functioning [16]. The test-retest reliability (kappa coefficients >0.45 ($p<0.05$)) of DSM-5 was perfect (100% agreement) for the diagnosis of ADHD [17].

A pilot study was carried out on 10% of the sample to test the research's applicability and the time needed for each clinical interview. Since no modifications were found to be necessary after the pilot study, the pilot sample was included in the main study sample.

Field work: This study took one year to be accomplished, from the first of August 2022 to the

end of July 2023. Training in the psychiatry clinic on how to diagnose ADHD using DSM-5 criteria was carried out by the principal investigator. In the first visit, students were interviewed to explain the nature of the study simply and to give them a written detailed explanation of the study and informed consent to be given to their parents; those who agreed were asked to attend a meeting at the school on a certain date. In the second visit, a face-to-face interview was conducted with the children, their parents, and teachers. The following was done: taking comprehensive psychiatric and medical history, a full clinical examination of the children, assessment of the children for criteria of ADHD included in the DSM-5, and filling the questionnaires (the Conner Parent Rating Scale and the Conner Teacher Rating Scale) by parents and teachers after a good explanation of it.

Ethical and administrative considerations: The study protocol received approval from the Institutional Review Board (IRB) of the Faculty of Medicine, Zagazig University, with the approval number ZU-IRB#:9404/31-4-2022. Necessary official permissions were obtained, and informed consent was collected from the parents of participating students. Parents were assured that all information would remain strictly confidential and that the study results would be used exclusively for research purposes. Furthermore, the study procedures were carefully designed to avoid any potential harm to the participants.

Statistical analysis

Computerized statistical analysis of the acquired data was performed using the SPSS (Statistical Package for the Social Sciences) application, version 27.0 [18]. Frequencies and relative percentages were used to represent the qualitative data. For qualitative variables, we utilized the Chi-square test to determine differences; for cells with less than five observations, we turned to Fisher's exact test. The mean ± standard deviation (SD) was used to express the quantitative data. The independent t-test was employed to evaluate differences in quantitative data between two groups that had normal distributions. Using the ANOVA F-test, we compared more than two groups whose data were regularly distributed. By using binary logistic regression analysis to determine adjusted odds ratios (OR), we were able to find significant predictors of ADHD. A significance level of 5% (P-value) was established for all statistical tests. Results were considered non-significant if the P-value was more than 0.05, significant if it was less than 0.05, and highly significant if it was less than 0.001 [19].

RESULTS

The ages of the studied children ranged from 6 to 12 years, with a mean of 8.51 years. Regarding sex and residence, 53.7% were males, and 87.4% were from rural areas. Muslim was the most frequent religion, and the medium social class represented 78.9% of the studied students (Table 1).

Regarding the medical history, 16.7% of the studied students had low birth weight. Regarding medications, 7.7% had a history of previous medications (most frequently iron), and 6.9% were on current medications (most frequently Tegretol). Positive family history was reported in 13% of the studied students (most frequently ADHD). Moreover, the majority of students had family social and financial support (89.8%), only 18.3% had family stressors, and 4.1% had legal concerns in the family (Table 2).

Regarding parent/caretaker reports of abnormal psychological symptoms and school performance, 5.7% of the students had symptoms of mental health problems (anxiety or depression), 13.8% had sleep problems, 10.2% had grade retention, 8.1% had remarked school absenteeism, 23.5% had learning problems, 3.7% needed special learning services, 10.6% had an impact on current function, and 4.5% were referred for legal problems (Table 2).

Results of the Conners CBRS among the studied students showed that the highest frequency of ADHD in the teacher questionnaire was found in the hyperactivity index (12.2%), but in parents, it was found in learning problems (15.9%) (Table 3).

The results of this study demonstrated that the Arabic version of the Conners assessment is a reliable and valid instrument for evaluating resilience in participants, as well as for confirming ADHD characteristics not listed in the DSM-5.

According to the DSM-5, 21.5% of the studied students had abnormal test results. Attention deficit was found in 7.3% of the students, hyperactivity in 5.7%, and both in 8.5% (Figure 1).

There were no statistically significant differences between normal and abnormal students according to DSM-5 regarding age, residence, religion, social class, or birth weight. However, there was a significantly higher frequency of male sex, medication intake, positive family history of ADHD, lack of family support, family stressors, and legal concerns in the family among students with abnormal DSM-5 compared to those with normal DSM-5. Moreover, the frequency of mental health

problems, sleep problems, grade retention, absenteeism, learning problems, needed special educational services, impact on function, and referral for legal issues was significantly higher among students with abnormal DSM-5 compared to those with normal DSM-5 (Table 4).

Regarding the relation between ADHD diagnosed by DSM-5 and Conners CBRS among the studied students, there was a statistically significant increase in all items of Conners CBRS of both parents and teachers among students with abnormal DSM-5 compared to normal students (Table 5).

Binary logistic regression analysis for significant predictors of ADHD among the studied students showed that the positive family history and family stressors increased the risk of ADHD by 7.303 and 4.168, respectively (Table 6).

Table (1): Sociodemographic data of the studied students

Variables		Students (*n*=246)	
Age (in years)	• **Mean ± SD** • **Range**	8.51±1.94 6-12	
		No.	**%**
Sex	• **Female** • **Male**	114 132	46.3 53.7
Residence	• **Rural** • **Urban**	215 31	87.4 12.6
Religion	• **Muslim** • **Christian**	234 12	95.1 4.9
Social class	• **Low** • **Medium** • **High**	7 194 45	2.8 78.9 18.3

Table (2): Medical history, parent/caretaker report of abnormal psychological symptoms and school performance among the studied students

Variables		Students (*n*=246)	
		No.	**%**
Birth weight	• **Normal** • **Low**	205 41	83.3 16.7
Medication history	• **-ve** • **+ve past** ○ **Iron** ○ **Long acting Penicillin** ○ **Calcium + Vit D** • **+ve current** ○ **Tegretol** ○ **Iron** ○ **Long acting Penicillin**	210 19 10 3 6 17 7 5 5	85.4 7.7 52.6 15.8 31.6 6.9 41.2 29.4 29.4
Family history	• **-ve** • **+ve** ○ **of ADHD** ○ **of other mental health problems**	214 32 24 8	87 13 75 25
Family social and financial support	• **Absent** • **Present**	25 221	10.2 89.8
Family stressors	• **Absent** • **Present**	201 45	81.7 18.3
Legal concern in family	• **Absent**	236	95.9

Variables		Students (*n*=246)	
		No.	%
	• Present	10	4.1
Mental health	• Normal • Abnormal	232 14	94.3 5.7
Sleep problems	• Absent • Present	212 34	86.2 13.8
Learning problems	• No • Yes	188 58	76.5 23.5
School performance	• Progress • Grade retention	221 25	89.8 10.2
Absenteeism	• No • Yes	226 20	91.9 8.1
Special educational services	• No • Yes	237 9	96.3 3.7
Symptom impact on current function	• No impact • Impact	220 26	89.4 10.6
Referrals for legal problems	• No • Yes	235 11	95.5 4.5

Table (3): Conners Comprehensive Behavior Rating Scale among the studied students

Variables			Students (*n*=246)	
			No.	%
Teachers	Conduct problems	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	218 21 7	88.6 8.5 2.8
	Hyperactivity	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	224 19 3	91.1 7.7 1.2
	Inattentive – passive	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	225 20 1	91.5 8.1 0.4
	Hyperactivity index	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	216 22 8	87.8 8.9 3.3
Parents	Conduct problems	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	221 20 5	89.8 8.1 2.1
	Learning problems	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	207 34 5	84.1 13.8 2.1
	Psychosomatic	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	213 16 17	86.6 6.5 6.9
	Impulsive Hyperactive	• Normal ≤ 60 • ADHD > 60 -70 • Sever ADHD >70	216 27 3	87.8 11 1.2

Variables			Students (*n*=246)	
			No.	%
	Anxiety	• **Normal ≤ 60** • **ADHD > 60 -70** • **Sever ADHD >70**	220 14 12	89.4 5.7 4.9
	Hyperactivity index	• **Normal ≤ 60** • **ADHD > 60 -70** • **Sever ADHD >70**	218 22 6	88.6 8.9 2.4

Table (4): Relation between ADHD diagnosed by DSM5 and socio demographic data, medical history, abnormal psychological symptoms and school performance among the studied students

Variables		Abnormal (n=53)		Normal (n=193)		t	P
Age (in years)	**Mean ± SD** **Range**	8.56±2.08 6-12		8.50±1.91 5-12		0.23	0.82 (NS)
		No	**%**	**No**	**%**	χ^2	**P**
Sex	• **Male** • **Female**	35 18	26.5 15.8	97 96	73.5 84.2	4.16	**0.04***
Residence	• **Rural** • **Urban**	44 9	20.5 29	171 22	79.5 71	1.18	0.28 (NS)
Religion	• **Muslim** • **Christian**	48 5	20.5 41.7	186 7	79.5 58.3	3.02	0.08 (NS)
Social class	• **Low** • **Medium** • **High**	1 40 12	14.3 20.6 26.7	6 154 33	85.7 79.4 73.3	1.02	0.60 (NS)
Birth weight	• **Low** • **Normal**	41 12	20 29.3	164 29	80 70.7	1.74	0.19 (NS)
Medication history	• **+ve past** • **+ve current** • **-ve**	11 11 31	57.9 64.7 14.8	8 6 179	42.1 35.3 85.2	39.3	**<0.001****
Family history	• **-ve** • **+ve**	32 21	15 65.6	182 11	85 34.4	42.29	**<0.001****
Family social and financial support	• **Absent** • **Present**	12 41	48 18.6	13 180	52 81.4	11.52	**0.001***
Family stressors	• **Absent** • **Present**	29 24	14.4 53.3	172 21	85.6 46.7	32.93	**<0.001****
Legal concern in family	• **Absent** • **Present**	45 8	19.1 80	191 2	80.9 20	21.07	**<0.001****
Mental health problems	• **Normal** • **Abnormal**	39 14	16.8 100	193 0	83.2 0	54.06	**<0.001****
Sleep problems	• **Absent** • **Present**	23 30	10.8 88.2	189 4	89.2 11.8	103.8	**<0.001****
Learning problems	• **No** • **Yes**	23 30	12.2 51.7	165 28	87.8 48.3	40.89	**<0.001****
School performance	• **Progress** • **Grade retention**	31 22	14 88	190 3	86 12	72.71	**<0.001****
Absenteeism	• **No** • **Yes**	43 10	19 50	183 10	81 50	10.43	**0.001***

Variables		Abnormal (n=53)		Normal (n=193)		t	P
Special educational services	• **No** • **Yes**	44 9	18.6 100	193 0	81.4 0	34.02	**<0.001****
Symptom impact on current function	• **Not impact** • **Impact**	28 25	12.7 96.2	192 1	87.3 3.8	95.74	**<0.001****
Referral for legal problems	• **No** • **Yes**	42 11	17.9 100	193 0	82.1 0	41.93	**<0.001****

SD: Standard deviation t: Independent t-test χ2 : Chi-square test
*NS: Non significant (P>0.05) *: Significant (P<0.05) **: highly significant (P<0.001)*

Table (5): Relation between ADHD diagnosed by DSM-5 and Conners CBRS among the studied students

Variables		Abnormal (*n*=53)	Normal (n=193)	t	P
		Mean ± SD Range	**Mean ± SD Range**		
Teachers	**Conduct problems**	59.06±8.34 43-75	47.26±6.86 32-62	10.56	**<0.001***
	Hyperactivity	57.58±8.52 40-80	46.38±6.23 33-65	10.65	**<0.001***
	Inattentive – passive	55.87±9.27 39-71	43.96±5.79 33-66	11.49	**<0.001***
	Hyperactivity index	58.81±8.83 43-76	44.35±6.33 33-76	13.44	**<0.001***
Parents	**Conduct problems**	58.75±7.74 41-76	47.33±5.58 38-67	12.07	**<0.001***
	Learning problems	60.72±11.07 6-80	49.25±5.91 38-76	10.10	**<0.001***
	Psychosomatic	67.04±19.03 39-122	50.23±7.76 37-122	9.71	**<0.001***
	Impulsive Hyperactive	59.38±6.57 44-74	45.52±8.22 29-83	11.32	**<0.001***
	Anxiety	60.21±12.64 37-97	47.15±6.13 36-66	10.56	**<0.001***
	Hyperactivity index	61.07±7.45 49-79	46.13±5.83 34-65	15.51	**<0.001***

*SD: Standard deviation t: Independent t-test *: highly significant (P<0.001)*

Table (6): Binary logistic regression analysis for significant predictors of ADHD among the studied students

Variables	B	S.E.	Wald	P	OR	95% C.I.	
Sex	0.726	0.389	3.481	0.06 (NS)	2.066	0.964	4.427
Positive medication history	0.555	0.410	1.828	0.17 (NS)	1.741	0.779	3.891
Positive Family history	**1.988**	**0.496**	**16.074**	**<0.001****	**7.303**	**2.763**	**19.301**
Family social & financial support	0.205	0.708	0.084	0.77 (NS)	1.227	0.307	4.910
Family stressors	**1.428**	**0.489**	**8.540**	**0.003***	**4.168**	**1.600**	**10.859**
Legal concern in family	1.342	0.944	2.023	0.15 (NS)	3.827	0.602	24.322

*NS: Non significant (P>0.05) *: Significant (P<0.05) **: highly significant (P<0.001)*

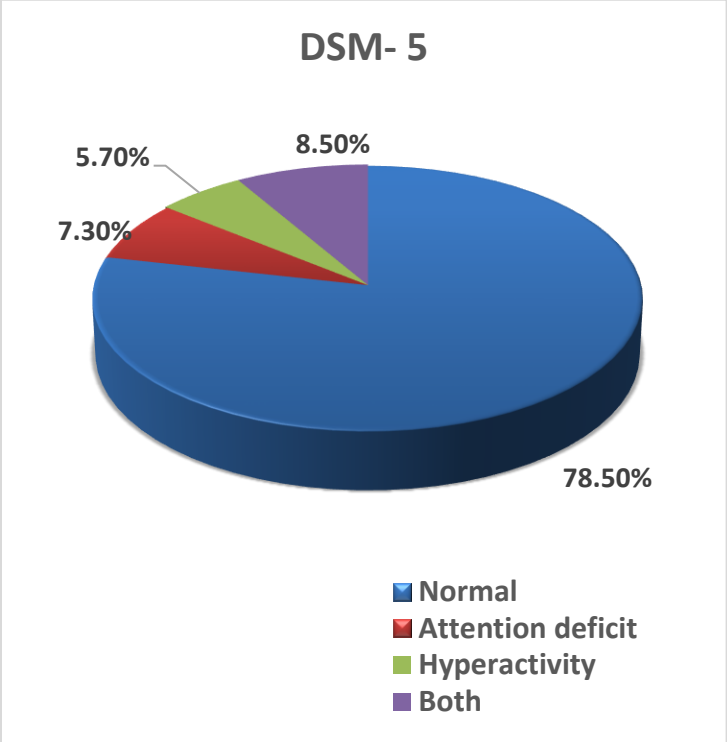

Figure (1): Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-5) results among the studied students.

DISCUSSION

Attention-deficit/hyperactivity disorder (ADHD) is a prevalent neurodevelopmental disorder that had substantial negative effects on both individuals and society, with its impact often extending into adulthood [20]. The current study was a cross-sectional analysis of students in primary schools in Minya El-Qamh District. The results showed that within this demographic, 21.5% fulfilled the DSM-5 criteria for ADHD. The prevalence of ADHD in Fayoum City was 20.5% [10], which was in close agreement with this number. Similarly, EL-Mogy et al. [7] reported an incidence ranging from 16.2% to 20.9% among Egyptian children.

Alternatively, Farahat et al. [21] detected a lower prevalence rate of 6.9% among primary school kids in Menoufia Governorate, Egypt. Additionally, our findings exceed those of the prevalence of ADHD in Europe, which varies between 3.2% and 7.5% [5]. Meanwhile, Al-Saedi et al. [22] reported a prevalence of ADHD of 52.5% among children in Makkah, which was greater than our study.

Our study showed that the presentation of ADHD was found to be inattentive in 7.3% of the students, hyperactivity in 5.7%, and combined in 8.5% (the most common). This proportion was consistent with the findings of Aboul-Ata et al. [10], who found a prevalence rate of 1.3% for the inattentive subtype, 2.8% for the hyperactivity/impulsivity subtype, and 16.4% for the combined subtype (the most common). Also, the combined type was the most common subtype in the study by Español et al. [23]. However, our findings contradicted those of Zagzoog et al. [24], who reported that 35.34% of respondents had inattention subtype (the most common type), 28.6% had hyperactivity/impulsivity subtype, and 21.3% had combined subtype. Variations in ethnicity, sociodemographics, and the methods used to diagnose ADHD all contribute to these observed variances in prevalence.

Our results showed that the highest frequency of ADHD in the Conners' Teacher Questionnaire was found in the Hyperactivity Index (12.2%). In contrast, in the Conners' Parents Questionnaire, it was found in Learning Problems (15.9%). There was a statistically significant increase in all items of Conners CBRS for both parents and teachers among students with abnormal DSM-5 scores compared to normal students. These findings were consistnet with those reported by Abdekhodaie et al. [25], who

detected a significant prevalence of 12.3% ± 2.12% of ADHD among kindergarten children in northeast Iran. The primary screening was conducted using the Conners' Parent-Teacher Questionnaire, and its validity was verified through clinical interviews. Additionally, Mostafaee et al. [3] found an ADHD prevalence of 11.3%.

In contrast to Abbasi et al. [26], who used a cross-sectional design to find a prevalence of ADHD among students by asking parents of 27.7% and by asking teachers of 22.5%, with a p-value of <0.05 being deemed statistically significant, our results show no such trend. Screening tools such as the Conners' Rating Scales and the Strengths and Difficulties Questionnaire are frequently utilized with children and adolescents [27].

Regarding the relationship between birth weight (BW) and ADHD, we found no significant association between low BW and ADHD risk. On the contrary, Wüstner et al. [28] and a meta-analysis by Franz et al. [29], found that low BW was associated with an increased risk of ADHD. Also, Ni et al. [30] found that children with low BW and very low BW have an increased risk of developing ADHD.

In contrast, Soheilipour et al. [31], who conducted a case-control study on children aged 5–12 years, discovered that children with higher BW had a greater risk of developing ADHD. These differing results may be attributed to variations in BW categorization, study populations, and study designs.

Regarding sex, our study showed ADHD to be more prevalent in males (53.7%). Abdekhodaie et al. [25] found a significantly higher prevalence of ADHD in boys (18.1%) compared to girls (6.7%) ($P < 0.0001$, $Z = 5.75$). Also, the prevalence estimate was twice as high in boys (10 %) compared to girls (5 %) [32].

Our study indicated that there was a strong correlation between a positive family history of mental health issues and the risk of ADHD when it came to the relationship between a positive family history of ADHD and ADHD risk. The results were in line with those of Rowland et al. [33], who investigated the prevalence of ADHD in North Carolina (U.S.) and discovered that a family history of the disorder influenced it.

We also reported a statistically significant increase in the frequency of ADHD among children who experienced family stressors. This agrees with Russell et al. [34] longitudinal cohort study, which found that children from families facing financial hardship had higher average ADHD symptom scores compared to all other groups.

Concerning the functional impairment of children with ADHD, our study indicated a significantly increased risk of functional impact. This finding was consistent with other studies, such as Kosheleff et al. [35], who showed that ADHD was associated with a wide range of functional impairments.

The current study showed a statistically significant increase in the frequency of sleep problems among students with abnormal DSM-5 scores compared to normal students. This aligns with the findings reported by French et al. [36], which were conducted with 12 mothers of children with ADHD who experienced sleep difficulties. Furthermore, Sohrabi et al. [37] found that the majority of children with ADHD experienced sleep problems, and the most common disorders included bedtime resistance.

When it came to academic difficulties, our results were in line with those of the Fleming et al. [38] cohort research, which indicated that children whose ADHD was treated had worse school results. They were more likely to need special educational assistance, more likely to be excluded from school, had worse exam scores, and dropped out of school at a younger age.

Regarding the association between referral for legal problems and ADHD, our study was in agreement with Berryessa et al. [39], which showed that individuals with ADHD face additional challenges once they encounter the criminal justice system and navigate the legal process.

The present study had several important limitations. First, it's hard to tell if a risk factor causes ADHD because the study was cross-sectional. Second, there's a chance of reporting bias because the survey used parents' and teachers' self-reported data. Third, because the sample only included one district, the results may not apply to other areas as well.

Future research should adopt longitudinal study designs to understand better the temporal sequence of ADHD development and its associated risk factors, enabling stronger causal inferences. Expanding the sample to include multiple districts with diverse demographic backgrounds will enhance the generalizability of the findings. To minimize reporting bias, incorporating objective assessment tools alongside multi-informant reports from clinicians, educators, and caregivers is recommended. Additionally, comprehensive screening programs should be implemented at the community and school levels, supported by

government health initiatives. Raising awareness among parents, teachers, and healthcare professionals about early ADHD detection, coupled with accessible psychological, educational, and financial support services, can significantly mitigate the disorder's impact on affected children and their families. It is the role of the state, the Ministry of Health, and primary care to provide screening programs, raise parental and teacher awareness of ADHD, and provide families with ADHD and their children with a full range of support services, including financial aid, counseling, and educational opportunities.

CONCLUSION

Based on the results of the current study, ADHD among elementary school children was a prevalent problem; it affects males more than females. Positive family history and family stressors were important predictors of ADHD. Screening and early diagnosis of ADHD were important preventive measures to decrease the burden of the problem. Raising awareness and providing learning facilities and financial and psychological support for those children and their families were our main recommendations.

Conflict of interest: None.
Financial disclosures: None.

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Citation

Mohamed, M., Shedeed, S., Raya, Y., Said, R., Frere, N. The Prevalence and Associated Risk Factors of Attention Deficit Hyperactivity Disorder Among Elementary School Students in Saadian - Minya El Qamh District. Zagazig University Medical Journal, 2025; (1341-1353): -. doi: 10.21608/zumj.2025.353139.3799