



Original Article

Knowledge of Attention Deficit Hyperactivity Disorder among Primary School Teachers in Kirkuk City: A Descriptive Cross-Sectional Study

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Abstract:

Background: Attention Deficit Hyperactivity Disorder (ADHD) significantly impacts academic outcomes, yet

teacher knowledge gaps persist globally. This study assesses ADHD knowledge among primary school teachers in Kirkuk, Iraq.

Methods: A cross-sectional study (November 2024-May 2025) included 429 teachers from 88 schools (36 public, 47 special public, 5 private) via random sampling. Data were collected using a validated questionnaire (reviewed by 14 experts) covering ADHD symptoms, causes, and treatments. Analyses used IBM SPSS v20.

Results: The results showed that while general awareness of ADHD was high, only 44.5% of teachers demonstrated a good level of knowledge, particularly lacking in understanding symptoms, causes, and treatment options. A significant difference was found between male and female teachers, with males scoring higher ($t(427) = 2.88, p = .005$). Female teachers and those with prior ADHD-related training showed higher levels of knowledge. Other demographic factors did not show a significant association.

Conclusion: While ADHD awareness is high, deep knowledge remains limited, especially regarding treatment options. The findings highlight the urgent need for structured teacher training programs and evidence-based information dissemination.

Keywords: Attention Deficit Hyperactivity Disorder, Knowledge, Primary School Teachers.

Introduction:

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder, first formally described by Dr. George Still in 1902 (Mahone & Denckla, 2017). Since then, the conceptualization and classification of the disorder have evolved significantly. Historically referred to as "minimal brain dysfunction" and "hyperkinetic reaction of childhood," ADHD was officially recognized by the American Psychiatric

Association in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III) in 1980, and later refined in DSM-5 (2022) into three subtypes: predominantly inattentive, predominantly hyperactive-impulsive, and combined type (Al-Amarei & Mohamed, 2020).

Globally, ADHD affects an estimated 5–11% of school-aged children, with boys diagnosed nearly twice as often as girls due to more externalized

behaviors such as hyperactivity and impulsivity (Francés et al., 2022; Shehata et al., 2016; Walpert et al., 2021). Prevalence rates vary by region, with reported estimates of 6.24% in Jordan, 6.9% in Egypt, and 16.4% in Saudi Arabia (Shehata et al., 2016). In the United States, approximately 7 million children between the ages of 3–17 have been diagnosed (Center for Diseases Control and Prevention, 2024). The etiology of ADHD is multifactorial, involving genetic predispositions (heritability estimates range from 70–80%), prenatal exposures, neuroanatomical abnormalities, dietary factors, and environmental stressors such as trauma or psychosocial adversity (Castanho et al., 2020; Faraone et al., 2024; Martín et al., 2018).

Children with ADHD commonly exhibit symptoms of inattention, hyperactivity, and impulsivity, which significantly affect academic performance and social integration. These difficulties often persist into adolescence and adulthood, influencing emotional regulation, interpersonal relationships, and occupational outcomes (Agnew-Blais & Michelini, 2023; Milledge et al., 2019; Smith & Langberg, 2018). Psychosocial stress, family dysfunction, and war-related trauma—especially relevant in Iraq—are additional risk factors (Hasan et al., 2019).

In educational settings, primary school teachers play a central role in identifying behavioral issues, initiating referrals, and providing early interventions. As front-line observers of children's behavior, their ability to recognize ADHD symptoms and respond appropriately is crucial to supporting students' developmental and academic success (Carrillo-Sierra et al., 2023; Koutsoklenis & Honkasilta, 2023). Yet, research consistently indicates that many teachers have limited formal training on ADHD and rely on informal sources such as media or anecdotal experience (Ballantine, 2015; Basudan et al., 2019).

Factors influencing teacher knowledge include gender, age, teaching experience, educational background, exposure to ADHD-related training, and personal beliefs. In conflict-affected regions such as Kirkuk, additional challenges including

limited professional development resources and trauma exposure may further shape educators' perceptions (Dessie et al., 2021; Hasan et al., 2023).

Despite the increasing prevalence of ADHD, few studies in Iraq have assessed teachers' understanding of the disorder. For instance, regional studies in Al-Diwaniyah, Al-Najaf, and Mosul highlight moderate to poor knowledge levels among teachers, with training being the only consistently significant predictor of awareness (Al-Amarei & Mohamed, 2020; Al-Wily et al., 2020; Hamed & Ghafel, 2022).

Finally, about Social Implications of Educational Reform, the results of this study may help guide training initiatives and educational policies that try to educate teachers better to deal with ADHD. Schools may create an inclusive atmosphere that meets a range of learning requirements and advances educational justice by filling up knowledge gaps (Hussain et al., 2023; Saadon & Salih, 2017).

This study aims to assess primary school teachers' knowledge of ADHD in Kirkuk City and examine its association with sociodemographic factors.

Methods:

A descriptive cross-sectional study was conducted during a period from 19th of September 2024 to 1st of May 2025. The study was conducted in public, private, and special education primary schools in Kirkuk City. Where 36 of them were public primary schools, 47 of them special public schools, and only 5 of private special educational schools in the Kirkuk city, random sampling involved 429 teachers.

Instrument:

A self-report questionnaire used in previous reports (Amha & Azale, 2022) was adapted for use in this study based on the authors' review and feedback from a pilot study. The final instrument consists of two parts:

Data collection was through direct interview, and using constructed and developed questionnaire as

a tool for data collection which involved two parts.

- First: Included the sociodemographic characteristics of the participants (age, father or mother, education, occupation, residency, and number of children); additional questions were added regarding contact with a child who they thought to have ADHD and the degree of kinship to that child
- Second: Questions about the definition of the disorder, symptoms, risk factors, and treatment.

Questionnaire validity

to validate the questionnaire, the instrument was sent to 14 experts and specialists from relevant fields, each with a minimum of 10 years of experience. Their feedback was incorporated to ensure the content validity, clarity, and relevance of the items.

Sampling and Study Population

A **multistage sampling method** was used to select participants:

- **Stage 1 (Public Schools):** The use of [randomizer.org](https://www.randomizer.org) to select 35 schools from 430 is a valid and commendable method for random selection
- **Stage 2 (Private Schools):** The inclusion of all 5 private schools in Kirkuk is acceptable for a census-based approach.
- **Stage 3 (Special Education Schools):** Including all 48 special education schools

Inclusion and Exclusion criteria.

Inclusion criteria:

- Governmental (public, special education) and private primary school teachers in Kirkuk city.
- Those who have at least one year of

experience as a teacher in primary school.

Exclusion criteria:

- The teachers with less than one year of primary school teaching experience.
- Teachers from Kirkuk rural and district areas have been excluded.

Sample Size

A priori power analysis was conducted using G*Power version 3.1.9.4 to determine the minimum sample size required for adequate statistical power. Assuming a small effect size ($d_z = 0.20$), a two-tailed paired-sample t-test, a desired power of 0.95 ($1 - \beta$), and an alpha level of 0.05, the minimum required total sample size was calculated to be **327 participants**. This calculation ensures sufficient power to detect a statistically significant difference in knowledge scores. Given this requirement, a total of **429 primary school teachers** were recruited, exceeding the minimum to enhance statistical robustness and accommodate potential data loss.

Ethical consideration

All participants provided verbal agreement after being informed of the study's goal and given assurances that the information gathered would be kept private and used exclusively for research.

Rating and Scoring:

The items were classified and scored according to the patterns below:

Three Likert scales are used in the knowledge for rating an item. The items rated as (True, False, and Don't Know), the levels of the scale are scored as (0) for False, (1) for Don't Know and (2) for True.

To determine the score of primary school teachers' knowledge, the scales are divided into two levels.

Tabil: The Rating Scales and Scoring.

Scales	Score	Grade
Knowledge	0-11	Poor
	12-23	Fair
	24-36	Good
ADHD Associated Factors	0-4	Poor
	5-9	Average
	10-15	Positive
Symptoms/Diagnosis	0-3	Poor
	4-6	Average
	7-9	Good
Treatment	0-3	Poor
	4-7	Average
	8-12	Positive

Instrument Reliability (for Methods section):

The reliability of the research instrument was assessed using Cronbach’s alpha to evaluate internal consistency. A pilot test was conducted with 25 participants (n = 25) to determine the reliability of the questionnaire components. The analysis yielded the following Cronbach’s alpha coefficients:

- **Attitudes section (20 items):** $\alpha = 0.81$
- **Total instrument (50 items):** $\alpha = 0.84$
- **Knowledge section (30 items):** $\alpha = 0.87$

All coefficients exceeded the minimum acceptable threshold of 0.70(Kennedy, 2022), indicating good internal consistency and acceptable reliability of the instrument.

Results:

Table 1 Participants’ sociodemographic characteristics (N = 429)

Variable	Frequency	Percent
Age (Years): Mean (SD): 42.77 ± 9.89	27	6.3
	99	23.1
	88	20.5
	112	26.1
	103	24.0
Religion	416	97.0
	9	2.1
	4	0.9
Type of school		

Public	405	94.4
Private	24	5.6
Do you have a specialization in Special Education?		
Yes	72	16.8
No	357	83.2
Do you know anyone with ADHD outside of your work environment?		
Yes	252	58.7
No	177	41.3
Number of students in each class: Mean (SD): 28.0 ± 14.1		
1-20	125	29.1
21-40	227	52.9
41-60	77	18.0

The study sample consisted of 429 primary school teachers in Kirkuk City. The mean age of participants was 42.77 years (SD = 9.89). The largest proportion of teachers fell within the 44–51-year age group (n = 112; 26.1%), followed by those aged 52–60 years (n = 103; 24.0%), 28–35 years (n = 99; 23.1%), 36–43 years (n = 88; 20.5%), and 20–27 years (n = 27; 6.3%).

In terms of religion, the overwhelming majority identified as Muslim (n = 416; 97.0%), with smaller numbers identifying as Christian (n = 9; 2.1%) or Other religions (n = 4; 0.9%).

Regarding the type of school, most participants were employed in public schools (n = 405; 94.4%), while a minority worked in private schools (n = 24; 5.6%).

With respect to special education services, only 16.8% of schools (n = 72) offered a special education specialization, while the majority (83.2%, n = 357) did not.

When asked whether they personally knew someone with ADHD outside their professional environment, 58.7% (n = 252) of teachers reported such exposure, while 41.3% (n = 177) did not.

Finally, concerning class size, the average number of students per classroom was 28.0 (SD = 14.1). More than half of the classes (52.9%, n = 227) comprised 21–40 students, followed by 1–20 students (29.1%, n = 125), and 41–60 students (18.0%, n = 77).

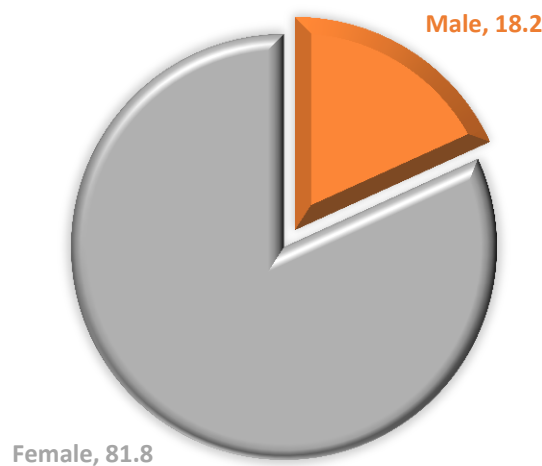


Figure 1. Gender Distributions of the sample

The above figure shows that the majority are females (81.8%) compared to males (18.2%).

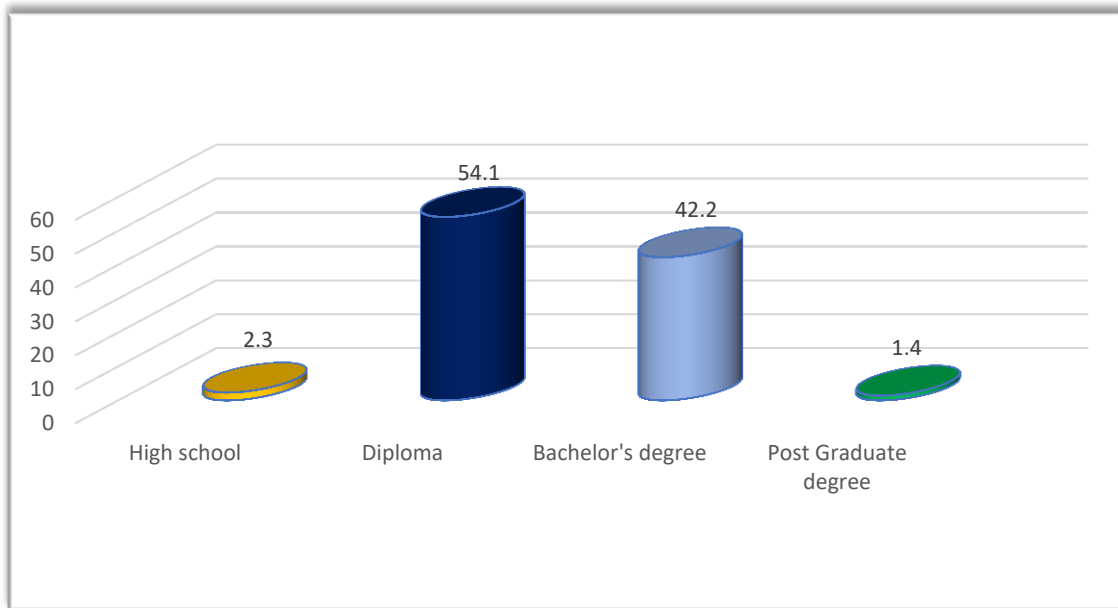


Figure 2. Highest educational level Distributions of the sample

Concerning the highest educational level participants attained, more than half hold diploma degree (54.1%), followed by those who hold

bachelor’s degree (42.2%), those who are high school graduates (2.3%), and those who hold graduate degrees (1.4%).

Table 2. differences in participants’ knowledge about Attention deficit hyperactivity disorder with sociodemographic variables. N=429

	Gender	N	Mean	t	P value
Gender	Male	78	23.8590	2.884	0.005
	Female	351	22.5698		
School type	Public	405	22.8815	2.019	0.054
	Private	24	21.5000		
existence of special education in schools	Yes	72	23.0417	0.634	0.528
	No	357	22.7563		
knowing anyone with Attention deficit hyperactivity disorder	Yes	252	22.6508	-1.105	0.270
	No	177	23.0284		

t= t-test

The study results reveal that there is a statistically significant difference in participants’ knowledge about children with ADHD between gender groups (p-value = .003).

The study results reveal that there is no statistically significant difference in participants’ knowledge about children with ADHD between school type groups.

The study results reveal that there is no statistically significant difference in participants' knowledge about children with ADHD between groups with the existence of special education in the school.

The study results reveal that there is a statistically significant difference in participants' knowledge about symptoms/diagnosis of children with ADHD between knowing anyone with ADHD outside their work environment and those who do not (p-value = .034).

Table 3. Differences in knowledge about Attention deficit hyperactivity disorder and sociodemographic variables. N=429

		Sum of Squares	Df	Mean Square	F	Sig.
Religion	Between Groups	8.718	2	4.359	0.360	0.698
	Within Groups	5158.834	426	12.110		
	Total	5167.552	428			
Educational qualification	Between Groups	41.413	3	13.804	1.144	0.331
	Within Groups	5126.140	425	12.062		
	Total	5167.552	428			

df= Degree of freedom, F= F-Statistics, Sig= Significance

The study results demonstrate that there were no statistically significant differences in knowledge about children with ADHD across different religious groups. Similarly, there were no

significant differences in ADHD knowledge among participants with varying educational qualification levels.

Table 4. Pearson Correlations Between Sociodemographic Variables and Attention deficit hyperactivity disorder Knowledge

	1	2	3	4	5	6	7
1. Age	-						
2. How many children do you have, if any?	0.346**	-					
3. Number of students in each class	0.027	0.091	-				
4. ADHD Associated Features	-0.032	-0.013	0.114*	-			
5. Symptoms/Diagnosis	-0.078	-0.004	-0.102*	0.053	-		
6. Treatment	-0.016	0.076	-0.010	0.140**	0.240**	-	
7. Overall Knowledge	0.009	0.033	0.113*	0.235**	0.147**	0.151**	-

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The study results reveal that there is no significant correlation between each participant's age, number of children they have, number of students

in the class, and their knowledge about children with ADHD

Discussion:

The present study reported a mean teacher age of 42.77 years (SD = 9.89), with the largest proportion aged 44–51, consistent with previous studies in Baghdad and Qatar, which also reflected mature teaching workforces (Al-Hendawi et al., 2024; Hamed & Ghafel, 2022). The religious composition (97% Muslim) mirrored national demographics (central intelligence Agency, 2025)

The majority of participants were from public schools (94.4%), reflecting the national dominance of public education. Only 16.8% of schools offered special education, underscoring a gap in specialized services. This aligns with prior findings emphasizing the need for enhanced special education capacity and teacher training to better support students with ADHD (Lee & Park, 2023).

Most teachers were female (81.8%), a trend consistent with both regional and global teaching demographics (Hamed & Ghafel, 2022). In terms of educational attainment, more than half held diploma qualifications, aligning with patterns observed in other Iraqi studies (Al-Robaiaay, 2013)

Table 2., showed Gender significantly influenced ADHD knowledge, with male teachers scoring higher, consistent with some international studies (Abouammoh et al., 2023). This finding highlights the need for equitable access to professional development for all teachers.

No significant differences were found between public and private school teachers, in line with mixed findings from UAE, Iran, and Saudi Arabia (Al-Moghamsi & Aljohani, 2018; Hosseinnia et al., 2020; Saad et al., 2022). These variations likely reflect regional disparities in teacher training rather than school type.

The presence of special education programs did not significantly impact ADHD knowledge. This confirms that mere exposure is insufficient without structured, evidence-based training—an observation supported by studies demonstrating the effectiveness of targeted ADHD education for

teachers (Adamis et al., 2024; Eltyeb et al., 2023; Monteiro & Sims, 2023).

Impact of Personal Exposure to ADHD, teachers who knew someone with ADHD outside of work demonstrated better knowledge of ADHD symptoms and diagnosis. However, this personal exposure did not significantly improve knowledge of treatment or associated features, highlighting that lived experience alone is not enough without formal training (Banks et al., 2024; Garcia, M. A., & Johnson, P. D., 2022).

Religion, Education Level, and ADHD Knowledge in table 3., showed No significant differences were found in ADHD knowledge across religious groups or educational qualification levels. These findings align with previous research showing that knowledge is more strongly influenced by training and professional development than by cultural or educational background (Alsubaie et al., 2024; Chronis-Tuscano & Bounoua, 2024; Ward et al., 2022).

Correlations Between Sociodemographic Variables and Knowledge according to the table 4., the study found no significant correlations between teachers' age, number of children, or class size and their ADHD knowledge. This aligns with existing literature indicating that demographic factors alone are poor predictors of knowledge without formal learning interventions (Hosseinnia et al., 2020; Mohr-Jensen et al., 2019).

These findings collectively emphasize that structured, evidence-based ADHD training is essential for improving teacher knowledge, regardless of gender, personal exposure, or school type. Building such capacity is critical for the early identification and support of children with ADHD, particularly in resource-limited educational contexts.

Study Limitations:

This study faced limitations including the geographic dispersion of schools, limited data collection time due to tight school schedules, and cultural hesitancy among some administrators. These factors may limit the generalizability of the

findings. Future research should consider extended timelines, enhanced stakeholder engagement, and culturally sensitive recruitment strategies.

Conclusions:

This study highlights critical insights into the knowledge of primary school teachers in Kirkuk regarding Attention Deficit Hyperactivity Disorder (ADHD). While most teachers acknowledged the importance of understanding ADHD, their actual knowledge levels were mostly average, with noticeable gaps, especially in areas such as risk factors and treatment approaches.

A significant portion of the participants relied on informal sources like social media for information, which may have contributed to the limited and inconsistent depth of knowledge. Although over 90% were aware of ADHD, only 44.5% demonstrated good overall knowledge, revealing a clear gap between basic awareness and comprehensive understanding—particularly in recognizing symptoms and developing appropriate interventions.

These findings emphasize the need for structured training programs. Teachers with more accurate knowledge are more likely to adopt effective strategies that improve classroom management and student outcomes, making targeted education a key priority for supporting students with ADHD.

To improve ADHD awareness among primary school teachers, this study recommends several key actions. First, structured training programs on ADHD should be included in both teacher education and ongoing professional development. These programs should cover symptoms, diagnosis, and classroom strategies.

Second, the Ministry of Education should integrate ADHD topics into the national curriculum for teacher training. Third, schools should offer regular workshops led by experts to provide practical support.

Teachers should also be encouraged to use reliable information sources, such as academic journals and official health materials, rather than social

media. Lastly, schools should adopt inclusive practices, including individualized plans and positive behavior strategies, to better support students with ADHD

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