

Original Article

Elementary school teachers' knowledge of attention deficit/hyperactivity disorder

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ABSTRACT

Background: Teachers are often the first ones to suspect attention deficit/hyperactivity disorder (ADHD) in their students, because they are with them for most of the day and they know how normal students typically behave in classroom situations. The aim of this study is to assess the teachers' level of knowledge of ADHD and identify some factors affecting that knowledge. **Methods:** It is a cross-sectional study conducted among male and female elementary governmental schools in Madina city during the year 2017/1438. A pre-validated and translated self-administered questionnaire is used in data collection. It includes demographical questionnaire and the Knowledge of Attention Deficit Disorder Scale. **Results:** The study included 416 teachers. Their age ranged between 22 and 66 years. The average percentage of knowledge regarding ADHD general information, symptoms/diagnosis, and treatment were 41.6 ± 15.1 , 41.7 ± 15 , and 30.7 ± 16.6 , respectively. The average percentage of overall knowledge score regarding ADHD was 38 ± 11.3 . Only experience in teaching ($P = 0.042$) and previous experience with a child with ADHD ($P < 0.001$) were significantly associated with teachers' knowledge regarding ADHD general information. Special need teachers had the highest score of knowledge regarding ADHD symptoms (mean rank was 283.7), $P = 0.013$, and they had the highest score of knowledge regarding ADHD treatment (mean rank was 261.9), $P = 0.032$. Teachers who reported previous experience with a child with ADHD expressed higher level of overall knowledge regarding ADHD, $P < 0.001$. **Conclusions:** The knowledge regarding ADHD among elementary school teachers in Madina is suboptimal, particularly regarding treatment.

Keywords: Attention deficit/hyperactivity disorder, elementary school teachers, elementary school teachers' knowledge of attention deficit/hyperactivity disorder, teachers' knowledge

Introduction

Attention deficit/hyperactivity disorder (ADHD) is one of the most common psychiatric illnesses that affect school-age children worldwide.^[1]

The Diagnostic and Statistical Manual of Mental Disorders—5th edition (DSM-5TM) defines ADHD as “a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, has symptoms presenting in two or more settings (e.g., at home, school, or work; with friends or relatives; in other

activities), and negatively impacts directly on social, academic or occupational functioning.”^[1]

There are three presentations of ADHD recognized in the DSM-5TM: (1) predominantly inattentive, (2) predominantly hyperactive-impulsive, and (3) combined inattentive-hyperactive-impulsive which depend on their ratio presented by the person with ADHD.^[1]

Diagnosis can be provided by a qualified health-care professional who gathers information from family members or significant others who know the person well like teachers.^[2]

ADHD is typically affecting school performance, concentration, and self-control at school. Teachers are often the first ones to

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suspect ADHD in their students, because they are with them for most of the day and they know how normal students typically behave in classroom situations.^[3]

Aim of the study

The aim of the study is to assess the teachers' level of knowledge of ADHD in Madina, KSA, 2017 and identify the main demographic variables affecting their knowledge.

Subjects and Methods

Study design

This is a descriptive (cross-sectional) study.

Study area

This study conducted in the elementary governmental schools in Madina city during the year 2017/1438. Al-Madinah Al-Monawarah region is one of the main regions in Kingdom of Saudi Arabia located in the western area with a total population of 2,083,326.^[4]

Study population

Male and female teachers in elementary governmental schools in Madina city constituted the study population.

Inclusion criteria

- All male and female teachers working in elementary governmental schools in Madina city.
- All male and female teachers working as administrators or student advisors in elementary governmental schools in Madina city.

Exclusion criteria

- Any male and female teacher working in private schools in Madina city.

Sample size

According to Medina Education Statistics 2017, there are 4117 male teachers working in 182 boys' elementary governmental schools dividing into four main sectors (southern area, northern area, eastern area, and western area).

On the other hand, there are 5258 female teachers working in 208 girls' elementary governmental schools in Madina dividing into three main sectors (northern, eastern, and western).

With a total number of 9375 teachers, the researcher used Epi Info™ 7 program to calculate the sample size.

Population size: 9375.

Expected frequency: 50%.

Acceptable margin of error: 5%.

Worst acceptable result: 45%.

Confidence level: 95%.

Calculated sample size: 369.

Sampling technique

The researcher used multistage random sampling technique.

Stage 1: Stratifying Madina city into three educational sectors as divided by Ministry of Education (northern area, eastern area, and western area).

Stage 2: The researcher chose 2 male and 2 female elementary governmental schools from each sector by simple random sampling technique; this gave 12 schools.

Stage 3: Thirty-one teachers were chosen from each school by simple random sampling technique starting from the first grade.

Data collection technique

The researcher and one male qualified assistant used a self-administered technique using KAAD scale.

Study tool

A pre-validated and translated self-administered questionnaire was used in a previous study,^[5] and demographical data questionnaire was used.

Demographical data questionnaire covered age, gender, education level, education role, teaching experience with ADHD students, and teaching experience years.

The Knowledge of Attention Deficit Disorder Scale developed by Sciumto *et al.* is one of the most widely used study tools to assess teachers' knowledge of ADHD, and it has been adapted in other studies.^[5-7]

It is a 36-item questionnaire which covers teachers' knowledge in three areas: (1) general knowledge of ADHD (15 items), (2) symptoms and diagnosis of ADHD (9 items), and (3) treatment of ADHD (12 items).

Knowledge score was computed in the way that correct answers were given a score of "1" and incorrect or do not know answers were given a score of "0." Total score and score percentages were computed for each participant.

Data entry and analysis

The statistical analysis was done using the Statistical Package for Social Sciences (SPSS) software version 22 (SPSS Inc., Chicago, IL, USA). Data of knowledge score percentage were tested for normality using Shapiro-Wilk test. Since data were abnormally distributed as evidenced by *P* value of < 0.001, nonparametric statistical tests were used for comparisons. Mann-Whitney test was used to compare percentage of knowledge score between two groups, and Kruskal-Wallis test was applied to compare percentage of knowledge score between more than two groups. Statistically significant level was determined at *P* < 0.05.

Ethical consideration

The proposal was submitted to the research ethical committee, and permission was taken from planning and development department in the Ministry of Education.

A letter was attached to each questionnaire and it was emphasized that confidentiality of personal data was granted to all participants by the researcher.

Written consent was taken from each participant.

Pilot study

A pilot study was conducted in one boy and one girl elementary governmental schools to test clarity of the questionnaire and time consumed to complete it. About 15 male teachers and 15 female teachers were included in the pilot study. Those teachers were not included in the main study.

Budget

It was a self-funded study.

Results

The study included 416 teachers. Their age ranged between 22 and 66 years with a mean of 39.9 years and standard deviation of ± 6.2 years and more than half of them (53.8%) aged between 31 and 40 years. Slightly more than half of the teachers (51.7%) were males. Majority of them (91.3%) had bachelor degree, the highest qualification. Also, most of them (79.5%) were regular teachers whereas 12.3% were administrators. About one-quarter of the teachers (22.1%) had an experience ranged between 6 and 10 years in teaching, whereas 45.9% of them had an experience exceeded 15 years [Table 1].

As illustrated in Figure 1, more than half (53.6%) of the teachers reported previous experience with a child with ADHD.

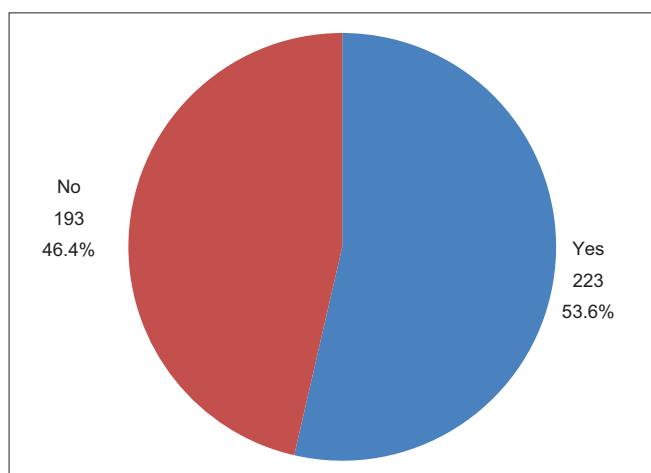


Figure 1: Previous experience of teachers with a child with ADHD

Knowledge of teachers regarding attention deficit/hyperactivity disorder

General knowledge

As demonstrated in Table 2, majority of the teachers (86.3%) knew that children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation. Also, most of the teachers (70.9%) knew that a diagnosis of ADHD by itself does not make a child eligible for placement in special education and ADHD children do not generally experience more problems in novel situations than in familiar situations (69.7%). More than half of the teachers knew that most ADHD children do not "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood (53.1%) and if an ADHD child is able to demonstrate sustained attention to video games or TV for over an hour, that child is not also able to sustain attention for at least an hour of class or homework (54.8%). On the other hand, minority of the teachers (7.7%) knew that most estimates did not suggest that ADHD occurs in approximately 15% of school age children, and in very young children (less than 4 years old), the problem behaviors of ADHD children

Table 1: General characteristics of the participants (n=416)

Variables	Categories	Frequency	Percentage
Age (years)	22-30	30	7.2
	31-40	224	53.8
	>40	162	39.0
Gender	Male	215	51.7
	Female	201	48.3
Highest educational level	Bachelor	380	91.3
	Diploma	12	2.9
	Master	24	5.8
Type of job	Regular teacher	331	79.5
	Special needs teacher	19	4.6
	Students` advisor	15	3.6
	Administrator	51	12.3
Experience in teaching (years)	≤5	59	14.2
	6-10	92	22.1
	11-15	74	17.8
	>15	191	45.9

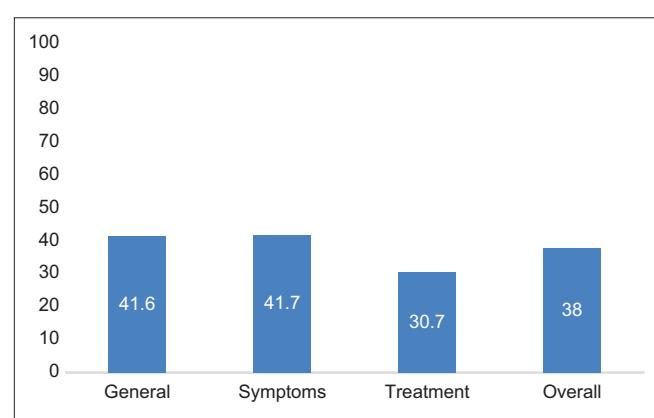


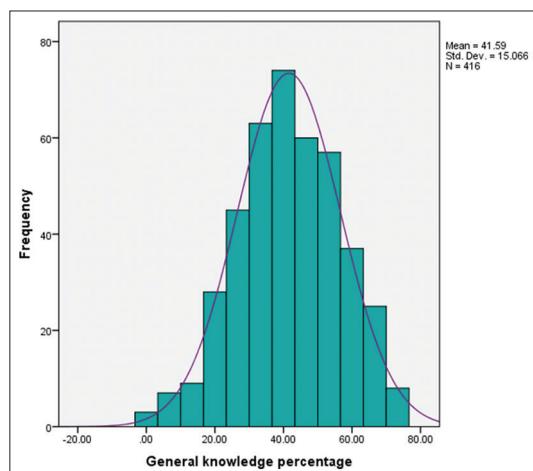
Figure 2: Average percentage of ADHD knowledge among primary school teachers

Table 2: Knowledge of the teachers regarding ADHD general information

General knowledge	Right answer No.	Right answer %
Most estimates suggest that ADHD occurs in approximately 15% of school age children. (False)	32	7.7
ADHD children are typically more compliant with their fathers than with their mothers. (True)	138	33.2
ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population. (True)	108	26.0
It is possible for an adult to be diagnosed with ADHD. (True)	196	47.1
Symptoms of depression are found more frequently in ADHD children than in non-ADHD children. ((True))	188	45.2
Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood. (False)	221	53.1
If an ADHD child is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework. (False)	228	54.8
A diagnosis of ADHD by itself makes a child eligible for placement in special education. (False)	295	70.9
ADHD children generally experience more problems in novel situations than in familiar situations. (False)	290	69.7
There are specific physical features which can be identified by medical doctors (e.g., pediatrician) in making a definitive diagnosis of ADHD. (False)	82	19.7
In school age children, the prevalence of ADHD in males and females is equivalent. (False)	121	29.1
In very young children (less than 4 years old), the problem behaviors of ADHD children (e.g., hyperactivity, inattention) are distinctly different from age-appropriate behaviors of non-ADHD children. (False)	32	7.7
Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation. (True)	359	86.3
The majority of ADHD children evidence some degree of poor school performance in the elementary school years. (True)	110	26.4
Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments. (True)	195	46.9

Table 3: Knowledge of the teachers regarding ADHD symptoms and diagnosis

Symptoms/diagnosis	Right answer No.	Right answer %
ADHD children are frequently distracted by extraneous stimuli. (True)	365	87.7
In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7. (True)	258	62.0
One symptom of ADHD children is that they have been physically cruel to other people. (False)	101	24.3
ADHD children often fidget or squirm in their seats. (True)	17	4.1
It is common for ADHD children to have an inflated sense of self-esteem or grandiosity. (False)	76	18.3
ADHD children often have a history of stealing or destroying other people's things. (False)	143	34.4
Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity. (True)	286	68.8
In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school). (True)	20	4.8
ADHD children often have difficulties organizing tasks and activities. (True)	297	71.4

**Figure 3: Distribution of the percentage of the knowledge of the teachers regarding ADHD general information**

(e.g., hyperactivity, inattention) are not distinctly different from age-appropriate behaviors of non-ADHD children.

Overall, the average percentage of knowledge regarding ADHD general information was $41.6\% \pm 15.1\%$ as shown in Figures 2 and 3.

Knowledge of attention deficit/hyperactivity disorder symptoms/diagnosis

As shown in Table 3, majority of the teachers (87.7%) knew that ADHD children are frequently distracted by extraneous stimuli and 71.4% of them knew that ADHD children often have difficulties organizing tasks and activities. Almost two-thirds of the teachers knew that current wisdom about ADHD suggests two clusters of symptoms: one of inattention and another consisting of hyperactivity/impulsivity (68.8%), and in order to be diagnosed with ADHD, the child's symptoms must have been present before age 7 (62%). On the other hand, minority of the

participants could recognize that in order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school) (4.8%) and ADHD children often fidget or squirm in their seats (4.1%).

Overall, the average percentage of knowledge regarding ADHD symptoms and diagnosis was $41.7\% \pm 15\%$ as shown in Figures 2 and 4.

Knowledge of attention deficit/hyperactivity disorder treatment

It is realized from Table 4 that most of the teachers (77.2%) knew that reducing dietary intake of sugar or food additives is not generally effective in reducing the symptoms of ADHD. Almost two-thirds of them (63%) knew that treatments for ADHD which focus primarily on punishment have been not found to be the most effective in reducing the symptoms of ADHD. On the other hand, minority of teachers knew that antidepressant drugs have been effective in reducing symptoms for many ADHD children (12%); behavioural/psychological interventions for children with ADHD do not focus primarily on the child's problems with inattention (11.1%) and parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment (4.1%).

Overall, the average percentage of knowledge regarding ADHD treatment was $30.7\% \pm 16.6\%$ as shown in Figures 2 and 5.

The average percentage of knowledge score regarding ADHD as a whole was $38\% \pm 11.3\%$ as shown in Figures 2 and 6.

Factors associated with teachers' knowledge regarding attention deficit/hyperactivity disorder

General information

Among studied factors, only experience in teaching and previous experience with a child with ADHD were significantly

associated with teachers' knowledge regarding ADHD general information. The highest score was reported among teachers who had 6–10 years of experience in teaching (mean rank was 226.5), whereas the lowest score was reported among those who had 5 years or less of experience in teaching (mean rank was 170.4), $P = 0.042$. Teachers who reported previous experience with a child with ADHD expressed higher level of knowledge regarding ADHD general information compared to those who did not have such experience (mean ranks were 229.9 and 183.8, respectively), $P < 0.001$ [Table 5].

Symptoms and diagnosis

Special need teachers had the highest score of knowledge regarding ADHD symptoms (mean rank was 283.7) whereas administrators had the lowest score (mean rank was 182.2). The difference was statistically significant, $P = 0.013$. Teachers who reported previous experience with a child with ADHD expressed higher level of knowledge regarding ADHD symptoms compared to those who did not have such experience (mean ranks were 219 and 196.4, respectively). The difference was borderline insignificant, $P = 0.05$ [Table 6].

Treatment

Special need teachers had the highest score of knowledge regarding ADHD treatment (mean rank was 261.9) whereas administrators had the lowest score (mean rank was 172.6). The difference was statistically significant, $P = 0.032$. Teachers who reported previous experience with a child with ADHD expressed higher level of knowledge regarding ADHD symptoms compared to those who did not have such experience (mean ranks were 218.5 and 197, respectively). However, the difference was statistically insignificant, $P = 0.066$ [Table 7].

Overall attention deficit/hyperactivity disorder knowledge

As realized from Table 8, teachers who reported previous experience with a child with ADHD expressed higher level of overall knowledge regarding ADHD compared to those who

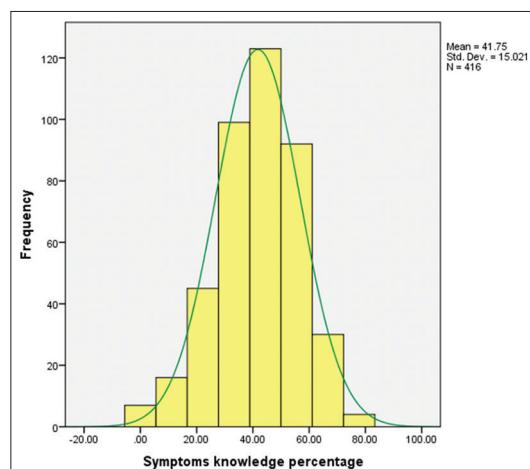


Figure 4: Distribution of the percentage of the knowledge of the teachers regarding ADHD symptoms and diagnosis

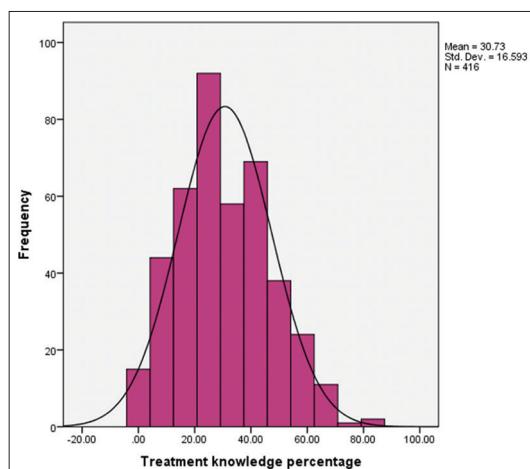


Figure 5: Distribution of the percentage of the knowledge of the teachers regarding ADHD treatment

did not have such experience (mean ranks were 229.4 and 184.3, respectively), $P < 0.001$. Higher experienced teachers and special need teachers were more knowledgeable than their counterparts. However, the difference did not reach a statistically significant level [Table 8].

Discussion

Despite teachers have a vital role in the recognition and management of ADHD, the present study revealed that the average percentage of ADHD knowledge among them was

only $38\% \pm 11.3\%$. In a similar study carried out in Makkah (Saudi Arabia), the overall percentage of correct answers regarding ADHD among elementary and kindergarten teachers was 58.9%.^[8] Very low percentage of overall score of correct answers (17.2%) has been reported in another study carried out in Riyadh, Saudi Arabia.^[5]

In overseas studies, comparable results were recorded. In South Africa, Kleynhans^[9] reported an average of 42.6% for correct answers regarding ADHD among elementary school teachers. In USA, Scιutto *et al.*^[11] reported an average

Table 4: Knowledge of the teachers regarding ADHD treatment

Treatment	Right answer	
	No.	%
Current research suggests that ADHD is largely the result of ineffective parenting skills. (false)	124	29.8
Antidepressant drugs have been effective in reducing symptoms for many ADHD children. (True)	50	12.0
Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment. (True)	17	4.1
When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return. (False)	111	26.7
Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction. (True)	175	42.1
Individual psychotherapy is usually sufficient for the treatment of most ADHD children. (False)	137	32.9
In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted. (True)	85	20.4
Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD. (False)	321	77.2
Stimulant drugs are the most common type of drug used to treat children with ADHD. (True)	107	25.7
Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention. (False)	46	11.1
Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD. (False)	99	23.8
Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD. (False)	262	63.0

Table 5: Factors associated with teachers' knowledge regarding ADHD general information

	ADHD knowledge score percentage			<i>P</i>
	Median	IQR	Mean rank	
Age (years)				
22-30 (<i>n</i> =30)	40	26.7-53.5	212.2	0.334*
31-40 (<i>n</i> =224)	40	33.3-53.3	215.8	
>40 (<i>n</i> =162)	40	26.7-53.3	197.7	
Gender				
Male (<i>n</i> =215)	40	33.3-53.3	203.7	0.394**
Female (<i>n</i> =201)	40	33.3-53.3	213.7	
Highest Educational level				
Bachelor (<i>n</i> =380)	40	33.3-53.3	209.2	0.576*
Diploma (<i>n</i> =12)	46.7	33.3-46.7	214.8	
Master (<i>n</i> =24)	36.7	21.7-51.7	173.7	
Type of job				
Regular teacher (<i>n</i> =331)	40	33.3-53.3	214.7	0.175*
Special needs teacher (<i>n</i> =19)	33.3	20-53.3	167.1	
Students' advisor (<i>n</i> =15)	46.7	33.3-46.7	198.7	
Administer (<i>n</i> =51)	40	26.7-53.3	186.9	
Experience in teaching (years)				
≤5 (<i>n</i> =59)	33.3	26.7-46.7	170.4	0.042*
6-10 (<i>n</i> =92)	46.7	33.3-53.3	226.5	
11-15 (<i>n</i> =74)	40	33.3-53.3	211.8	
>15 (<i>n</i> =191)	40	33.3-53.3	210.4	
Previous experience with a child with ADHD				
Yes (<i>n</i> =223)	46.7	33.3-46.7	229.9	<0.001**
No (<i>n</i> =193)	40	26.7-46.7	183.8	

*Kruskal-Wallis test. **Mann-Whitney test. IQR: Inter quartile range

Table 6: Factors associated with teachers` knowledge regarding ADHD symptoms and diagnosis

	ADHD knowledge score percentage			<i>P</i>
	Median	IQR	Mean rank	
Age (years)				
22-30 (n=30)	44.4	33.3-55.6	225.5	0.388
31-40 (n=224)	44.4	33.3-55.6	201.6	
>40 (n=162)	44.4	33.3-55.6	214.9	
Gender				
Male (n=215)	44.4	33.3-55.6	199.7	0.112
Female (n=201)	44.4	33.3-55.6	217.9	
Highest Educational level				
Bachelor (n=380)	44.4	33.3-55.6	208.6	0.997*
Diploma (n=12)	44.4	25-55.6	206.9	
Master (n=24)	44.4	33.3-52.8	209.4	
Type of job				
Regular teacher (n=331)	44.4	33.3-55.6	207.5	0.013*
Special needs teacher (n=19)	55.6	44.4-55.6	283.7	
Students` advisor (n=15)	44.4	33.3-55.6	224.3	
Administer (n=51)	40	26.7-53.3	182.2	
Experience in teaching (years)				
≤5 (n=59)	44.4	22.2-55.6	203.2	0.727*
6-10 (n=92)	44.4	33.3-55.6	200.6	
11-15 (n=74)	44.4	33.3-55.6	204.5	
>15 (n=191)	44.4	33.3-55.6	215.5	
Previous experience with a child with ADHD				
Yes (n=223)	44.4	33.3-55.6	219	0.050**
No (n=193)	44.4	33.3-55.6	196.4	

*Kruskal-Wallis test, **Mann-Whitney test. IQR: Inter quartile range

Table 7: Factors associated with teachers` knowledge regarding ADHD treatment

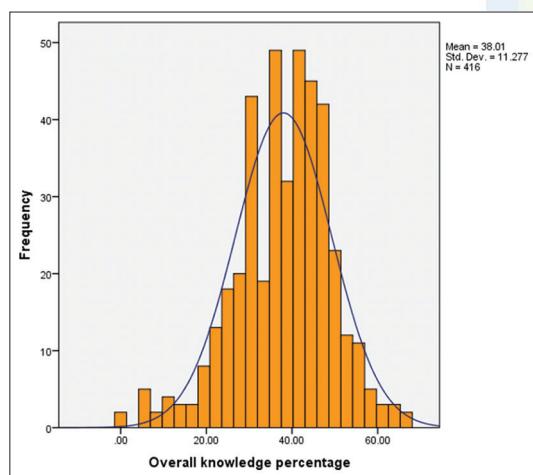
	ADHD knowledge score percentage			<i>P</i>
	Median	IQR	Mean rank	
Age (years)				
22-30 (n=30)	33.3	25-41.7	236.5	0.135*
31-40 (n=224)	25	16.7-41.7	198.7	
>40 (n=162)	33.3	16.7-41.7	216.9	
Gender				
Male (n=215)	33.3	16.7-41.7	211.9	0.548**
Female (n=201)	25	16.7-41.7	204.9	
Highest Educational level				
Bachelor (n=380)	25	16.7-41.7	207.9	0.349*
Diploma (n=12)	33.3	25-41.7	234.6	
Master (n=24)	25	10.4-39.6	175.3	
Type of job				
Regular teacher (n=331)	25	16.7-41.7	211.4	0.032*
Special needs teacher (n=19)	41.7	25-50	261.9	
Students` advisor (n=15)	25	25-33.3	198.5	
Administer (n=51)	25	16.7-33.3	172.6	
Experience in teaching (years)				
≤5 (n=59)	25	16.7-33.3	188	
6-10 (n=92)	29.2	25-41.7	218.1	
11-15 (n=74)	25	16.7-41.7	197.9	
>15 (n=191)	25	16.7-41.7	214.3	0.333*
Previous experience with a child with ADHD				
Yes (n=223)	33.3	16.7-41.7	218.5	
No (n=193)	25	16.7-41.7	197	0.066**

*Kruskal-Wallis test, **Mann-Whitney test. IQR: Inter quartile range

Table 8: Factors associated with teachers` overall knowledge regarding ADHD

	ADHD knowledge score percentage			<i>P</i>
	Median	IQR	Mean rank	
Age (years)				
22-30 (<i>n</i> =30)	41.7	32.6-45.1	229.8	0.545*
31-40 (<i>n</i> =224)	38.9	30.6-44.4	204.6	
>40 (<i>n</i> =162)	38.9	30.6-47.2	209.9	
Gender				
Male (<i>n</i> =215)	38.9	30.6-44.4	205.5	0.610**
Female (<i>n</i> =201)	38.9	30.6-47.2	211.7	
Highest Educational level				
Bachelor (<i>n</i> =380)	38.9	30.6-44.4	208	0.423*
Diploma (<i>n</i> =12)	41.7	34-47.2	232.3	
Master (<i>n</i> =24)	34.7	25-47.2	178.3	
Type of job				
Regular teacher (<i>n</i> =331)	38.9	30.6-47.2	213.8	
Special needs teacher (<i>n</i> =19)	41.7	30.6-47.2	231.2	
Students` advisor (<i>n</i> =15)	36.1	30.6-44.4	198	
Administer (<i>n</i> =51)	36.1	27.8-41.7	169	0.072*
Experience in teaching (years)				
≤5 (<i>n</i> =59)	36.1	30.6-41.7	172.2	0.074*
6-10 (<i>n</i> =92)	38.9	30.6-44.4	214.2	
11-15 (<i>n</i> =74)	38.9	30.6-47.2	205.4	
>15 (<i>n</i> =191)	41.7	30.6-47.2	218.2	
Previous experience with a child with ADHD				
Yes (<i>n</i> =223)	41.7	33.3-47.2	229.4	<0.001**
No (<i>n</i> =193)	36.1	30.6-44.4	184.3	

*Kruskal-Wallis test. **Mann-Whitney test. IQR: Inter quartile range

**Figure 6: Distribution of the percentage of the knowledge of the teachers regarding ADHD**

of 47.8% for correct answers among primary school teachers. In Australia, Kos *et al.*^[7] reported that 60.7% of the items on the ADHA knowledge questionnaire were correctly answered by teachers. These differences between various studies, including ours, could be due to utilization of different tools for assessing ADHD knowledge.

In the current study, primary school teachers were more knowledgeable regarding ADHD symptoms and diagnosis than treatment. The same has been reported by others.^[5,8,9]

Despite the relatively adequate level of knowledge of teachers regarding symptoms and diagnosis of ADHD, a considerable proportion of them (38%) did not know that in order to diagnose ADHD, the child's symptoms must have been present before age 7, and in addition, only minority of them (<5%) could recognize that in order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school) and ADHD children often fidget or squirm in their seats. In another study carried out in Makkah (Saudi Arabia),^[8] almost half of the teachers did not know that the child's symptoms must have been present before age 7.

Barkley^[10] stated that "it will be difficult to establish behaviour management programmes within classroom if teachers have a poor knowledge on the nature, outcome and treatment of ADHA." Unfortunately, in the present study, approximately one-quarter of the teachers knew that the majority of ADHD children evidence some degree of poor school performance in the elementary school years and that ADHD is more common in the first degree biological relatives of children with ADHD than in the general population and less than half of them knew that symptoms of depression are found more frequently in ADHD children than in non-ADHD children. Regarding treatment, minority of teachers (≤12%) knew that antidepressant drugs have been effective in reducing symptoms for many ADHD children; behavioral/psychological interventions for children with ADHD do not focus primarily on the child's problems with inattention and parent and teacher training in managing an ADHD child are generally effective when combined

with medication treatment (4.1%). Therefore, future educational interventions should focus on different characteristics of ADHA, not only symptoms and diagnosis.^[11]

The poor knowledge of teachers regarding ADHD treatment observed in this study goes in line with findings of other similar studies carried out in Saudi Arabia^[5,8] and worldwide.^[7,11-13]

Training of teachers is very essential in diagnosis and treatment of ADHD. In a previous Saudi study carried out in Makkah,^[8] 12.3% of teachers attended courses related to ADHD and this training was not significant with teachers' knowledge regarding different aspects of the disorder which reflect inadequate training. In the present study, we did not investigate this issue.

As expected, special need teachers and those who had previous experience with a child with ADHD were more knowledgeable regarding ADHD. The same has been reported by others.^[5,14,15]

The most important limitation of this study is its cross-sectional design that allows only testing the association and not causality between knowledge of ADHD and its associated factors. Despite that, the study has some strength; the results could be generalized as a multistage random sampling technique was adopted. The used questionnaire is a valid tool and finally includes male and female teachers.

Conclusions

From the results of this study, it is concluded that the knowledge regarding ADHD among elementary school teachers in Madina is suboptimal, particularly regarding treatment. Some misconceptions regarding ADHD general information, symptoms, diagnosis, and treatment among teachers were observed. Teachers with previous experience with ADHD child were more knowledgeable. Special need teachers were more knowledgeable about ADHD symptoms, diagnosis, and treatment than other categories of teachers.

Recommendations

- Elementary school teachers should be trained in identifying ADHD symptoms as well as in behavioral management and academic interventions
- There should be collaboration with educational psychologists in the course of teachers' training
- University curriculum of teachers should include subject on early screening for children with ADHD
- Teachers should be encouraged to involve the parents of ADHD children in the learning process of their children
- Further research is recommended, on a large scale to address the lack of knowledge and misperceptions among teachers regarding ADHD.

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Conflicts of interest

There are no conflicts of interest.

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