

# Knowledge and attitude of Attention-Deficit and Hyperactivity Disorder (ADHD) among male primary school teachers, in Riyadh City, Saudi Arabia

Fahad Alanazi<sup>1</sup>, Yousef Al Turki<sup>2</sup>

<sup>1</sup>Family Medicine Resident (R4), Department of Family and Community Medicine, <sup>2</sup>Professor and Consultant Family Medicine, Department of Family and Community Medicine, King Saud University, College of Medicine, King Saud University Medical City, Riyadh, Saudi Arabia

## ABSTRACT

**Objective:** The aim of this study was to explore teachers' knowledge about the ADHD, its origin, causes, and identify the main demographic variables affecting their knowledge. **Methods:** The study was conducted among male school teachers of ten government primary schools that are found in different regions of Riyadh city, the Kingdom of Saudi Arabia. We used a stratified random sampling technique to collect our sample with inclusion criteria of being male teachers who currently working in male government primary school and are directly involved on teaching of students. Data analysis was performed using SPSS software statistical program version 21. **Results:** We received 400 response for our questionnaire, mostly younger than 40 years old. Most of teachers in this sample had a bachelor's degree, only 6% had diploma while 8% had a higher degree, while most of them had experience more than 5 years in teaching (74.2%). only 8% of teachers admitted that they had not heard about ADHD before. 78% of teachers had read about ADHD at least once before. This knowledge was more from reading books (32.8%) followed by reading internet websites (28.7%), TV/Media (14.6%) while magazine and social media represent (23.9%). Most of the teachers showed that they had attended courses/training about ADHD (76.7%) however only 40.4% of them thought that they had the enough information about the disease. 51.5% of teachers showed that they had already asked before to assess a child who was suspected to have ADHD and 65.3% had taught a child with the disease. **Conclusion:** From the results of this study, it is concluded that the knowledge regarding ADHD among elementary school teachers is suboptimal. Some teachers had misunderstanding about ADHD symptoms and general information, which indicated the further needing for courses to enhance this knowledge.

**Keywords:** ADHD, primary school, Saudi Arabia, teacher

## Introduction

Attention Deficit-Hyperactivity Disorder (ADHD) is basically an impairment in functioning in at least two settings, usually home and school due to in impulsivity, inattention, or hyperactivity.<sup>[1,2]</sup> There are three major types of ADHD; the combined type, which

is the most common, patients with this problem have difficulty with attention and focus, and have some hyperactive or impulsive behavior. The second type is the inattentive type, the patients may have difficulty with attention, but there is no significant hyperactive or impulsive behaviors,<sup>[3]</sup> and then the hyperactive-impulsive type, which is less common, there are less problems with attention, and it is more common maybe in preschoolers where they mostly have the hyperactive component.<sup>[4-8]</sup> There seems to be some genetic predisposition to this problem, boys are much more likely than girls to get the problem, a child of a parent with ADHD has a

**Address for correspondence:** Dr. Fahad Alanazi,  
Department of Family and Community Medicine, King Saud  
University Medical City, Riyadh, Saudi Arabia.  
E-mail: mmsfahad05590@gmail.com

Received: 23-10-2020

Revised: 03-12-2020

Accepted: 16-12-2020

Published: 08-04-2021

### Access this article online

#### Quick Response Code:



**Website:**  
www.jfmpc.com

**DOI:**  
10.4103/jfmpc.jfmpc\_2194\_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Alanazi F, Al Turki Y. Knowledge and attitude of Attention-Deficit and Hyperactivity Disorder (ADHD) among male primary school teachers, in Riyadh City, Saudi Arabia. J Family Med Prim Care 2021;10:1218-26.

25% chance of developing ADHD themselves. Also, there is a 55 to 90% monozygotic twin concordance. In other words, there seems to be some strong genetics at work here<sup>[3-9]</sup> there are also some syndromes that are genetic that are predisposed to developing ADHD. Children with Klinefelter's, Turner's, fragile-X, or neurofibromatosis type I are at increased risk for ADHD<sup>[5]</sup> There are also, however, environmental factors at work. Patients with lower socioeconomic status are more prone to the problem, patients with parents who have mental disorders, children in foster care are more likely to have ADHD, children who were of low birth weight or prematurity are more likely as well to have ADHD, and children with acquired traumatic brain injury may develop ADHD.<sup>[10]</sup> It is prevalent in around 3%-6% of the adult population. It is one of the most prevalent disorders found in childhood.<sup>[11]</sup> ADHD may present differently depending on the age at which the child is being brought to attention. In the preschool era, hyperactivity is usually larger component, these patients may be impulsive, they are not flexible with their environment. In other words, if something has significantly changed, they don't tolerate it very well, and they may be aggressive with their peers. In the elementary school era, these children now start to struggle with listening in class, they have poor organizational skills, they struggle with social interaction, and they may have difficulty functioning independently. As adolescents, they have a problem with adult academic demands, as high school starts and these children have increased responsibility, academically they can really start to struggle with attention, learning and even executive functioning.<sup>[12]</sup> The treatment is related to stimulants and psychotherapy. This review would further shed light upon the causal factors, pathophysiology, and management of ADHD.<sup>[13]</sup> When parents and child's teacher work together it rises the chance that a child will be successful in school. Teachers are often the first ones to identify attention-deficit/hyperactivity disorder (ADHD) in their students, because they spent most of the day with them and they know how normal student's behavior in classroom.<sup>[10,12]</sup> Carrie<sup>[14]</sup> found that information from school reports for the diagnosis of ADHD is the main source that more than half of the 401 pediatricians examined depend on it.

ADHD is related to diffuse abnormalities in the brain that associated with cognitive and functional deficits. The children with ADHD had diffuse abnormalities documented in Structural imaging studies. The problem that there is no single test like a blood test or an X-ray, which is able to perform suitable and accurate diagnosis of ADHD and similar behavioral or learning disorders, and even professional physicians might encounter difficulties in performing accurate diagnosis. This can be explained as ADHD symptoms differ from an individual to another can change with age or the context or environment a person is in, based on the gender of the individual. Therefore, it is identified by diagnosed clinically.<sup>[15]</sup> The specialists are responsible for identifying if some criteria for ADHD are met and if the Symptoms are present in more than one place (home, school, work), and if it affects or reduce daily functioning and there isn't another condition that has the same Symptoms.<sup>[16]</sup>

It isn't easy to tell the parents that there is no cure for ADHD, but we can manage and treated the symptoms, that make improvements in school or work and also in relationships, confidence, and self-esteem improve. According to the National Center for Complementary and Integrative Health, teachers and preschool teachers may have an important role in that. It may then turn out that there is no urgent need for treatment.

Treatment regimens for ADHD have two types: Psychosocial and pharmacotherapy treatment. Pharmacotherapy includes Stimulants medicines,<sup>[17]</sup> and Non-Stimulants (antidepressants and alpha agonists). The other form of treatment that is used is Psychosocial treatment. These programs include training programs for the children to manage short- and long-term goals and psycho-education for the family. These programs prove to be very useful when used side by side with the pharmacotherapy.<sup>[18-20]</sup> The antecedent behavior consequence model is mostly conducted for Parent and teachers training by various methods.<sup>[21]</sup>

Stevens, Quittner, and Abikoff (1998) showed that School teachers are playing a key role in assessing of children's academic and behavioral difficulties and are considered a significant source of information regarding the diagnosis as they are exposed on a daily basis to children in different clinical situations.<sup>[22]</sup> Scitutto, Terjesen, and Bender-Frank (2000) clarified that teachers are normally who perform referrals at the primary stages of ADHD-related assessment, and these referrals were considered as predicting factors of a child's symptoms.<sup>[23]</sup> Moreover, some studies of ADHD knowledge level among school teachers, such as Arcia *et al.* (2000), Barbaresi and Olsen (1998), and DiBattista and Shepherd (1993) reported that school teachers had mistaken beliefs about ADHD, its symptoms and risk factors.<sup>[24-26]</sup>

School teachers can adopt individual-based and class-based interventional programs using antecedents and/or consequence approaches.<sup>[27]</sup> Antecedent interventions are depends on the knowledge and practice of different previous actions (eg, boredom, peer provocation, inconsistent rules), which leads to behavioral problems.<sup>[28]</sup> Teachers can used other behavioral strategies in the classroom setting to facilitate attention These include placing the child with ADHD close to the teacher, reduce environmental distractions, and arranging seating in simple rows rather than groups. Research has proven that the use of lessons that involve novelty and stimulation in easy and repetitive tasks more than new or difficult ones is benefit the child with ADHD. Mostly, the first who ask for identify the diagnosis of ADHD in a child are teachers and other school personnel (Phillips, 2006; Sax and Kautz, 2003). Teachers had bad feeling of insecure about behavioral problems and how deal with it (Walter, Gouze, and Lim, 2006) and uncertain to accept responsibility for students with ADHD.<sup>[29]</sup>

Ohan JL (2008) showed that teachers' role are important in implementing, supporting and evaluating of the recommended therapeutic plans for children with ADHD.<sup>[30]</sup> Some studies showed that however, parents tend to follow the recommendations about ADHD from teachers; this can be misleading as teachers

with low knowledge about the disease may make appropriate or inappropriate recommendations.<sup>[31-33]</sup> In Di Battista and Sheperd<sup>[26]</sup> research revealed that teachers provided inaccurate and non-appropriate advices to parents whose children are having ADHD, which many of them used it. SO teacher's knowledge about ADHD affected in their behavior and attitudes for the children. In a review of North-American research studies performed by Sherman *et al.*,<sup>[34]</sup> that teachers' perspectives about the treatment plans, and kinds of methods used in the classroom might have significant impact on the school learning of children with ADHD. In addition, Ohan JL (2008) showed that the teachers who had poor knowledge of ADHD cannot identify children with symptoms who lose benefit from assessment and treatment.<sup>[25]</sup> Moreover, Kendall L. showed that the demotivation and self-deprecation of students with ADHD may increase by negative teachers' attitude.<sup>[34]</sup> Teachers' knowledge of ADHD including in promoting help-seeking is importance emphasized to a study cross-national comparisons of teachers' knowledge and misconceptions of ADHD involving nine countries including South Africa.<sup>[27]</sup>

Such studies highlighted the significant role of educators in the identification of children who require more support, make referrals after assessment, and the ability of managing them in the classroom.<sup>[34]</sup> As such, in the recent two decades, there was an increase emphasis on teachers' knowledge and perceptions about ADHD. Many studies from various spots of the world reported that teachers' knowledge is at best reasonable and in different cases, insufficient and require interventional procedure for improvement.<sup>[5,35]</sup>

Based on the above, the present study aimed at assessing the knowledge and attitude of the male government primary school teachers in Riyadh, Saudi Arabia about ADHD and to identify the major sources of knowledge about ADHD.

### Significance of the study

The present study provides an overview of the level of Saudi teachers' knowledge and attitudes about ADHD. Teachers are considered as the first who perform referrals of ADHD children. Therefore, they must possess a high level of knowledge and awareness about ADHD, its symptoms, risk factors and complications. Having a good and sufficient knowledge enables the school teachers to make the appropriate diagnosis and consequently improves further actions performed by the physician and significantly increases the recovery chances of ADHD children.

## Methods

### Study area and setting

- The study was conducted among male school teachers of ten government primary schools that are found in different regions of Riyadh city, kingdom of Saudi Arabia from Feb. 2019 to Feb. 2020. We used stratified random sampling

technique to collect our sample with inclusion criteria of being male teachers who currently working in male government primary school and are directly involved on teaching of students in region of Riyadh. Those who working on administrative positions like principles and admin staff of the schools, non- Saudi teachers or teachers of private schools were excluded from this study.

### Study design

This is a cross sectional study used to achieve the objectives of this study.

Why we select this study design?

- This study Used to prove and/or disprove assumption
- Not cost to perform and does not require a lot of time
- Captures a specific point in time
- Contains multiple variables at the time of the data snapshot
- The data can be used for various types of research
- The findings and consequences can be processed to develop new theoretical frameworks or in-depth empirical research studies.

### Sample size

In this study we used single proportion formula to calculate the sample size and the result was 370 teachers. In order to generalize the results on Riyadh city we choose schools from different regions of the city. Therefore, from each region of the five regions (North, South, west, east and middle), we need a sample of 74 teachers. The total number of questionnaire collected from the study was 400.

### Data collection method/tools

The data was collected by paper-based questionnaire which is obtained from previous published study<sup>[36]</sup> which is validated and written permission was taken from the team leader to use the questionnaire in our study. The questionnaire is divided into three parts. The first part includes demographic data and source of obtaining knowledge regarding ADHD. The second part assesses the knowledge about ADHD. The third part assesses the teacher's attitude toward ADHD students.

### Data analysis

Data analysis was carried out using SPSS program v. 21. Descriptive analysis was done where the teachers' age and years of teaching were reported as mean and standard deviation. Categorical variables such as grade which they teach, education level and specialty was given as percentages and frequencies. ANOVA test was used for assessing the association between teachers' knowledge about ADHD and demographic data. All statistical tests were considered significant with *P* value less than 0.05.

### Ethical considerations

- The ethical approval was obtained from the ethical committee. At King Saud University (Approval number E-19-3722)

- Informed consent was obtained from participants and all data will be confidential and used only for the purpose of this study
- There is no conflict of interest
- IRB from king Saud university on (10/march/2019) (no. e-19-3722).

## Results

The questionnaire had been distributed among different teachers mostly younger than 40 years old. 42.3% of them were with age between 31-40 years old, 33.3% had age ranged between 21-30 years old while 24.6% represent older teacher who were older than 41 years old [Figure 1]. Most of teachers in this sample had bachelor's degree, only 6% had diploma while 8% had a higher degree as master's/specialist or doctoral degree [Figure 2]. Most of teacher had experience more than 5 years in teaching (74.2%), mostly from 6- 10 years as professional teacher (35.3%), followed by teacher with lower experience lower than 5 years (25.8%), 23.3% of them with experience more than 16 years and 15.8% with 11-15 years of experience [Figure 3].

Moreover, most of teachers in this sample teaching for fifth grade (30%) followed by teacher teaching for fourth grade (18.8%), 18.3% of them teaching for grade six, 16.3% for first grade, 10.8% of second grade and 6% of them are teacher of grade three [Table 1]. 19.5% of teachers were English teachers while teachers of science represent 19.3%, 16.5% of teachers teach math, 10.5% were sport teachers, 18.8% were history and Islamic teachers while social studies and Arabic teachers represent 15.5% of the sample [Table 2].

From total sample in this paper only 8%of teachers admitted that they had not heard about ADHD before [Figure 4]. In further analysis this group were excluded from final results, therefore next results only represent teachers who at least heard about ADHD. In [Figure 5], we show that 78% of teachers had read about ADHD at least once before. This knowledge was more from reading books (32.8%) followed by reading internet websites (28.7%), TV/Media (14.6%) while magazine and social media represent (23.9%) of the sample as a source of knowledge [Figure 6].

Most of teachers showed that they had attended courses/training about ADHD (76.7%) however only 40.4% of them thought that they had the enough information about the disease. 51.5% of

teachers showed that they had already asked before to assess a child who was suspected to have ADHD and 65.3% had taught a child with the disease [Figure 7].

To assess the teachers' knowledge, the questionnaire contains 17 questions about the symptoms of ADHD in students. The

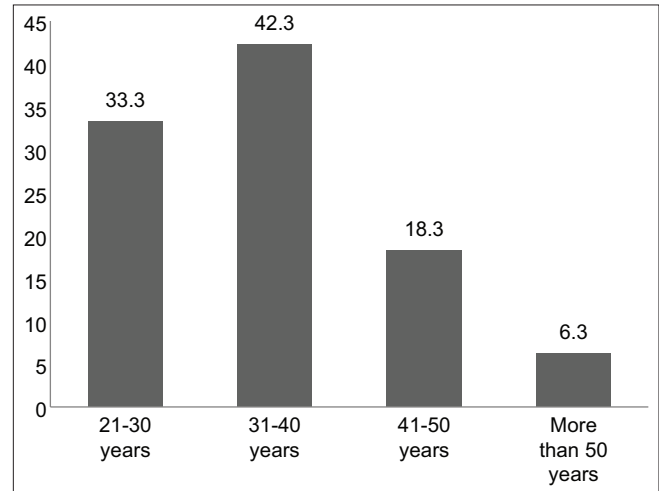


Figure 1: Age

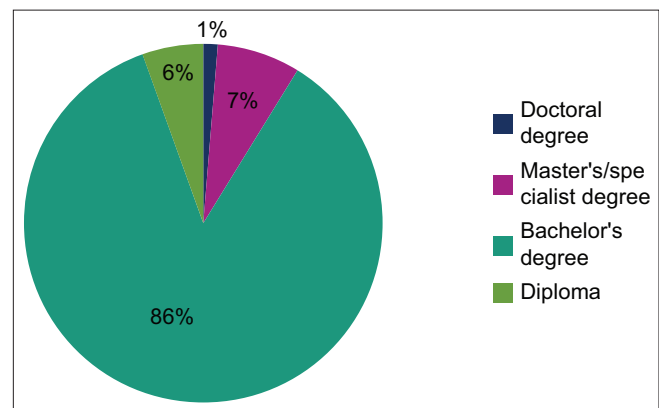


Figure 2: Education level

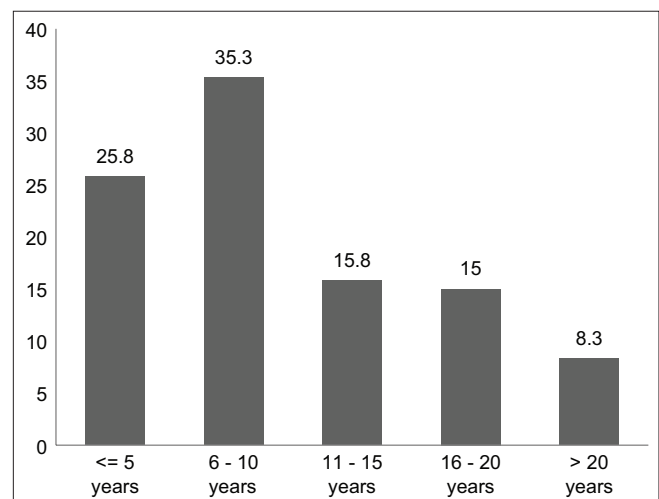


Figure 3: Teaching years

Grade	Frequency	Percent
First grade	65	16.3
Second grade	43	10.8
Third grade	24	6
Fourth grade	75	18.8
Fifth grade	120	30
Sixth grade	73	18.3
Total	400	100

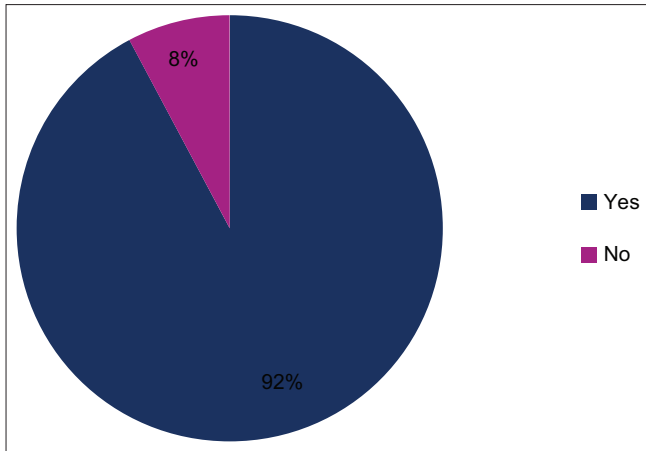


Figure 4: Have you ever heard about ADHD?

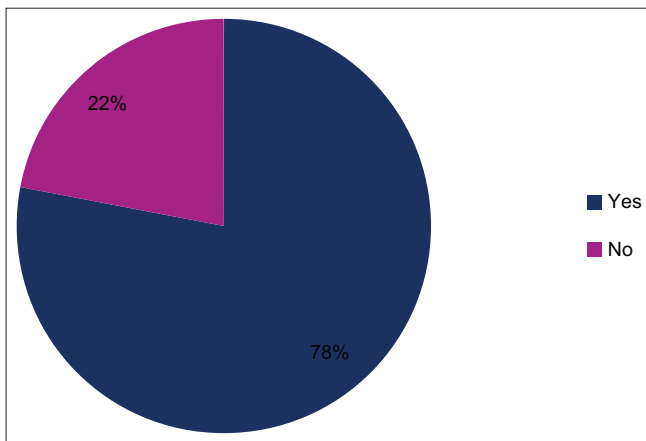


Figure 5: Have you ever read about ADHD?

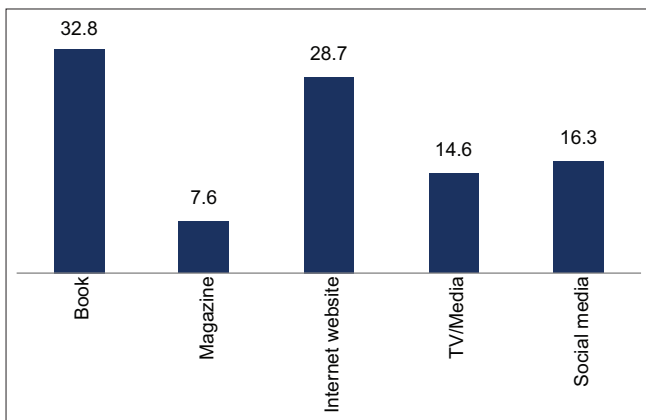


Figure 6: Source of information

correct answers are to agree by any degree with all sentences. In most questions, the percentage of teachers choose agree choice was higher than 80% with mean of 77%. Symptom as that, children with ADHD would leave their chairs during their classes even if this is not allowed, was the most known symptoms about ADHD among teachers (total agree = 88.9%, agree = 36.9%, strongly agree = 52%) while 8.4% of them chose neutral position, and only 2.7% gave wrong answers. In addition, often runs,

	Frequency	Percent
English	78	19.5
History	38	9.5
Math	66	16.5
Science	77	19.3
Islamic	37	9.3
Social studies	40	10
Arabic	22	5.5
Sport	42	10.5
Total	400	100

jumps and climbs things not permitted to, is another symptom of ADHD most teachers agreed with it (total agree = 88.1%, agree = 64.50% %, strongly agree = 23.60%) while 9.50% of them chose neutral position, and only 2.5% gave wrong answers. Moreover, other symptoms as inability of child to play quietly and constantly moving were also known to most teachers (total agree = 88% and 87.3%, agree = 39.80% and 62.60%, strongly agree = 48.20% and 24.70% respectively). Symptoms as making lot of mistakes and does not care about the details, trouble to concentrate and stay focused, zoning out without realizing it, even in the middle of a conversation and trouble being patient were known to teachers with lower incidences (total agree = 80.7%, 82.9%, 81.9 and 82.9 respectively). On the other side, some symptoms were not known by a large percentage of teachers as avoidance of children with ADHD to do a task, which needs to be accomplished where 39.1% disagrees with it and only 39.6% of teachers who agree with it with any degree of agreement. Other symptoms were in middle where many but not best known with all patients. However, in most questions there was many teachers who decided to be neutral and not agree or disagree with the statements, this group reach in some questions to 24.7% and minimal 8.40% and mean of 15.88% [Table 3].

In next section, we tried to assess attitude of teachers about dealing with children with ADHD using 12 questions. 87.5% of teachers agreed with those special teaching techniques are helpful in managing ADHD (agree = 53.4% and strongly agree = 34.1%), while 2.4% disagreed with it and 10% was neutral in estimating that question. In addition, this agreed percentage decreased to 84.8% I considering that behavior management is an effective treatment for ADHD (agree = 57.20% and strongly agree = 27.60%), while 2.1% disagreed with it and 13% was neutral in estimating that question. In considering the importance of training teachers in behavior management for ADHD, 88.9% of teachers agreed, 2.1% disagreed, and 8.9% took neutral position. Most of teachers saw that ADHD results from parents being inconsistent with rules and consequences (74.3%) while 4.3% disagreed with it and almost quarter of them had neutral position. This agreed group decreased to 67.2% when thinking about that some children may develop ADHD because of needing attention with higher percentage of neutral teachers (26.3%) while 6.5% of them did not think that the need for attention would force children to develop ADHD. While

**Discussion**

50.1% took the neutral position, which mean not know if family problems as alcoholism or marital disorder could contribute to a child’s ADHD, only 36.8% of them agreed with it and 13% did not think that family problems could contribute with ADHD. However, most of teachers (86.7%) believed that improving the parenting skills of parents of children with ADHD would benefit their child, 3.3% of teacher doubt that will be useful. 80.5% of teachers thought that ADHD can be the result of the child not trying hard enough to control his/her behavior and 64.4% thought child with ADHD should be treated if a doctor recommended it that. And however, 85.3% of teachers thought that social skills training can be helpful for children with ADHD and 84.3% of them thought that clear, consistent rules and consequences are helpful in treating children with ADHD, only 40.7% of them would be reluctant to learn specialized teaching techniques to treat a child’s ADHD [Table 4].

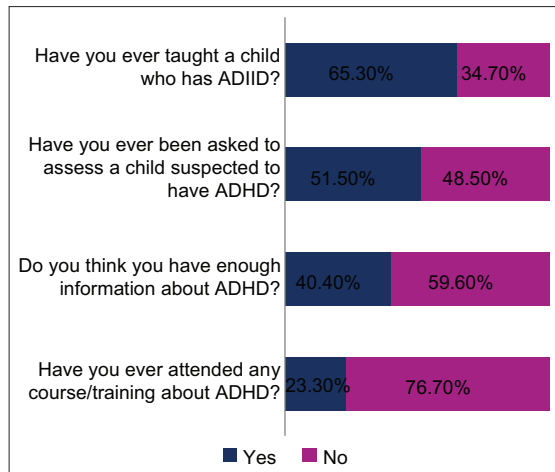
Primary school teachers play a major role in early identification of students with ADHD, as most of their symptoms become apparent in early school days. Hence, basic knowledge is crucial for primary school teachers to facilitate early recognition and intervention for students with ADHD. The present study revealed that the average percentage of ADHD knowledge among them was good (at least 90% of their answer were correct). In another study carried out in Makkah (Saudi Arabia), the overall percentage of correct answers regarding ADHD among elementary and kindergarten teachers was lower 58.9%.<sup>[37]</sup> Another study carried out in Riyadh, Saudi Arabia percentage of overall score of correct answers (17.2%) has been found.<sup>[38]</sup> In overseas studies, In South Africa, Kleynhans<sup>[38]</sup> reported an average of 42.6% for correct answers regarding ADHD among schoolteachers. In USA, Sciutto *et al.*<sup>[39]</sup> Showed an average of

**Table 3: Teachers’ knowledge of identifying ADHD children**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Leaves his chair during class even if he’s not allowed to.	0.00%	2.70%	8.40%	36.90%	52.00%
2. Often runs, jumps and climbs things not permitted to.	0.30%	2.20%	9.50%	64.50%	23.60%
3. Constantly moving (hyperactivity and restlessness).	0.00%	1.60%	11.10%	62.60%	24.70%
4. Cannot play quietly.	0.80%	2.20%	8.90%	39.80%	48.20%
5. Talks a lot.	0.50%	5.70%	13.00%	36.00%	44.70%
6. Makes a lot of mistakes and does not care about the details.	0.50%	3.50%	13.00%	39.00%	43.90%
7. Trouble concentrating and staying focused.	0.50%	2.70%	14.90%	32.80%	49.10%
8. “Zoning out without realizing it, even in the middle of a conversation	0.80%	4.30%	14.90%	37.40%	42.50%
9. Doesn’t abide instructions and trouble finishing projects.	1.60%	4.90%	17.90%	59.10%	16.50%
10. Poor organizational skills.	2.20%	8.90%	17.10%	56.10%	15.70%
11. Avoidance of doing a task which needs to be accomplished.	27.40%	11.70%	21.40%	27.10%	12.50%
12. Constantly losing or misplacing things.	1.60%	5.10%	25.70%	49.30%	18.20%
13. Extremely distractible.	2.20%	3.50%	20.30%	40.10%	33.90%
14. Frequently forgetting.	4.10%	6.20%	24.70%	52.80%	12.20%
15. Answers before finishing the question.	1.60%	4.10%	16.30%	61.50%	16.50%
16. Trouble being patient.	0.00%	2.40%	14.60%	59.10%	23.80%
17. Frequently interrupt others.	1.40%	3.00%	18.40%	54.50%	22.80%

**Table 4: Teachers’ knowledge about ADHD**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Special teaching techniques are helpful in managing ADHD.	0.50%	1.90%	10.00%	53.40%	34.10%
2. Behavior management is an effective treatment for ADHD.	0.50%	1.60%	13.00%	57.20%	27.60%
3. Training teachers in behavior management is important for ADHD.	0.50%	1.60%	8.90%	33.90%	55.00%
4. ADHD results from parents being inconsistent with rules and consequences.	0.50%	3.80%	21.40%	55.60%	18.70%
5. Some children develop ADHD because they want attention.	1.10%	5.40%	26.30%	53.40%	13.80%
6. Improving the parenting skills of parents of children with ADHD would benefit their child.	0.00%	3.30%	10.00%	40.40%	46.30%
7. Family problems such as alcoholism or marital disorder often contribute to a child’s ADHD.	1.90%	11.10%	50.10%	21.40%	15.40%
8. ADHD can be the result of the child not trying hard enough to control his/ her behavior.	0.50%	4.60%	14.40%	37.10%	43.40%
9. A child with ADHD should be treated if a doctor recommended it.	1.10%	3.30%	31.20%	36.60%	27.80%
10. I would be reluctant to learn specialized teaching techniques to treat a child’s ADHD.	32.00%	10.80%	16.50%	30.10%	10.60%
11. Social skills training can be helpful for children with ADHD.	1.10%	1.90%	11.70%	44.40%	40.90%
12. Clear, consistent rules and consequences are helpful in treating children with ADHD.	1.60%	2.40%	11.70%	45.00%	39.30%



**Figure 7:** Teachers' responses towards dealing with ADHD children

47.8% for correct answers among primary school teachers. In Australia, Kos *et al.*<sup>[23]</sup> found that teachers correctly answered 60.7% of the items on the ADHA knowledge questionnaire. Because different knowledge assessment tools of ADHD were used, these differences were found between different studies, including our study. The poor knowledge of teachers regarding ADHD symptoms also shown in other findings of other similar studies carried out in Saudi Arabia<sup>[40,41]</sup> and worldwide.<sup>[40-42]</sup>

In addition, the teachers show a high knowledge about symptoms and diagnosis of ADHD, the most known symptoms about ADHD was that children with ADHD would leave their chairs during their classes even if this were not allowed (89%). In addition, other symptoms as often runs, jumps and climbs things not permitted to most teachers know it (88.1%). Moreover, other symptoms as inability of child to play quietly and constantly moving were also known to most teachers (88%). On the other side, some symptoms were not known by a large percentage of teachers as avoidance of children with ADHD to do a task, which needs to be accomplished only 39.6%.

Unfortunately, in considering the importance of training teachers in behavior management for ADHD, 88.9% of teachers agreed. 87.5% of teachers agreed with those special teaching techniques are helpful in managing ADHD. Therefore, future educational interventions should focus on different characteristics of ADHA, not only symptoms and diagnosis.<sup>[23]</sup>

One of the problems in our systems that found in this study that the knowledge of teachers about the ADHD is from reading books, reading internet websites, TV/Media, magazine and social media and little of them who indicated having courses about the disease. Moreover, as we know that teacher training seem to be important for the diagnosis and treatment of ADHD. To avoid teachers' lack of knowledge and misconceptions about ADHD more courses and awareness programs should be recommended and applied for teachers. Barkley<sup>[43]</sup> stated, "It will be difficult to establish behavior management programs within classroom if teachers have a poor knowledge on the nature, outcome and

treatment of ADHA." Therefore, Health and/or Educational Ministry should promote a special course on ADHD for teachers and education should be part of the curriculum in faculty training. Providing these educational programs on television and radio may be highly effective as they were the most common source of information.

Moreover, most of teachers thought that ADHD could result from parents being inconsistent with rules and consequences besides, family problems such as alcoholism or marital disorder. On the other hand mostly thought that children may develop symptoms of ADHD because they need more attention or because they not trying hard enough to control his/her behavior. This mis-understand of causes of the disease may affect their attitude when dealing with children with ADHD. However, most of them believe that training them in behavior management, gaining social skills and some special teaching techniques would be helpful in managing children with ADHD, only 40% of them indicated that they would be reluctant to learn specialized teaching techniques to treat a child's ADHD. These mis-understand also seen in other study as Ahmad Ghanizadeh 2006 who found that 53.1% of all the teachers considered ADHD to be the result of parental spoiling.<sup>[35]</sup> In addition, LISA L. 2009 showed that however special education teachers included in the study, they remained "neutral" on several false and reasonable beliefs, including: "Self-control training is an effective treatment for ADHD" and "Social skills training is an effective treatment for ADHD."<sup>[44]</sup> The problem is if education teachers hold the false belief that students are in control of their behavior, they may expect students to demonstrate a level of classroom behavior that is beyond their capacity in the absence of appropriate supports.

To summarize, the present study aimed at investigating the level of knowledge and attitudes of Saudi school teachers about Attention-Deficit And Hyperactivity Disorder (ADHD). The study revealed that there is a lack of knowledge about ADHD among Saudi primary school teachers, which requires an urgent intervention to improve the teachers' knowledge and enhance their attitudes.

## Conclusion

From the results of this study, it is concluded that the knowledge regarding ADHD among elementary school teachers is suboptimal. Some teachers had misunderstanding about ADHD symptoms and general information, which indicated the further needing for courses to enhance this knowledge.

## Declaration of patient consent

The authors certify that they have obtained all appropriate participant consent forms. In the form the participant(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The participants understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

- Greenhill LL, Pliszka S, Dulcan MK, Bernet W, Arnold V, Beitchman J, *et al.* Practice parameter for the use of stimulant medications in the treatment of children, adolescents, and adults. *J Am Acad Child Adolesc Psychiatry* 2002;41 (2 Suppl):26S-49S.
- American Academy of Pediatrics. Subcommittee on Attention-Deficit/Hyperactivity Disorder and Committee on Quality Improvement. Clinical practice guideline: Treatment of the school-aged child with attention-deficit/hyperactivity disorder. *Pediatrics* 2001;108:1033-44.
- Biederman J, Monuteaux M, Mick E, Spencer T, Wilens TE, Silva JM, *et al.* Young adult outcome of attention deficit hyperactivity disorder: A controlled 10 year follow-up study. *Psychol Med* 2006;36:167-79.
- Franke B, Faraone SV, Asherson P, Buitelaar J, Bau CH, Ramos-Quiroga JA, *et al.* The genetics of attention deficit/hyperactivity disorder in adults, a review. *Mol Psychiatry* 2012;17:960-87.
- Chou IC, Lin CC, Kao CH. Enterovirus encephalitis increases the risk of attention deficit hyperactivity disorder: A Taiwanese population-based case-control study. *Medicine (Baltimore)* 2015;94:e707.
- Hadzic E, Sinanovic O, Memisevic H. Is bacterial meningitis a risk factor for developing attention deficit hyperactivity disorder. *Isr J Psychiatry Relat Sci* 2017;54:54-7.
- Adeyemo BO, Biederman J, Zafonte R, Kagan E, Spencer TJ, Uchida M, *et al.* Mild traumatic brain injury and ADHD: A systematic review of the literature and meta-analysis. *J Atten Disord* 2014;18:576-84.
- Donzelli G, Carducci A, Llopis-Gonzalez A, Verani M, Llopis-Morales A, Cioni L, *et al.* The Association between Lead and Attention-Deficit/Hyperactivity Disorder: A systematic review. *Int J Environ Res Public Health* 2019;16:382.
- Polanczyk G, de Lima MS, Horta BL, Biederman J, Rohde LA. The worldwide prevalence of ADHD: A systematic review and meta-regression analysis. *Am J Psychiatry* 2007;164:942-8.
- Salvi V, Migliarese G, Venturi V, Rossi F, Torriero S, Viganò V, *et al.* ADHD in adults: Clinical subtypes and associated characteristics. *Riv Psichiatr* 2019;54:84-9.
- Kates N. Attention deficit disorder in adults. Management in primary care. *Can Fam Physician* 2005;51:53-9.
- Matas M. Approach to attention deficit disorder in adults. *Can Fam Physician* 2006;52:961-4.
- Pary R, Lewis S, Matuschka PR, Rudzinskiy P, Safi M, Lippmann S. Attention deficit disorder in adults. *Ann Clin Psychiatry* 2002;14:105-11.
- Wilens TE, Spencer TJ. Understanding attention-deficit/hyperactivity disorder from childhood to adulthood. *Postgrad Med* 2010;122:97-109.
- Weiss M, Murray C. Assessment and management of attention-deficit hyperactivity disorder in adults. *CMAJ* 2003;168:715-22.
- Centers for Disease Control and Prevention. Symptoms and Diagnosis of ADHD.
- Advokat C, Scheithauer M. Attention-deficit hyperactivity disorder (ADHD) stimulant medications as cognitive enhancers. *Front Neurosci* 2013;7:82.
- Han DH, McDuff D, Thompson D, Hitchcock ME, Reardon CL, Hainline B. Attention-deficit/hyperactivity disorder in elite athletes: A narrative review. *Br J Sports Med* 2019;53:741-5.
- Ching C, Eslick GD, Poulton AS. Evaluation of methylphenidate safety and maximum-dose titration rationale in attention-deficit/hyperactivity disorder: A meta-analysis. *JAMA Pediatr* 2019;173:630-9.
- Pelham W, Wheeler T, Chronis A. Empirically supported psychosocial treatments for attention deficit hyperactivity disorder. *J Clin Child Psychol* 1998;27:190-205.
- van den Hoofdakker BJ, van der Veen-Mulders L, Sytema S, Emmelkamp PM, Minderaa RB, Nauta MH. Effectiveness of behavioral parent training for children with ADHD in routine clinical practice: A randomized controlled study. *J Am Acad Child Adolesc Psychiatry* 2007;46:1263-71.
- Stevens J, Quittner AL, Abikoff H. Factors influencing elementary school teachers' ratings of ADHD and ODD behaviors. *J Clin Child Psychol* 1998;27:406-14.
- Sciutto MJ, Terjesen MD, Bender-Frank AS. Teachers' knowledge and misperceptions of attention-deficit/hyperactivity disorder. *Psychol Sch* 2000;37:115-22.
- Arcia E, Frank R, Sanchez-LaCay A, Fernandez M. Teacher understanding of ADHD as reflected in attributions and classroom strategies. *J Atten Disord* 2000;4:91-101.
- Barbarelli W, Olsen R. An ADHD educational intervention for elementary schoolteachers: A pilot study. *Dev Behav Pediatr* 1998;19:94-100.
- Di Battista D, Shepherd M. Primary school teachers' beliefs and advice to parents concerning sugar consumption and activity in children. *Psychol Rep* 1993;72:47-55.
- Barkley R. Attention-Deficit/Hyperactivity Disorder: A Handbook for Diagnosis and Treatment. 3<sup>rd</sup> ed. New York, NY: Guilford Press; 2005.
- Abikoff H. Cognitive training in ADHD children; Less to it than meets the eye. *J Learn Disabil* 1991;24:205-9.
- Te Meerman S, Batstra L, Grietens H, Frances A. ADHD: A critical update for educational professionals. *Int J Qualit Stud Health Well-being* 2017;12(sup1):1298267.
- Ohan JL, Cormier N, Hepp SL, Visser TAV, Strain MC. Does knowledge about attention deficit/hyperactivity disorder impact teachers' reported behaviors and perceptions? *Sch Psychol Q* 2008;23:436-49.
- Carey W. Problems diagnosing attention and activity. *Paediatrics* 1999;103:664-7.
- Sciutto MJ, Terjesen MD, Kučerová A, Michalová Z, Schmiedeler S, Antonopoulou K, *et al.* Cross-national comparisons of teachers' knowledge and misconceptions of ADHD. *Int Perspect Psychol Res Pract Consult* 2016;5:34-50.
- Bussing R, Schoenberg NE, Perwien AR. Knowledge and information about ADHD: Evidence of cultural differences among African-American and white parents. *Soc Sci Med* 1998;46:919-28.
- Sherman J, Rasmussen C, Baydala L. The impact of teacher factors on achievement and behavioural outcomes of children with attention deficit/hyperactivity disorder (ADHD): A review of the literature. *Educ Res* 2008;50:347-60.



35. Ghanizadeh A, Bahredar M, Moeini S. Knowledge and attitudes towards attention deficit hyperactivity disorder among elementary school teachers. *Patient Educ Couns* 2006;63:84-8.
36. Alfageer HH, Aldawodi MD, Al Queflie SA, Masud N, Al Harthy NA, Alogayyel N, *et al*. Knowledge and attitude of male primary school teachers about attention deficit and hyperactivity disorder in Riyadh, Saudi Arabia. *J Natural Sci Biol Med* 2018;9.2:257-62.
37. Munshi AM. Knowledge and misperceptions towards diagnosis and management of attention deficit hyperactive disorder (ADHD) among primary school and kindergarten female teachers in Al-Rusaifah district, Makkah city, Saudi Arabia. *Int J Med Sci Public Health* 2014;3:444-51.
38. Alkahtani K. Teachers' knowledge and misconceptions of attention deficit/hyperactivity disorder. *Psychology* 2013;4:963-9.
39. Kleynhans SE. Primary school teacher's knowledge and misperception of attention deficit/hyperactivity disorder. In *Partial Fulfillment of the Requirement for the Degree of Master of Education and Educational Psychology*. South Africa: University of Stellenbosch; 2005.
40. Kos JM, Richdale AL, Jackson MS. Knowledge about attention-deficit/hyperactivity disorder: A comparison of in-service and preservice teachers. *Psychol Sch* 2004;41:517-26.
41. Snider VE, Busch T, Arrowood L. Teacher knowledge of stimulant medication and ADHD. *Remedial Spec Educ* 2003;24:46-56.
42. West J, Taylor M, Houghton S, Hudyma S. A comparison of teachers' and parents' knowledge and beliefs about attention-deficit/hyperactivity disorder (ADHD). *Sch Psychol Int* 2005;26:192-208.
43. Barkley RA. Attention deficit hyperactivity disorder. *A Handbook for Diagnosis and Treatment*. New York: Guilford Press; 1998.
44. Weyandt L, Fulton K, Schepman S, Verdi G, Wilson K. Assessment of teacher and school psychologist knowledge of Attention-Deficit/Hyperactivity Disorder. *Psychol Sch* 2009;46:951-61.