

ORIGINAL ARTICLE

## How Teachers' Knowledge of Attention Deficit Hyperactivity Disorder Makes Difference in Doctors' Diagnostic Decisions and Management?

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### ABSTRACT

**Objective:** The teacher's knowledge plays a key role in the process of assessing, screening, and diagnosing attention deficit hyperactivity disorder. This was a cross-sectional study aimed at surveying teachers' knowledge about attention-deficit hyperactivity disorder, one of the most prevailing neurodevelopmental disorders.

**Materials and Methods:** One hundred and thirteen female elementary school teachers were randomly chosen from six regular female public and private schools in Al-Khobar in the Eastern Province of Saudi Arabia. They completed a self-reported questionnaire on their general "factual" knowledge of the nature of attention-deficit hyperactivity disorder, and the management "action knowledge" of the condition. Factors which might affect their knowledge were also examined.

**Results:** About 48.7% of the total sample had adequate factual knowledge, but only 27 (23.9%) showed adequate action knowledge about how to deal with attention-deficit hyperactivity disorder. Teachers' knowledge of attention-deficit hyperactivity disorder (factual and action) was not significantly correlated with their years of experience, level of education (qualification) and duration of training in educational methodology.

**Conclusion:** It was concluded that teachers in female primary schools had inadequate knowledge about attention-deficit hyperactivity disorder. Implications and recommendation for health and educational professional are outlined.

**Key words:** Action knowledge, ADHD (attention-deficit hyperactivity disorder), Saudi Arabia

### ملخص البحث :

هذه دراسة مقطعية أجريت بهدف معرفة معلومات المدرسين عن مشكلة صحية منتشرة بين تلاميذ المدارس وهي متلازمة نقص الانتباه وفرط الحركة. شملت الدراسة 113 معلمة تم اختيارهن عشوائياً من ست مدارس حكومية وخاصة بمدينة الخبر بالمنطقة الشرقية للمملكة العربية السعودية. تم تعبئة استبانة عن الحقائق العلمية عن المتلازمة والمعلومات التي يمكن استخدامها عملياً. احتوت الاستبانة على العوامل التي يمكن أن تؤثر على معلومات المدرسات. وضحت الدراسة أن 48.7% من المدرسات لديهن الحقائق العلمية عن المتلازمة بينما 23.9% منهن يمتلكن المعلومات التي تمكنهم من معالجة المشكلة. خلصت الدراسة إلى أن المدرسات ليس لديهن القدر الكافي من المعلومات عن هذه المتلازمة؛ وقدم الباحثان التوصيات اللازمة للجوانب الصحية والتعليمية في تدبير المتلازمة.

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## INTRODUCTION

Attention-deficit hyperactivity disorder (ADHD) is a common neurodevelopmental and behavioral disorder in childhood and adolescence. The three categories of behaviors associated with ADHD are, a pattern of extreme pervasive, persistent and debilitating inattention, hyperactivity, and impulsivity (American Psychiatric Association).<sup>[1]</sup>

Prevalence rates vary depending on the criteria used, and the population studied. However, ranges of 3-5%, and 4-7% have been reported in children,<sup>[1,2]</sup> with a male to female ratio of 3:1. Some studies have reported a prevalence rate of up to 15%,<sup>[3]</sup> and reports on the persistence of ADHD into adulthood is estimated as 30-50% of the childhood cases.<sup>[4]</sup>

With regard to studies in Arabic-Speaking Communities, the available prevalence data on ADHD is limited.<sup>[5]</sup> In their study of the prevalence of symptoms of ADHD in the United Arab Emirates, Haroon *et al.*, found an overall prevalence of 29.7%.<sup>[6]</sup> While in Qatar, the prevalence rate was reported as 11.1%.<sup>[7]</sup> In Saudi Arabia, three studies that explored the prevalence of ADHD reported rates ranging from 2.7% to 28.3%.<sup>[8-10]</sup>

Attention-deficit hyperactivity disorder is associated with a significant impact on social and academic success, and self-esteem. It is often associated with learning disabilities, and other behavioral disorders, which further impede the successful development of those affected. Numerous studies, including those conducted in Arabian populations, have examined the comorbidity, social, economic and educational costs of ADHD in children and adults.<sup>[10-13]</sup> Similarly, extensive research has been carried out in relation to issues of management and assessment of ADHD.<sup>[14-18]</sup>

However, although the importance of the role of the school teacher in the assessment and management of children with ADHD has frequently been emphasized, it has not often been researched. Both parents and teachers are to be interviewed as part of the diagnostic process, because to achieve a current valid diagnosis of ADHD the behavioral difficulties experienced by a child has to occur and be discerned in more than one environment.<sup>[1,16]</sup> Several rating scales have been developed for use with both parents and teachers. Most of the available rating scales and behavioral management programs require the collaboration of teachers for successful efficient diagnoses and treatment.<sup>[1,14,16]</sup> The teacher's role is important because the initial observation of most of the behaviors associated with ADHD is in a classroom setting where it is also most taxing. In fact, it has been reported that in nearly 40% of the time, teachers have been involved in making the initial referral.<sup>[19]</sup> This clearly indicates the importance of the teacher in early identification of ADHD. Although they are a valuable source of information in identifying and diagnosing ADHD, many teachers have no understanding or knowledge of ADHD, nor the training to deal with the

condition. Some authors indicate that teachers' lack of knowledge and misconceptions about ADHD are some of the major obstacles against attending to the needs of children with ADHD.<sup>[20]</sup> Understanding and improving the knowledge of the school teachers would, therefore, be an essential part of the management and treatment of children with ADHD.

Compared to research on various issues related to ADHD (e.g., assessment, treatment, prevalence, and etiology), however, research on the teacher's knowledge about ADHD is relatively limited.<sup>[21]</sup> Most studies have used a questionnaire to examine teachers' knowledge of ADHD. In one study, Jerome *et al.* compared Canadian and US teachers' knowledge and reported that although teachers had little training regarding ADHD, they did well on knowledge-based questions on etiology and educational implications.<sup>[22]</sup> These authors also reported an average knowledge score of 77.5%; and Barbaresi and Olsen<sup>[23]</sup> reported similar results. A lower score of the knowledge questionnaire (47/8%) was reported by Sciutto *et al.*<sup>[20]</sup> However, the scoring system of the latter study was different from the two earlier studies. Kos *et al.*<sup>[21]</sup> believe that the finding of Sciutto *et al.* was more accurate as their scoring system minimized guessing by teachers. A recently published study, conducted by Al-Sharbati *et al.*, in a sample of Omani teachers reported that regardless of the length of their teaching experience, their understanding was deficient in several aspects of ADHD.<sup>[24]</sup>

In their study of elementary school teachers on knowledge and attitudes towards ADHD, Ghanizadeh *et al.*<sup>[25]</sup> reported that knowledge about ADHD was very low. They strongly advised health and education authorities to arrange a special course on ADHD for teachers, indicating also that education on ADHD should form a part of the curriculum in faculty training.

Some studies have also examined the role of such factors as training and experience in changing the knowledge and attitudes of teachers about ADHD. Jerome *et al.*<sup>[22]</sup> suggested that teachers who were more recently qualified and exposed to more current in-service training on ADHD had a better knowledge base of this subject than teachers who had been practising for a longer period without the benefit of in-service training.

It is important to note that almost all of the studies mentioned above with the exception of Al-Sharbati *et al.*, were carried out in non-Arabic speaking populations.<sup>[24]</sup> The objective of the present study was to evaluate the knowledge of female

elementary school teachers about ADHD. Furthermore, we had to examine the effects of some demographic, experiential, and training-related factors in increasing or reducing the teacher's knowledge of ADHD.

## MATERIALS AND METHODS

This study was conducted as a part of a larger one that surveyed the prevalence of ADHD in primary school girls in Al-Khobar, Eastern Province of Saudi Arabia. Ethical approval was obtained from the relevant health and education authorities to conduct the study. Permission was also obtained from the Department of Family and Community Medicine. The original study covered six schools which were randomly selected.<sup>[26]</sup> A convenient sample of teachers who participated in the prevalence study volunteered to complete a questionnaire on knowledge of ADHD. Thus, 113 primary school female teachers in Al-Khobar, with a mean age ranging from 22 to 50 years (mean = 35.3, standard deviation [SD] = 6.5 years) volunteered to participate in the present study.

A self-administered questionnaire designed by the authors to measure the knowledge of the female primary school teachers about the problem of ADHD in children, the role of the teacher in dealing with the children, as an important part of comprehensive, multimodal management of the child with ADHD, and her knowledge of how to deal with the academic problems of these children. This questionnaire was developed in consultation with expert psychometricians, and composed of three parts: The first part covered demographic data and information about training and experience. The second comprised questions on the teacher's general knowledge. This part had 31 items on the general knowledge of ADHD, its characteristics, and possible etiology. The sum scores of this part are referred to as "factual or general knowledge". The third part of the questionnaire, (9 items), had questions on the teacher's role in dealing with and managing ADHD and coexisting academic problems in the classroom and school. The sum scores of this part are referred to as "action knowledge". The face and content validity of the questionnaire was revised and agreed upon by experts of psychometrics and community medicine.

### Method of scoring and data analysis

To score the teachers' answers, the total grades were grouped as follows: The total score for the general (factual) knowledge section was 62 (mean =  $39 \pm 9.6$ ) divided into: Poor knowledge ( $\leq 30$ ), fair or average knowledge (31-40), and adequate knowledge ( $> 41$ ) scores. The total score for the action knowledge section

was 18 scores (mean =  $14 \pm 2.5$ ), divided into poor knowledge ( $< 14$ ), average knowledge (14-16) and adequate knowledge ( $> 17$ ) scores. All data were analyzed using SPSS package (Version 15).

## RESULTS

Table 1 shows selected sociodemographic characteristics of the teachers' sample. The teachers' ages ranged from 22 to 50 years (mean = 35.3, SD = 6.5 years). The majority were Saudis (96.5%). Of those, 85% taught in

**Table 1: Selected sociodemographic and educational characteristics of the teachers**

Demographic features	Number (%) of teachers (n = 113)
Age (years)	
20-30	29 (25.8)
31-40	60 (53.1)
41-50	24 (21.2)
Nationality	
Saudi	109 (96.5)
Non-Saudi	4 (3.5)
School type	
Governmental	96 (85)
Nongovernmental	17 (15)
Teacher's qualification	
Secondary	10 (8.8)
Diploma	46 (40.7)
Bachelor's	57 (50.5)
>Bachelor's	0 (0)
Teacher's specialty	
General	56 (49.6)
Science	20 (17.7)
Arts	37 (32.7)
Number of years of experience	
1-5	17 (15.1)
6-15	46 (40.7)
>16	50 (44.2)
Number of students taught by each teacher	
<30	50 (44.3)
>30	63 (55.7)
Training of teachers in Educational methodology	
Yes	71 (62.8)
No	42 (37.2)
Special education	
Yes	5 (4.4)
No	108 (95.6)
Learning disabilities	
Yes	4 (3.5)
No	109 (96.5)

government schools and 15% were in private schools. Half (50.5%) of the teachers had a bachelor's degree, >40% had a teaching diploma, none of the teachers had a master's or a Ph.D. degree.

About half of the teachers (49.6%) were not specialized in any particular discipline (general), 32.7% were specialized in the arts and humanities, and only 17.7% were in the science track.

The teachers' years of experience ranged between 1 and 33 years, with a mean of  $14.4 \pm 7.7$  years. More than two-fifths (44.2%) had >16 years of teaching experience.

The total number of students taught by each teacher ranged between 24 and 200 students, with a mean and median of about 61 students. More than half of the teachers (55.7%) taught >30 students. Almost two-thirds (62.8%) had training in education and teaching methods, with a training duration ranging between 0 and 96 weeks ( $12.7 \pm 22$  weeks), but very few (4.4%) had training in special education, and even fewer (3.5%) had training in dealing with learning disabilities. Most of the teachers had a bachelor's degree, and the majority were in the arts. There were hardly any teachers trained in special education, and the handling of children with learning disabilities. This was expected because the curricula in the educational system do not include these courses.

The results showed that, for 18 (15.9%) subjects the score for factual knowledge was in the poor range, 40 (35.4%) had fair or average knowledge, while 55 (48.7%) had adequate knowledge. For items on action knowledge, 38 subjects (33.6%) showed poor knowledge, 48 (42.5%) had average knowledge, and only 27 (23.9%) had adequate knowledge on how to deal with ADHD.

Relationship between teachers' knowledge of ADHD and their years of experience: Table 2 shows the relationship between teachers' knowledge of ADHD (factual, and action) and their experience in teaching. The finding shows that this relationship was not statistically significant ( $P = 0.26$ , and  $0.92$ ) for factual and knowledge of effective action respectively. This finding can be attributed to the lack of pre-and post-graduate training on learning disabilities, in general, and ADHD in particular.

Relationship between teachers' qualification and their knowledge of ADHD: Table 3 shows the relationship

between teachers' level of education (qualification) and their knowledge of ADHD. The finding reveals that as the teachers' level of education rose their factual knowledge of ADHD improved, increasing from 0.9% (good scores >41) for secondary school graduate teachers to 23.9% for teachers with a bachelor's degree. With regard to the knowledge of good action, scores (>17 scores) increased from 2.7% for secondary graduates, to 13.3% for teachers with a bachelor's degree. However, these relationships were statistically insignificant.

Relationship between teachers' knowledge of ADHD and the duration of training in education and teaching methods: Table 4 shows the relationship between teachers' knowledge of ADHD and the duration of their training in education and teaching methods. As mentioned above, more than two-thirds of the teachers had had training in education and teaching methods as

**Table 2: Relationships between teachers' knowledge of ADHD and duration experience in years**

Knowledge type (scores)	Number of years of experience			$\chi^2$	P
	1-5	6-15	$\geq 16$		
	Number (%)				
	<i>n</i> = 17 (15%)	<i>n</i> = 46 (40.7%)	<i>n</i> = 50 (44.2%)		
Factual					
0-30	2 (1.8)	10 (8.8)	6 (5.3)	5.3	0.259*
31-40	4 (3.5)	19 (16.8)	17 (15)		
>41	11 (9.7)	17 (15.0)	27 (23.9)		
Action					
<14	5 (4.4)	14 (12.4)	19 (16.8)	0.94	0.918*
14-16	8 (7.1)	21 (18.6)	19 (16.8)		
>17	4 (3.5)	11 (9.7)	12 (10.6)		

\*Not significant; ADHD – Attention deficit hyperactivity disorder

**Table 3: Relationship between teachers' qualification and their knowledge of ADHD**

ADHD knowledge (scores)	Teacher's qualification			$\chi^2$	P
	Secondary	Diploma	Bachelor's		
	Number (%)				
	<i>n</i> = 10 (8.8%)	<i>n</i> = 47 (41.6%)	<i>n</i> = 56 (49.6%)		
Factual					
0-30	2 (1.8)	8 (7.1)	8 (7.1)	8.8	0.066*
31-40	7 (6.2)	12 (10.6)	21 (18.6)		
>41	1 (0.9)	27 (23.9)	27 (23.9)		
Action					
<14	5 (4.4)	19 (16.8)	14 (12.4)	5.14	0.27*
14-16	2 (1.8)	19 (16.8)	27 (23.9)		
>17	3 (2.7)	9 (8.0)	15 (13.3)		

\*Not significant; ADHD – Attention deficit hyperactivity disorder



**Table 4: Relationships between teachers' knowledge of ADHD and the duration of their training in education and teaching methods**

ADHD knowledge (scores)	Duration of training (weeks)			$\chi^2$	P
	0-1	2-8	>8		
	Number (%)				
	n = 55 (48.7%)	n = 23 (20.4%)	n = 35 (31%)		
Factual					
0-30	9.8 (8.0)	4 (3.5)	5 (4.4)	1.26	0.868*
31-40	20 (17.7)	6 (5.3)	14 (12.4)		
>41	26 (23.0)	13 (11.5)	16 (14.2)		
Action					
<14	20 (17.7)	6 (5.3)	12 (10.6)	2.75	0.600*
14-16	20 (17.7)	13 (11.5)	15 (13.3)		
>17	15 (13.3)	4 (3.5)	8 (7.1)		

\*Not significant; ADHD – Attention deficit hyperactivity disorder

undergraduates. Most of these teachers had a diploma in teaching, a training during which they were given courses in education and educational skills. However, there was no statistically significant relationship between this training and their knowledge of ADHD ( $P = 0.868$  and  $0.600$  for factual and action knowledge).

## DISCUSSION

The aims of the present study were to evaluate the knowledge of female elementary school teachers about ADHD and how to deal with it, and to investigate the relationships between this knowledge and various characteristics of teachers. Two types of teachers' knowledge were investigated:

- General knowledge (e.g., symptom and causes) and
- action knowledge (e.g., how to deal with ADHD).

With regard to the general knowledge, the number of teachers who had adequate knowledge was higher than those who had poor or fair knowledge, while for the action knowledge, those whose knowledge were adequate were fewer than those whose knowledge was poor and fair.

Interestingly, from the teachers' characteristics chosen in this study, none significantly correlated with the type and amount of knowledge gained. First, teachers' experience was not significantly correlated with their knowledge of ADHD (factual, and action). This finding can be attributed to the lack of pre-and post-graduate (training on learning disabilities, in general, and on ADHD in particular). In addition, the perception of teachers on symptoms of ADHD seemed to depend on their own efforts to educate themselves and their cultural

backgrounds. This finding is comparable to the findings by Jerome *et al.*, and Snider *et al.*,<sup>[19,22,27]</sup> who reported no significant correlation between the years of experience and American teachers' knowledge of ADHD. This is also consistent with the Al-Sharbaty *et al.* study which reported that despite the lengthy teaching experience of their participants, they only had little information on ADHD, which was not sufficient to enable them to identify ADHD cases.<sup>[24]</sup>

Secondly, the relationship between the teachers' level of education (qualification) and their factual and action knowledge of ADHD was insignificant as shown in Table 3. Nonetheless, it is worth noting that as the teachers' level of education rose, their knowledge of ADHD improved. Thus, the percentage of teachers who scored at the level of adequate factual knowledge (score >41), increased from 0% to 9% for the secondary school graduate teachers, to 23% for those with a bachelor's degree. With regard to adequate knowledge of action, (score >17), the percentage rose from 2.7% for secondary school graduates, to 13.3% for those with a bachelor's degree. However, these relationships were statistically insignificant. This is possibly due to the fact that the training programs for these teachers do not usually include sufficient training and instruction on ADHD or special needs.

The third variable investigated in this study was the duration of training in educational and teaching methods. The relationship between this variable with both factual and action knowledge were statistically insignificant as shown in Table 4. This result would strengthen the earlier suggestion that issues such as ADHD, and their assessment and management are not adequately represented in teacher training courses.

It was important to study teachers' knowledge of ADHD (factual and action) because of the importance of the teacher in detecting children with behavior problems that affect their academic performance, and which contributes to the process of the diagnosing and managing ADHD.

The findings of the present study have many important implications for both health and educational authorities. First of all, teachers need to be trained to recognize the primary symptoms of ADHD in the children they teach and understand these and associated difficulties (like learning disability) in a coherent manner. They should understand how secondary academic and behavioral problems develop from the primary symptoms of ADHD,

and how their own behavior might contribute to the exacerbation or attenuation of such problems.

Secondly, changes should be made in the educational system to incorporate a comprehensive in-service training of teachers to upgrade their knowledge and application of effective classroom techniques. Many authors have indicated that additional in-service and training (e.g., workshops or seminars) should be specifically aimed at improving the knowledge of primary-school teachers on ADHD.<sup>[21,28]</sup>

## CONCLUSION

It is important to launch programs to encourage medical authorities to work in concert with educational authorities to establish a system that would improve the ability of teachers to recognize and appropriately recommend an evaluation and management of children with ADHD. This could certainly be done by taking advantage of the resources of the internet, technology and mass media and using them effectively to implement health education programs to improve teachers' knowledge. Finally, more research and collaboration with the Ministry of Education are required, as mentioned previously, to plan for better interventional programs. This requires the establishment of standardized diagnostic tools, or cultural socioeconomic and environmental modifications of the ones currently available.

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