

Attention Deficit Hyperactivity Disorder: Knowledge and Perception of Dental Care Providers

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Abstract

Aim: The aim was to measure the level of perception and knowledge of dental care providers to Attention Deficit Hyperactivity Disorder (ADHD) at King Abdulaziz University faculty of dentistry (KAUFD), Jeddah, Saudi Arabia. **Materials and Methods:** Three-part questionnaire with an explanatory method were mailed to 50 specialist pediatric faculty members and residents (Master, Doctorate degrees and Saudi Board) and 140 dental interns and externs. The first part of the questionnaire includes the participants' demographic information. The second part related to the participants previous clinical and educational experiences with ADHD and the third part included questions related to the participants' knowledge and management of ADHD. The respondents were asked to choose only one choice from 3 choices (agree, disagree, I do not know). **Results:** Working experience was found to be a significant factor ($P \leq 0.05$) in relation to the background knowledge of the participants when comparing those with 10+ years of work experience to those with 1-3 years and 4-9 years work experience. Additionally, female participants had better knowledge than their male counterpart ($p < 0.001$), as did married participants ($p = 0.007$) and those who have children especially with regards to the adverse effects of drugs, oral health and dental management for ADHD patients ($p = 0.001$, $p = 0.011$, $p = 0.011$). Interns also reported significant differences than consultants ($P \leq 0.05$) in their knowledge and general information about oral health and dental management for ADHD. **Conclusion:** The background knowledge among a sample of oral health care providers in KAUFD was found to be statistically and positively related to the work experience in terms of years of practice as well as the social and demographic status of the participants.

Key Words: Perception, Knowledge, Dental interns, ADHD

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is the most commonly diagnosed neuro-developmental disease [1]. It is a complex neurobiological disorder affecting children and is characterized by inattention and/or impulsivity and hyperactivity [2]. The etiology of ADHD is a combination of multiple risk factors includes: psychosocial, biological, environmental and genetic factors. However, the exact cause remains unclear [3]. Pure cases of ADHD are rare [4], and mostly associated with other developmental disorders such as autism spectrum disorders, learning disabilities, intellectual disability and cerebral palsy [3]. According to the American Academy of Pediatrics, ADHD prevalence ranges from 4% to 12% [5]. Further epidemiological studies on ADHD estimated a prevalence of 7.48 % in Egypt [6], 11.9% males and 8.5% females in Palestine, 9.4% in Qatar, 29.7% in United Arab Emirates [7] and 3.2% in Lebanon [8]. In Saudi Arabia, a study was conducted in Assir region to explore the ADHD prevalence in primary schools in Saudi Arabia and the result showed that the overall rate of ADHD was 2.7% [9]. Another study showed higher prevalence of combined ADHD among schoolboys in Dammam of 16.4% [7]. In Riyadh, ADHD prevalence of 25.5% was reported among patients who attended a psychiatric clinic at a university hospital [10].

According to Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV), ADHD is subdivided into three subtypes: "Combined", "Predominantly inattentive"

and "predominantly hyperactive" [11]. ADHD Symptoms must be present for at least 6 months and be present prior to age 7 [5]. Medications most commonly prescribed include short- and long-acting psychostimulants. Patients who have adverse effect or do not respond to the stimulants can be treated with adjunctive or alternative medications [12]. Alternative or complementary treatments include chamomile, additive and/or sugar-free diets, valerian, kava-kava, ginkgo biloba, ginseng, and multivitamin therapy [13]. Management of ADHD with effective psychosocial treatments involves participation of parents and teachers to change the social and physical environments in order to alter or change behavior [14]. Preschool early intervention with parent training is effective, [15] while the multimodal approach employing both medication and psychosocial therapies was reported to be the most promising in reducing the multiple symptoms of ADHD [16,17]. A study found that combination approach is more satisfying for both parents and teachers [18].

Oral health problems

Studies have shown that children with ADHD had higher DMF or dmf scores compared to controls [19,20]. Some have reported xerostomia, as an adverse reaction to methylphenidate [21,22] while others did not find any effect of methylphenidate on salivary flow rates: A study by Groom et al. [23] reported no difference in unstimulated saliva production between children with ADHD and controls, while

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another study by Hidas et al. [20] found that all ADHD children had significantly lower salivary flow rates unstimulated salivary flow rates with lower values among those on medication. Children with ADHD had significantly higher decayed, missing or filled and significantly higher decayed surfaces in comparison with controls [24].

A preliminary study found that ADHD children had greater difficulty in learning and performing a variety of motor skills [25]. Another study reported that one-third of ADHD children have motor coordination problems reported by parents and teachers [26] which affects everyday activities such as Tooth brushing and dressing. Others reported that children with ADHD who were on prescribed medications had a higher prevalence of Bruxism than others, and 2.5 times the number of worn teeth was reported among those taking stimulants [27]. Oral habits (such as bruxism and nail biting) are reported to be less common in children with ADHD than the controls [28].

Dental management

Behavioral management is one of the more challenging aspects in treating children with ADHD; due to their inability to stay focused on the dental treatment. It is always useful to consult the patient's pediatrician and/or other health care providers. Careful timing of appointments is important, with scheduling those in the morning usually advisable [29]. Atmetlla et al. [28] showed that it's more difficult to manage children with ADHD in the dental office due to difficulty in establishing communication, especially with oral hygiene instruction. "Tell-show-do" was the most effective behavior management technique of choice because it moderates the behavior of ADHD children [30]. Despite the vast amount of research on ADHD, there are still concerns regarding identification, referral, diagnosis and treatment of children with ADHD. This is highly influenced by the knowledge and perspectives of all individuals involved. Diagnosis and treatment of ADHD requires the collaboration between the family, the educational sector and the health care professionals [31]; therefore, it is essential to address such variance in order to attain a mutual understanding and common goals.

Aim

The aim of the current study is to measure the level of perception and knowledge of dental care providers to ADHD.

Materials and Methods

A cross-sectional observational study at KAUFU in Jeddah, Saudi Arabia was conducted. The Ethical Committee at KAUFU approved the research protocol. Two appropriate samples were chosen for the study group as follows: 50 specialist pediatric faculty members and residents (MSc, PhD and Saudi Board) as well as 140 dental interns and externs were included in the study. All participants were from KAUFU. Questionnaires with an explanatory method were mailed to them. The participants were informed about the study and assured of anonymity. Two weeks after the

questionnaire was mailed a follow up cover letter and the questionnaire was sent again to remind non-respondents to complete and return the questionnaire.

A modified questionnaire prepared or designed by Hirfanoglu et al. [32] was used in the present study. Initially, a focus group was organized to test the questionnaire for content, clarity and validity. The final three-part questionnaire consisted of 55 items.

The first part of the questionnaire included the participants' demographic information: name (optional), gender, academic degree, year and place of graduation, job position, and marital status and if they had children. The second part related to the participants previous clinical and educational experiences with ADHD: did the participants receive proper education or training for treating patients with ADHD, did they ever provided treatment or like to provide dental care to individuals with ADHD as a part of their dental practice. The third part included questions related to the participants knowledge and management of ADHD on the basis of DSM-IV diagnostic criteria [11] to assess the general knowledge, differential diagnosis and coexisting conditions regarding ADHD. The medical management and adverse effects of drugs, oral health problems and dental management of ADHD was also evaluated.

The questionnaire included 4 questions on the background information about ADHD, 42 questions addressed general knowledge and management of ADHD by dental practitioners (general knowledge questions were 12, differential diagnosis questions were 6, coexisting conditions questions were 4, the medical management and adverse effects of drugs questions were 6, oral health problems questions were 8 and dental management questions were 6). The answers included 3 choices: agree, disagree, I do not know.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) 10.0 was used. The numerical values, age of the doctors and the time of residency were expressed as mean \pm standard deviation (SD). Chi-square analysis was used in testing the differences between physician responses according to their institution (UH or SH), and private office. Overall assessment of each division was carried using the independent t test.

Results

Of the health care providers participating in our study 57.9% were female and 42.1% were male. 57.2% of the participants were married and 42.8% were single. Those with children were only 25.2% while 74.8% did not have children. Most the participants (83.6%) were holders of bachelor degree of dental surgery while 11.3% were enrolled in master degree (MSc) or Saudi board holders and only 5% were awarded with doctorate degree (PhD). About 74.8% of the respondents were interns, 16.4% were pediatric dentistry residents and 8.8% were consultant pediatric dentists. 5% of the participants had been working for 10 years and above (10+years), 13.2% for

4-9 years, while 78.6% for only 1-3 years. These demographic characteristics are shown in (Table 1).

Table 1. The characteristics of the health care providers.

Characteristics of the health care providers (N=159)		n	%
Gender	Female	92	57.9
	Male	67	42.1
Marital status	Married	91	57.2
	Single	68	42.8
Having children	No	119	74.8
	Yes	40	25.2
Academic degree	BDS	133	83.6
	Master/board	18	11.3
	PHD	8	5
Occupation	Intern	119	74.8
	Pediatric Dentistry Residents	26	16.4
	Consultants pediatric dentists	14	8.8
Years of experience	1-3	125	78.6
	4-9	21	13.2
	10 and above	8	5

Health care providers background information towards ADHD

Most participants (Interns (I): 86.6%, Pediatric Dentistry Residents (R): 61.5%, Consultant Pediatric Dentists (C): 42.9%) have never provided treatment for a patient with ADHD. Most of the consultants (71.4%), half of the residents (46.2%) and 14.3% of the Interns have received proper education to effectively treat individuals with ADHD. About 50% of the consultants, 76.9% of the residents and 95.0% of the Interns

reported that they didn't receive proper training for treating patients with ADHD. Almost all the respondents (C: 100.0%, R: 96.2% and I: 68.1%) reported that they are willing to provide dental care to individuals with ADHD as a part of their dental practice. There is a gradient statistically significant decrease in the percentage of agreement and willingness to provide dental care to individuals with ADHD from consultants down to residents then interns ($p < 0.001$) (Table 2).

Table 2. Health care providers background information towards ADHD.

Background Information		Occupation						P value
		Interns (n=119)		Pediatric Dentistry Residents (n=26)		Consultant Pediatric Dentists (n=14)		
		n	%	n	%	n	%	
Have you ever provided treatment for a patient with ADHD?	No	103	86.4	16	61.5	6	42.9	<0.001*
	Yes	16	13.4	10	38.5	8	57.1	
Did you receive the proper education to effectively treat individuals with ADHD?	No	102	85.7	14	53.8	4	28.6	<0.001*
	Yes	17	14.3	12	46.2	10	71.4	
Did you receive the proper training for treating patients with ADHD?	No	113	95	20	76.9	7	50	<0.001*
	Yes	6	5	6	23.1	7	50	
Would you like to provide dental care to individuals with	No	38	31.9	1	3.8	0	0	<0.001*
	Yes	81	68.1	25	96.2	14	100	

ADHD as a part of your dental practice?								
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Relation between health care providers background information towards ADHD and their years of working experience

No significant differences were reported regarding providing treatment for ADHD patients or to their likeness to provide dental care to individuals with ADHD as part of their practice. When questioned regarding proper education or proper

training for treating patients with ADHD, nearly 62.5% of those with more years of experience (10+years) reported that they received proper education and 37.5% of the same group received further training. The rate was significantly different than those with 1-3 years and 4-9 years of working experience (*Table 3*).

Table 3. Relation between health care providers background information towards ADHD and their years of experience.

Background Information		Years of experience						P value
		1-3 years (n=125)		4-9 years (n=21)		10+ years (n=8)		
		n	%	n	%	n	%	
Have you ever provided treatment for a patient with ADHD?	No	103	82.4	14	66.7	5	62.5	0.126 NS
	Yes	22	17.6	7	33.3	3	37.5	
Did you receive the proper education to effectively treat individuals with ADHD?	No	100	80	15	71.4	3	37.5	0.019*
	Yes	25	20	6	28.6	5	62.5	
Did you receive the proper training for treating patients with ADHD?	No	114	91.2	19	90.5	5	62.5	0.036*
	Yes	11	8.8	2	9.5	3	37.5	
Would you like to provide dental care to individuals with ADHD as a part of your dental practice?	No	34	27.2	3	14.3	0	0	0.116 NS
	Yes	91	72.8	18	85.7	8	100	

* Statistically significant at $P \leq 0.05$. NS: Not statistically significant.

Health care providers demographics compared with knowledge, attitude and conceptions of ADHD

When comparing the scores relating to knowledge, attitude and conceptions about ADHD to the demographics of participants; mixed results were obtained. There was statistical significant difference between the responses given by females and males, where females had superior knowledge regarding ADHD's oral health and management compared to males ($p < 0.001$). Also, married participants showed significantly greater knowledge with regards to oral health and ADHD than single participants ($p = 0.007$) and those who have children reported statistically significant better information about adverse effects of drugs, oral health and dental management for ADHD patients ($p = 0.001$, $p = 0.011$, $p = 0.011$). There were differences between responses given by consultants, residents and interns regarding knowledge, attitude, conceptions and management of ADHD. Interns showed significantly less knowledge about ADHD than residents and consultants ($p = 0.07$ and $p = 0.002$). For the co-existent conditions and adverse effects of drugs, interns again reported lower knowledge significantly compared to both

residents and consultants ($p = 0.022$, $p < 0.001$). Interns also reported significantly lower differences than consultants ($p = 0.004$) in the general information about ADHD's oral health. When questioning their knowledge about dental management for ADHD, interns showed again significant lower differences than consultants ($p = 0.004$) (*Table 4*).

Discussion

The present cross-sectional observational study is one of the recent studies to measure the level of perception and knowledge of dental care providers to ADHD at KAUFU, Jeddah, Saudi Arabia. It was intended to assess the knowledge and general information of specialist pediatric faculty members, residents and dental interns about oral health and dental management for ADHD.

ADHD is a common psychiatric disorder that is characterized by symptoms of inattention, impulsivity, and hyperactivity [2]. The overall prevalence of ADHD in Saudi Arabia varies among the different regions of the Kingdom with some areas reporting high prevalence. Accordingly, the level of knowledge and understanding of the disease must be

addressed and shared with all practitioners, parents, teachers, and healthcare providers.

Table 4. Correlation between health care providers demographics with knowledge, attitude and conceptions of ADHD.

	N	Knowledge about ADHD			Differential diagnosis			Co-existent conditions			Management and adverse effects of drugs			Oral health and ADHD			Dental management for ADHD		
		Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max
Gender																			
Female	92	5	0	9	2	0	6	2	0	4	1	0	6	4	0	7	4	0	7
Male	67	4	0	10	2	0	6	1	0	4	1	0	6	3	0	7	3	0	7
P-value		0.110 NS			0.687 NS			0.084 NS			0.890 NS			<0.001*			<0.001*		
Marital status																			
Married	91	5	0	10	2	0	6	2	0	4	1	0	6	4	0	7	4	0	7
Single	68	5	0	9	2	0	6	1.5	0	4	0	0	5	3.5	0	6	3.5	0	6
P-value		0.203 NS			0.463 NS			0.934 NS			0.097 NS			0.007*			0.007*		
Having children																			
No	119	5	0	10	2	0	6	1	0	4	0	0	6	4	0	7	4	0	7
Yes	40	4	2	9	2	0	6	2	0	4	2	0	6	4	0	7	4	0	7
P-value		0.411 NS			0.212 NS			0.067 NS			0.001*			0.011*			0.011*		
Occupation																			
Consultant Pediatric Dentists	14	6.5a	3	9	2	0	4	2ab	0	4	2	0	5	5	2	6	5	2	6
Pediatric Dentistry Residents	26	6a	1	9	2	0	6	2a	0	4	3	0	6	4	0	7	4	0	7
Interns	119	4b	0	10	1	0	6	1b	0	4	0	0	6	4	0	7	4	0	7
P-value		<0.001*			0.079 NS			0.010*			<0.001*			0.001*			0.001*		
Years of experience																			
1-3 years	125	5	0	10	2	0	6	1	0	4	0	0	6	4	0	7	4	0	7
4-9 years	21	6	1	9	2	0	6	3	0	4	2	0	6	5	0	7	5	0	7
10+ years	8	5	3	8	1	0	4	1	0	4	3	0	5	5	2	6	5	2	6
		0.076 NS			0.395 NS			0.001*			0.002*			0.014*			0.014*		

* Statistically significant at $P \leq 0.05$. NS: Not statistically significant.

A study in the USA [33] with a sample size of 374 adolescents at risk of ADHD and their caregivers who thought they had perfect knowledge about the disease revealed the opposite as indicated by their answers to the questioner. Another study in the USA [34] compared teacher trainees' knowledge of ADHD with that of undergraduate students and found that teacher trainees showed good actual and perceived knowledge which was significantly higher than undergraduate students. Similarly, a survey of 3,409 pediatricians and family physicians working in Canada [35] reported referral of ADHD patients to other professionals as they lack the required knowledge to manage them.

In the current study, the health care providers background information towards ADHD was evaluated and assessed to

ascertain whether the participants received the proper education and training to effectively treat individuals with ADHD. According to the results of this study, there is a statistically significant decrease in the percentage of agreement and willingness to provide dental care to individuals with ADHD that is a gradient (from consultants down to residents then interns). Hence educational courses are needed combined with further training in order to increase the ability to manage and enhance the knowledge of oral health care providers. A study conducted in Turkey by Hirfanoglu et al. [32] reported that approximately 102 (65.3%) of the residents stated right answers to the questions during evaluating their knowledge of ADHD, 127 thought that their knowledge of ADHD was insufficient, while 123 stated that they did not even know how to diagnose the disease.

Furthermore, the level of health care providers information towards the disease is significantly and positively proportional to the years of experience and practice (10+years) when compared to those with 1-3 years and 4-9 years of working experience. Approximately 62.5 % of health care professionals who received proper education had 10+years of working experience. However, this result is dissimilar to the result of Hirfanoglu et al. study [32], which revealed that the working and residency duration factor were not statistically different between the residents from different hospitals. On the other hand, the level of background knowledge and general information about ADHD and dental management reported by the interns was significantly higher than of both residents and consultants.

Regarding the response to knowledge of co-existent conditions and side effects of the drugs prescribed to treat ADHD, the interns' knowledge was statistically significant than residents. This is unlike the findings of Hirfanoglu et al. [32] who concluded that there was no significant difference on the level of knowledge between residents in different hospitals.

Recently the use of therapeutic agents to manage patients with ADHD gained popularity and wide spread. One of the most commonly used drugs is methylphenidate. Based on a previous study by Hirfanoglu et al. [32] residents consider this drug to be the most commonly prescribed drug for the management of ADHD, and their knowledge regarding its side effects was found to be adequate. This finding is not corresponding to our study findings, which reflects that interns' knowledge was significantly less than residents' knowledge regarding side effects of the drugs.

There are a few limitations to this study that should be considered as this study was a cross-sectional observational study using health care providers (specialist pediatric faculty members, residents and dental interns) from one faculty (KAUFD), which might influence the findings and reflect institutional characteristics not representative of health care providers elsewhere in Saudi Arabia. Another limitation of this study was the lack of funding of the research project.

Conclusion

The background knowledge among a sample of oral health care providers in KAUFD was found to be statistically and positively related to the work experience in terms of years of practice as well as the social and demographic status of the participants.

Recommendations

Further observational studies using a larger sample size of health care providers representing more than one institution in Saudi Arabia should be carried out in future to draw a definitive conclusion.

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