

Attention-Deficit and Hyperactivity Disorder (ADHD) Symptoms in Saudi Children: Parental Knowledge and Awareness

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Abstract

Attention deficit/hyperactivity disorder (ADHD) is the most common mental health condition in children, affecting social interaction and self-esteem. ADHD is characterized by symptoms such as inattention, hyperactive-impulsive behavior, or both. There is limited research on parental knowledge and awareness of ADHD in Saudi Arabia. Understanding parental knowledge is crucial for effective parenting and treatment compliance. We are aiming to assess parental knowledge and awareness regarding ADHD symptoms. This cross-sectional study utilizes a structured questionnaire developed by the authors. The study includes Saudi parents who have at least one child diagnosed with ADHD and are actively involved in raising their children. Parents of children with intellectual disabilities and those residing outside Saudi Arabia are excluded. The study included 327 participants, the majority of respondents fall within the 21-30 and 31-40 age, comprising 37.0% and 29.1% of the sample. Females constitute a significant majority at 80.7% compared to males at 19.3%. The majority of the population, comprising 52.9%, belongs to the "Moderate knowledge level" category, followed by 30.9% to the "Good knowledge level" category, and 16.2% low knowledge level. Age, gender, and occupation were the only parameters to have a significant association with knowledge scores, 0.002, 0.012, and 0.005 respectively. In conclusion, ADHD is a prevalent disorder among children in Saudi Arabia, and parents need to be aware of the symptoms and seek proper diagnosis and treatment. Our study findings showed that participants exhibited sufficient knowledge scores compared to other studies held in Saudi Arabia.

Keywords: Attention deficit-hyperactivity disorder, Parents, Knowledge, Saudi Arabia

INTRODUCTION

The most common mental health condition in children is attention-deficit/hyperactivity disorder (ADHD) [1]. That has an impact on social interaction and self-esteem. ADHD is classified as a neurodevelopmental disorder by the American Psychiatric Association, and its symptoms include the inability to focus for a long time, hyperactive-impulsive behavior, or both [2]. ADHD is linked to impairment in many domains of daily life, this includes a variety of risk-taking activities, such as substance abuse, and unsafe driving. Additionally, compared to their peers without ADHD, children and adolescents with ADHD experience more scholastic difficulties and achieve lower learning outcomes [3]. ADHD is commonly diagnosed between the ages of six and twelve, and a diagnosis requires that symptoms manifest across several contexts and impair academic, interpersonal, or occupational performance. A third to half of people with ADHD who were diagnosed as children still have symptoms as adults [2]. The worldwide prevalence rate of ADHD among children is 7.2% [4]. However, in the eastern part of

Saudi Arabia, the prevalence for females aged 6 to 15 was 3.5% in 2012 and for boys aged 6 to 13, it was 16.4% in 2008 [5]. The severity of a child's ADHD symptoms has a detrimental impact on the quality of life, family dynamics, and financial situation of the parents [1]. According to a previous study done in April 2023, 84% of parents reported

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having little awareness of ADHD, which was related to education level [6]. In comparison to housewives, parents who are service workers, or retired/unemployed knew much less about ADHD [2]. The educational guideline improved mother's understanding of their children with attention deficit hyperactivity disorder [7], compared to teachers, mothers were more likely to notice that their ADHD kids had difficulties with learning and executive function [8]. A recent review suggested that parents of children with ADHD need a well-informed understanding of ADHD for better prognosis and fewer complications [9]. Despite the high prevalence of ADHD in Saudi Arabia, there are very few published studies evaluating the understanding and awareness of ADHD in Saudi Arabia. Furthermore, Parental understanding of ADHD is important in how they raise their children who have the illness and improving treatment compliance. Therefore, it is crucial to conduct a reliable assessment of parents' knowledge and awareness of ADHD in Saudi Arabia.

Objectives

We are aiming to assess parental knowledge and awareness regarding ADHD symptoms.

MATERIALS AND METHODS

Study Design and Study Setting

Based on an author-developed structured questionnaire, this study was a cross-sectional study.

Participants, Recruitments, and Sampling Procedure

Our targeted population is Saudi parents of one child or more during 2023.

Inclusion and Exclusion Criteria

Parents from various socioeconomic backgrounds who agreed to participate in the study who had children under the age of 16 who were diagnosed with ADHD by child psychiatrists or pediatricians were included. Participants who did not actively participate in raising their children as well as parents of children with intellectual disabilities who did not live in Saudi Arabia were also excluded.

Sample Size

A sample size of 385 was determined. In order to calculate the sample size, a single-proportion formula considered a 95% confidence interval and a 5% marginal error. Data was entered on the computer using the "Microsoft Office Excel Software" program (2016) for Windows. Data was then transferred to the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) to be statistically analyzed.

Method for Data Collection and Instrument

ADHD knowledge, perceptions, and cues to action. These were assessed using 10 survey questions modeled after the AIDS knowledge and attitudes section in the 1988 National Health Interview Survey and originally designed to serve as indicators of general ADHD familiarity and related health beliefs among non-clinical populations. During pilot testing of the measure, the 2-week test-retest agreement of the 10 individual survey questions was satisfactory, ranging from 73% to 100%, and internal consistency (coefficient alpha).

Scoring System

Three items address disease knowledge, namely: (1) whether the respondent has ever heard about "attention deficit disorder, hyperactivity, ADD, or ADHD" (yes or no); (2) how recently the respondent heard about the disorder (today, days ago, or weeks ago coded as "recently"/months ago or years ago coded as "not recently"); and (3) the extent of self-rated knowledge (some, a little, or nothing coded as "not a lot"/a lot coded as "a lot").

Two items address actual and preferred information sources. Respondents can list multiple sources. Sources are elicited verbatim and subsequently can be grouped into four major information categories, "any health professional" (doctor, mental health professional, hospital clinics or public health departments); "any written" (library, medical journals, newspaper or brochures); "any social network" (relatives, friends); and "any other" (teacher/school, television, internet, other).

Three items address perceived etiology and treatment benefits, and respondents indicate whether the statements are "definitely" true or false, or "probably" true or false, or whether they do not know. The statement "Attention deficit or hyperactivity is caused by too much sugar in the diet" refers to a suspected nutritional etiology and also serves as an indicator of perceived susceptibility and severity. We hypothesize that the etiology of ADHD is due to sugar intake, suggesting that anyone who consumes too much sugar is potentially at risk for this etiology. "No attribution to sugar" is coded for responses of "definitely, or probably, false." The benefits of treatment are assessed with the statements "attention deficit or hyperactivity can be treated with medicines" and "too many children are being given medicines by doctors for attention deficit or hyperactivity." Both statements are coded affirmative for responses of "definitely, or probably, true."

Analyzes and Entry Method

Collected Data was entered on a computer using the Microsoft Excel program (2016) for Windows. Data was then transferred to the Statistical Package of Social-Science Software (SPSS) program, version 20. To be statistically analyzed.

RESULTS AND DISCUSSION

Table 1 shows that in terms of age distribution, the majority of respondents fall within the 21-30 and 31-40 age, comprising 37.0% and 29.1% of the sample, respectively. This indicates a relatively youthful demographic profile. Additionally, the data shows a gender imbalance, with females constituting a significant majority at 80.7% compared to males at 19.3%. Nationality-wise, the overwhelming majority of respondents are Saudi nationals, accounting for 91.4% of the sample, while non-Saudis represent 8.6%. The data also provides a detailed breakdown of respondents' locations, revealing varying levels of representation across different regions. For instance, the Makkah Region stands out with 51.7% representation, followed by the Eastern Province at 14.7%. Education level is another crucial parameter, with the majority of respondents holding a bachelor's degree (61.2%), followed by postgraduate certificate holders (11.0%). Occupation-wise, the data highlights the diversity of employment status among respondents, with "I work in another sector" being the most prevalent at 25.7%, followed by "Not employed" at 28.1%. The distribution of annual income in Saudi Riyals shows that a significant proportion of respondents earn less than 10,000 Riyals, with 36.4% falling in the "Less than 5,000" category and 30.3% in the "5,000 - 10,000" category. Finally, the marital status breakdown reveals that the majority of respondents are married (71.6%), followed by singles at 21.4%.

Table 1. Sociodemographic characteristics of participants (n=327)

Parameter		No.	%
Age	18_20	11	3.4
	21_30	121	37.0
	31_40	95	29.1
	41_50	59	18.0
	51_60	41	12.5
Gender	Male	63	19.3
	Female	264	80.7
Nationality	Saudi	299	91.4
	Non-Saudi	28	8.6
	Al-Baha	27	8.3
	Northern borders	4	1.2
Location	Eastern Province	48	14.7
	Jazan	4	1.2
	Al-Jawf region	2	.6
	Riyadh region	28	8.6
	Qassim region	1	.3
	Medina region	13	4.0
	Tabuk region	26	8.0
	Hail region	2	.6
	Asir region	2	.6
	Makkah Region	169	51.7
	Najran region	1	.3
Education Level	uneducated	1	.3
	Primary school certificate	5	1.5

Occupation	Middle school certificate	3	.9
	Secondary school certificate	47	14.4
	Bachelor Degree	200	61.2
	Diploma	35	10.7
	Postgraduate certificate	36	11.0
	free business	22	6.7
	I work in another sector	84	25.7
	I work in the health sector	27	8.3
	Student	42	12.8
	Not employed	92	28.1
Annual Income (in Saudi Riyals)	Retired	26	8.0
	Other	34	10.4
	Less than 5,000	119	36.4
	5,000 - 10,000	99	30.3
Marital Status	11,000 - 15,000	56	17.1
	Over 15,000	53	16.2
	Married	234	71.6
	Single	70	21.4
	Divorced	12	3.7
	Widowed	11	3.4

Table 2 shows that a majority of respondents (96.3%) have heard of ADHD, while a small percentage (3.7%) have not. Additionally, over half of the participants (53.8%) have personally known someone with ADHD. Among those who have known someone with the disorder, the most common relationship to the individual with ADHD is a family member, accounting for 36.4% of responses. This is followed by the son of a friend (21.0%), and one's daughter (16.5%). The age distribution of individuals with ADHD is also provided, with the highest percentage falling within the 5-9 age group (43.2%), followed by the 10-14 age group (23.3%). Furthermore, the data indicates a significant gender disparity, with 84.1% of individuals with ADHD being male and 13.6% feminine. In terms of information sources, social media appears to be the most prominent platform, with 66.1% of respondents citing it as a primary source of information about ADHD. Other notable sources include friends (29.1%), medical books (11.0%), and advertisements/publications (24.2%). When asked about their preferred sources for obtaining more information about ADHD, social media once again emerged as a popular choice, with 48.6% of respondents expressing a preference for this platform. Psychologists (42.2%) and hospitals (27.5%) are also highlighted as preferred sources for additional information. The table also includes responses related to common misconceptions about ADHD. For instance, a notable portion of respondents (28.7%) indicated that they do not know whether ADHD is caused by too much sugar in the diet. Similarly, a significant percentage (28.7%) expressed uncertainty about whether ADHD can be treated with medication. Furthermore, the table captures perceptions about the overprescription of medications for ADHD, with 45.3% of respondents.

Table 2. Knowledge and awareness of participants of ADHD symptoms in Saudi children (n=327).

Parameter		No.	%
Have you ever heard of attention deficit hyperactivity disorder?	Yes	315	96.3
	No	12	3.7
Have you ever personally known anyone who suffers from ADHD?	Yes	176	53.8
	No	151	46.2
If the answer is yes, who is he?	The son of my friend	37	21.0
	my daughter	29	16.5
	A family member	64	36.4
	Other	44	25.0
	1_4	33	18.8
How old is a person with attention deficit hyperactivity disorder?	5_9	76	43.2
	10_14	41	23.3
	15_18	19	10.8
Is the person with attention deficit hyperactivity disorder male or female?	Male	148	84.1
	Female	24	13.6
When was the last time you saw, heard, or read anything about ADHD?	Today	23	7.0
	A few days ago	41	12.5
	A week ago	27	8.3
	Months ago	108	33.0
	Years ago	93	28.4
Compared to most people, how much do you know about ADHD?	Never	35	10.7
	I know a lot	47	14.4
	Intermediate knowledge	125	38.2
	Little knowledge	130	39.8
	I do not know anything	25	7.6
Where do you get most of your information about ADHD? (You can choose more than one option)	the doctor	75	22.9
	Friends	95	29.1
	the hospital	59	18.0
	Social media	216	66.1
	Medical books	36	11.0
	The school	25	7.6
	Advertisements and publications	79	24.2
	Relatives	59	18.0
	Newspapers and magazines	29	8.9
	TV	38	11.6
If you want more information about	The Library	11	3.4
	Psychologists	58	17.7
	The radio	12	3.7
	Other	34	10.4
	The hospital	90	27.5
	Social media	159	48.6

ADHD, where do you prefer to get it? (You can choose more than one option)
* Not on the level of knowledge, but rather on preference.

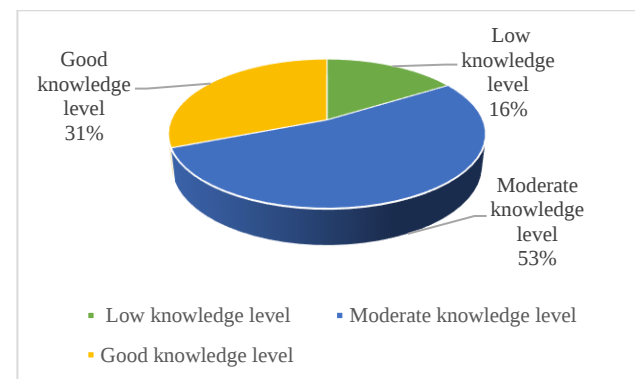
ADHD is caused by too much sugar in the diet?

Can attention deficit hyperactivity disorder be treated with medication?

Too many children are given medications by doctors for ADHD?

Psychologists	138	42.2
Friends	21	6.4
Relatives	22	6.7
Medical books	68	20.8
newspapers and magazines	22	6.7
The radio	17	5.2
The school	30	9.2
The doctor	151	46.2
The Library	24	7.3
TV	42	12.8
Advertisements and publications	56	17.1
Certainly correct	29	8.9
correct	106	32.4
I don't know	94	28.7
False	67	20.5
Definitely wrong	31	9.5
Certainly correct	20	6.1
correct	146	44.6
I don't know	94	28.7
False	49	15.0
Definitely wrong	18	5.5
Certainly correct	13	4.0
correct	79	24.2
I don't know	148	45.3
False	65	19.9
Definitely wrong	22	6.7

It is evident from **Figure 1** that the majority of the population falls into the "Moderate knowledge-level" category, accounting for 52.9% of the total sample. Furthermore, the "Good knowledge-level" category comprises 30.9% of the population. On the other hand, the "Low knowledge level" category represents the smallest portion, with only 16.2% of the population falling into this group.


Figure 1. Parental Knowledge Score of Attention-Deficit and Hyperactivity Disorder (ADHD) Symptoms in Saudi Children

Starting with age, **Table 3** shows that the highest percentage of participants falls in the age group of 21-30 (37.0%), followed by 31-40 (29.1%). The lowest percentage of participants falls in the age group of 18-20 (3.4%). The p-value for age is significant (0.002), indicating a significant association between age and knowledge score, as age group 21-30. Moving on to marital status, the table shows that the highest percentage of participants are married (71.6%), followed by single (21.4%). The p-value for marital status is not significant (0.076), indicating that there is no statistically significant difference. In terms of gender, the table shows that the highest percentage of participants are female (80.7%), followed by male (19.3%). The p-value for gender is significant (0.012), indicating that there is a statistically significant difference in knowledge scores across different genders, as females exhibit higher knowledge scores (25.7%) than males (5.2%). Regarding nationality, the table shows that the highest percentage of participants are Saudi (91.4%), followed by non-Saudi (8.6%). The p-value for nationality is not significant (0.324), indicating that there is no statistically significant difference. Moving on to education level, the table

shows that the highest percentage of participants have a bachelor's degree (61.2%), followed by secondary education (14.4%). The lowest percentage of participants are uneducated (0.3%). The p-value for education level is significant (0.173), indicating that there is no statistically significant difference. Regarding occupation, the table shows that the highest percentage of participants work in another sector (25.7%), followed by unemployed (28.1%). The lowest percentage of participants have a free business (6.7%). The p-value for occupation is significant (0.005), indicating that there is a statistically significant difference in knowledge scores across different occupations, as participants working in another sector had higher knowledge (9.2%) than other occupations. Finally, the table shows that the highest percentage of participants have a monthly income of less than 5,000 Saudi Riyals (36.4%), followed by 5,000 - 10,000 Saudi Riyals (30.3%). The lowest percentage of participants have an income of over 15,000 Saudi Riyals (16.2%). The p-value for monthly income is not significant (0.294), indicating that there is no statistically significant difference in knowledge scores across different income levels.

Table 3. Association between sociodemographic characteristics and knowledge score of participants of ADHD symptoms in Saudi children (n=327).

Parameter		Knowledge score			Total (N=327)	P value
		Low knowledge level	Moderate knowledge level	Good knowledge level		
Age	18 -20	0	9	2	11	0.002
		0.0%	2.8%	0.6%	3.4%	
	21 -30	8	73	40	121	
		2.4%	22.3%	12.2%	37.0%	
	31 - 40	18	42	35	95	
		5.5%	12.8%	10.7%	29.1%	
marital status	41- 50	15	28	16	59	0.076
		4.6%	8.6%	4.9%	18.0%	
	51 -60	12	21	8	41	
		3.7%	6.4%	2.4%	12.5%	
	Single	3	43	24	70	
		0.9%	13.1%	7.3%	21.4%	
Gender	Married	46	117	71	234	0.012
		14.1%	35.8%	21.7%	71.6%	
	Divorced	1	7	4	12	
		0.3%	2.1%	1.2%	3.7%	
Nationality	widow	3	6	2	11	0.324
		0.9%	1.8%	0.6%	3.4%	
	Male	18	28	17	63	
		5.5%	8.6%	5.2%	19.3%	
Education Level	Female	35	145	84	264	0.173
		10.7%	44.3%	25.7%	80.7%	
	Saudi	51	158	90	299	
		15.6%	48.3%	27.5%	91.4%	
	Non-Saudi	2	15	11	28	0.173
		0.6%	4.6%	3.4%	8.6%	
	Uneducated	1	0	0	1	
		0.3%	0.0%	0.0%	0.3%	
	Primary	2	3	0	5	0.173
		0.6%	0.9%	0.0%	1.5%	
	Middle	0	3	0	3	
		0.0%	0.9%	0.0%	0.9%	

Occupation	Secondary	11 3.4%	21 6.4%	15 4.6%	47 14.4%	0.005
	Bachelor	30 9.2%	106 32.4%	64 19.6%	200 61.2%	
	Diploma	5 1.5%	22 6.7%	8 2.4%	35 10.7%	
	Postgraduate	4 1.2%	18 5.5%	14 4.3%	36 11.0%	
	Free Business	5 1.5%	10 3.1%	7 2.1%	22 6.7%	
	Another sector	16 4.9%	38 11.6%	30 9.2%	84 25.7%	
	I work in the health sector	3 0.9%	15 4.6%	9 2.8%	27 8.3%	
	Student	1 0.3%	30 9.2%	11 3.4%	42 12.8%	
	Unemployed	14 4.3%	49 15.0%	29 8.9%	92 28.1%	
	Retired	11 3.4%	13 4.0%	2 0.6%	26 8.0%	
	Other	3 0.9%	18 5.5%	13 4.0%	34 10.4%	
	Less than 5,000	14 4.3%	66 20.2%	39 11.9%	119 36.4%	
	5,000 - 10,000	15 4.6%	58 17.7%	26 8.0%	99 30.3%	
	11,000 - 15,000	11 3.4%	26 8.0%	19 5.8%	56 17.1%	
	Over 15,000	13 4.0%	23 7.0%	17 5.2%	53 16.2%	
0.294						

Attention-Deficit and Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder that affects children and adults worldwide. In Saudi Arabia, ADHD is a commonly diagnosed disorder among children, and its prevalence is estimated to be around 5-10%. However, despite the high prevalence rate, there is still a lack of awareness and knowledge about ADHD among parents in Saudi Arabia [3]. The symptoms of ADHD include inattention, hyperactivity, and impulsivity. Children with ADHD may have difficulty paying attention, staying organized, completing tasks, and following instructions. They may also exhibit impulsive behaviors, such as interrupting others or acting without thinking. Hyperactivity can also be a symptom of ADHD, where children may have trouble sitting still, constantly fidgeting, or talking excessively [5].

Parents in Saudi Arabia may not be aware of the symptoms of ADHD, which can lead to a delay in diagnosis and treatment. In some cases, parents may mistake the symptoms of ADHD for misbehavior or lack of discipline. This lack of awareness can also lead to stigmatization and discrimination against children with ADHD [7, 8].

Our study found that regarding knowledge score, 52.9% of participants exhibited a moderate knowledge score and 30.9% exhibited a high knowledge score. Another study showed that the average level of ADHD knowledge among them was high, with at least 90% of their answers being right

[10]. A separate study conducted in Makkah, Saudi Arabia, revealed that the collective proportion of accurate responses concerning ADHD among elementary and kindergarten educators was below 58.9% [11]. A recent study conducted in Riyadh, Saudi Arabia has revealed that the percentage of right answers in the overall score is 17.2% [12]. In the United States, Scituito *et al.* demonstrated that primary school instructors had an average accuracy rate of 47.8% in providing accurate responses [13]. In Australia, Kos *et al.* discovered that teachers accurately responded to 60.7% of the items on the ADHA knowledge questionnaire [14]. Due to the utilization of several knowledge assessment instruments for ADHD, disparities were identified across different studies, including our own. The limited understanding of educators on the signs of ADHD is also evident in the outcomes of other comparable research conducted in Saudi Arabia [15].

One of the problems we encountered during our study is that 66.1% of the participants got their information from social media, 29.1% from friends, and 22.9% only got their information from the doctor. One study identified a similar issue, as teachers' knowledge regarding ADHD primarily comes from sources such as books, internet websites, TV/Media, magazines, and social media. Only a small number of instructors reported having had formal training on the subject [10].

Our study showed that 96.3% of participants had heard of ADHD, and 53.8% had personally known anyone who suffers from ADHD. Moreover, 39.8% of participants rated their knowledge as little compared to most people. Khaled *et al.* conducted a study on the awareness of Attention Deficit Hyperactive Disorder (ADHD) in children among the population of Madina Region in Saudi Arabia. The study revealed that the level of awareness about ADHD in Madina society was extremely low. Only 25.1% of the participants had knowledge about ADHD based on their personal experience with patients they knew. Additionally, 14.7% gained awareness about ADHD by reading about it on medical websites, while 7.3% became aware of it through social media and print media [16].

Parents in Saudi Arabia need to understand that ADHD is a real disorder that requires proper diagnosis and treatment. Early detection and treatment can help children with ADHD manage their symptoms and improve their quality of life. Treatment for ADHD may include medication, behavioral therapy, and lifestyle changes.

The study has several limitations, firstly, the study sample was limited to parents of children with ADHD symptoms in Saudi Arabia. This means that the results may not be generalizable to other populations or cultures. Additionally, the study relied on self-reported data from parents, which may be subject to bias or inaccuracies. Furthermore, the study did not include a control group, which limits the ability to draw causal conclusions about the relationship between parental knowledge and awareness of ADHD symptoms and the prevalence of these symptoms in children. Finally, the study did not explore other potential factors that may impact parental knowledge and awareness of ADHD symptoms, such as socioeconomic status or cultural beliefs.

By examining parental knowledge and awareness of ADHD symptoms in children, the study can inform the development of educational programs and interventions aimed at increasing awareness and understanding of ADHD among parents. This could lead to earlier detection and intervention for children with ADHD, ultimately improving their overall well-being and academic success. Additionally, the study's findings may also contribute to the development of culturally sensitive and tailored approaches to addressing ADHD in Saudi children, potentially leading to better outcomes and support for affected individuals and their families.

CONCLUSION

In conclusion, ADHD is a prevalent disorder among children in Saudi Arabia, and parents need to be aware of the symptoms and seek proper diagnosis and treatment. Our study findings showed that participants exhibited sufficient knowledge scores compared to other studies held in Saudi Arabia. Raising awareness about ADHD can help reduce stigma and discrimination against children with the disorder and improve their overall well-being.

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