Prevalence of Attention Deficit and Hyperactivity Disorder among Primary School Students in Jeddah city, KSA

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Abstract: This study aimed at identifying the spread of attention deficit/hyperactivity disorder (ADHD), as well as its subtypes, in a sample of primary school children in Jeddah, KSA. The implemented tool was the Attention Deficit Hyperactivity Disorder Scale. This instrument was administered to 2770 students with a range of 6-12 years. The findings of the study reveal that the prevalence of ADHD was estimated to be 11.6%. The subtypes results indicate: a prevalence of 6.3% for ADD, a prevalence of 2.2% for HD. The third type that is the combined hyperactive/ impulsive and inattentive type of ADHD has a prevalence of 3.1%. The results show that there is a difference between ADHD prevalence among elementary school children due to the difference in age. Furthermore, the total prevalence percentage of ADHD for female students was (4.2%). The total prevalence percentage of ADHD for male students was (7.4%).

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1.Introduction

Attention Deficit & Hyperactivity Disorder (ADHD) is one of the most common disorders in early childhood years (Breton *et al.,* 1999). It can be identified by its main characteristics that include: impulsivity, hyperactivity, cognitive, behavioral, and emotional deficits, and inattention. The symptoms of nearly half of ADHD children are shown when children are 5 years old (Chae, J. *et al*, 2001). According to the Centers for disease Control and Prevention children with ADHD have many troubles in paying attention, sometimes acting without thinking about what the result will be, and, in some cases, they are overly active (CDC, 2010). Consequently these children face many difficulties in school. They show behavioral and academic problems due to the conflict between the academic requirements of the schools and the specific characteristics of this disorder. So, children find a hardship in finishing the required tasks and following the directions (Barkley, 1998). The subtypes of ADHD include: the inattentive, the hyperactive/impulsive, and the Combined type (Parker, 2005). On the other hand, the CDC analysis National Survey of Children's Health (NSCH) 2003 found that male are 2.5 times more frequently diagnosed with ADHD than female (Viser & Lesesne, 2005).

When it comes to the previous literature that discussed the geographical prevalence of ADH, the American Psychiatric Association indicates that its prevalence percentage is 3-7% (Staller & Faraone, 2006). The report of the Center for Disease Control (CDC, 2010) specifies that the rate of parent-reported ADHD among children 4-17 years of age increased by 22% between 2003 and 2007, from 7.8% to 9.5%. In another study that was study was initiated in Tabriz, North-West of Iran, the prevalence was 9.7% for clinical ADHD (Amiri, F. *et al*., 2010). However, in Sivas city, Turkey the percentage was 8.1% (Ersan, D. *et al*, 2004) while in Qatar a study was conducted to find out the prevalence of ADHD there and the percentage was 9.4% (Bener, Q. *et al*, 2006).

The prevalence of ADHD subtypes was investigated in previous literature. According to Bathiche (2008) study the prevalence of the subtypes of ADHD in Lebanon were: the inattentive prevalence was 11.4%, the hyperactive/impulsive prevalence was 8.7%, and the combined type prevalence was 3.5%. Another study was conducted in Nigeria found out that the inattentive prevalence among 7-12 aged children was 4.9%, the hyperactive/impulsive prevalence was 1.2%, and the combined type prevalence was 2.6% (Adewuya & Famuyiwa, 2007). In a German elementary school sample Baumgartel, W. et al, (1995) found out that the inattentive type's prevalence was 5.4%, the hyperactive/impulsive prevalence was 3.6%, and the combined type prevalence was 2.4%.Furtheremore, a study was conducted in Trabzon, Turkey by Gul, Tiryaki, Ebru, Topbas and Ak (2010) to find out the prevalence of ADHD subtypes. The results showed that the inattentive type's prevalence was 1.6%, the hyperactive/impulsive prevalence was 6.1%, and the

combined type prevalence was 0.9%. On the other hand, several studies indicate that the prevalence among male children was more higher than female counterpart (Adewuya & Famuyiwa, 2007; Amiri *et al.,* 2010; Gul, *et al.,* 2010; Ambuabunos, O., *et al,* 2011; Bruchmuller, M., *et al,* 2012). According to Do¨pfner, B., *et al.,* (2008) ADHD can be counted as a major public health issue due to its prevalence and the chronic nature of this disorder, and its potential to interfere with different areas of developmental relevance. Thus, this study investigates the spread of ADHD in Jeddah, KSA area as another geographic origin that can add to the previous literature that discusses the same issue throughout the world. So, the main purpose of this study was to identify the spread of ADHD and its subtypes among a sample of primary public school children in Jeddah province in Kingdom of Saudi Arabia (KSA).

2.Research Methods

This study was initiated in Jeddah, a city in the Tihamah region on the coast of the Red Sea and is the major urban center of western Saudi Arabia. According to the central department of statistics and information (2010), there were 3513717 inhabitants during 2010. Jeddah's primary public schools consist of: 296 male public schools and 295 female public schools. In the male schools there are 4842 teachers and there are 5278 teachers who teach in female schools.

Table (1): Show the number of students who participated in these schools:

Grade Level	Male Students (n)	Female Students (n)
First Grade	18156	18676
Second Grade	17692	17963
Third Grade	18518	18537
Fourth Grade	19553	19736
Fifth Grade	19037	18938
Sixth Grade	18291	18316

Study Sample

Random proportional cluster sample was chosen to represent the primary public schools in Jeddah, KSA. The specific sample of this study consisted of 2770 students with a range of 6-12 years. The specific number of males and females is represented in Table (2) while the sample distribution according to age is represented in Table (3).

Table (2): The number of Male and Female participants

		N	%	Valid Percent	Cumulative Percent
Valid	Male	1414	51.0	51.0	51.0
	Female	1356	49.0	49.0	100.0
	Total	2770	100.0	100.0	

Table (3): The participants' distribution according to age

		N	%	Valid Percent	Cumulative Percent
Valid	6-9	1430	51.6	51.6	51.6
	10-12	1340	48.4	48.4	100.0
	Total	2770	100.0	100.0	

They study sample was selected from 20 public schools. Jeddah schools were divided into five main areas: north, south, east, west, and middle of Jeddah. Four schools were selected randomly from each area; two schools represent male schools and the other two schools represent the female schools. From each school 6 classes (from 1st grade to 6th grade) were selected randomly to represent the study sample.

Study Instrument

The research instrument that was implemented in this study is the Attention Deficit Hyperactivity Disorder Scale. The purpose of this instrument is to investigate ADHD among elementary school children. The scale was developed based on the criteria of the 4th edition of the diagnostic and statistical manual of mental disorders that was published by the American Psychiatric Association (APA, 2000). Then the developed scale was translated into Arabic language and modified for the Arabic culture (Homidi, 2010). This translation was used in the present study.

The scale included: (18) items that measure characteristics of ADHD subtypes. Specifically, nine of the items are related to: (1) the inattentive type, (2) the other nine items are related to the hyperactive/impulsive type, and (3) the individual who rated as having significant problems on more than 6 items is counted as having the combined hyperactive/impulsive and inattentive type. The scale used options responses ranging from "rarely" to "always". Homidi (2010) reported good internal consistency for this scale (r=91.) The instrument was administered by classroom teachers who were previously trained on how to implement the research scale.

3.Results and Discussion

The SPSS for Windows was used for the statistical analysis. The results were calculated as frequencies (%). In addition, Pearson's Chi Square was used in calculating differences between different age groups. The first research question was: What is the prevalence percentage of ADHD among elementary school children in Jeddah city? To respond to this question, the frequencies of each type of ADHD among the participants were calculated and the procedure was successfully completed in the entire selected cluster sample of 2770 school children. The results are presented in Table (4).

Table (4) :The prevalence percentage of ADHD and its subtypes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2449	88.4	88.4	88.4
	ADD	175	6.3%	6.3	94.7
	HD	61	2.2%	2.2	96.9
	ADHD	85	3.1%	3.1	100.0
	Total	2770	100.0	100.0	

The results of Table (4) specify the rates of the subtypes and the total prevalence of ADHD. Specifically, the results indicate: a prevalence of 6.3% for ADD among children who participated in this study, a prevalence of 2.2% for HD. The third type that is the combined hyperactive/ impulsive and inattentive type of ADHD has a prevalence of 3.1%. The total prevalence of ADHD in Jeddah, which is the total of the 3 types, is (11.6%).

The second question of this research was: Is there a difference of ADHD prevalence percentage related to the participants' age? The hypothesis that related to this question is: There is no significant relationship between ADHD prevalence among elementary school children and the demographic variable of age.

This research hypothesis indicates that there is no significant relationship between ADHD prevalence among elementary school children and the demographic variable of age. The results are presented in **Table (5).**

Table (5):

			Age		Total
			6-9	10-12	
Group	0	Count	1238	1211	2449
		within Group	50.6	49.4	100.0
		within Age	86.6	90.4	88.4
		of Total	44.7	43.7	88.4
	ADD	Count	99	76	175
		within Group	56.6	43.4	100.0
		within Age	6.9	5.7	6.3
		of Total	3.6	2.7	6.3
	HD	Count	39	22	61
		within Group	63.9	36.1	100.0
		within Age	2.7	1.6	2.2
		of Total	1.4	.8	2.2
	ADHD	Count	54	31	85
		within Group	63.5	36.5	100.0
		within Age	3.8	2.3	3.1
		of Total	1.9	1.1	3.1
Total		Count	1430	1340	2770
		within Group	51.6	48.4	100.0
		within Age	100.0	100.0	100.0
		of Total	51.6	48.4	100.0

As shown in Table (5) the prevalence percentage of children 6-9 years was higher than the prevalence percentage of children 10-12 years. Specifically, the results above indicate that the prevalence of ADD is 6.3%. When it comes to age, this percentage was different for different group age. Specifically, for the children with a range of 6-9 years the total prevalence was 3.6% while the children with a range of 10-12 years have a prevalence of 2.7%. When it comes to the

relationship between age and the prevalence of HD, the results show that the prevalence of HD for the children with a range of 6-9 years was 1.4% whereas the percentage for children with a range of 10-12 years was 0.8%. With regard to the total prevalence of the combined type was 3.1%. Specifically, the percentage of the children with a range of 6-9 years was 1.9% and it was 1.1% for children with a range of 10-12 years. Consequently, this study reveals that younger children have a higher percentage than older group regarding ADHD subtypes' prevalence. It is important to point out that this result highlights the importance of early screening and providing the adequate intervention in order to overcome the conflict between the academic requirements of the schools and the specific characteristics of this disorder as mentioned in the previous literature above (CDC, 2010).

To respond to the second question Chi-Square Tests were implemented. The results show that there is a difference between ADHD prevalence among elementary school children due to the difference in age. Table (6) presents the results of Chi-Square Tests.

Table: (6): Chi-square tests according to age

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.370(a)	3	.010
Likelihood Ratio	11.507	3	.009
Linear-by-Linear Association	10.881	1	.001
N of Valid Cases	2770		

A 0 cells (.0%) have expected count less than 5. The minimum expected count is 29.51

The third question was: Is there a difference of ADHD prevalence percentage related to the participants' gender? The hypothesis that related to this question is : there is no significant relationship between ADHD prevalence among elementary school children and the demographic variable of gender.

This research hypothesis indicates that there is no significant relationship between ADHD prevalence among elementary school children and the demographic variable of Gender. The results are presented in Table (7).

Table (7): The prevalence of the types of ADHD according to gender

			Gender		Total
			Male	Female	
Group	0	Count	1208	1241	2449
		within Group	49.3	50.7	100.0
		Within Gender	85.4	91.5	88.4
		of Total	43.6	44.8	88.4
	ADD	Count	97	78	175
		within Group	55.4	44.6	100.0
		within Gender	6.9	5.8	6.3
		of Total	3.5	2.8	6.3
	HD	Count	45	16	61
		within Group	73.8	26.2	100.0
		within Gender	3.2	1.2	2.2
		of Total	1.6	.6	2.2
	ADHD	Count	64	21	85
		within Group	75.3	24.7	100.0
		within Gender	4.5	1.5	3.1
		of Total	2.3	.8	3.1
Total		Count	1414	1356	2770
		within Group	51.0	49.0	100.0
		within Group	100.0	100.0	100.0
		of Total	51.0	49.0	100.0

The results of Table (7) show that the total prevalence of ADD is 6.3%. The specific ADD rate of male children in this study was 3.5% while the ADD prevalence for female participants was 2.8%. Further, the results show that the total prevalence of HD was 2.2%. The specific HD prevalence for male participants was 1.6% whereas the rate was 0.6% for female participants. The total prevalence for the combined type was 3.1%. For this specific type the rate for male participants was 2.3% and for female participants the rate was 0.8%. The total prevalence percentage of ADHD for female students was (4.2%).

The total prevalence percentage of ADHD for male students was (7.4%). As a result, this research indicates that the prevalence of ADHD and its subtypes among male participants was higher than female participants' rate. With the same line of thought, previous literature indicates the male-to-female ADHD ratio ranged from 6:1 to 2:1 in the general population (APA, 1994 as cited in Chae, J. *et al*, 2001). In general, previous studies presented same views regarding the higher prevalence among male children comparing to female counterpart (Adewuya & Famuyiwa, 2007; Amiri *et al.,* 2010; Gul, *et al.,* 2010; Ambuabunos, O., *et al,* 2011; Bruchmuller, M., *et al,* 2012).

To respond to the third question Chi-Square Tests were implemented. The results show that there is a difference between ADHD prevalence among elementary school children due to the difference in gender. Table (8) presents the results of Chi-Square Tests.

Table (8): Chi-square Tests according to gender

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.849(a)	3	.000
Likelihood Ratio	38.448	3	.000
Linear-by-Linear Association	35.205	1	.000
N of Valid Cases	2770		

A 0 cells (.0%) have expected count less than 5. The minimum expected count is 29.86

In conclusion, the main intent of this study was to estimate the precise prevalence percentage and demographic information of ADHD in elementary school children of Saudi Arabian students using Attention Deficit Hyperactivity Disorder Scale (Homidi, 2010). The prevalence of ADHD was 11.6%. The subtypes' results indicate: a prevalence of 6.3% for ADD, a prevalence of 2.2% for HD. The third type that is the combined hyperactive/ impulsive and inattentive type of ADHD has a prevalence of 3.1%. The results show that there is a difference between ADHD prevalence among elementary school children due to the difference in age. Furthermore, the total prevalence percentage of ADHD for female students was (4.2%). The total prevalence percentage of ADHD for male students was (7.4%). This finding matches the previous literature that shows that male are more frequently diagnosed with ADHD than female (Viser & Lesesne, 2005). These results reflect can be beneficial for policy makers in KSA to increase the screening of ADHD among younger children and start the process of intervention as early as possible in order to help children with ADHD, especially in the first grade, deal successfully with academic requirements and improve their social skills. This requires an attention from elementary teachers who may not know about this specific disorder and thus they may not use the adequate teaching strategies for ADHD children. Consequently, adequate educational training to identify this disorder by elementary teachers and parents can be beneficial in the intervention process.

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