

Attention-deficit hyperactive disorder in school-aged children in Saudi Arabia

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Abstract The current study was designed to explore the prevalence of attention-deficit hyperactive disorder (ADHD) in primary schools in Saudi Arabia. The study collected data from both teachers and parents for 708 primary school pupils attending grades 1–3 (7–9 years old), using DSM-IV criteria of ADHD. The result showed that the overall rate of ADHD was 2.7%, and in particular, the rate of attention types, 2.0%; hyperactive/impulsivity type, 1.4% and combined type, 0.7%. Teachers reported ADHD in a higher frequency than parents. However, applying a combination of reports from teachers and parents, screening of ADHD is likely to be more accurate. These findings highlight the importance of detecting ADHD in pupils at an early age and to develop a specific set of psychological clinical interventions for helping them.

Keywords Attention · Attention-deficit hyperactive disorder · Hyperkinetic disorder · ADHD · Assir Vanderbilt scale · Saudi Arabia

Introduction

It is estimated that at least one child in every education classroom has attention-deficit hyperactivity disorder (ADHD) [5]. ADHD is one of the most prevalent developmental disorders, affecting 3–5% of school-aged

children [16]. Some studies reported prevalence rates varying among school-aged children from about 2% to 18% [3, 6, 14, 17]. The several definitions and methods of measurement have resulted in a wide variation in prevalence [11].

Children with ADHD typically exhibit behaviour that is classified into two main categories: poor sustained attention and hyperactive/impulsiveness. Accordingly, DSM-IV proposed three subtypes of ADHD: 1) inattentive type, requiring the presence of at least six inattentive symptoms; 2) hyperactive/impulsive type, requiring the presence of at least six hyperactive or impulsive symptoms and 3) combined type, requiring the presence of at least six symptoms in each subtype. To date, there have been no studies to explore the prevalence of ADHD in school-aged children in Saudi Arabia. The goal of the current exploratory study was to screen the prevalence of ADHD in the first three grades (1–3) of primary schools in Saudi Arabia.

Participants and procedure

Pupils selected for this study were those in grades 1 to 3 (7–9 years old) in the Assir region, south of the Kingdom of Saudi Arabia. The current study was conducted from April through June 2007. This period was selected because teachers had by then formed quite a firm judgment about each student's behaviour. According to the educational system in Saudi Arabia, there are separate schools for boys and girls. In order to obtain results that are representative of this population, 33 schools (17 boys schools and 16 girls schools) were selected randomly to represent the population of this area. Grades 1 to 3 were targeted and only the first ten pupils (i.e., according to the school records) were selected and included in the study. As a consequence, the

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teachers found it easier to participate because there were only ten children from each class in the study. Each child was asked to take part, and if agreeable, his or her parents were approached for permission for their child to participate in the study.

For each student, the teacher completed one questionnaire, and the parents completed another one. Each student had to have two questionnaires, which had to be returned and completed; otherwise, they would be excluded from the study. All teachers who participated in the current study are the main teachers of the selected classes and all are Saudis. All parents participated are fathers or mothers; none of them was a guardian, and all were Saudis citizens.

Instrument

The questionnaire contained questions regarding demographic information and adaptation of Vanderbilt ADHD diagnostic rating scale [18]. Vanderbilt ADHD diagnostic rating scale is a relatively simple instrument that directly follows the DSM-IV criteria because it was clear that the aim of this study was screening ADHD behaviour, rather than the diagnosis of ADHD. The 18 items of the Vanderbilt ADHD scale were only used. The other items for testing mood, anxiety and the child's performance were omitted. Because Vanderbilt scale never has been used

Table 1 Socio-demographic characteristics of the sample (teachers and parents)

Demographic characteristics		Teachers		Parents	
		n	(%)	n	(%)
Sex	F	34	45.9	433	61.2
	M	40	54.1	275	38.8
Age	≤35	49	66.2	305	43.1
	≥36	25	33.8	403	56.9
Education	Basic level ^a	13	17.6	280	39.5
	More educated ^b	61	82.4	428	60.5

*Chi-square χ^2 was performed to tests the associations between each sample characteristic and teachers/parents rating ADHD, and no significant differences were found

^a Holding a high school certificate or its equivalent or less

^b Holding any bachelor's degree or higher.

locally, it was translated into Arabic using forward and backward translations. One independent bilingual translator forward-translated Vanderbilt scale from English into Arabic, afterwards, it was back-translated into English by another independent bilingual translator. After finishing the translation, the two translators met together with the current researcher to compare their translations and to modify them if necessary. This Arabic copy was labelled as "Assir Vanderbilt scale". Then it was sent to a panel of five experts, three academic staff in the Department of Psychology at King Khalid University as well as to one general practitioner and one paediatrician, in order to comment on each item's appropriateness and acceptability. They generally agreed the questionnaire to be applicable within Saudi culture. At this stage, the questionnaire was tested in a pilot study (40 teachers and parents). Every comment, which reflected the teachers' or parents' difficulty in understanding, instructions or items, was noted and the questionnaires were modified accordingly. However, in the current study, the judgments of the five experts have been used to confirm the validity of this scale in Saudi Arabia. Considerable evidence supports the reliability and the validity of this scale [18, 19].

Each item was rated on a four-point rating scale. The teachers and the parents indicated their perception of the frequency of ADHD in each child using a scale from 0 (never) to 3 (very often). A rating of 2 or 3 is considered to be a positive endorsement for each item. To consider the children's exhibited inattentive type behaviour, at least six of the nine inattentive items must be positive in both scales (i.e., teacher and parent scales); to consider the children's exhibited hyperactive/impulsive type behaviour, at least six of the nine hyperactive/impulsive items must be positive in both scales; the combined type requires the

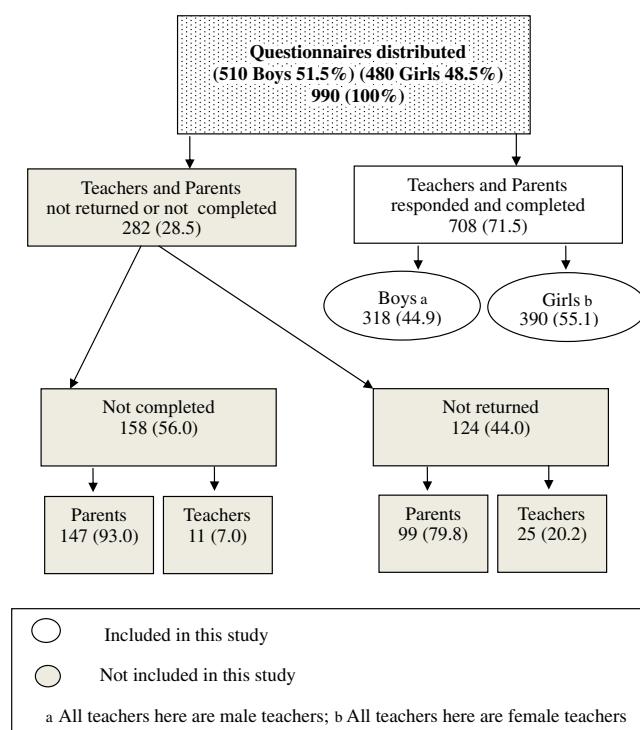


Fig. 1 Showing response/completion rates according to the gender of children ($n=990$)

Table 2 One-way ANOVA tested the potential differences in parental scale. Values shown are for the two classified categories: attentions and hyperactive/impulsivity

Parental response	(n=708)	Median (ranges)		F (degrees of freedom: between groups, within groups)	
		Attention	Hyper/Impuls	Attention	Hyper/Impuls
Fathers	414	2.5 (1–3)	2.8 (2–4)	0.453	2.519
Mothers	257	2.8 (2–4)	3.5 (2–5)	(2,692)	(2,684)
Both father and mothers	37	3.4 (1–4)	3.9 (2–5)	P=0.636	P=0.081

presence of at least six positive items in each subtype. To obtain additional information from teachers and parents, the scales were also examined independently in assessing ADHD. Parents were asked whether their child had ever consulted a specialist regarding ADHD.

The reliability that came from the present data was tested by Cronbach's alpha. Alpha coefficient ranges in value from 0 to 1. The higher the score, the more reliable the generated scale is. Nunnaly [13] has reported 0.7 to be a satisfactory reliability coefficient but lower cut-off is applied sometimes in the literature. For the teachers' attention subscale, teachers' hyperactive/impulsivity subscale, parents' attention subscale and parents' hyperactive/impulsivity subscale, their alpha were 0.9, 0.9, 0.8 and 0.8, respectively.

Data analysis

Socio-demographic characteristics of the sample were tested by Chi-square tests. The SPSS-12 was used to conduct the statistical analysis. Alpha test was employed to test the reliability of scale. ANOVA was applied to test the potential differences in parental responses. Cross-tabulations were used between all pairs of subscales to match between teachers' and parents' responses. *t* test was performed to compare between teachers and parents in rating attention and hyperactive/impulsivity.

Results

Of 990 questionnaires distributed to teachers and parents, 120 (12.1%) questionnaires were not returned, 159 (16.1%) were returned incomplete and 708 (71.5%) were returned and completed (Fig. 1).

Of the 708 completed questionnaires, 414 (58.5%) were completed by fathers, 257 (36.3%) completed by mothers and 37 (5.2%) by both. There were no significant differences in the following demographics of the teachers and parents: sex, age and level of education (Table 1).

Because of the potential differences in parental responses, one-way ANOVA was performed (Table 2). There were no significant effects of differences in parental questionnaires in both classified categories: attention and hyperactive/impulsivity.

Cross-tabulations were used between all pairs of subscales (Table 3) to obtain the prevalence of ADHD according to the three criteria: teachers alone, parents alone and teachers and parents (DSM-IV criteria). Teachers reported greater ADHA behaviour than parents in both subscales: attention (9.9%) and hyperactive/impulsivity (16.1%). Both teachers and parents agreed to report positive attention behaviour in (2.0%) and positive hyperactive/impulsivity behaviour in (1.4%) of the sample. Among them, only 0.7% have been classified with combined type. Based on teachers and parents agreement (DSM-IV criteria), 19 (2.7%) of the pupils were detected to have

Table 3 Cross-tabulations and percentages comparing between all pairs of subscales (teachers vs. parents)

		Parents' subscale			
		Attention n (%)		Hyper/ impulsivity n (%)	
		Negative –	Positive +	Negative –	Positive +
Teachers subscale	Attention	–	617 (87.1%)	7 (1.0%)	5 (0.7%)
		+	70 (9.9%)	14 (2.0%)	
	Hyper/ Impulsivity	–		548 (77.4%)	36 (5.1%)
		+		114 (16.1%)	10 (1.4%)

Table 4 Differences (median and ranges, *t* test) between teachers and parents in rating attentions and hyperactive/impulsivity

		Median (ranges)	<i>t</i> test (df)	<i>P</i> value
Attention	Parents	3.4 (1–4)	9.7 (691)	0.000
	Teachers	3.9 (2–5)		
Hyper/Impulsivity	Parents	2.9 (2–5)	5.0 (683)	0.000
	Teachers	3.5 (2–4)		

ADHD (i.e., attention type, hyperactive/impulsivity type, or both).

Significantly, teachers and parents differed in their ratings. Teachers rated higher than parents in both attention and hyperactive/ impulsivity (Table 4).

Boys in all of the three category types reported greater ADHD behaviour than girls (Table 5). No parents reported that their children consulted a specialist regarding ADHD.

Discussion

This study succeeded in providing basic epidemiological data about the patterns of comorbidity of ADHD among Saudi primary schools. The result showed that the prevalence of ADHD is 2.68%. The prevalence is in accordance with that reported by several studies worldwide [10–15]. Also, the current results are consistent with other studies, indicating that boys are more likely to exhibit ADHD behaviour than girls [7].

It is possible that the current results provide a more conservative estimate of the prevalence of ADHD behaviour, by applying DSM-IV criteria. It is possible that if this study had obtained the information from a single source, such as teachers, the prevalence rate would have been higher. According to the teachers' subscale alone, ADHD in the current study was high, raising the issue of reporting the prevalence of ADHD differently between teachers and parents. Several studies were screening ADHD by teachers' questionnaires [4, 9, 14, 18]. Others targeted parents to be the main source of ADHD data [8].

Partly, rating the differences between teachers and parents could be explained when we take into account the differences between the two environments in school and home. For instance, in school, there are roles and

instructions that control all the pupils' behaviour. In such an environment, patterns such as "disturbing other students, having difficulty waiting in line" would be noted easily. Unlike hyperactive/impulsivity type, attention types is a hidden problem that more likely to be noted by teachers rather than by parents; "he has difficulty in sustaining focus to complete task" is one example that more likely monitors such behaviour at school rather than at home.

On the other hand, the lower rate of ADHD according to parental reports in this study could reflect the lack of parental concern about ADHD. Previous work of Mulhern et al. [12] suggested that a lack of parental concern is predictive of a non-ADHD diagnosis. After all, the prevalence of ADHD reported in this study is providing at least some support for using teachers and parents scale together when screening for ADHD.

In this study, the rate of prevalence refers to the behavioural field, not the diagnostic field. Due to the lack of any Saudi study about ADHD in school-aged samples, the current result cannot match or compare its findings with others. However, this finding reported less ADHD than that found in Qatar. In study of Bener et al. [2], about 9% of primary school students reported to have ADHD. As mentioned above, methods of measurement could explain this variation.

Finally, the current study draws a preliminary picture about the prevalence of ADHD among primary school pupils in Saudi Arabia. However, results of this study should be interpreted cautiously in light of some potential limitations, as the sample is not representative of the population of school age in Saudi Arabia as a whole. The academic and social performances need to be included in future studies. The scope of this study was limited to investigate the prevalence of ADHD. Very important questions emerging from this study need to be investigated in future studies. This study did not address parents' and teachers' knowledge and beliefs about ADHD, such as beliefs about causation and the proper help, which are very important. Qualitative study could provide more essential information in this regards. Further studies are also needed in screening ADHD in preschool pupils. This would help to identify those preschool children to have a better opportunity of obtaining early diagnosis of ADHD and early help for school pupils in Saudi Arabia [1].

Table 5 Prevalence of ADHD according to the DSM-IV criteria, based on the positive response on both pairs of subscales: teachers and parents. Values shown compare between boys and girls

ADHD types	Girls (n=390)	Boys (n=318)
Attention	5 (1.3%)	9 (2.8%)
Hyperactive/impulsivity	3 (0.8 %)	7 (2.2%)
ADHD combined	2 (0.5%)	3 (0.9 %)

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