

Urbanization, Culture & Hyperactivity: An Exploratory Study of Omani Schoolgirls

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Although formulated for Western populations, the study of variation in human behaviors within the advocated diagnostic categories of the Western psychiatric nosology has been found to be universally applicable. This paper attempts to tease out whether gender differences are shaped by socio-cultural or ecological factors by examining the prevalence of attention deficit hyperactivity disorder (ADHD) in a sample of 708 Omani schoolgirls residing in Muscat, the capital of Oman. Academic performance, and some intellectual and social correlates were also explored. The findings reveal that academic, intellectual and social correlates fluctuate in complex ways. The prevalence of ADHD amongst Omani students was 5%, a rate that is lower than what is observed in many Western samples. The authors discuss the importance of socio-cultural versus ecological factors that might play a role in the expression of hyperactivity and speculate about the gender related issues concerning ADHD in an Arab/Islamic country.

The comparative approach to study variation in human behavior was initially formulated for the Western populations, but eventually, the diagnostic categories of the Western psychiatric nosology was advocated as universally applicable to all humankind. In Kiev's (1972) view, forms of psychiatric disorders remain essentially constant throughout the world, irrespective of the culture in which they appear. On this premise, Kiev (1972) classified various 'culture-bound disorders' within the diagnostic categories of the Western model. However, applying this model to other parts of the world may be an example of what Kleinman (1977) terms 'category of fallacy.' The fallacy suggests that there is a reification of a nosological category developed for a particular cultural group which is then applied to members of another culture for whom the category lacks

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coherence and/or lacks validity. This 'category of fallacies' is implicit in much of the psychosocial approaches and in their attempt to fit many 'exotic' idioms of distress into an overgeneralized universal diagnostic framework (Sartorius & Emsley, 2000).

The prevailing paradigm that cross-cultural studies can only be explained through the western cultural microscope has been recently challenged, as the progress in cross-cultural studies increasingly emphasized the relevance and importance of cultural variation. Cultural variation is particularly important in modes of distress and help-seeking behavior (Lewissfernandez & Kleinman, 1995). Data emanating from diverse regional, cultural and linguistic groups have yielded new and important insights into many topics of social scientific relevance (Kirmayer & Minas, 2000). One significant finding from these cross-cultural studies is the realization that the concept of health and illness varies from one culture to another. This new insight has led to the re-evaluation of what constitutes culture-specific or culture-reactive idioms of distress, emotionality, cognition and other forms of human behavior (Kleinman, 1986). The remaining challenge is the scarcity of studies examining gender differences in children's functioning in different cultural settings. Studies examining whether gender differences and phenomena of childhood behavioral and emotional disturbances are shaped by socio-cultural or ecological factors are scant. Focusing on a widely reported condition like hyperactivity (attention deficit hyperactivity disorder or ADHD) may be a starting point in teasing out whether gender differences are a culture-specific or culture-reactive phenomenon.

In the past, studies conducted on Euro-American populations have suggested that males suffer more from various 'culturally devalued' conditions (such as ADHD) than their female counterparts (Daradkeh, Ghubash & Abou-Saleh, 2002; Eapen et al., 2001; Tadesse et al., 1999). Both clinical and non-clinical surveys often show that males are more likely to have impulsivity, an essential feature of ADHD (Oades et al., 2002). However, as earlier stated, such generalizations are largely derived from Euro-American populations (Brewis, Schmidt & Casas, 2003; Gaub & Carlson, 1997), and from studies on mostly males. In the Euro-American literature, if ADHD is identified in females at all, it is often equated with 'tomboyishness.' Since expectations about female temperament tend to be mellow, deviations from the norm (unless highly exaggerated), are likely to be misdiagnosed (Marks et al., 2002; Hartung et al., 2002; Parr, Ward & Inman, 2003). Therefore, additional studies are needed to confirm the occurrence and prevalence of ADHD in females and more studies are needed to examine whether ADHD occurs in cross-cultural populations.

As phenotypes central to ADHD could be a cultural construct (Porreca, 2001), studies from non-western populations are also needed to find out whether sex role expectations differ from culture to culture (Fedigan, 1986; Inman et al., 2001).

In patriarchal societies such as those from the Arab/Islamic world, females have traditionally played exclusively domestic roles. Again, in patriarchal societies, gender roles are strongly associated with women's biological imperatives (Obermeyer, 1992). In his anthropological analysis of the Islamic culture and tradition, Eickelman (2001) suggests that females in the Arab world receive unidimensional portrayals of gender roles, where the public/private dichotomy is almost absolute. Such studies also tend to highlight male's distrust of female sexuality (Chatty, 2000; Eickelman, 1984; Wikan, 1982; see Sev'er & Yurdakul, 2001 for a slightly different interpretation). The majority of findings suggest that the more a society is patriarchal in nature, the more marginal will be the status of the females in that society. Thus, the society sees men and boys as "capital investments'...to the social prestige of the family while females are relegated to 'burdensome and a potential source of shame'" (Eickelman, 1981, p. 144).

In Oman, it can be argued that the recent acculturation and the spread of education have brought new roles and opportunities for females (Al-Lamki, 2000; Heath, 1999). Since the introduction of modern education in the early 1970s, females have been one of the major beneficiaries of spread of modern education in Oman. Moreover, females appear to be outperforming their male counterparts in education (Spencer, 1994; Sulaiman & El-Mneizel, 1999). Despite this influx of female children into the educational institutions and although research on various aspects of education exists (Moosa, 1994), scant attention has been paid on childhood behavioral and emotional disturbances in Omani schools.² Likewise, little is known about the experience, if any, of ADHD in Omani schools.

Oman is an Arab/Islamic country located in the south-eastern corner of the Arabian Peninsula. The population is estimated to be 2.4 million (World Population Prospects, 2003), with more than 50% being under 15 years of age (Statistical Yearbook, 2001). The Omani people occupy around 300,000 square kilometers of mainly desert terrain. Annually, Oman spends 3.5% of its GNP to furnish universal free education. Due to these efforts, literacy among the country now approaches 80% (Ministry of Education, 2001). Historically, Oman came under British authority during the early XIXth Century. Despite this foreign incursion, Omani

² For notable exceptions, see Ohlin, 1995; Al-Jardani, 2001.

native culture remained almost intact. A process of acculturation started only after the discovery of oil in the 1960's (Landen, 1967). Nevertheless, oil revenues quickly and permanently changed the landscape and the people of Oman. As Smith (1988) observes: "money from oil... has brought the Omanis through development that took a thousand years in Europe in less than 20 years" (p. 297). However, Oman's transition to modernity, in Weberian terms from *Gemeinschaft* to *Gesellschaft* (Weber, 1958), has not followed a pattern similar to the one experienced in Europe. As Whelan (1988) sharply notes: "for a country used to trading in dates and goats, and living on land at subsistence level, the oil industry has transformed Oman permanently" (p. 721).

Once considered the 'Tibet of Arabia' due to its isolation and mediaeval-like social existence (Wikan, 1982), Oman has experienced a rapid modernization and acculturation in the past few decades (Allen & Rigsbee, 2000). However, this change is not without a cost. According to Melikian (1988), the exploitation of oil has brought in its wake a disruption of interpersonal relationships. Traditional tribal identification patterns gave way to a class system based on wealth. Individualism emerged, the value of education replacing the value of the family. Along these changes, Melikian (1988) notes, fathers lost their traditional role of being the only one who has the dominance and guidance in the family. It is also argued that frugality gave way to luxury, affluence and consumerism, egalitarianism gave way to formalism and simplicity to complexity. These shifts are seen as disruptive to the security system of the individuals as they signal the necessity for drastically new life styles.³ Although it is thought that ADHD is a developmental child disorder that could be inherited (Pauls, 1991; Sherman, Iacono & McGue, 1997; Vandenberg, Singer & Pauls, 1986) or acquired (as in case of head injuries, intoxications, infections like meningitis and encephalitis, etc.), there is also the view that ADHD may be a disorder of adaptation (Jensen, 1997). Little is known whether rapid shifts from traditional societies to modernity affect children in general. If there is such a cultural change effect, girls whose roles are more rigidly defined/controlled in patriarchal societies may be more vulnerable to adaptation-related disorders than their male counterparts.

Since research in ADHD is scarce in Arab Countries (Al-Ghamdy & Qureshi, 2001; Al-Sharbaty, Al-Hussaini & Sajjeev, 2003; Al-Sharbaty, Younan & Sudani, 1998), this study attempts to determine the problem in

³ Although Melikian's (1988) view of the changes may appear to be nostalgic, no one can argue against the possible toll on human and family relationships of the magnitude of such changes, and the speed of their occurrence.

the Sultanate of Oman. The specific aim is to quantify the rate of ADHD by examining the psychosocial and academic performance correlates of ADHD amongst Omani schoolgirls and thus laying the groundwork for raising public awareness about the situation. Such an undertaking is likely to help to formulate culture-flexible diagnosis and treatment techniques as well as provide a basis for assessment of the magnitude of ADHD in a cross-cultural background.

METHODS

This cross-sectional study was conducted during the spring of 2000. Three public elementary schools for girls were selected randomly in Muscat (the capital of Oman) and its suburbs. Seven hundred and eight schoolgirls (aged 6-13 years), attending first to sixth grades (equal proportions from each grade), constituted the participants of the present study. The selected schools represent all strata of Omani society. Almost all the girls were Omani nationals, although it needs to be pointed out that ethnicity of Omanis is difficult to establish since they are a mixed stock from Arab, African and South Asian origins.

After getting approval from the principals⁴ of each school, teachers and social workers who had gotten to know the girls during five-months of education were approached for help in quantifying their students' behavioral characteristics. Teachers were asked for their opinion on a number of questions regarding the girls' attention-span, hyperactivity and impulsivity, using a structured scale. In addition to the structured assessment, teachers were also requested to provide their subjective view of their pupils' behavior regarding aggression, stealing and lying in the class. Aggression was operationalized as any behavior that intended to harm others in the form of retaliation, breaking the rules of games, possession of toys, equipment and/or territory. Stealing was defined as using or attempting to use unauthorized assistance, material, or equipment while preparing for, or working on an examination or other academic assignment as well as trying to gain material benefit without the consent of the owner. Lying was defined as a conscious attempt to deceive others. Responses were in the form of "yes" or "no". Social workers also assisted in providing children's demographic and school achievement variables from school records and to verify information if this was not readily available.

⁴ Parental consent is not required in studies conducted in Omani schools, unless the study involves "invasive" medical procedures such as taking blood or administering medication. The pencil and paper measures of the present study are not considered "intrusive."

After getting their verbal consent, invitations were extended to the students to take part in a formal test of intellectual functioning during class time. Instead of a lecture, they were asked to give their time towards this study. It was explicitly stated that their responses would have no influence on their grades or examination results and their scores would be anonymous. To avoid peer influence, students were not allowed to discuss the test amongst themselves. Responses from students with known sensory or cognitive impairments serious enough to affect the proper completion of the questionnaire were excluded from the analysis.⁵ The study was approved by both the Ethics Committee for Human and Clinical Research and by the Medical Research Committees of Sultan Qaboos University.

Demographic & Academic Characteristics

Various demographic and academic characteristics including the child's birth order among her siblings, family size, parental educational status, school performance in the first term in mathematics and Arabic were recorded. Any history of school failure in previous years was also recorded. Arabic and mathematics grades were sought to reflect students' overall academic status. Students who scored lower than 50% in the first term in any one of the two subjects were classified within the poorly achieving group.

Conners' Teacher Rating Scale (CTRS)

The short form of the Conners' Teacher Rating Scale (CTRS, see Conners et al., 1998; Al-Sharbati, Younan & Sudani, 1998) was used to determine symptoms of ADHD according to the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1994). The short form of the CTRS consists of 10 items concerning different aspects of the child's behaviour (hyperactive and disruptive behavior, attention problems, mood fluctuation, etc.). Experienced staff members produced an Arabic version of the scale by the method of back-translation (Al-Adawi et al., 2002). Each item was scored separately, ranging from zero to three. Zero meant 'not at all' and three meant 'very much'. Thus a child who has been described to have 'not at all' in all items will score zero, while the one who has received 'very much' in all items will score 30. Girls who scored 15/30 or more in the CTRS were considered to be probable cases of hyperactivity.

The CTRS is a commonly used research and clinical tool for assessing children's behavior in the classroom and in hospitals (Al-Sharbati,

⁵ Project No. MREC-122 in 29th Jan. 2000) of College of Medicine & Health Sciences, Sultan Qaboos University.

Younan & Sudani, 1998; Al-Sharbati, Al-Hussaini & Sajjeev, 2003; Conners et al., 1998; Farre-Riba & Narbona 1997; Luk et al., 1988; Montiel-Nava et al., 2002). Previous studies conducted in the Arab world have confirmed the validity of the short form of CTRS that is also used in this study (Al-Sharbati, Younan & Sudani, 1998). Teachers who are considered to be more competent than others (like parents and physicians) in assessing individual child's behavior (Foye 1990; Kinsbourne, 1985), rate the children on 'descriptors of behavior' covering conduct problems, learning problems, impulsivity and hyperactivity.

Raven's Progressive Matrices Intelligence Test (RPM)

To gauge intellectual functioning, an abbreviated version of Raven's Progressive Matrices, a non-verbal intelligence test, was administered to the students (Raven, 2000). For brevity, the entire students, as a group, were shown transparencies of the Raven items in their respective classrooms. Students responded on individual answer sheets.⁶ For the present purposes, students were classified into three groups: below average (0-4 points/12), average (5-8/12), and above average (9-12/12). Raven's Progressive Matrices test has been shown to be effective in identifying intelligence functioning in various cultural populations (Benjasuwantep, Ruangdaraganon & Visudhiphan, 2002).

Data Analysis

The data were analyzed through the SPSS program, and presented by both descriptive as well as inferential statistics ((2 for both Pearson and for linear trends).

RESULTS

The sample of this study consists of 708 schoolgirls. The sample was drawn from three randomly selected schools in Muscat and its suburbs. The age range of the girls was 6-13. The origin of the people inhabiting this area is a mixture of those who were born there and those who migrated from different places of the country for seeking employment opportunities. Consequently, the socio-economic status in that area is greatly variable, starting from the illiterate fishermen and taxi drivers to the highly educated ministerial and university staff. Thus, the sample quite accurately represents the Omani population in urban centres.

Thirty-six (5.1%) participants out of the 708 got a CTRS score of 15/30 or more, and were classified as the hyperactive group. This group

⁶ No child was labeled or identified as "hyperactive" in front of other students or their teachers.

exhibited aggressive (n=9, 25%), stealing and lying behaviors (n=3, 8.3%) more than the normoactive group (aggressive, n=19, 2.8%; stealing/lying, n=21, 3.1% respectively). However, only the difference in aggression was statistically significant ($X^2 = 38.58$, df 1, $p < .001$).

Also the hyperactive girls had poor school achievement in the first term (less than 50% in Arabic and/or mathematics, n=10, 27.7%), or having failed in previous year(s), (n=16, 44.4%) compared with the normoactive group (first term, n=49, 7.3%; previous failures, n=145, 21.6% respectively). Both findings are statistically significant (term failure, $X^2 = 16.19$, df 1, $p < .001$ and previous failure(s), $X^2 = 8.91$, df 1, $p = .001$, see Table I).

Table I. The Relationships Between Hyperactivity, Antisocial Behavior & School Achievement

Behavioral Problems		Teachers' Connors' Scale for hyperactivity					
		Hyperactive ≥ 15		Normoactives < 15		Total	
		n.	%	n.	%	n.	%
Aggression ^a	Present	9	25	19	2.8	28	3.9
	Absent	27	75	653	97.2	680	96
Total		36	100	672	100	708	99.9
Stealing & Lying ^b	Present	3	8.3	21	3.1	24	3.4
	Absent	33	91.7	651	96.9	684	96.6
Total		36	100	672	100	708	100
Failure (Term) ^c	Present	10	27.7	49	7.3	59	8.3
	Absent	26	72.2	623	92.7	649	91.7
Total		36	99.9	672	100	708	100
Failure (Years) ^d	Present	16	44.4	145	21.6	161	22.7
	Absent	20	55.6	527	78.4	547	77.3
Total		36	100	672	100	708	100

^a $X^2 = 38.58$, df 1, $p < .001$

^b $X^2 = 1.46$, df 1, $p = .093$ (NS)

^c $X^2 = 16.19$, df 1, $p < .001$

^d $X^2 = 8.91$, df 1, $p = .001$

Table II shows the relationships between hyperactivity and both the birth order of the child among her siblings and the total number of siblings in the family. Twenty-one hyperactive girls (58.3%) were born as one of the first five children in the family. The birth order of the normoactive children was similar (433, 64.4 %). Twenty-seven hyperactive children (75%) had five siblings or more, compared with 447 (66.5%) of the non-hyperactive group. This observation is also not significant statistically. Thus, neither the birth order nor the family size of the hyperactive girls statistically differs from the non-hyperactive ones in the above stated measures.

Table II. Hyperactivity & Family Characteristics

Family Characteristics		Teachers' Connors' Scale for hyperactivity					
		Hyperactive ≥ 15		Normoactives < 15		Total	
		n.	%	n.	%	n.	%
Child's Rank^a	5 or less	21	58.3	433	64.4	454	64.1
	> 5	15	41.7	239	35.6	254	35.9
Total		36	100	672	100	708	100
No. of Siblings^b	5 or less	9	25	225	33.5	234	33.1
	> 5	27	75	447	66.5	474	66.9
Total		36	100	672	100	708	100

^a $\chi^2 = 0.319$, df 1, p=.457 (NS)

^b $\chi^2 = 0.761$, df 1, p=.292 (NS)

Table III shows the educational level of the fathers. The paternal distribution of the educational level of the hyperactive girls is more or less similar to the normoactive group.

Table III. Paternal Educational Level

Conners' Scale	Paternal Educational Level a											
	Illiterate		Read & write		Preparatory		Secondary		Univer sity +		Total	
	n.	%	n.	%	n.	%	n.	%	n.	%	n.	%
< 15	117	95	233	96	116	93	102	95	104	94	672	95
≥ 15	6	5	9	4	9	7	5	5	7	6	36	5
Total	123	100	242	100	125	100	107	100	111	100	708	100

^a χ^2 Linear Trend =0.61, p=.434 (NS)

Table IV shows the maternal educational levels, which is similar to the paternal distribution of educational levels (Table III). Again, there is no statistically significant difference between the maternal educational levels of the hyperactive and non-hyperactive girls.

Table IV. Maternal Educational Level

Conners' Scale	Maternal Educational Level a											
	Illiterate		Read & write		Preparatory		Secondary		Univer sity +		Total	
	n.	%	n.	%	n.	%	n.	%	n.	%	n.	%
< 15	236	98	232	91	88	95	65	96	51	100	672	95
≥ 15	6	2	22	9	5	5	3	4	-	-	36	5
Total	242	100	254	100	93	100	68	100	51	100	708	100

^a χ^2 Linear Trend =0.09, p=0.765 (NS)

Table V shows the Abbreviated RPM-IQ test distribution of the girls. Most hyperactive girls have low (n=3, 8.3%) or average (n=24, 66.7%) intelligence, meanwhile the majority of the normoactive girls (n=384, 58.8%) have above average intelligence. These differentiations are highly significant between the groups ($\chi^2 = 16.19$, df 2, p< .001). The hyperactive

group shows much lower intelligence than the normoactive group, as measured by RPM.

Table V. The Abbreviated Raven's IQ Test Results

Abbreviated Raven IQ Test ^a	Teachers' Conners Scale for hyperactivity					
	Hyperactives ≥ 15		Normoactives < 15			Total
N	%	N	%	N	%	
0-4	3	8.3	27	4.1	30	4.4
5-8	24	66.7	241	36.9	265	38.5
9-12	9	25	384	58.8	393	57.1
Total	36	100	652	99.9	688	100

^a $\chi^2 = 16.189$, df 2, $p < 0.001$

DISCUSSION

Demographic trends in Oman show that children and adolescents are forming the majority of the population (Statistical Yearbook, 2001). This trend points to the importance of contemplating psychosocial services for such an important and vulnerable age group. Moreover, the recent acculturation and modernization has opened the door for the education of female children. Thus, one of the aims of the present study is to explore the rate of ADHD and its academic and demographic correlates in Oman among the flux of female children in Oman's school system. ADHD, as conceived in psychiatric nosology, involves inappropriately high levels of activity, difficulty in concentrating, poor impulse control, and low frustration tolerance, found to be common in many males (Biederman, 1999; Montiel-Nava et al., 2002). To our knowledge, there are no existing studies of occurrence of ADHD among females in Oman. With the shift from infectious and nutritional disorders to chronic life-style disorders in countries whose economy and culture are in transition, it is yet to be established whether ADHD in females occurs in Oman. It is also crucial to find out whether ADHD is caused by acculturation or other, yet to be established factors. Potentially, an increase in the population in Oman means that the number of people afflicted by adjustment disorders of all

kinds is greater (Murray & Lopez, 1996). In the 1990's Oman's population grew at an annual rate of 4.86%, faster than the rate of any other country in the world. One of the principal aims of the present study is to examine whether ADHD can be identified in Oman, and whether the findings can shed light into its causation.

The present data do suggest the presence of ADHD in Omani females. Using a behavioral measure (CTRS), the observed rate of ADHD among girls in this study was 5.1%. This rate is lower than the 11%-19.8% reported in some studies of other populations (Gadow et al., 2000; LeFever, Dawson & Morrow, 1999; Pineda et al., 2001; Rowland et al., 2001; Rowland et al., 2002). The high variability of prevalence rates between Omani and other populations suggests that either socio-cultural, ecological or methodological factors play a substantial role in the manifestation of ADHD. Another interesting question to ask is: is there a cultural patterning that is inhibiting impulsivity in Omani females? However, when ADHD does occur, does it entail a higher social disapproval since Omani females are expected to be docile and complacent? Some authors have speculated about culturally specific mechanisms of socialization that are conducive to impulsivity (Doob, 1990). In the Euro-American culture, children are usually raised in ways that encourage them to become self-reliant and independent. In such a socialization pattern, impulsivity and risk taking behaviors may be instrumental for the individual. The unprecedented material progress of the Euro-American societies may also be an artifact of such socialization (Weber, 1958). In contrast, children in Oman are usually encouraged to think and act as a member of their families. They learn to suppress their individual wishes when their wishes are in conflict with the needs of the family, sometimes called as an allocentric cultural patterning (Dwairy & VanSickle, 1996). In such a society, independence and self-reliance are discouraged since such quests are viewed (and judged) as selfishness. This evaluation is likely to be harsher for girls/women. For example, one implication of the traditional Omani cultural patterning is that a female who has poor impulse control is likely to be viewed with disapproval and may attract negative evaluation from others. While future studies on community attitudes and perceptions towards ADHD would substantiate this view, some speculation on the social consequences for female ADHD in Oman is worthwhile. In a society where proper public appearance is highly valued, the family of an ADHD girl may resort to over-protectiveness, such as social confinement. The family may feel that their child is compromising their reputation in the community, and may deprive her from social interaction. Her behavior may even be deemed "dishonorable." In Wikan's words (1982, p.142), it is the "conduct of their

women that constitutes threat to family's honor". Thus, such a girl may have lowered chances for forming a desirable conjugal union, since marriage is often awarded to those who heed the norms of the society. Dwairy & VanSickle (1996) has suggested that such a society would likely shun and stigmatize people whose conduct deviates from the social norms, and view them with suspicion (see Money & Lamacz, 1984 for a slightly different interpretation). Within such a traditional climate, future studies ought to explore how ADHD is experienced in the Omani society, especially when it afflicts girls/women.

Another aim of the present study was to examine the educational correlates of ADHD in Oman. The present data suggest that ADHD has a propensity to lower academic competence. The poor school-achievement in the ADHD group in this study is congruent with earlier studies (Al-Sharbaty, 1987; Montiel-Nava et al., 2002; Rabiner & Coie, 2000). This might be attributed to the disturbed cognitive functions that characterize hyperactive children (as attention problems, lack of vigilance, and/or selective attention) and might result in forgetfulness and poor temporal organization. This, in turn, might result in diminution of cognitive functioning despite intact intelligence (Al-Sharbaty, 1987; Szymanski & Zolotor, 2001; Willems et al., 1986). Finally, poor motivation might also contribute to the observed poor academic performance (Popper & West, 1999). Future studies ought to explore the relationship between these variables in more detail.

In the present study, there were no significant differences between hyperactive and non-hyperactive girls in their parental education, birth order or the total number of siblings in the family. These findings are in accordance with other studies (Rucklidge & Tannock, 2001). One possible explanation for this is that ADHD is a neurobiological (within-child) problem, which means that it does not depend on environmental factors in its causation. However these factors (as parental education, birth order and the family size) may influence the ADHD outcome indirectly, for example, by buffering its catastrophic consequences through a supportive and stimulating home environment. On the contrary, if the environment is not supportive, it may increase the deterioration in both scholastic and behavioral aspects (Biederman et al., 1995).

Using a non-verbal test of intellectual functioning (RPM), we found that ADHD girls had lower intelligence than the comparison group. Previous research on ADHD, both in community and in hospital settings, has produced similar findings (Al-Sharbaty, Al-Hussaini and Sajjeev, 2003; Biederman, 1999; Chae, Jung & Noh, 2001). Although intellectual functioning has been shown to be orthogonal to symptoms of ADHD, the present sample suggests a strong association between intellectual

functioning, academic performance and IQ scores. Some of the cognitive difficulties reported in children with ADHD include problems with concentration, attentiveness, impulsivity, hyperactivity, planning and other skills such as temporal organization of behavior. Some studies have suggested that ADHD is associated with poor reading skills since such children lack the visual processing skills needed to read, focus and retain information (Rucklidge & Tannock, 2002). These difficulties dovetail with many characteristics seen in children with learning disabilities or subnormal intellectual functioning. Therefore, it is not surprising that the present children with ADHD have performed significantly poorer in intellectual functioning. It is apparent that children with ADHD need to be identified by the school as early as possible, should receive different forms of instruction, and should undergo different forms of evaluation. The education they receive should be according to their specific strengths and weaknesses.

LIMITATIONS OF THE STUDY

As true for most exploratory studies, the limitations of the current study are many, and can be listed as follows:

1. Information from parents concerning the child's medical and developmental history is absent. In addition, there are no measures of children's behavior at their own homes.
2. Data collection by questionnaires poses general problems. Earlier studies have found that different cultures attach different meanings to life and thus perceive reality differently. Although all the items of the screening instrument were translated to achieve conceptual equivalence in the Omani dialect, its usefulness still may have been hampered by subtle linguistic and conceptual misunderstandings.
3. It has been estimated that any where between 20% to 100% ADHD children are not allowed to continue with their ordinary education (Al-Ghamdy & Qureshi, 2001). Placing children with ADHD in special education classrooms is a subject of intense debate. In developing countries, special education programs are often non-existent, forcing institutions to mix children with ADHD with those who have serious developmental delays and/or who have serious psychiatric conditions. If this has been the case in Oman, the present study will underestimate the true prevalence rate of ADHD amongst Omani girls.
4. Finally, in line with the view that human behavior is shaped by social and environmental constraints, it might be more pertinent to quantify ADHD through culturally sensitive measurements. However, such an

undertaking would likely hamper much needed international comparisons (Al-Adawi et al., 2001). In the absence of a culturally sensitive measure, the present study may have inadvertently contributed to a 'category of fallacy' (Kleinman, 1977). Future studies ought to use culturally sensitive measurements in order to lay the groundwork for how the repertoire of human behaviors is expressed in different cultures.

IMPLICATIONS

As this study confirms the presence of ADHD in Omani schoolgirls at a rate of 5.1%, a more comprehensive exploration of the magnitude of the problem in developing countries is necessary. Findings from this study have direct implications for cross-cultural research, diagnosis, clinical practice as well as to the formulation of preventive strategies. While further prospective work needs to be done to examine the socio-cultural correlates of ADHD, the idea that ADHD is uniquely Western does not appear to be true. The present study shows that such disorders exist amongst Arab-Islamic children. Health-planners in Oman need to allocate more time and resources for children with behavioral problems, especially given the fact that the population distribution of Oman has a preponderance of children.

In a developing country like Oman, women have been shown to be a catalyst for social development when the road for empowerment for them is opened. If the approximately 5% of Omani females with ADHD are ignored or neglected, then the loss of their potential contributions will be felt by their current and future families as well as by the whole society. This idea echoes the biblical metaphor that a 'hungry man is a hungry man, but a hungry women is a hungry world.'

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