

ATTENTION-DEFICIT AND HYPERACTIVITY AMONG SCHOOL-AGE UNITED ARAB EMIRATES CHILDREN

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The prevalence of ADHD was studied among 200 UAE school-age children. Variables that distinguish ADHD and non-ADHD children were examined, including child characteristics, parents' sociodemographics, socioeconomic status, family environment, and parental style of influence. Results indicated that 12.5 % of the children had ADHD symptomatology, and that the prevalence ratio varied across the three ADHD subtypes, with the following rates; 1.5 % for the combined type, 7.5 % for the inattentive type, and 3.5 % for the hyperactive-impulsive type. The results of the logistic regressions indicated that ADHD inattentive type was positively associated with gender, and harsh discipline. Children with ADHD inattentive type were predominately males and were more likely to experience harsh disciplining compared to children without ADHD. On the other hand, none of the child characteristics, parent's sociodemographics, family environment and parenting were significant predictors of ADHD hyperactivity-impulsivity type. The clinical and policy implications of the findings are discussed.

Attention deficit/hyperactivity disorder (AD/HD) is characterized by developmentally maladaptive and inconsistent levels of inattention, impulsivity, and hyperactivity (DSM-IV; American Psychiatric Association, 1994; Barkley 1998; Faraone & Biederman 1994; Gaub & Carlson, 1997). Although the American Psychiatric Association (APA 1994), indicates that about 3 to 5 percent of the school-age population have ADD or ADHD, with boys greatly outnumbering girls, other studies reveal higher prevalence rates of ADHD (Canino *et al.* 2004; Khamis, 2006; Lesesne *et al.* 2003).

The underlying aetiological explanations of ADHD varied from biological to environmental (Daley, 2006). The biological explanations include genetics (Stevenson *et al.*, 2005; Thapar *et al.* 1999), brain structure (Castellanos & Acosta 2002; Semrud-Clikeman *et al.*, 2000), brain injury or dysfunction (Riccio, Hynd, Cohen, & Gonzalez, 1999), and neuropsychological (Nigg 2001; Schachar *et al.*, 2000) while the environmental include parenting and diet. In addition, various psychological causes have been suggested, ranging from psychoanalytic explanations to those involving social learning theory. For instance, studies of modeling and imitation illustrate how children could acquire deviant behavior patterns through observation of frenetically active parents or siblings. The literature is replete with examples of how children's inappropriate behavior can be manipulated by social attention, suggesting that parents and teachers could inadvertently teach youngsters to behave in the manner that characterizes ADHD (Barkley, 1998; Hallahan & Cottone., 1997; Hinshaw, 1994; Kauffman, 2005). Although the causes of ADHD are still under investigation, leading researchers suggest that poorly understood neurological factors instigate the problem, which is then exacerbated by a variety of factors in the physical and social environment (Hallahan & Cottone., 1997; Kauffman, 2005). However research does not clearly and reliably point to any specific biological or environmental cause and genetic factors (Hallahan & Cottone., 1997; Kauffman, 2005; Lerner, Lowenthal, & Lerner, 1995; Riccio *et al.*, 1993).

The problem with ADHD is not one that can be addressed in isolation; the cultural foundations shaping the construction of the disorder must be understood. Researchers have emphasized the need for ADHD theorists and practitioners to reexamine the role of culture in the entire spectrum of ADHD activities, intervention, and treatment (Ideus, 1995). In a recent review of literature, Daley (2005) has shown the environmental influences on attention deficit hyperactivity disorder. The best evidence for environmental

influences on ADHD come from intervention studies which have demonstrated improvements in ADHD symptoms, when parents have been taught alternative parenting skills (Sonuga-Barke et al., 2001; Bor et al., 2002). Studies have indicated that children who have a genetic predisposition will express the disorder when put in the correct environment, typically one characterized by chaotic parenting (Johnston & Mash, 2001; Larsson *et al.*, 2004). More specifically, Hinshaw (1994) has indicated that the family system could not be overlooked in the evaluation of ADHD. Buhrmester and colleagues (1992) investigate both mother-son and father-son interactions and found that parents of ADHD boys were more demanding, aversive and power assertive, while the findings of Gardner (1994) have demonstrated that mothers of ADHD children have been found to be more negative, controlling, intrusive and disapproving, and less rewarding and responsive than mothers of non-ADHD children. Research has shown that high levels of stress, a lowered sense of parenting competence, and discordant parent-child interactions are salient features accompanying ADHD (Anastopoulos, Guevermont, Shelton, & DuPaul, 1992; Anderson, Hinshaw & Simmel, 1994; Mash & Johnston, 1990). While such features are rarely considered as primary causes of ADHD behavior, stressful, discordant interactions may well predict the maintenance of symptomatology and even the eventual course of the disorder (Anderson et al., 1994; Campbell, March, Pierce, Ewing, & Szumowski, 1991; Hinshaw, 1994). Specifically, the degree of maternal harshness and coercion in parent-child interactions predicted concurrent or subsequent noncompliance, hyperactivity, and antisocial behavior in children.

Research in the Arab world (Khamis, 2006) has recently indicated that family environment and parental style of influence may be a key cause of ADHD, however combining ADHD subcategories into an omnibus cluster of children with ADHD may result in a loss of crucial information. Considerable evidence supports the partial independence of ADHD-related symptomatology and comorbid aggression and anxiety disorders. Without assessments that can yield information on additional features or possible subtypes, we may misattribute risk factors, underlying etiologic mechanisms, follow-up status, or treatment response patterns to ADHD, when these features more accurately pertain to other dimensions or disorders (Hinshaw, 1994).

Despite the growing scientific research of the environmental influences on attention deficit hyperactivity disorder in Western societies, there is limited information that can provide insight into the prevalence, and correlates of ADHD among Arab children and in particular the UAE school-age children (Bu-Haroon, Eapen, & Bener, 1999; Khamis, 2006). In fact, the problems of students with ADHD in the UAE public school system are usually more evident in the classroom, where compliance and focused attention to task are essential for success and school performance. The further study of the interplay of culture-specific risk factors and ADHD in school-age UAE children will help clinician and teachers in identification, prevention, and intervention. Consequently, the purpose of this research, is to investigate the prevalence and correlates of ADHD among UAE school-age children. Initial attention will be given to variables that distinguish ADHD children and non-ADHD children, such as child characteristics, parents' sociodemographics, socioeconomic status, family environment, and parental style of influence.

Method

Participants

The sample size was 200 school age children, of whom 100 (50%) were males and 100 (50%) females. They ranged in age from 11 to 14 years ($M=12.36$, $SD=.86$). All were from governmental schools, representing various United Arab Emirates; 60 (30%) from Sharjah, 93 (46.5%) from Abu Dhabi, 40 (20%) from Fujairah and 7 (3.5%) from Umm Al-Qwain. One hundred and sixty four (82%) of the children surveyed lived in two-parent homes. Of the children in this study, 59 (29.5%) had learning problems predominantly in Arabic language and Math. For the entire sample, the mean level of education for mothers and fathers was elementary, with the range extending from illiteracy to some university study. The combined monthly income of the participant's families ranged from 3000 to 22000 UAE Dirham ($M=12005$, $SD=5054$).

Sample Selection

The design for sample selection was based on three primary stratified variables: gender, age of the child, and various Emirates (i.e. Abu Dhabi, Dubai etc). Data from the Ministry of Education and Youth (MOEY) was used to allocate public schools in the various United Arab Emirates. Children then were selected randomly from each school with the help of school personnel and these students were asked for an interview.

Procedure

Informed consent was obtained from the Ministry of Education, school directors and the participants. They were given a full explanation of the study, assured of the anonymity of their responses, and were ensured confidentiality of all information collected. Three female special education graduates who were trained by the author carried out the interviews with the student and teacher at school.

Instrumentation

Child and Family Data Sheet

A brief questionnaire was developed by the author to secure demographic and background information about the child and the family from mothers and fathers. The child variables considered for this study were age, gender, and school average. The families' sociodemographics were level of education completed by parents, marital status, employment, family size, and total household income.

Diagnostic Status

The diagnosis for Attention –Deficit Hyperactivity Disorder (ADHD) was based on strict DSM-IV criteria for ADHD (DSM-IV; American Psychiatric Association, 1994). The diagnostic information about the children was obtained through structured interviews with teachers. The interviews included all symptoms related to ADHD. Each item scored yes if the symptom was endorsed as definitely present or no if the respondent indicated either sometimes, rarely, or never.

Family Ambiance Scale (FAS)

The Family Ambiance Scale (Khamis, 2000) was used to assess child's experience of anxiety in proximal home environment. Items reflected subjective anxiety (tension, nervousness) or its opposite (relaxation, calm) in situations involving various family patterns of interaction such as speaking, discussing and communicating. Cronbach's alpha for the total scale is .73.

Parental Support Scale (PSS)

The Parental Support Scale (Khamis, 2000) was used to assess child's degree of satisfaction with parental support. The evaluations of items were rated on a 7-point rating scale ranging from 10 (very dissatisfied) to 70 (highest possible satisfaction). Items dealt with tangible support (e.g. presents, rewards, money, food, and clothing) emotional support (e.g., affection, love, warmth), and social support (e.g., help, caring). Cronbach's alpha for the scale is .89.

Gender Inequities Scale (GIS)

The Gender Inequities Scale (Khamis, 2000) was used to measure children perceived fairness regarding parents' gender preferences. Functions of parental gender bias reflected practices regarding rewards, support, help, empathy, and responsive caregiving. Cronbach's alpha for the total scale is .76.

Harsh Discipline Scale (HDS)

The harsh discipline scale (Khamis, 2000) was used to measure children's perception of parent's rearing practices. The 6 items on the HDS refer explicitly to harsh discipline such as coercive punishment, immediate obedience to parental orders, monitoring and directing activities. The items were rated on a 5-point Likert scale ranging from 6 (very lenient) to 30 (very harsh discipline). Cronbach's alpha for the total scale is .74.

Statistical Analyses

To simplify data analyses, the number of predictor variables considered was reduced. This was accomplished by identifying variables significantly associated with ADHD symptomatology through *t* tests, and chi-square analyses. Then logistic regression was used to predict ADHD in children. Inclusion of many of the significant demographics and contextual variables is important since they are viewed as factors that influence the ADHD symptomatology. All logistic regressions presented are *simultaneous models*, which means that all variables are adjusted (i.e., controlled) for all other variables in the model simultaneously. For each regression, odds ratio (*OR*), *r*, and R^2 statistics are provided. The *r* and R^2 statistics in logistic regression are useful analogs to the partial *r* correlation and the R^2 statistics in linear regression, respectively, but are not fully equivalent (see Hosmer & Lemeshow, 1989; Kleinbaum, Kupper, & Morgenstern 1982). To denote this, the subscript *p* is used (i.e., r_p and R^2_p) to indicate that these should be interpreted as *pseudo r* and R^2 statistics, respectively. In cases where the predictor variable is significant and is a dichotomous variable (e.g., gender), the *OR* is reported in the text and is readily interpretable: it indicates the odds of having a current disorder when the predictor variable

changes from 0 to 1, controlling for all other variables in the model. When the predictor has more than two categories (e.g., parental support), the *OR* represents the change in the odds of having a current disorder per unit change in the predictor variable and, hence, is not as readily interpretable in terms of effect magnitude. Consequently, when a predictor is significant and has more than two categories, the *r* analog (r_p) is reported in the text instead of the *OR*. All statistical analyses were performed using SPSS Version 15.

Results

Prevalence of ADHD among school age children

The present findings in this sample indicate that the prevalence of ADHD among school age children is 12.5 %, and that the prevalence ratio varied across the three ADHD subtypes, with the following rates; 1.5 % for the combined type, 7.5 % for the inattentive type, and 3.5 % for the hyperactive-impulsive type .The following is the analyses of the results of the ADHD subtypes separately.

ADHD Inattentive Type

In regard to child characteristics, the results indicated that there were statistically significant differences between ADHD children inattentive type and non-ADHD children, in regard to gender $X^2(1,185) = 5.83, p=0.01$; and school performance $t(198) = 3.91, p = 0.0001$ (see Table1). The prevalence of ADHD inattentive type was higher among males (12%) than females (3%). Also, children with ADHD inattentive type had lower school performance than did non-ADHD children.

With respect to parent's sociodemographics, no statistically significant differences were found between ADHD children inattentive type and non-ADHD children, in regard to family income. However, significant differences were found for father's education, $t(198) = -4.56, p = 0.0001$; and mother's education, $t(198) = 2.59, p = 0.01$. While the educational level of mothers of ADHD children inattentive type was lower than mothers of non-ADHD children, the educational level of fathers were higher.

In regard to family environment and parenting, ADHD children inattentive type reported higher levels of gender inequities, $t(198) = -3.64, p = 0.0001$ (see Table 1). There were no statistically significant differences between the two groups in regard to family ambiance, parental support, and harsh discipline.

Table 1. Means and Standard Deviations of ADHD Subtypes by Child Characteristics, Parents' Sociodemographics, Socioeconomic, Family Ambiance, Parental Support, Gender Inequities, and Harsh Discipline

| Variable | ADHD Inattentive type | Non -ADHD | ADHD Hyperactive Impulsive type | Non-ADHD |
|--------------------|-----------------------|-------------|---------------------------------|-------------|
| School Performance | 63.80/9.38 | 76.83/12.59 | 69.71/11.72 | 76.08/12.84 |
| Family Income | 11733/3453 | 12027/5169 | 9000/2943 | 12113/5086 |
| Father Education | 10.60/4.96 | 5.05/4.48 | 8.42/5.74 | 5.36/4.68 |
| Mother Education | 1.80/.41 | 4.38/3.84 | 2.14/.69 | 4.26/3.81 |
| Family Ambiance | 28.00/1.30 | 29.35/4.05 | 27.57/2.29 | 29.31/3.96 |
| Parental Support | 46.80/1.42 | 49.63/7.34 | 48.14/1.21 | 49.46/7.23 |
| Gender Inequities | 26.00/2.07 | 22.23/3.94 | 25.42/3.03 | 22.41/3.94 |
| Harsh Discipline | 19.66/1.44 | 19.50/3.22 | 21.57/2.50 | 19.44/3.12 |

Note. Means for the variables appear prior to the slash (/), and their standard deviations appear after the slash

The results of the logistic regressions are shown in Table 2. They indicate that ADHD inattentive type was positively associated with gender, and harsh discipline. The odds ratio for child's gender was significant ($OR = 31.04; p < .002$), indicating that males were more likely to receive ADHD inattentive type diagnosis than females. Among family environment and parenting variables, ADHD children inattentive type reported higher levels of harsh disciplining ($r_p = -.58, p = 0.05$).

ADHD Hyperactivity- Impulsivity Type

In regard to child characteristics, the results indicated that there were no statistically significant differences between ADHD children hyperactivity-impulsivity type and non-ADHD children, in regard to gender, age, and school performance (see Table 1). Therefore, the symptoms of hyperactivity and impulsivity in children with ADHD are exhibited across gender, age, and various performance levels.

With respect to parent's sociodemographics, no statistically significant differences were found between ADHD children hyperactivity-impulsivity type and non- ADHD children, in regard to family income as well as the educational level of mothers and fathers. In other words, the hyperactivity and impulsivity symptomatology in children with ADHD did not vary according to their diverse backgrounds.

Among the family environment and parenting variables, the only significant differences found between ADHD hyperactivity-impulsivity type and non- ADHD children was on the gender inequities scale $t(198) = -1.99, p = 0.04$ with ADHD children hyperactivity-impulsivity type reported higher levels of gender inequities (see Table 1). Children who reported that they were subjected to gender discrimination and bias in their families in terms of receiving rewards, support, help, empathy, and responsive care-giving exhibited symptoms of hyperactivity-impulsivity more than children who didn't suffer from gender bias in their families.

Logistic regression was used to predict ADHD hyperactivity-impulsivity type. The results indicated that none of the child characteristics, parent's sociodemographics, and family environment and parenting were significant predictors of ADHD hyperactivity-impulsivity type.

Table 2. Logistic Regression Predicting ADHD Inattentive type and ADHD Hyperactive – Impulsive type

| Variable | ADHD Inattentive type | | | ADHD Hyperactive – Impulsive type | | |
|--------------------|-----------------------|-------|---------|-----------------------------------|-------|------|
| | b | t_p | OR | b | t_p | OR |
| Gender | 3.43 | .17 | 31.04** | .86 | .08 | 2.36 |
| School Performance | -.04 | -.26 | .95 | .02 | -.09 | 1.02 |
| Family Income | .000 | -.01 | 1.00 | .00 | -.11 | 1.00 |
| Father Education | .58 | .30 | 1.78 | .25 | .11 | 1.29 |
| Mother Education | -3.32 | -.18 | .03 | -.39 | -.10 | .67 |
| Family Ambiance | -1.84 | -.09 | .83 | -.48 | -.08 | .61 |
| Parental Support | -.22 | -.10 | .79 | -.07 | -.03 | .92 |
| Gender Inequities | .23 | .25 | 1.26 | -.00 | .14 | .99 |
| Harsh Discipline | -.58 | .01 | .55 | .49 | .12 | 1.63 |

Gender is coded: Male=1; Female=0. School Performance is coded: Cumulative Average. Educational level of Mothers and Fathers are coded in Years. Family Income is coded in Dirham. Family Ambiance is coded: 5-point scale ranging from 7 to 35. Parental Support (PSC) is coded: 5-point ranging scale ranging from 10 to 100. Gender Inequities is coded: 5-point ranging scale ranging from 8 to 40 Harsh Discipline (HD) is coded: 5-point scale ranging from 6 to 30.

* $P < .01$; ** $P < .001$

Discussion

The results of the current study indicate that the overall prevalence rate of ADHD was 12.5 % among United Arab Emirates school-age children, with most children showing symptoms that are predominantly inattentive, followed by those who are predominantly hyperactive-impulsive, and those who exhibit a combination of all symptoms- the combined type. Although the proportion of children identified as ADHD may be higher than the estimates of the DSM (APA, 1994), the results are more or less consistent with previous findings on UAE children which reported an overall prevalence rate of 14.9% (Bu-Haroon, Eapen, & Bener, 1999). Yet it was inconsistent with the results of a recent study on Arab children (i.e., Palestinians) which has indicated a much higher prevalence rate of 34.1%. Differences in the prevalence rate of ADHD may be attributed to the fact that Palestinian children live in difficult circumstances, and experience a considerable number of difficulties and stressors which may engender substantial harm to them and make them more susceptible to the development and/or maintenance of the disorder (Khamis, 2006). Nevertheless, the results of this study yielded similar rates of ADHD among children from various countries (Baumgaertel, Wolraich, & Dietrich, 1995; Gaub & Carlson, 1997; Hinshaw, 1994; Pineda, Ardila, Rosselli, Arias, Henao, Gomez, Mejia, & Miranda, 1999). This is likely due to the similarity in research design, which relied on teachers' ratings in which prominent symptoms were only displayed in the school setting. An earlier study carried out in UAE (Daradkeh, 1993) noted that teachers may be more accurate in their ratings of ADHD among school- aged children. Also, consistent with previous findings (Barkley, DuPaul, & McMurray, 1990; Cantwell & Satterfield, 1978; Holborow & Berry, 1986; Lambert & Sandoval, 1980; McKinney, Mason, Perkerson, & Clifford, 1975), children with

ADHD inattentive subtype displayed significant academic underachievement compared to non-ADHD children.

Consistent with previous findings the prevalence of ADHD was much more common among males than females (Bu-Haroon, Eapen, & Bener, 1999; Khamis, 2006), with males showing more symptoms of the inattentive type rather than the hyperactive-impulsive type. However, in a recent study on Arab children (i.e., Palestine), males were found to have a higher rate of symptoms of the hyperactive-impulsive and combined types rather than the inattentive type (Khamis, 2006).

Consistent with previous findings (Barkley, DuPaul, & McMurray, 1990; Cantwell & Satterfield, 1978; Holborow & Berry, 1986; Lambert & Sandoval, 1980; McKinney, Mason, Perkerson, & Clifford, 1975), children with ADHD inattentive subtype displayed significant academic underachievement compared to non-ADHD children

While gender inequities were found to be associated with ADD and ADH in UAE school age children, this variable was not a significant predictor in the final models. Nevertheless, the analyses of the results emphasized the crucial role of harsh discipline in predicting ADD symptomatology in UAE children. Children with ADD symptoms were more likely to report higher levels of parental harsh discipline such as coercive punishment, immediate obedience to parental orders, monitoring and directing activities. The results are consistent with previous studies that linked gender inequities and harsh discipline (Buhrmester et al., 1992; Gardner, 1994; Khamis, 2006), childhood maltreatment (Egeland, 1985; Rosenzweig & Kaplan, 1996), and conflicted patterns of family communication (Barkley, Antastopoulous, Guevremont, & Fischer, 1992) to attention problems. Since causal statements cannot be supported by correlational results, additional investigations are needed to identify family contextual variables (e.g., influence of parental styles) that may account for differences observed in ADHD symptomatology among children.

To summarize, the results of the current study reveal the existence of ADHD symptomatology among UAE school-age children. As a result there is an urgent need for policies aimed at identifying, preventing, and treating this childhood disorder in schools. At the same time, the public school system has to emphasize remedial education aimed at improving the study skills and academic achievement of children with ADHD, particularly those who are at high risk for ADHD such as males and children who are subjected to harsh disciplining in their home environment.

Interventions directed towards the family could be used to promote more positive styles of parental influence. Such interventions may include parental awareness programs that would draw attention to the adverse affects of gender inequities, and harsh disciplining. This could be achieved through in-service workshops and training programs directly aimed at parents' awareness and empowerment in an attempt to alter or change their orientations towards child-rearing practices. While the main findings provide some reassurance that success resulting from evidence-based ADHD treatments is related to the degree of change in negative/ineffective discipline (Hinshaw et al. 2000), policies are needed to include diagnostic and clinical procedures in the school setting.

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