PREVALENCE OF PARENT-RATED HYPERKINETIC DISORDER AND ASSOCIATED RISK FACTORS IN A SCHOOLGOING POPULATION

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ABSTRACT

Background: Hyperkinetic disorder is among the most prevalent mental disorders in children and is one of the most difficult diagnoses to categorize. Clinic-based studies in Pakistan have reported a very high prevalence. There are no reported community based studies from Pakistan. **Aim:** To determine the prevalence of hyperkinetic disorder amongst school children and to identify associated risk factors. **Methods:** A cross-sectional survey of 5-11 year-olds attending mainstream private and community schools was conducted in Karachi. Assessment of hyperkinetic disorder was conducted using Strength and Difficulties Questionnaire (SDQ). **Results:** A total of 675 parents agreed to participate in the study (response rate 45.3 %). We found estimates of hyperkinetic disorder to be higher than reported from other countries. Based on parent's ratings, 18.8% of children were 'abnormal' on the hyperactivity subset of the SDQ. Regression analysis revealed that the adjusted odds of a female child being rated abnormal was only half that of a male (O.R.=0.48; 95% CI 0.3 - 0.7; p=0.001). **Conclusion:** Consistent with most studies, risk of hyperkinetic disorder was greater for males than females. There is a need for developing programs to train, sensitize and mobilize teachers and parents regarding behavioral problems in children.

Diagnostic criteria for ADHD (attention-deficit hyperactivity disorder) and HKD (hyperkinetic disorder) have changed with each revision of the Diagnostic and Statistical Manual (DSM) and International Classification of Diseases (ICD). Further revisions are likely to address outstanding issues such as disorder subtypes, age of onset, and the applicability of these criteria across the lifespan. Current DSM-IV[1] and ICD-10[2] diagnostic criteria are similar, with differences relating primarily to symptom severity and pervasiveness.

ADHD and HKD are amongst the most commonly diagnosed behavioral disorders in children and young people. Core symptoms include developmentally inappropriate levels of activity and impulsivity and an impaired ability to sustain attention. Affected children and young people have difficulty regulating their activities to conform to expected norms and as a result are frequently unpopular with adults and peers. They often fail to achieve their potential and many have co-morbid difficulties such as developmental delays, specific learning problems, and other emotional and behavioral disorders.[3] The constellation of symptoms that constitutes ADHD/HKD has been recognized for many years and has been given a variety of labels. Associated morbidity includes educational underachievement, antisocial behavior, delinquency, and an increased risk of road traffic accidents in adolescence. In addition, there can be a dramatic effect on family life.

Prevalence estimates are highly dependent on three main factors: the population sampled, the method of ascertainment, and the diagnostic criteria applied. The reported prevalence of ADHD in school-age children varies from 1.7% to 17.8%, depending on the criteria used.[4] Most estimates lie between 5% and 10%.[5] US estimates have historically been higher than UK estimates, due presumably to the application of narrower diagnostic criteria by UK authors.[6] Three studies of English populations have shown a prevalence rate of between 2% and 5%, depending on whether DSM-IV or ICD-10 criteria were applied.[7] A large sample of school children (n = 22,044) screened using DSM-IV teacher rating scales showed a similar prevalence at school entry.[8] The male-to-female ratio in ADHD prevalence (but not necessarily within all dimensions of the disorder) is at least 4 to 1.[9]

Developing countries such as India report an ADHD prevalence ranging from 5% to 10%.[10,11] Reports from community based epidemiological samples gave a lower estimate in Al Ain, from the Arabian peninsula.[12] A search of the MEDLINE database showed no community studies on ADHD from Pakistan. More recently, the authors of this study conducted a clinic-based study to determine the frequency, gender ratio, clinical characteristics, and co-morbidities of ADHD in the Pakistani population.[13] We undertook this study to look at the prevalence and associated risk factors of hyperkinetic disorder from a community perspective. This paper addresses results of the hyperactivity subset of the questionnaire.

METHODS

Setting

The study was conducted in Karachi, a coastal urban center in the south-east of Pakistan; its population at the time of the survey was estimated at 15 million. Karachi is divided into 18 towns, each having its own union council and district nazim (mayor). It is Pakistan's largest city and the country's industrial and business hub.

Sampling strategy

The educational setup in Pakistan comprises of public or community schools and private schools, with the latter offering a much better quality of education and facilities. We collected data from both private and community school. The latter are run by non-governmental organizations (NGOs) and mostly have a low fee structure and cater to the lower socioeconomic classes. A town-wise list of all the community schools in Karachi was obtained from Sindh Education Foundation (SEF), which was established in 1992 as a semi-autonomous organization with the aim of providing education to disadvantaged communities. On their advice, nine towns were selected on the basis that their school authorities were most likely to cooperate with us. One community school was selected from each town. In seven of these towns we were also able to identify a private school. Two private and three community schools declined to take part, asserting that the topic might upset parents or was irrelevant to their pupils. We contacted three other community schools in the same towns of which two agreed to participate, of the two other private schools contacted in the same towns both agreed to participate. Hence a total of seven private and eight community schools agreed to participate. Children were eligible for the study if they were over 5 years of age and had not yet reached their 12th birthday. From each school 100 children were selected, 20 from each class (grades 1-5). If there were less than 20 children in a class, all were

selected; if there were more than 20, then 20 were selected from the class attendance register using alternate odd-even serial numbers. A total of 1488 children were approached for inclusion and consent forms and information about the study were sent to their parents. Six hundred and seventy five parents gave consent to participate in the study (response rate 45.4%), and were called on a later date to the school for data collection. Active parental consent was documented.

Protocol and instruments

Screening of all children was carried out by means of parental questionnaires. The Socio-demographic Parent Proforma (SDPP) is a 13-item proforma based on existing literature and expert discussions. It elicits details such as child age, gender, type of schooling, parental education, parental occupation, age of parents, residential area, informant, name of the head of the household, family income, family type, physical illness/disability, and languages spoken at home. The Strengths and Difficulties Questionnaire (SDQ) is a brief mental health-screening questionnaire that measures 25 attributes, some positive and others negative.[14] Items are grouped into five subscales of five items each, generating scores for conduct, hyperactivity, emotionality, peer problems, and social behavior. All scales excluding the last are summed to generate a Total Difficulties score. Category bands and total difficulties scores can be classified as normal, borderline and abnormal. These bands, which are not adjusted for age or gender, have been chosen so that approximately 80% of children fall in the normal category, 10% are considered borderline, and 10% abnormal.[14] The SDQ can be completed by either the parents or the teachers of 4-16 year-olds. Besides common areas of emotional and behavioral difficulties, it also inquires whether the informant thinks that the child has a problem in these areas and, if so, asks about resulting distress and social impairment.[15] The SDQ has been shown to be of acceptable reliability and validity, performing at least as well as the longer-established Rutter Questionnaires and Child Behavior Checklist.[14,16] Originally published in English, the SDQ has subsequently been translated into over 40 languages, including Urdu, the national language of Pakistan. A study to test the validity of the Urdu version has been carried out.[17] Additional details are available at www.sdqinfo.com.

Data collection

Data were collected from January-March 2006 for private schools and from April-June 2006 for community schools. In order to obtain consent from schools a meeting was held with the educational authorities and school principals. They were provided with consent forms, an information sheet, and a brief outline of the research

procedure and the kind of assistance required from the schools. Materials were available in English, Urdu, and Sindhi (the regional language of Sindh province that is spoken in some areas of Karachi). For schools that consented to participate in the study, a meeting was held with the parents and teachers of selected students separately at the school. Parents were given a short presentation on child mental heath disorders explaining the rationale for the study. The purpose of the presentation was to provide awareness as there is lack of information on child psychiatric problems in the country, as well as encouraging survey participation, and reducing the number of dropouts. The SDQ was filled by parents. As most parents of private school children could read, they filled the questionnaires. However in community schools, a majority of parents were uneducated, requiring assistance of the principal researcher (SH) along with other interviewers to complete the questionnaires. A team of five interviewers assisted with data collection. All had Master's degrees, with two of them including the principal investigator having a Master's degree in Psychology. Before data collection, they were all trained by various means in interviewing style, concepts and coding conventions, including interviews of volunteers, role play, and recorded interviews. All data was entered into a specially designed database and verified by independent double entry.

STATISTICAL ANALYSIS

Descriptive statistics were computed for the socio-demographic characteristics of children and parents. The frequency distribution for the 'normal', 'borderline' and 'abnormal' categories for hyperkinetic disorders rated on the SDQ subset was computed. For regression analysis, cases were grouped into a binary response. Normal and borderline categories were grouped into a single "Normal" variable. Association of socio-demographic variables with the SDQ hyperkinetic rating was examined using logistic regression analysis. Data was analyzed using the software package SPSS version [14.5].

RESULTS

Thirty five questionnaires were excluded, as they did not meet criteria (child over or under age). Data analysis was carried out on 640 parent forms. Table 1 reports the descriptive statistics for socio-demographic variables. Mean age of children in the study sample was 8.4 + 1.85 years. About 42% children were going to private while 57% were attending community schools. Mean age of mothers was 35 + 7 years. Fifty percent of mothers and

Table 1: Socio-demographic characteristics (n=640)

Gender	N (%)
Male	339 (53)
Female	301 (47)
School Type	
Private school	271 (42.3)
Community School	369 (57.7)
SES[1]	
Lower	492 (78.6)
Middle	113 (18.1)
Upper	21 (3.3)
Mother Education	
Not educated	319(49.8)
Non-matric	85(13.3)
Matric	161(25.2)
Graduate/higher	75(11.7)
Father Education[2]	
Not educated	202(31.6)
Non-matric	120(18.8)
Matric	166(25.9)
Graduate/higher	151(23.6)

[1] missing data; n=626
[2] missing data; n= 639

Table 2: Numbers of children rated abnormal on hyperactivity subset

Community school

SDQ SUBSCALE	MALE	FEMALES	TOTAL
Hyperactivity	62 (25.5)	24 (14)	86 (21)

Private school

SDQ SUBSCALE	MALE	FEMALES	TOTAL
Hyperactivity	27 (19.1)	16 (12.3)	43 (16)

Table 3: Multivariable logistic regression analysis for identifying factors associated with parent's rating of school children (n= 640).

Variables	Adjusted Odds Ratio*	95%CI*
GENDER		
Male	1.0	-
Female	0.5**	(0.3,0.7)

*Adjusted for father's education and school type
** 0.84 rounded off

32% fathers were uneducated. Only 12% of mothers and about 24% of fathers had graduate education. Most mothers were housewives (89%) and belonged to the lower socioeconomic status (79%). Ethnically our sample was very diverse. Since languages or dialects represent different ethnic groups in Pakistani culture, spoken language is often the most appropriate determinant of ethnicity. A total of 16 different linguistic or ethnic groups were represented in our sample. Urdu was the language spoken by 42% of households, with 12% each speaking Sindhi and Balochi, 9% Pashto, and 7.5% Punjabi. Other respondents reported many different languages spoken in the Subcontinent as their primary means of communication.

Based on parents' ratings on the SDQ, 18.8% of all children were categorized as 'abnormal' on the hyperactivity subset. In this subset 66.7% (n=80) were males and 64.2% (n= 77) belonged to community schools; 52.5% (n=63) had uneducated mothers while 38.3% fathers were uneducated (n=46). A prominent majority (78.3%) belonged to lower socioeconomic status (n=94).

In univariate analysis, variables found to be significantly associated with outcome included gender, father's education, and school type. Mother's education was not found significant at this stage but was retained in the statistical model based on evidence from the literature supporting it as a significant predictor of children's behavior. On multivariate analysis, only gender remained significantly associated with hyperactivity. It was found that the odds of a female child being rated as abnormal on this scale was only 0.5 times that of a male, adjusting for parent's education and school type (O.R.=0.48; 95% CI 0.3-0.7; p=0.001).

DISCUSSION

This survey was carried out with the objective to determine the prevalence of hyperkinetic disorder amongst school children and identify associated risk factors. The prevalence of hyperkinetic disorder has been investigated in several countries and in all continents. It appears that differences found in prevalence rates have more to do with the methodology used (type of sample, study design, source of information, age, diagnostic criteria, or how they are applied) than with genuine transcultural diagnostic differences.[18,19] Studies using DSM-IV criteria tend to find prevalence rates of around 3-6% in school-aged children.[18, 20]

More recent community based epidemiological studies of common child mental health disorders have reported much lower prevalence figures. The Great Britain Office of National Statistics[21] conducted a survey in 1999 of more than 10,000 children, as well as their parents and teachers. This study found a DSM- IV-based prevalence of ADHD of 1.4% in . Prevalence rates of 1.5% were seen in the study replicated in 2004, and higher rates were reported in both studies for boys compared with girls. A similar profile is seen in recent studies conducted in developing countries including Brazil, where the DSM- IV-based prevalence for ADHD was 1.8%[22]. An ICD-10-based prevalence of 2.0% in Bangladesh23 and 1.6% in India[24] was noted for hyperkinetic disorder. All the above studies used a two-stage design; the first screening phase was followed by a diagnostic interview to determine the diagnosis based either on DSM- IV or ICD- 10 criteria. In our study, estimates of hyperkinetic disorder may be higher because these frequencies are being reported based on the screening questionnaire alone.

Since there is a lack of child mental health studies, we reviewed studies in child mental heath research form other countries as well as literature on adult mental health in Pakistan to determine risk factors for psychopathology. Based on this, we explored socio-demographic factors associated with psychiatric morbidity among children such as gender, school type, and parental education, as well as socioeconomic status. In our study, male gender was the only variable significantly associated with psychopathology in children. Male gender has been consistently reported in the literature as a predictor of hyperkinetic disorder. Boys have been found to generate consistently higher parent and teacher ratings of hyperactivity and inattentiveness than girls matched for age.[25] The male/female ratio ranges from 2:1 in population-based studies to 9:1 in clinical trials.[11] This difference may be due to the fact that girls have hyperkinetic disorder with a higher predominance of inattention and fewer co-morbid symptoms of conduct disorder, causing less trouble to the family and at school, and are therefore less easily identified, resulting in fewer referrals to treatment.

One limitation of the present study is its reliance on rating scale measures rather than interviews with children and parents. Unlike rating scale methods, interview-based procedures come close to reproducing the results one might expect from a clinical evaluation and may be more likely to incorporate the impairment and pervasiveness criteria of diagnoses for hyperkinetic disorder. Further interview-based studies assessing the prevalence of hyperkinetic disorder as defined by ICD-10 criteria, and directly comparing prevalence in different countries, are required to provide a clearer picture of the burden of hyperkinetic disorder amongst Pakistani school children.

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