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Original Article

A Clinical Comparison Study of Attention Deficit/Hyperactivity Disorder (DSM-IV) and Hyperkinetic Disorder (ICD-10) in Indian children and Adolescents

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Abstract
Aims: To compare the usefulness of DSM IV and ICD-10 DCR criteria in clinic children presenting with the symptoms of inattention and hyperactivity- impulsivity. **Methods:** 62 children (54 boys and 8 girls) participated in the study. Children were assessed on Kiddie schedule for affective disorders and schizophrenia - present and lifetime version and then diagnosed as attention deficit/hyperactivity disorder (ADHD) or hyperkinetic disorder (HKD) as per DSM IV or ICD-10 DCR criteria. Comorbidities were diagnosed as per DSM IV criteria. Severity of symptoms was rated using Hillside Behavior Rating Scale (HBRS) while global assessment of functioning was assessed on Children's Global assessment Scale (CGAS).
Results: All could be diagnosed with ADHD however, only 44 (71%) could be diagnosed as HKD. There was no statistically significant difference in most sociodemographic variables, severity of illness on HBRS and impairment on CGAS of the subjects diagnosed with ADHD and HKD and subjects with ADHD but not HKD (non-HKD-ADHD).
Conclusions: DSM IV should be used because it diagnoses more children with impairing symptoms of inattention and hyperactivity-impulsivity as compared to ICD-10 DCR. Also, there is a significant overlap in between ADHD and HKD.
Key words: ADHD, Hyperkinetic Disorder, DSM IV, ICD-10, children and adolescents.

Introduction

Symptoms of inattention, hyperactivity and impulsivity in children and adolescents (hereafter children unless specified) can be classified as attention deficit/hyperactivity disorder (ADHD)[1] or as hyperkinetic disorder (HKD)[2]. Although ICD-10-DCR and DSM-IV criteria have similar lists of symptoms but there are differences in symptom count, subcategories and the way comorbidities are handled. The ICD-10 requires at least 6 out of 9 symptoms of inattention, 3 out of 5 of hyperactivity, and 1 out of 4 of impulsivity for the diagnosis of HKD. While DSM-IV defines 3 categories: predominantly inattentive type (ADHD-IA), predominantly hyperactive-impulsive type (ADHD-HI), and combined type (ADHD-C). To qualify as inattentive or hyperactive-impulsive type, 6 or more symptoms should be present from either inattention or

hyperactive-impulsive domains. For the combined type, 6 or more symptoms must be present from each of both the domains.

The above differences may affect the prevalence of these disorders. HKD (ICD-9)[3] was about 20 times less common than ADHD (DSM III R)[4] It is possible that HKD (ICD-10) is also less common than ADHD (DSM-IV). In an epidemiological study in India only 1.6% children were diagnosed with HKD [5].

How these disorders relate to each other and which classification best classifies the children with inattention, hyperactivity, impulsivity is not fully understood. Limited evidence suggests that ICD-10 identifies less number of children with the problems of hyperactivity and inattention as compared to DSM-IV. HKD and ADHD-C are perhaps the more severe variants of the condition than ADHD-IA and ADHD-HI types. Also, HKD responds to pharmacotherapy better than the psychotherapy in community samples [6-9].

Thus, there is a possibility that DSM-IV allows diagnosis of more children with impairing symptoms of inattention and hyperactivity-impulsivity. However, there is not enough evidence in this regard and none from India. This study was therefore aimed at a prospective diagnostic classification of clinic children with inattentive and hyperactivity-impulsivity symptoms using DSM-IV and ICD-10-DCR criteria to find out which criteria will be more useful to our clinic children presenting with the above symptoms.

Material and Methods

All the children registered in the child and adolescent psychiatric clinic, between 6-16 years of age, and presenting with the symptoms of inattention and/or hyperactivity were screened for ADHD on items of hyperactivity-impulsivity factor of Connor's Parent Questionnaire [10]. A child with score of 2 or more was taken as screen positive. Screen positive children, whose parents gave written informed consent to participate in the study, were included. The children with mental age less than 6 years, drug induced hyperactivity, gross sensory or motor impairment and on psychotropic medications for a disorder other than HKD/ADHD were excluded.

Information regarding socio-demographic details, chief complaints, history of present illness, history of past illness, family history and personal history was obtained from the parents and recorded along with the findings of physical examination on a semi-structured proforma. The parents gave information about the ADHD symptoms and impairments due to them in both home and school settings. They got information about the child's behaviour and impairment at school from the teachers during the parent-teacher meetings. They also learnt about such things from the results of class tests and quarterly, half-yearly and annual examinations which have the teacher's comments on child's behaviour and performance. School work and reports were examined to gather more information.

Psychiatric assessment was done by applying Kiddie schedule for affective disorders and schizophrenia - present and lifetime version (K-SADS-PL) [11]. The parents were specifically asked for the impairment in the functioning at home, school and other settings. Attention, activity, impulsivity and other behaviors of the child in the clinic, were rated on Hillside Behavior Rating Scale (HBRS) [12]. Global impairment in functioning was assessed by Children's Global assessment Scale (CGAS) [13].

Intelligence was assessed using Stanford-Binet Test [14]. The children who were taking methylphenidate were asked to discontinue methylphenidate for 2 days before their assessment was done. DSM- IV and ICD-10 DCR criteria were used for the diagnosis of ADHD or HKD respectively for all the children. Comorbidities were diagnosed using DSM- IV criteria. The parents were asked for family history of ADHD in the child's first degree relatives.

Chi Square test and Test of proportions were applied to compare the data.

The study was approved by the institutional review board.

Results

112 children were found to be screen positive for the inattentive and hyperactivity-impulsivity symptoms. After application of the inclusion and exclusion criteria, 62 subjects were included in the study. All these subjects could be diagnosed with ADHD. Diagnosis of 15 children was ADHD-IA. 9 had ADHD-HI. 38 had ADHD-C. Out of 62 subjects diagnosed with ADHD, only 44 (71%) could be diagnosed as HKD (38 ADHD-C and 6 ADHD-IA). There were, thus, 18 children with ADHD but not HKD (non-HKD ADHD). Their sociodemographic and clinical details are given in table 1.

Table 1 Sociodemographic and Clinical Variables of ADHD/HKD and non-HKD ADHD subjects.

Variables	**ADHD/HKD** (n=44)	**Non-HKD ADHD** (n=18)
Mean Age (years) ± SD	8.3 ± 2.1	7.2 ± 2.6
Male n (%)	38 (86.4%)	16 (88.9%)
Female n (%)	6 (13.6%)	2 (11.1%)
Mean IQ ± SD	97 ± 13.4	95.6 ± 14.9
Urban n (%)	43 (97.7%)	17 (94.4%)
Rural n (%)	1 (2.3%)	1 (5.6%)
Socioeconomic Status Upper* n (%)	11 (25%)	9 (50%)
Middle or Low n (%)	33 (75%)	9 (50%)
Education n (%) up to 5th Standard	40 (90.9%)	15 (83.3%)
Uneducated	4 (9.1%)	3 (16.7%)
Family history of ADHD n (%)	9 (20.2%)	4 (22.2%)
Birth complications n (%)	31 (70.9%)	12 (66.6%)
Mean HBRS scores ± SD	20.6 ± 5.3	18.6 ± 6.9
Mean CGAS scores ± SD	43.8 ± 6.9	46.3 ± 5.8

*$x^2 = 26.12$; $p<0.001$ two-tailed

HKD: hyperkinetic disorder

ADHD: attention deficit/hyperactivity disorder

HBRS: Hillside Behavior Rating Scale

CGAS: Children Global assessment Scale

There was no statistically significant difference in most sociodemographic variables, severity of illness on HBRS and impairment on CGAS of subjects diagnosed with ADHD/HKD and non-HKD ADHD. Non-HKD ADHD children had higher socioeconomic status than HKD children ($x^2 = 26.12$; $p<0.001$)

58 (93.5%) subjects with ADHD had one or more comorbid psychiatric disorders (Table 2). 35 (56.5%) subjects had a single comorbidity and 23 (37%) had multiple comorbidities. There was no significant difference between the rates of comorbidity in ADHD/HKD and non-HKD ADHD groups. However, conduct disorder was significantly more in ADHD/HKD group ($z = 2.05$, $p<0.05$) and tic disorders were seen only in ADHD/HKD group. Learning disorders ($z= 1.82$, $p<0.05$) and specific phobias ($z = 2.65$, $p<0.05$) were significantly more common in non-HKD ADHD group. Separation anxiety disorder was seen only in non-HKD ADHD group.

Table 2 Comorbidities in ADHD/HKD and non-HKD ADHD subjects.

***Comorbidities**	**ADHD/HKD** (n=44) **N (%)**	**Non-HKD ADHD** (n=18) **N (%)**
Oppositional defiant disorder	32 (72.7%)	9 (50%)
Conduct Disorder	14 (31.8%)†	1 (5.6%)
Mental Retardation	4 (9.1%)	3 (16.7%)
learning disorders	3 (6.8%)	3 (16.7%)‡
Depressive episode	2 (4.5%)	1 (5.6%)
Enuresis	13 (29.5%)	4 (22.2%)
Specific phobia	2 (4.5%)	4 (22.2%)§
Tic disorders	3 (6.8%)	
Separation Anxiety Disorder		3 (16.7%)
Multiple comorbidities	16 (36.4%)	6 (33.3%)

**Not mutually exclusive*

†. $z = 2.05$, $p < 0.05$ two-tailed,
‡. $z= 1.82$, $p<0.05$,
§. $z = 2.65$, $p<0.05$
HKD: hyperkinetic disorder
ADHD: attention deficit/hyperactivity disorder

Discussion

The results of our study showed that it was possible to diagnose more children with impairing symptoms of inattention and hyperactivity-impulsivity with DSM-IV (100%) as compared to ICD-10 DCR (71%). This difference has clinical implications because the non-HKD ADHD subjects missed by ICD-10-DCR had significant impairment similar to the ADHD/HKD group. Such findings have also been reported by the other studies [6,8,9]. Tripp et al [6] reported that DSM-IV identifies more inattentive children with ADHD than does ICD-10 with HKD. They also reported a substantial overlap between ADHD and HKD. 48.8% of ADHD were also diagnosed as HKD. In our study, we found

71% overlap of HKD. The reason for greater overlap in our study could be because due to a lack of awareness about child psychiatric disorders in our country, children with rather severe disorders are generally brought for the psychiatric treatment. If milder cases were also brought, possibly ADHD would have been diagnosed more often reducing the percentage of HKD. Similarly, other studies [8,9] found that both ADHD and HKD are valid disorders but ICD-10 under-identifies children with inattention and hyperactivity-impulsivity symptoms as compared to DSM-IV.

The other studies have opined that HKD is a distinct subgroup of ADHD with more disability [6,7]. However, in our study there were no significant differences between ADHD/HKD and non-HKD ADHD groups in either severity of illness on HBRS or impairment on CGAS. Overall rate of comorbidity was also similar in both the groups. However, conduct disorder ($z = 2.05$, $p<0.05$) was significantly more in ADHD/HKD group and tic disorder was seen only in ADHD/HKD group. Lee et al [9] also reported higher rate of conduct disorder in HKD group. In our study, Learning disorders ($z= 1.82$, $p<0.05$) and specific phobias ($z = 2.65$, $p<0.05$) were significantly more common in non-HKD ADHD group. Separation anxiety disorder was seen only in non-HKD ADHD group. Previous studies have reported more comorbidity of learning disorders with ADHD-IA [15, 16]. In our study both ADHD/HKD and non-HKD ADHD groups had similar rates of family history of ADHD and birth complications. Both the groups had similar IQ scores.

Overall, we did not find any significant difference between ADHD/HKD and non-HKD ADHD groups. Therefore, DSM-IV should be used to diagnose inattentive and hyperactive-impulsive clinic children with impairment because our findings suggest that it identifies a broader range of such children who could be helped by the treatment than does ICD-10 DCR.

Limitations

Our study was a clinic based study on small sample size therefore its findings can not be generalized to the children in general population.

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