Attention Deficit Hyperactivity Disorder in Adolescent School Children

MONICA JUNEJA, SMITHA SAIRAM AND RAHUL JAIN

Child Development Center, MAMC and associated Lok Nayak Hospital, New Delhi, India. drmonicajuneja@gmail.com

The prevalence of Attention deficit hyperactivity disorder was estimated in 500 adolescents using Conners' parents and teachers rating scales. Thirty six (7.2%) adolescents had positive scores on both the scales. The parents and teachers also completed a Diagnostic and Statistical Manual-IV based questionnaire which showed good agreement with Conners' rating scales.

Keywords: *Attention deficit disorder with hyperactivity, Epidemiology, Hyperkinetic syndrome*

Attention deficit hyperactivity disorder (ADHD) is a commonly diagnosed in school age children. Longitudinal studies indicate that ADHD persists into mid-adolescence and adulthood; inattention and impulsivity persists more than overt physical hyperactivity [1,2]. This study aimed to estimate the proportion of ADHD in adolescents from a school, and study the applicability of a Diagnostic and Statistical Manual-IV (DSM-IV)-based questionnaire for detecting ADHD [3].

A private English medium school in Delhi was chosen and permissions were taken from school authorities. The study protocol was approved by the Institutional Ethical Committee. Five hundred students, 100 each (50 boys and 50 girls) from classes 6th to 10th, were selected randomly. At the beginning, several sessions were taken with the teachers and parents explaining the purpose and importance of the study. Each student was given a sealed envelope addressed to their parents containing a letter providing background of the study, consent form, Conners' parents rating scale-revised: short form (CPRS-R:S) and DSM-IV based ADHD questionnaire. Both parents were requested to complete the scales together and return them in a sealed envelope. A reminder was sent after two weeks in non-responders and class teacher was requested to reinforce the same in subsequent parent-teacher meetings.

The class teacher was asked to rate the Conners' teachers rating scale-revised:short form (CTRS-R:S) for each selected student of his/her class and the DSM-IV based questionnaire for every 5th selected student, the first being selected randomly. On Conners' rating scales, T-scores ≥65 on ADHD Index subscale and inattention and/or Hyperactivity subscale were taken as positive. Children positive on both CTRS-R:S and CPRS-R:S were labeled as ADHD. They were classified as predominantly hyperactive, predominantly inattentive or combined type, based on subscale scores [4]. Their intelligence quotient was assessed in school premises using Standard progressive matrices [5]. Intervention services were offered to diagnosed cases.

The DSM-IV based questionnaire had 18 questions. The students fulfilling DSM-IV criteria (i.e. presence of symptoms in 6 out of 9 questions on inattention or 6 out of 9 questions in hyperactivity-impulsivity domain, or both) were taken as positive for ADHD. Statistical analysis was carried out using SPSS version 11. Besides descriptive statistics, agreement studies were done to compare the results of DSM-IV based questionnaire with Conners' Rating Scales.

The median age of study population was 13 years (range 10-15 years). Fifty one (10%) students were positive for ADHD on CPRS-R:S and 52 (10%) were positive on CTRS-R:S; 36 (7.2%) were positive for both. These children had average intelligence. Twenty nine (80%) were males, 28 (75%) had predominantly inattentive type of ADHD and rest had combined type. The results of DSM-IV based questionnaire are shown in *Table* **I**.

The prevalence of ADHD among primary school children is estimated to vary from 2% to 17% [6]. There are fewer studies in adolescents. In a school-based study from Colombia, 7.3% adolescents were diagnosed as ADHD using DSM-IV based ADHD checklist, with Inattentive subtype being predominant [7]. In a two-stage study from Brazil, 9.7% of 1013 students were positive using sent checklist [8].

The major limitation of this study was that we could not perform a detailed assessment in a clinical setting to confirm our diagnosis. However, the diagnosis was based on the agreement between parents and teachers rating, which is in line with DSM-IV criterion of presence of symptoms in two settings.

TABLE I: PERFORMANCE OF THE STUDY QUESTIONNAIRE AGAINST CONNERS' RATING SCALES

| | | Conners' rating scales | |
		positive	negative
*Parents' Questionnaire	+	28	16
	–	8	448
#Teachers' Questionnaire	+	10	5
	–	2	83

+: positive or –: negative for ADHD; Cohen's Kappa 0.67* and 0.77#

To conclude, ADHD is an important behavior problem in adolescents. DSM-IV based questionnaire, which is simple to administer and score, can be a useful screening tool in resource-limited settings.

REFERENCES

1. Willoughby MT. Developmental course of ADHD symptomatology during the transition from childhood to adolescence: a review with recommendations. J Child Psychol Psychiatry. 2003;44:88-106.
2. Biederman J, Faraone SV, Taylor A, Sienna M, Williamson S, Fine C. Diagnostic continuity between child and adolescent ADHD: findings from a longitudinal clinical sample. J Am Acad Child Adolesc Psychiatry. 1998;37:305-13.
3. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th edition. Washington (DC): APA Press; 2000.
4. Conners CK. Manual for Conners Rating Scale. North Toman-nanda, New York: Multi health system; 1989.
5. Raven JC, Court JH, Raven J. Standard Progressive Matrices. London: H K Lewis and Co. Ltd;1977.
6. Scahill L, Schwab-Stone M. Epidemiology of ADHD in school-age children. Child Adolesc Psychiatr Clin N Am. 2000;9:541-55.
7. Pineda D, Ardilla A, Rosselli M, Arias BE, Henao GC, Gomez LF, *et al.* Prevalence of Attention deficit hyperactivity disorder symptoms in 4-17 year old children in the general population. J Abnorm Child Psychol. 1999;27:455-62.
8. Rohde LA, Biederman J, Busnello EA, Zimmermann H, Schmitz M, Martins S, *et al.* ADHD in a school sample of Brazilian adolescents: a study of prevalence, comorbid conditions, and impairments: J Am Acad Child Adolesc Psychiatry. 1999;38:716-22
9. Bard DE, Wolraich ML, Neas B, Doffing M, Beck L. The psychometric properties of the Vanderbilt attention-deficit hyperactivity disorder diagnostic parent rating scale in a community population. J Dev Behav Pediatr. 2013;34:72-82.

Chimeric Fusion Karyotypes in Childhood B-cell Acute Lymphoblastic Leukemia

LILY S KERKETTA, VUNDINTI BABU RAO AND KANJAKSHA GHOSH
From Department of Cytogenetics, National Institute of Immunohematology, KEM Hoapital, Parel, Mumbai, India.
kanjakshaghosh@hotmail.com

Cytogenetics study using combination of conventional cytogenetics and fluorescent insitu hybridization was carried out in 171 pediatric acute lymphoblastic leukemia patients subgrouped to B-ALL (*n*=126) and T-ALL (*n*=45) by bone marrow morphology and immunophenotype. The chromosomal aberration frequency in B-ALL and T-ALL was 79% and 71%, respectively. TEL/AML1 translocation was detected in 28% of patients.

Keywords: *Complex chromosomal change, FISH, Giemsa banded karyotype, Translocations.*

The most common type of childhood leukemia is acute lymphoblastic leukemia (ALL), which has a B-cell precursor phenotype. The main subtypes of ALL involve multiple genetic alterations including point mutations and deletions, and are also characterized by gross chromosomal changes such as translocations, which are likely to cause illegitimate recombination or juxtaposition of normally separated genes. In leukemias, an in-frame fusion gene is often created, generating a hybrid protein with altered properties. More than 200 genes are known to be involved in translocations in leukemias [1]. Multiplex reverse transcriptase polymerase-chain-reaction (RT-PCR)