# Original Article

# A Follow-up Study of Academic Functioning and Social Adjustment in Children with Attention Deficit Hyperactivity Disorder

**Jasmin Garg, Priti Arun**

ABSTRACT

**Background**: Attention deficit hyperactivity disorder (ADHD) persists in a majority of adolescents. It has been reported that ADHD patients have poor social functioning and risk for developing co-morbid psychiatric illnesses. **Aims:** To determine the retention of diagnosis of ADHD and to assess social adjustment, academic functioning and co-morbidities at follow-up. **Design:** Retrospective cohort study. **Materials and Methods:** ADHD patients of 5-14 years of age who came to the out-patient department from 2005 to 2008 were contacted telephonically. Fifty one patients could be contacted. Parents of patients were interviewed using Vanderbilt ADHD Diagnostic Parent Rating Scale for diagnosing ADHD and co-morbidities. Social Adjustment Inventory for Children and Adolescent was administered for assessing their academic and social functioning. Chi square test, Mann–Whitney Test, Kruskal–Wallis Test, and Pearson's product moment correlations were used for statistical analysis. **Results:** At current assessment, out of 51 patients, 38 were still fulfilling diagnosis of ADHD. Of these, 21 were of inattention type, 3 were hyperactive, and 14 were of combined type. Social functioning and academic functioning were significantly better in those who currently did not fulfill the criteria for ADHD (*N*=13). Twelve patients developed features of oppositional defiant disorder (ODD)/conduct disorder (CD) at follow-up. **Conclusions:** ADHD persists in the majority of adolescents. Decline with age is seen more in hyperactive/impulsive symptoms than inattentive symptoms. Several adolescents also develop features of ODD/CD in addition to poorer functioning. Continuation of treatment is crucial to prevent such consequences.

**Key words:** *Attention deficit hyperactivity disorder, academic functioning, conduct disorder, oppositional defiant disorder, social adjustment*

## INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) has been considered as a life disability.[1] Adolescents with persistent ADHD have significantly impaired cognitive, family, school, and psychosocial functioning.[2] Studies indicate that patients with ADHD are at risk for developing co-morbidities like oppositional defiant disorder (ODD), conduct disorder (CD), and depression.[3] The magnitude of persistence of ADHD has been inconsistent across studies.[4] Also, there is a paucity of studies in this area in developing countries. There can be a higher persistence of ADHD and impairment in social adjustment due to adverse psychosocial factors.[5]

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### Aims and objectives of the study

- To find out the retention of diagnosis of ADHD

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after 3 years
- To assess the social adjustment and academic functioning of children diagnosed as ADHD at follow-up after three years
- To assess the associated psychiatric co-morbidity.

## MATERIALS AND METHODS

Children up to 14 years of age, who were diagnosed as ADHD according to the DSM-IV criteria[6] in Child Guidance Clinic (CGC) from January 2005 to December 2008 were included in the study.

Socio-demographic details and clinical details were noted. IQ tests performed for children <6 years of age were Gessel's Drawing Test[7] and Vineland Social Maturity Scale[8] and for children of age ≥6 years, Malin's Intelligence Scale for Indian Children[9] and Coloured Progressive Matrices component of Raven's educational test[10] were used.

The children who had ADHD along with mental retardation or pervasive developmental disorder were excluded.

From May to July 2011, the patients of ADHD were contacted telephonically by a 2nd year MD Psychiatry student. Telephonic assessment has been reported to have comparable reliability to face-to-face interview.[11] Out of 138 ADHD patients, three promised to come for follow-up, while 48 could be contacted telephonically only. The rest (*N*=87) could not be contacted due to unavailability of their changed phone numbers. Analysis was done to compare the characteristics of the patients who could be contacted and could not be contacted. The patients who could not be contacted had significantly longer mean time period from last follow-up (*P*=0.03*), were lesser in mean age at first presentation (*P*=0.007**), and their referral was more commonly from other departments (*P*=0.002**). They did not differ statistically on other variables such as gender, residence, number of visits, IQ, type of ADHD, time period of treatment adherence, and presence of co-morbidities.

Mother or father of each patient was contacted telephonically. Their verbal consent was obtained before conducting the interview. They were asked about the current status of their child, whether the treatment was continued, the reasons for not following up in CGC, and the parents' subjective assessment of improvement in ADHD symptoms.

### Measures

1. Vanderbilt ADHD Diagnostic Parent rating scale (VADPRS)[12] was administered to the parent to find out if the child still retained the diagnosis of ADHD. VADPRS requires assessment of frequency of 18 specific behavior symptoms of ADHD on a four-point scale. In addition, it contains items to screen for common coexisting mental health conditions (ODD, CD, and depression), which were also assessed
2. The Social Adjustment Inventory for Children and Adolescent (SAICA).[13] The SAICA is a semi-structured interview designed for administration to school aged children and to parents in reference to their children. It provides an evaluation of children's functioning in school and in spare time activities as well as interaction with peers, siblings, and parents. Sixteen subscale ratings were made using four-point scales (with higher scores indicating poorer adjustment) for assessing these characteristics. The total score was calculated as the arithmetic mean of all subscale ratings.

### Statistical analysis

Statistical analysis was carried out using the SPSS version 13. Chi square test, Mann–Whitney Test, Kruskal–Wallis Test, and Pearson's product moment correlations were used according to test results.

## RESULTS

At baseline, out of 51 included patients, five were diagnosed as having inattention type of ADHD and 46 with combined type of ADHD. At current assessment, 38 (74.5%) were still fulfilling a diagnosis of ADHD as per VADPRS [Figure 1]. Out of the total 38 patients still fulfilling the criteria for ADHD, 21 (41.2%) were of inattention type and 17 (33.3%) were of combined type. The characteristics of the three groups, ADHD remitted (*N*=13), inattention type (*N*=21), and combined type (*N*=17) were compared [Table 1]. Majority were males (*N*=49) and the age of children on the first visit ranged from 5 to 14 years. Their current age ranged from 8 to 19 years. IQ test results were available in 35 out of 51 patients. The period of treatment adherence ranged from 0 to 48 months with

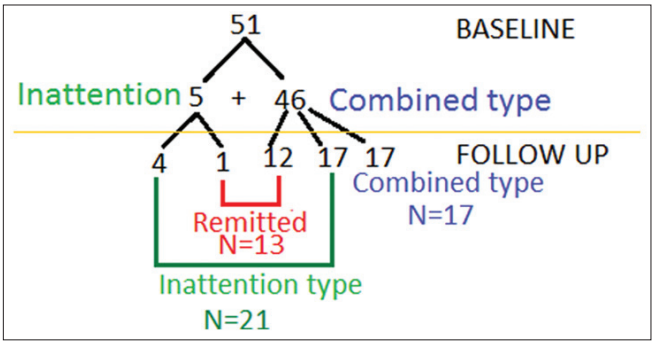


**Figure 1:** Status of ADHD at follow-up

an average of 6.82 months. There was no statistically significant difference in the three groups in their age, gender, mean number of visits to CGC, time period from last follow-up, mean IQ, and the type of treatment received.

Table 2 shows the mean current VADPRS composite score and scores in its different domains in the three groups. The mean VADPRS composite score was significantly lower in ADHD remitted type group. It was highest in combined type group.

**Table 1: Comparison of the three groups on socio demographic details**

| Variables | ADHD remitted *N*=13 | Inattention type *N*=21 | Combined type *N*=17 |
|---|---|---|---|
| Gender | | | |
| Male | 13 | 20 | 16 |
| Female | 0 | 1 | 1 |
| Residence | | | |
| Tricity | 9 | 17 | 12 |
| Other area | 4 | 4 | 5 |
| Age at first visit in years, mean (SD) | 10.54 (2.634) | 9.76 (2.143) | 8.41 (2.717) |
| Current age in years, mean (SD) | 14.85 (2.703) | 14.00 (1.975) | 12.41 (2.647) |
| Mean number of visits (SD) | 6.92 (5.107) | 6.86 (6.287) | 5.53 (3.955) |
| Time period in months from last follow up, mean (SD) | 40.38 (19.649) | 40.67 (17.229) | 36.59 (16.602) |
| Time period in months from last treatment received, mean (SD) | 40.00 (20.433) | 38.95 (19.628) | 39.18 (14.050) |
| IQ, mean (SD) | *N*=8 99.38 (11.01) | *N*=15 99.73 (12.77) | *N*=12 100.33 (16.15) |
| Subjective improvement in %, mean (SD) | 74.62 (16.515) | 39.76 (23.477) | 27.06 (23.477) |
| Type of treatment received | | | |
| Atomoxetine | 4 | 5 | 6 |
| Methylphenidate | 0 | 8 | 2 |
| Clonidine | 2 | 0 | 0 |
| More than one medication | 1 | 4 | 3 |
| BT with medication | 3 | 2 | 3 |
| Treatment not taken | 3 | 2 | 3 |

ADHD – Attention deficit hyperactivity disorder; BT – Behavior therapy

Social adjustment and academic functioning was compared between those currently fulfilling ADHD criteria (*N*=38) and ADHD remitted (*N*=13) subjects using SAICA [Table 3]. There was significantly more impaired SAICA composite score in children still fulfilling ADHD criteria i.e., they had poorer social adjustment. Also, they had significantly more impaired score in domains of academic problems, poor relations with teachers, school problems, peer problems, relations with mother, and problems with parents. Comparison between inattention type (*N*=21) and combined type (*N*=17) groups on SAICA showed that mean composite score was slightly higher in combined type group, though not statistically significant. Correlation between current VADPRS score and percentage improvement perceived by parents in their child with time was performed. It was found that there was significant negative correlation between improvement perceived and VADPRS composite score (−0.674**), inattentive score (−0.669**), hyperactive score (−0.465**), and ODD score (−0.517**).

Patient's parents were asked about the reason for not following up in OPD and discontinuation of treatment [Table 4]. Most common reason (33%) reported by parents was fear of side effects. Table 5 shows the co-morbid psychiatric illness at first visit of patients with ADHD. Four patients had associated ODD/CD. On current assessment, a total of 16 patients fulfilled criteria for ODD/CD [Table 6].

## DISCUSSION

This study was undertaken to assess whether the diagnosis of ADHD is retained from childhood into adolescent. We found that 74.5% children still retained the diagnosis of ADHD after 3 to 5 years. This was in concordance with the studies from other countries that reported persistence of ADHD in 66% to 85% adolescents.[4] In the present study, inattention was more persistent as compared to hyperactivity/impulsivity, as out of 46 children with combined ADHD at baseline, only 17 were still fulfilling criteria for combined type. The rest had either remitted (*N*=12) or had symptoms of inattention (*N*=17) only. Earlier

**Table 2: Comparison on VADPRS scores**

| Current VADPRS† score | ADHD remitted *N*=13 Mean (SD) | Inattention type *N*=21 Mean (SD) | Combined type *N*=17 Mean (SD) | Chi-square | *P* value |
|---|---|---|---|---|---|
| Composite | 18.46 (8.87) | 33.43 (10.02) | 53.06 (10.53) | 18.790 | 0.000* |
| Inattentive | 8.23 (3.39) | 19.24 (3.85) | 20.35 (5.3) | 1.577 | 0.209 |
| Hyperactive/Impulsive | 5.92 (4.97) | 6.29 (4.14) | 20.12 (3.69) | 26.774 | 0.000* |
| ODD‡ | 3.54 (2.54) | 6.24 (4.42) | 9.47 (4.17) | 4.743 | 0.029* |
| CD§ | 0.38 (1.12) | 1.76 (3.42) | 1.59 (2.37) | 0.080 | 0.777 |
| Depression | 0.38 (0.87) | 0.33 (0.66) | 1.29 (2.37) | 2.519 | 0.112 |

**P* value is significant at 0.05 level, †Vanderbilt ADHD diagnostic parent rating scale, ‡Oppositional defiant disorder, §Conduct disorder; ADHD – Attention deficit hyperactivity disorder

**Table 3: Social adjustment and academic functioning**

| SAICA† | ADHD remitted *N*=13 Mean (SD) | ADHD present *N*=38 Mean (SD) | *P* value |
|---|---|---|---|
| Composite score | 1.48 (0.22) | 1.89 (0.33) | 0.000* |
| Academic problems | 2.00 (0.57) | 2.52 (0.68) | 0.020* |
| Attitude towards school | 1.07 (0.27) | 1.39 (0.59) | 0.065 |
| Attitude towards teachers | 1.23 (0.43) | 1.55 (0.60) | 0.084 |
| Teachers attitude towards child | 1.46 (0.51) | 2.02 (0.85) | 0.037* |
| Relationship with classmates | 1.15 (0.37) | 1.44 (0.64) | 0.136 |
| School problems | 1.53 (0.51) | 2.34 (0.58) | 0.000* |
| Spare time activities | 1.84 (0.37) | 2.00 (0.51) | 0.336 |
| Time spent with others | 2.46 (0.66) | 2.55 (1.03) | 0.865 |
| Spare time problems | 1.15 (0.37) | 1.39 (0.49) | 0.115 |
| Peer relations | 1.69 (0.63) | 1.94 (0.69) | 0.252 |
| Peer problems | 1.07 (0.27) | 1.86 (0.70) | 0.000* |
| Sibling relations | 1.07 (0.75) | 1.44 (0.89) | 0.129 |
| Sibling problems | 1.15 (0.80) | 1.47 (0.79) | 0.115 |
| Relationship with mother | 1.46 (0.51) | 1.86 (0.62) | 0.042* |
| Relationship with father | 1.76 (0.43) | 1.86 (0.96) | 0.515 |
| Problems with parents | 1.15 (0.55) | 1.81 (0.76) | 0.003* |

**P* value is significant at 0.05 level; †Social adjustment inventory for children and adolescents; ADHD – Attention deficit hyperactivity disorder

**Table 4: Reasons for discontinuation of treatment**

| Reasons for drop out given by parents | ADHD remitted *N*=13 | Inattention type *N*=21 | Combined type *N*=17 | Total |
|---|---|---|---|---|
| Improved | 2 | 1 | 0 | 3 |
| No improvement | 0 | 1 | 2 | 3 |
| Side effects | 3 | 8 | 3 | 14 |
| Fear of side effects | 5 | 7 | 5 | 17 |
| Difficult to come | 1 | 1 | 5 | 7 |
| Still continuing treatment | 1 | 2 | 0 | 3 |
| Child refused treatment | 1 | 2 | 2 | 5 |

ADHD – Attention deficit hyperactivity disorder

**Table 5: Associated problems at first visit**

| Associated problem at first visit | ADHD remitted *N*=13 | Inattention type *N*=21 | Combined type *N*=17 | Total *N*=51 (%) |
|---|---|---|---|---|
| Depression | 0 | 1 | 0 | 1 (1.96) |
| SLD‖ | 2 | 3 | 2 | 7 (13.72) |
| CD§ | 1 | 1 | 0 | 2 (3.92) |
| ODD‡ | 1 | 1 | 0 | 2 (3.92) |
| Seizure disorder | 0 | 0 | 1 | 1 (1.96) |

‡Oppositional defiant disorder, §Conduct disorder, ‖Specific learning disability; ADHD – Attention deficit hyperactivity disorder

**Table 6: Current co-morbidities**

| Associated problem at present | ADHD remitted *N*=13 | Inattention type *N*=21 | Combined type *N*=17 | Total *N*=51 (%) |
|---|---|---|---|---|
| ODD‡ | 1 | 3 | 9 | 13 (21.56) |
| CD§ | 0 | 2 | 1 | 3 (5.88) |

‡Oppositional defiant disorder, §Conduct disorder; ADHD – Attention deficit hyperactivity disorder

follow-up studies also reported that as children with ADHD grow into adolescence and adulthood, there is generally an overall reduction of ADHD symptoms in which hyperactive/impulsive symptoms decline more and inattentive symptoms persist.[3,4,14]

Adolescents with persistent ADHD had more impaired scores on scales reflecting academic performance, relations with teachers, school behavior, and problems with peers and parents. They had significant interpersonal deficits and poor academic performance as compared to those who had remitted, which was consistent with previous research on follow-up of patients with ADHD.[2] It has been reported that children with ADHD perform better academically if treatment is continued.[15,16] In fact, adolescents with persistent ADHD have significant maladjustment in the family environment, society, and academic achievement along with development of co-morbid ODD/CD.[17,18]

When an attempt was made to find out difficulties these children face in school behavior, peer relationship, and home behavior, no difference was noticed in inattention and combined type group, which is in contrast to previous research findings that state that children with combined subtype may encounter different characteristic of problems as compared to inattention subtype.[19] However, our findings were consistent with a literature review that found that children with a different type of ADHD do not differ in cognitive, social, academic, and behavioral functioning, and it is not adequately resolved whether both the subtypes should be considered as two independent disorders.[20]

At baseline, there were only four children who had co-morbid ODD/CD. Whereas on follow-up, out of those who were untreated, 16 out of 48 screened positive for ODD/CD in the current assessment. Indeed, an earlier study has reported that continuation of treatment in the long-term has significant protective effect from development of ODD/CD in children with ADHD.[16] The diverse negative impacts of ADHD on adolescent development indicate the need for early and aggressive treatment.[17]

In the present study, there were four children who had received treatment for >2 years. They did not screen positive for ODD/CD. This sample size was small for statistical analysis to be carried out comparing academic functioning and co-morbidity, yet it points toward results of earlier studies. The previous studies with an average duration of treatment adherence of 5 years, report decrease in risk of development of ODD/CD and academic failure.[15,16] In another study, which evaluated 3-year outcome after initial 14 months treatment, there was no significant difference between academic achievement of those who received treatment and those who did not.[21]

We found that more patients among those with persistent ADHD (*N*=38) screened positive for ODD (*N*=12) and CD (*N*=3) as compared to those who had remission (*N*=13) of ADHD symptoms (*N*=1), which was also consistent with earlier studies.[18,22,23] It has also been reported earlier that the ODD is more commonly associated with combined-type ADHD individuals than pure inattention type.[24] In the present study as well, more of patients with combined ADHD had screened positive for ODD (*N*=9) than those with only inattention type of ADHD (*N*=3). In the present study, none of the patient screened positive for depression at follow-up. It has been reported in follow-up studies that there is no significant difference in the prevalence of depression in those with ADHD and without ADHD in adulthood.[25-27]

In the present study, >90% patients became non-adherent to medication at various time intervals, which was higher than studies from western countries, where the prevalence of medication discontinuation is from 13.2% to 64% in children/adolescents with ADHD.[28] The higher drop-out rate was also found in another study from India, in which 83.3% had become non-adherent in 1 month itself.[29] The reasons reported by parents were fear of side effects of medicines (due to the misconception that it could adversely affect their children's brain), development of minor side effects, difficult to follow-up in OPD, child refused medication, perceived remission, or perceived no improvement. These reasons were similar to the those reported in other studies in the past.[29-31]

This study had some limitations. Baseline assessments on the rating scales were not available for comparison with current assessments due to retrospective nature of the study. The assessments were carried out telephonically. We encouraged patient's parents to come to the OPD for assessment, three were already coming for follow-up, and another seven had reported eventually in the OPD, where the assessments were confirmed. Another limitation was that ODD and CD were only assessed on screening scales and not confirmed as diagnosis. The same rating scale was used in children and adolescents for uniformity of data interpretation. However, a previous study that examined ADHD in children and adolescents, no significant difference was found in the manifestations of the disorder,[22] which justifies the use of same scale for children and adolescents in our study.[22]

This is the first study from India, where the status of children with ADHD in the long-term was assessed. It showed that a diagnosis of ADHD was retained in the majority of patients after 3 years. Hyperactive/impulsive symptoms decline more with increasing age as compared to inattentive symptoms. There is poorer academic functioning and social adjustment in children with persistent ADHD. These children are at risk for development of ODD/CD, especially the combined type. In conclusion, childhood hyperactivity predisposes to adolescent maladjustment and continues to affect significant functional domains in a substantial majority of subjects. Treatment discontinuation is exceedingly common in these patients. ADHD is a fairly treatable condition, and continuation of treatment may prevent development of such adverse consequences.

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