

Cross-sectional study of self-reported ADHD symptoms and psychological comorbidity among college students in Chandigarh, India

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ABSTRACT

Background: Existence of attention deficit hyperactivity disorder (ADHD) in adults is scantily researched in India. There is dearth of information on prevalence of ADHD in college students worldwide. Further, fewer studies in the past have evaluated the impact of ADHD on the psychological well-being of college students. **Aims:** To study the prevalence of ADHD among college students and psychological problems related to ADHD. **Design:** Cross-sectional study. **Subjects and Methods:** A total of 237 students were recruited from various medical, engineering, and commerce and arts colleges of Chandigarh, India. They were administered the Adult ADHD Self Report Scale v1.1 (ASRS) and the Wender Utah Rating Scale (WURS) to diagnose adult ADHD. To assess comorbidities; General Health Questionnaire-12 (GHQ); Zung Depression Rating Scale (ZDRS); Rosenberg's Self-Esteem Scale (RSES); and questions on emotional stability, social problems, and substance use (alcohol, tobacco, and cannabis) were administered on all participants. **Results:** A total of 13 students (5.48%) fulfilled the criteria for adult ADHD. These students experienced significantly higher emotional instability and low self-esteem than those without ADHD ($N = 224$). The occurrence of psychological problems, depression, social problems, and substance abuse was comparable in students with and without ADHD. **Conclusions:** ADHD is prevalent among the college students studying in the most competitive institutes as well. Students with ADHD experience higher emotional instability and poor self-esteem than others. It has little effect on their psychological well-being and social adjustment. Prompt detection and management of ADHD in college students may help them deal with these problems effectively.

Keywords: Attention deficit hyperactivity disorder, college students, comorbidity, prevalence

Attention deficit hyperactivity disorder (ADHD) is one of the most common neurobehavioral disorders in children. It is estimated to persist in about 40% cases in adulthood. Diagnosing ADHD in adults is difficult and requires evaluations by rating scales and clinical interviews. Adults must have childhood onset, persistent, and current symptoms of ADHD to be diagnosed with the disorder.^[1,2] Adult ADHD is being diagnosed more and more often in the west.^[3] Yet in India there is meager research from the adult general population and ADHD is still considered a

diagnosable disorder in children only. There is vast literature available on prevalence of ADHD in children. A systematic review estimated worldwide prevalence of ADHD in children and adolescents as 5.29%.^[4] Some studies have also evaluated prevalence of ADHD in adults. A recent meta-analysis estimated the pooled prevalence of adult ADHD as 2.5%.^[5] However, there is dearth of information on prevalence of ADHD in college students. Research is further limited on the psychological and social functioning of college students with ADHD.^[3] ADHD goes along with academic underachievement, because of which many of such adolescents fail to reach the college level. Those who reach the college may represent those with better cognitive abilities and better coping strategies of their underlying disability.^[6] Indeed studies have found no difference in social satisfaction and psychological well-being in college students with ADHD compared to controls. While some other studies found that ADHD in college students

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is associated with poor adjustment, poorer academic performance, poor quality of life, more depression, and substance abuse.^[7] There are inconsistencies in the existing literature. Also, none of the studies available in this context have been carried out in India. Hence, the current study was carried out with the following aims:

- To study the prevalence of ADHD among college students
- To establish the comorbidities associated with ADHD.

SUBJECTS AND METHODS

This study was conducted among students from various medical, dental, and commerce and arts, engineering colleges of the city. The students who were 18-25 years of age and were at least 12th pass were included in the study. Convenience sampling technique was used for recruitment.

A total of 237 students were recruited in this study. They were administered the Adult ADHD Self Report Scale v1.1 (ASRS) to screen for current symptoms of adult ADHD.^[8] The ASRS consists of 18 questions which are based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) criteria and are divided into two parts: Part A and B. Six of these questions are the most predictive of adult ADHD and are included in part A. Part B consists of the remaining 12 questions which are used just as additional cues in making the diagnosis. Part A was used in this study. Since diagnosing adult ADHD requires evidence of childhood onset of symptoms, the students were also administered the Wender Utah Rating Scale (WURS).^[9] WURS consists of a set of 61 questions to be answered in relation to the childhood of the adult being analyzed, out of which 25 questions form the basis of diagnosis of childhood ADHD. Those students who came positive on both ASRS and

WURS were diagnosed as adult ADHD. The number of students which screened positive using ASRS was 56 out of 237. But only 13 out these 56 were positive for WURS, the remaining 43 were considered as false positive for the presence of ADHD in adulthood. The total number of students who came positive on WURS were 34 (14.3%) out of 237. As 21 out of these 34 students (61.8%) did not screen positive on ASRS, they represented those with ADHD in childhood but not currently. So 13 students out of 237 (5.48%) were diagnosed with ADHD persisting in adulthood and were taken as the study group. The rest, that is, 224 (94.5%) were taken in the control group [Figure 1]. A comparison was made between both these groups for the presence of associated problems using the following measures.

1. General Health Questionnaire-12 (GHQ) was used to screen for non-psychotic psychiatric disorders in the participants. GHQ-12 has four options for each item, the two less favorable answers are combined and coded 1 and the two more favorable coded as 0, with total scores ranging from 0 to 12. A cut-off score ≥ 2 indicates psychological problem^[10]
2. Zung Depression Rating Scale (ZDRS) was used to screen the students with depression. The scale consists of 20 questions, out of which 10 are positively worded and 10 are negatively worded. Each question is rated on a scale of 1-4 and a score ≥ 50 is considered to be indicative of depression^[11]
3. Rosenberg's Self-Esteem Scale (RSES) was used to assess the self-esteem which is defined as an overall evaluation of oneself. It is a Likert-type scale with 10 items to be answered on a four point scale ranging from strongly agree to strongly disagree. The score varied from 0 to 30 with scores below 15 suggesting low self-esteem^[12]
4. Other questions- A questionnaire was developed to assess following areas:

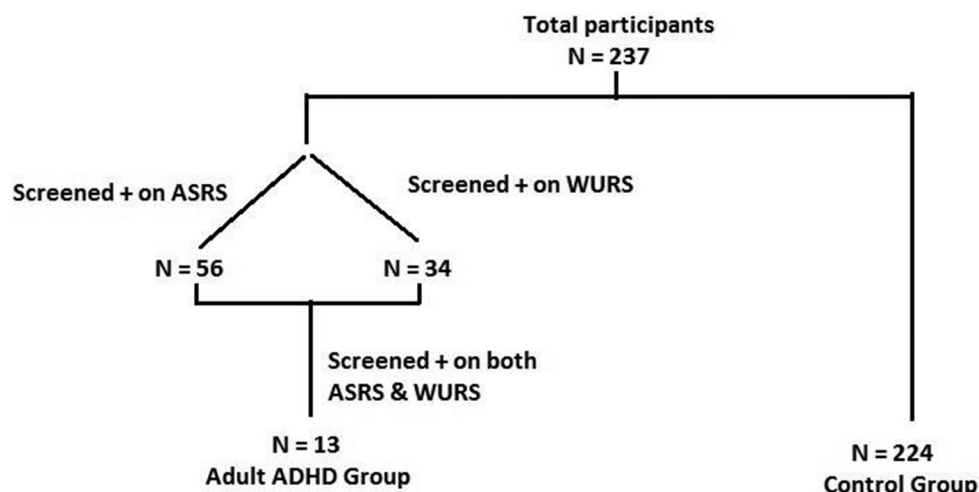


Figure 1: Adult ADHD and control group. ADHD – Attention deficit hyperactivity disorder; ASRS – Adult ADHD Self Report Scale v1.1; WURS – Wender Utah Rating Scale

- Emotional stability- Two questions were used to analyze the emotional stability of the participants. The two questions evaluated both the positive as well as negative pole of the personality domain
- Social concerns- To evaluate the social satisfaction and level of interpersonal problems, a four item scale was used. Two out of the four statements were framed positively and two negatively
- Alcohol use- Two questions were included to analyze the frequency and quantity of alcohol consumed by the students in the past
- Tobacco use- It was assessed on number of cigarettes smoked in the past 30 days
- Other drug use- Questions on frequency of cannabis consumption and daily amount of coffee intake.

Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 15. Pearson χ^2 test or Fisher's exact test was used for analysis of categorical variables. A *P* value of < 0.05 was considered to indicate statistical significance.

The participants were ensured of confidentiality and were given an option of refusal to participate in the study. All the queries were answered and informed consent obtained. The study was undertaken after due clearance from the Ethics Committee of Government Medical College and Hospital, Chandigarh.

RESULTS

Sociodemographic variables

In this study, mean age of the participants ($N = 237$) was 19.46 ± 1.16 years. Majority of the participants were females ($N = 157$), belonged to 18-20 years age group and hailed from medical stream. Out of the 80 male participants, five (6.25%) were found to be having ADHD. While out of 157 female participants, eight (5.1%) had ADHD. Hence, a slightly higher proportion of males were found to be having ADHD. There was no significant difference between both the groups on all variables [Table 1].

Comorbidities

The number of participants having psychological problems (assessed by GHQ) in ADHD group was not found to be significantly different from the number of participants in the control group. Similarly, there was no significant difference in the number of participants having depression (assessed by ZDRS) between the ADHD and control group. However, significantly higher number of participants had low self-esteem (assessed by RSES) in the ADHD group than the control group. By using the questionnaire designed for assessing emotional instability,

significantly higher numbers of individuals were found to be emotionally unstable in the ADHD group. While assessing the social problems, there was no significant difference between the numbers of individuals between the ADHD and control group. Similarly, no significant difference was found between numbers of individuals with any substance abuse in both frequency and quantity in the two groups [Table 2].

There were four participants out of 13 of the ADHD group, who had consumed alcohol in last 6 months. Among these four participants, two reflected significant alcohol use, one had consumed 2-5 drinks/occasion with number of occasions ranging 14-20 in the last 6 month and other one had consumed >5 drinks/occasion with number of occasions being 3-5 in the same period. But there was no significant difference between the ADHD and control group with regard to number of individuals, quantity, and frequency of alcohol intake. None had consumed tobacco

Table 1: Sociodemographic data

Variables	Total participants (N=237)	ADHD group (N=13)	Control group (N=224)	Chi-square	P value
Age group (years)					
18-20	205	12	193	0.398	1.000
20-25	32	1	31		
Gender					
Female	157	8	149	0.136	0.766
Male	80	5	75		
Streams					
Medical	114	10	104	4.811	0.090
Commerce and Arts	66	1	65		
Engineering	57	2	55		

ADHD – Attention deficit hyperactivity disorder

Table 2: Comparison between two groups on associated problems

Variables	ADHD group (N=13)	Control group (N=224)	Chi-square	P value
Psychological problem (GHQ) (N=236)	8	103	1.162	0.281
Depressive illness (ZDRS) (N=234)	3	18	3.351	0.099
Low self-esteem (RSES) (N=235)	7	43	8.715	0.008**
Emotional instability (N=235)	12	109	9.179	0.002**
Social problems (N=234)	11	185	0.007	1.00
Alcohol use (N=237)	4	53	0.340	0.519
Tobacco use (N=231)	0	6	0.367	0.985
Cannabis use (N=233)	1	9	7.98	0.092

* $P < 0.05$, ** $P < 0.01$. ADHD – Attention deficit hyperactivity disorder; GHQ – Global Health Questionnaire-12; ZDRS – Zung Depression Rating Scale; RSES – Rosenberg Self-Esteem scale

or smoked cigarettes in the past in the ADHD group, while one participant had consumed cannabis for 10-15 occasions in the last 6 months. However, there was no significant difference between the ADHD and control group with regard to number of individuals and frequency of cannabis intake as well as tobacco consumption [Table 2]. An account of caffeine consumption in the form of cups of coffee revealed that nine out of 13 students had consumed two cups of coffee per day in the past 30 days, while none consumed more than two cups. The number of such students within ADHD group was not significantly different from control group.

Comorbidities in different streams

When the numbers of individuals with comorbidities were compared among medical, engineering, and commerce and arts streams; no significant difference was found. The number of individuals with psychological problems, depression, low self-esteem, emotional instability, social problems, and substance abuse were statistically comparable across the three streams [Table 3].

DISCUSSION

To our knowledge, this is the first study from India which attempted to look into the prevalence of adult ADHD in college students. Another study from India assessed the presence of ADHD in adults and they were followed up for 1 year, but the authors had recruited the sample from psychiatric outpatient clinic.^[13,14]

In our study, when ASRS alone was used to assess the presence of ADHD, 56 participants (23.6%) reported having symptoms suggestive of adult ADHD. However, only 13 among these 56 participants were identified to be having ADHD symptoms in childhood, which reflected the true prevalence rate of adult ADHD among college students. So in the present study, 5.48% of the college students were diagnosed as having ADHD using two self-report measures. This was consistent with most of the earlier research studies from other high-income countries.^[15-19] However, the estimated prevalence rate of the present study was much lower than the findings of study from another low-income country, which estimated it as 21.8%. But these researchers

had employed ASRS screen alone to estimate this prevalence rate and they failed to identify those college students who had symptoms in childhood which would have reflected a true prevalence rate.^[20]

In our study, we found only a slight higher prevalence (6.25%) in males compared to females (5.1%). This was also consistent with earlier research which states that much higher prevalence of ADHD is found in males in childhood (4:1); however, this difference tends to decrease in college years when ADHD may be found as common in males as in females.^[21]

In the present study, we did not find any significant difference between the numbers of students with ADHD within different streams of colleges. It was expected that children who had ADHD would not be able to perform well in school, and hence, lesser numbers would be able to enter professional colleges where tough entrance exams need to be cleared.^[22] However, a meta-analysis of four studies evaluating academic functioning among college students with ADHD concluded that ADHD impacts academic functioning of a relatively selective sample of college students. It was also reported that college students with ADHD may represent a distinct set of individuals who have better cognitive abilities and better compensatory adaptive skills than the general population with ADHD.^[6] This supported the findings of the present study as the individuals with ADHD constituting better abilities might have had no difficulty in achieving and pursuing the medical college education, and hence, there was no significant difference between the number of students with ADHD in various streams.

We also found that the number of college students with ADHD did not differ from those without ADHD with respect to psychological problems, depressive symptoms, social problems, and substance abuse. Yet significantly more number of students with ADHD perceived emotional instability and poor self-esteem compared to those without ADHD. This implies that though the students with ADHD perceived them to be emotionally unstable and felt low self-esteem, still they were able to adapt well in college without any of them developing significant depressive

Table 3: Comorbidities in different streams

Variables	Medical (N=114)	Engineering (N=57)	Commerce and Arts (N=66)	Chi-square	P value
Psychological problems (GHQ)	56	21	34	2.77	0.25
Depressive illness (ZDRS)	13	3	5	1.87	0.39
Low self-esteem (RSES)	26	10	14	0.47	0.78
Social problems	97	47	52	0.44	0.80
Emotional instability	63	27	31	1.25	0.53

GHQ – Global Health Questionnaire-12; ZDRS – Zung Depression Rating Scale; RSES – Rosenberg Self-Esteem Scale

symptoms, psychological problems, or problems in social relations. This can again be explained on the premise that those students with ADHD who study in college may represent those with better adaptive skills than those who can't make it to college.^[6] Our findings are concordant with the findings of few earlier studies which reported that students with ADHD did not have more psychological distress, social problems, and were even more resilient than controls.^[23-25] While some studies have also reported poor self-esteem, poor quality of life, emotional instability, depressive symptoms more often associated with college students with ADHD.^[26-28] Regarding substance abuse in college students with ADHD, mixed results have been reported with some reporting lesser alcohol, tobacco, or cannabis abuse; while others reporting higher.^[24,28-30] There is dearth of studies in these areas, which has led to inconsistent results in the existing literature.

In the present study, we also tried to evaluate if there were more psychological problems in any particular stream of college students and could find none. Few earlier studies found that professional college students, especially medical college students experience more stress than nonprofessional college students.^[31,32] However, another study found nonmedical students showed a higher prevalence of moderate and severe depressive symptoms than medical students which reported more symptoms of mild depression.^[33] There is inconsistency in the various research findings as research in this area is scant. More number of studies with greater sample sizes incorporating information about family history, socioeconomic factors, year of course, other predictors of adjustment, etc., need to be carried out to reach to a final conclusion.

Our study has certain limitations. Diagnosis was made based on questionnaires and clinical interviews were not conducted. The sample recruited may not be representative of the actual population of college students due to convenient sampling technique. Nonetheless, the present study contributes significantly to the existing knowledge.

In conclusion, ADHD is prevalent among the college students studying in the most competitive institutes as well. This disorder has little effect on their academic achievement, psychological well-being, and social adjustment. ADHD in college students is also not associated with depression and substance abuse. However, those with ADHD experience higher emotional instability and poor self-esteem than peers. Prompt detection and management of ADHD in college students may help them deal with these problems effectively. Further studies are required with larger sample size with emphasis on detecting the comorbidities to affirm the findings of the present study.

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