

## Prevalence of Adult ADHD Co-morbidity in Alcohol Use Disorders in a General Hospital Setup

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### ABSTRACT


**Background:** Attention deficit hyperactive disorder (ADHD) symptoms persisting into adulthood can influence the course and outcome of alcohol use disorders (AUDs). A cross-sectional study was conducted to assess the prevalence of adult ADHD in patients admitted with AUDs in a general hospital setup. **Methods:** In this study, 100 consecutive inpatients with alcohol use disorder (AUD) were evaluated for the diagnosis of ADHD. Patients with AUD were assessed with Severity of Alcohol Dependence Questionnaire, Clinical Institute Withdrawal Assessment for Alcohol and Adult ADHD Self Report Scale. Among the subjects who screened positive for adult ADHD on ASRS, diagnosis of adult ADHD was confirmed using the DSM 5 diagnostic interview. Epi-Info Version 7.2 was used for data entry and analysis. Mann Whitney test and Chi-square test (or Fisher's Exact test) were used for statistical analysis. **Results:** Twenty-one subjects screened positive for adult ADHD. Among them, 19 subjects had a confirmative diagnosis of adult ADHD. Patients with adult ADHD comorbid with AUDs showed accelerated progression towards dependence, and early relapses. **Conclusions:** In all, 19% of treatment-seeking inpatients with AUDs have co-morbid adult ADHD. Regular screening of AUD patients for adult ADHD and addressing the psychopathology may improve the treatment outcome.

**Key words:** Adult ADHD, alcohol use disorder, prevalence

**Key messages:** Adult ADHD is a common co-morbidity in subjects with alcohol use disorders.

Attention deficit hyperactivity disorder (ADHD) is a neuro-developmental disorder characterized by core symptoms of inattention, hyperactivity, and impulsivity. ADHD persists into adulthood among the majority of the affected children.<sup>[1,2]</sup> However, with the increasing

age, the symptom manifestation changes considerably: the hyperactivity decreases, while the inattention and impulsivity persist.<sup>[3]</sup> Studies around the world have shown that the prevalence of childhood ADHD in the

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general population ranges 5%-12% while the prevalence of adult ADHD ranges 2%-6%.<sup>[4-8]</sup>

The literature review indicates a bidirectional relationship between ADHD and substance use disorders (SUDs).<sup>[9]</sup> Earlier studies from the west showed a very high prevalence ranging from 35% to 70% for adult ADHD among individuals with SUD.<sup>[7]</sup> However, recent studies with improved diagnostic instruments indicate a prevalence rate ranging from 10.8% to 40.9%.<sup>[4-8]</sup> A recent meta-analysis reported the prevalence of comorbid ADHD at 23.1% among individuals with SUD.<sup>[4]</sup> Most studies to date have been on ADHD comorbidity among individuals with SUD as a whole or have focused predominantly on stimulant abuse. Very little data are available on adult ADHD comorbidity among individuals with alcohol use disorders (AUDs), particularly from the Indian population. A few studies have indicated that adult ADHD is comparatively low among individuals with AUD compared to those who use other substances.<sup>[8]</sup> Ohlmeier *et al.* reported that ADHD comorbidity among individuals with AUD had a lifetime prevalence of 23%, while only 8% had symptoms persisting into adulthood. Wood *et al.* determined that 33% of the AUD individuals have comorbid adult ADHD.<sup>[6,7]</sup> Kumar *et al.* reported 40% prevalence for adult ADHD among fishermen with alcohol-dependence, while in another outpatient-based screening study, Ganesh *et al.* reported that 21.7% of the SUD subjects screened positive for "highly likely ADHD."<sup>[1,10]</sup> Both the studies were done in South India and had used screening tools to check for ADHD in patients with AUD.

With a paucity of studies on adult ADHD comorbidity among individuals with AUD in the Indian population, the current study was planned by using standardized diagnostic tools. In this study, the primary aim was to determine the prevalence of adult ADHD among subjects with AUD using diagnostic interview method according to DSM 5. Second aim was to compare the characteristics of alcoholism in subjects with and without adult ADHD co-morbidity.

## SUBJECTS AND METHODS

### Study design

This was a cross-sectional study conducted in a semiurban-based medical college hospital. All subjects admitted to the deaddiction ward with an index diagnosis of AUD were recruited for the study. A total of 100 patients who were consecutively admitted in the deaddiction ward between March and December 2017 were included in the study after taking the informed consent. The inclusion criteria were as follows: (1) Meeting the diagnostic criteria for AUD according to DSM 5; (2) Age between 18 and 60 years;

and (3) Subjects consenting for participation in the study. Exclusion criteria were as follows: (1) Having other SUD except nicotine dependence; (2) Being admitted primarily for another major psychiatric disorder; and (3) Having intellectual disability. Subjects with intellectual disability were excluded by clinical interview method. All subjects admitted for alcohol deaddiction underwent both pharmacological and psychosocial interventions as part of the treatment protocol for managing withdrawal states and relapse prevention.

### Procedure

After obtaining the approval from the Institutional Ethics Committee, patients meeting the above criteria were recruited into the study. All patients admitted to the deaddiction ward were clinically interviewed by the attending Consultant Psychiatrist. Patients presenting with an index diagnosis of AUD according to DSM 5 and consenting for the study were recruited. Following admission to the deaddiction ward, the patients underwent an assessment with SADQ to assess the severity of alcoholism and CIWA scale to monitor the withdrawal symptoms.<sup>[11,12]</sup> Patients were applied adult ADHD Self-Report Scale (ASRS) after completion of detoxification and the CIWA score being <9.<sup>[13]</sup> Those patients who screened positive on ASRS were taken up for diagnostic confirmation using DSM-5 Clinical Interview.<sup>[14]</sup> ASRS is an instrument used for screening adult ADHD and consists of two parts, A and B. The scale was applied in English and Urdu forms which have been validated and translated by the World Health Organisation. The diagnostic confirmation of ADHD was done using DSM 5 by clinical interview method. The diagnostic criteria for adult ADHD was made according to DSM 5 when (1) patients had at least five of the inattention or hyperactivity and impulsivity symptoms; (2) several of symptoms were present prior to the age of 12 years; (3) symptoms occur in more than two settings; and (4) symptoms cause social and occupational dysfunction. Further, the diagnosis was made only in those not being admitted for manifestations of other major psychiatric disorders. The primary investigator was trained in applying Structured Clinical Interview for DSM-5 disorder - Clinician version (SCID-CV-5) prior to the study.

### Statistical analysis

Centre for Disease Control and Prevention (CDC) software Epi Info Version 7.2 was used for data entry and analysis.<sup>[15]</sup> For the purpose of analysis, the sample was divided into two groups: one group consisted of AUD with comorbid ADHD and the other group only AUD. Chi-square test (or Fisher's Exact test) was used to identify the difference among the subgroups regarding categorical variables, and

Mann-Whitney U test was used to compare the two groups on continuous variables. Benjamini-Hochberg procedure was applied to reduce false discovery rates. The individual *P* values were compared with the Benjamini-Hochberg critical value with a false discovery rate of 5%.

## RESULTS

### Socio-demographic details

All subjects were males, with the mean age being 40.68 years. Majority of the subjects had an education

**Table 1: Socio-demographic details of the study subjects**

	Subjects with ADHD (n=19)	Subjects without ADHD (n=81)
Age (years)*	32.52 (SD=6.67)	42.59(SD=8.59)
Gender		
Male	19	81
Female	0	0
Religion		
Hindu	16	73
Muslim	2	6
Christian	1	2
Education		
No formal Schooling	1	4
Up to Middle School	1	13
High School	3	20
Pre-university	8	17
Graduation	6	27
Employment status		
Unemployed	7	6
Unskilled/semiskilled	1	18
Skilled	6	29
Business	3	11
Government service	2	17
Marital status		
Married	12	71
Unmarried	7	9
Widowed	0	1
Background		
Rural	10	41
Urban	9	40
Deaddiction treatment (prior to current admission)	15	66

\**P*<0.001. ADHD: Attention deficit hyperactivity disorder

**Table 2: Characteristics of alcoholism in subjects with ADHD and without ADHD**

Characteristic of Alcoholism	Subjects with ADHD (n=19)	Subjects without ADHD (n=81)	<i>P</i> (Mann Whitney U test)
Age of first exposure to alcohol (years)	20.84	22.9	0.154
Age of regular use (years)	25.10	28.50	0.054
Age of onset of craving (years)	24.79	28.51	<b>0.035</b>
Age of development of tolerance (years)	25.89	29.85	<b>0.034</b>
Age of onset of withdrawal symptoms (years)	26.71	30.34	<b>0.038</b>
Age of development of loss of control (years)	26.78	32.51	<b>0.006*</b>
Age of onset of salience (years)	27.31	33.33	<b>0.004*</b>
Age of onset of early morning use (years)	29.81	36.25	<b>0.003*</b>
Alcohol use in units per day	23.52	20.56	<b>0.026</b>
SADQ score	37.79	32.56	<b>&lt;0.001*</b>
Longest abstinence from Alcohol (days)	43.63	148.37	<b>0.029</b>

Bold values: *P*<0.05. \*significant after applying Benjamini-Hochberg procedure for controlling false discovery rate. ADHD: Attention deficit hyperactivity disorder

above the high school level, and one-third of them were graduates. The sociodemographic details are described in Table 1.

### Clinical characteristics

Among the 100 subjects, screening for ADHD using ASRS was positive in 21 subjects. Among the 21 ASRS positive patients, DSM-5 diagnostic interview confirmed the diagnosis of adult ADHD in 19. Of these 19 subjects with ADHD, eight subjects had a predominantly hyperactive/impulsive presentation; two had predominantly inattention subtype, while nine had a mixed presentation. A family history of alcoholism was present in 64 subjects of the total sample, which was not statistically different (*P* = 0.9) between subjects with and without ADHD. Psychiatric comorbidity was observed in 16 of the total subjects. Five subjects with ADHD had other psychiatric co-morbidity, which included two subjects with bipolar disorder in remission, one with delusional disorder, one with mild depressive disorder with anxious distress, and one with unspecified anxiety disorder. ADHD subjects had a higher risk of having a comorbid psychiatric disorder with an odds ratio of 2.26.

### Characteristics of Alcohol use in subjects with and without ADHD

Mean age of subjects with ADHD was 32.52 years (SD = 6.67) and those without ADHD was 42.59 years (SD = 8.59), and the difference was statistically significant (*P* < 0.001). Mean age of first exposure to alcohol was 20.84 (SD = 3.53) and 22.9 years (SD = 5.70) for subjects with and without ADHD, respectively. Though there was early exposure to alcohol in subjects with ADHD, the difference was not statistically significant. Mean age of regular use of alcohol was 25.1 (SD = 5.52) and 28.5 years (SD = 6.95) for subjects with and without ADHD, respectively. The difference in mean age of onset of craving, tolerance, withdrawal symptoms, loss of control, salience and early morning use were

statistically significant ( $P < 0.05$ ). The pattern of alcohol use in subjects with ADHD when compared with subjects without ADHD has been described in detail in Table 2.

Average consumption of alcohol prior to admission in subjects with ADHD was 23.52 units per day, and in subjects without ADHD it was 20.56 units per day. There was a higher consumption of alcohol in the group with ADHD, and the difference was statistically significant ( $P = 0.024$ ). The SADQ score for subjects with ADHD was 37.79 while that for those without ADHD was 32.56, and the difference was statistically significant ( $P \leq 0.001$ ). The mean longest abstinent period prior to admission was 43.63 days for those with ADHD and it was 148.37 for those without ADHD, while in only those with history of deaddiction treatment the mean longest abstinence was 32.73 days and 110.59, respectively. The differences were statistically significant with  $P = 0.029$  and  $P = 0.021$ , respectively.

## DISCUSSION

Adult ADHD was seen in 19% of patients with AUDs and was associated with rapid progression towards dependence pattern of use of alcohol. The AUD patients in this study were recruited from an inpatient de-addiction ward in a hospital which caters to both rural and urban population. Data available with respect to adult ADHD in patients with AUDs is limited and most studies conducted are with SUDs in general. Our findings indicate that adult ADHD is common in patients with AUDs and that there is a need to evaluate for the same. AUD has a higher prevalence compared to other SUDs in India,<sup>[16]</sup> and hence the present study throws more light on the comorbidities of AUD in India.

On screening with ASRS, 21% ( $n = 21$ ) of the subjects were positive for ADHD. After applying a diagnostic interview using DSM 5 in these subjects, ADHD diagnosis was confirmed in 19% ( $n = 19$ ) of the subjects. Tartar *et al.* and Johann *et al.* reported that 19.9% and 21.3%, respectively, of their subjects with alcohol dependence were determined to have adult ADHD.<sup>[17,18]</sup> The findings from the current study are similar to the above studies on AUD patients. The predominant presentation of the subjects with ADHD in the study was of combined ( $n = 9$ ) and hyperactive/impulsive ( $n = 8$ ) types. These ADHD symptoms predispose an individual to have AUDs due to higher impulsivity.

In the current study, subjects with AUDs comorbid with ADHD were younger compared to the rest of the

patients. The time of the first experience of alcohol to the time to regular use of alcohol was earlier in patients with ADHD when compared with patients without ADHD. The findings from the current study are similar to earlier studies in India and from other countries.<sup>[1,2,4]</sup> Subjects with ADHD had a relatively faster progression of the disease process. This is reflected in the significantly earlier age of onset of craving, higher amount of alcohol use, tolerance, withdrawal symptoms, salience, and early morning use among these patients in the current sample. Further, the subjects with ADHD had significantly higher severity of alcoholism compared to those without ADHD. Subjects with ADHD consumed a significantly higher amount of alcohol compared to the rest of the sample. These findings are similar to the findings by Matthys *et al.* and Arius *et al.*<sup>[5,9]</sup>

Patients with AUDs with comorbid adult ADHD had early progression towards dependence this might indicate common pathophysiology involving higher impulsivity and executive dysfunction affecting the outcome of AUDs. The subtype of patients of AUDs comorbid adult ADHD fall in the category of Babor's classification of type B subjects, who were characterized by early onset, a more rapid course, more severe symptoms, and poorer prognosis.<sup>[19]</sup> Whether comorbid ADHD with AUD is a subtype of AUD requiring aggressive management needs to be considered and evaluated in further studies.

The severity of alcohol use was high and the time to relapse was shorter in patients with ADHD, both of which are indirect indicators of higher severity of alcohol use in them. Further, this underlying pathology increases the dropout rate from the treatment process.<sup>[6]</sup> This is reflected in the current study finding that subjects with ADHD had shorter abstinence period compared to those without ADHD even after taking treatment. Wilens *et al.* reported that patients with ADHD had lower remission rates and longer duration of substance use.<sup>[5,6,20]</sup>

Patients with ADHD were at higher risk of developing another psychiatric disorder, with the odds being as high as 2.26 compared to subjects without ADHD. Oortmerssen *et al.* and Wilens *et al.* studying SUDs also reported higher psychiatric comorbidity among subjects with ADHD.<sup>[21]</sup>

## Limitations

The present study was of cross-sectional design, and all patients in the study were recruited from an inpatient deaddiction ward with a diagnosis of severe AUD according to DSM 5. Hence, the data are limited in generalisability towards patients with mild

to moderate AUD attending deaddiction services. Adult ADHD diagnosis was confirmed by clinical interview method using DSM 5, and no structured diagnostic instruments were used for making adult ADHD diagnosis. Presence of childhood ADHD symptoms was not assessed. Clinical assessments were done using DSM 5 by interview method only, and structured assessment for other psychiatric morbidity, including personality disorders, was not done. Presence of childhood ADHD was not assessed. Finally, all patients in this study were males. Although this reflects the clinical scenario observed in India in a general hospital setup, it is a known fact that AUD is prevalent among the female population in a community set up.

## CONCLUSION

Overall, the present study confirms high ADHD comorbidity in subjects with AUD and show that these subjects have a more severe course with early relapses. AUD subjects with ADHD were younger, had faster progression towards regular use of alcohol, and a higher amount of alcohol consumption. The subjects with comorbid ADHD have a history of an early relapse. Hence, all patients should be evaluated for ADHD and interventions should be initiated for the underlying ADHD along with treatment for AUDs. Further, medications like atomoxetine need to be considered in the management, while more trials are needed to confirm the benefits of the same.<sup>[22,23]</sup> Alcoholism being a significant problem in the Indian population, we need to evaluate all patients for comorbid ADHD and more research is required in these disorders in Indian samples.

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## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Ganesh S, Kandasamy A, Sahayaraj US, Benegal V. Adult attention deficit hyperactivity disorder in patients with substance use disorders: A study from Southern India. *Indian J Psychol Med* 2017;39:59-62.
2. van de Glind G, Konstenius M, Koeter MW, van Emmerik-van Oortmerssen K, Carpentier PJ, Kaye S, *et al.* Variability in the prevalence of adult ADHD in treatment seeking substance use disorder patients: Results from an international multi-centre study exploring DSM-IV and DSM-5 criteria. *Drug Alcohol Depend* 2014;134:158-66.
3. Daigre Blanco C, Ramos-Quiroga JA, Valero S, Bosch R, Roncero C, Gonzalvo B, *et al.* Adult ADHD Self-Report Scale (ASRS-v1.1) symptom checklist in patients with substance use disorder. *Actas Esp Psiquiatr* 2009;37:299-305.
4. VanEmmerik-van Oortmerssen K, van de Glind G, van den Brink W, Smit F, Crunelle CL, Swets M, *et al.* Prevalence of attention-deficit hyperactivity disorder in substance use disorder patients: A meta-analysis and meta-regression analysis. *Drug Alcohol Depend* 2012;122:11-9.
5. Arias AJ, Gelernter J, Chan G, Weiss RD, Brady KT, Farrer L, *et al.* Correlates of co-occurring ADHD in drug-dependent subjects: Prevalence and features of substance dependence and psychiatric disorders. *Addict Behav* 2008;33:1199-207.
6. Kalbag AS, Levin FR. Adult ADHD and substance abuse: Diagnostic and treatment issues. *Subst Use Misuse* 2005;40:1955-81.
7. Ohlmeier MD, Peters K, TeWildt BT, Zedler M, Ziegenbein M, Wiese B, *et al.* Comorbidity of alcohol and substance dependence with attention-deficit/hyperactivity disorder (ADHD). *Alcohol Alcohol* 2008;43:300-4.
8. van de Glind G, van Emmerik-van Oortmerssen K, Carpentier PJ, Levin FR, Koeter MW, Barta C, *et al.* The international ADHD in substance use disorders prevalence (IASP) study: Background, methods and study population. *Int J Methods Psychiatr Res* 2013;22:232-44.
9. Matthys F, Stes S, van den Brink W, Joostens P, Mobius D, Tremmery S, *et al.* Guideline for screening, diagnosis and treatment of ADHD in adults with substance use disorders. *Int J Ment Health Addict* 2014;12:629-47.
10. Kumar M, Bharadwaj B, Kuppli PP, Ramaswamy G, Majella GM, Chinnakali P, *et al.* Association of attention-deficit hyperkinetic disorder with alcohol use disorders in fishermen. *J Neurosci Rural Pract* 2017;8(Suppl 1):S78-82.
11. Stockwell T, Murphy D, Hodgson R. The severity of alcohol dependence questionnaire: Its use, reliability and validity. *Addiction* 1983;78:145-55.
12. Sullivan JT, Sykora K, Schneiderman J, Naranjo CA, Sellers EM. Assessment of alcohol withdrawal: The revised clinical institute withdrawal assessment for alcohol scale (CIWA-Ar). *Br J Addict* 1989;84:1353-7.
13. Kessler RC, Adler L, Ames M, Demler O, Faraone S, Hiripi E, *et al.* The world health organization adult ADHD self-report scale (ASRS): A short screening scale for use in the general population. *Psychol Med* 2005;35:245-56.
14. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5<sup>th</sup> ed. Washington, DC: American Psychiatric Association; 2013.
15. Epi Info [computer program]. Version 7.2. Atlanta (GA): Centers for Disease Control and Prevention; 2018.
16. Gururaj G, Varghese M, Benegal V, Rao GN, Pathak K, Singh L, *et al.*; NMHS Collaborators Group. National Mental Health Survey of India, 2015-16: Prevalence, Pattern and Outcomes. Bengaluru: National Institute of Mental Health and Neuro Sciences, NIMHANS, Publication No 129; 2016.
17. Tarter RE, Kirisci L, Mezzich A. Multivariate typology of adolescents with alcohol use disorder. *Am J Addict* 1997;6:150-8.
18. Johann M, Bobbe G, Putzhammer A, Wodarz N. Comorbidity of alcohol dependence with attention-deficit hyperactivity disorder: Differences in phenotype with increased severity of the substance disorder, but not in genotype (serotonin transporter and 5 hydroxytryptamine-2c receptor). *Alcohol Clin Exp Res* 2003;27:1527-34.
19. Babor TF, Hofmann M, DelBoca FK, Hesselbrock V, Meyer RE, Dolinsky ZS, *et al.* Types of alcoholics, I. Evidence for

- an empirically derived typology based on indicators of vulnerability and severity. *Arch Gen Psychiatry* 1992b; 49:599-608.
20. Wilens TE, Biederman J, Mick E. Does ADHD affect the course of substance abuse? *Am J Addict* 1998;7:156-63.
  21. Van Emmerik-van Oortmerssen K, van de Glind G, Koeter MW, Allsop S, Auriacombe M, Barta C, *et al.* Psychiatric comorbidity in treatment-seeking substance use disorder patients with and without attention deficit hyperactivity disorder: Results of the IASP study. *Addiction* 2014;109:262-72.
  22. Wilens TE, Adler LA, Weiss MD, Michelson D, Ramsey JL, Moore RJ, *et al.* Atomoxetine treatment of adults with ADHD and comorbid alcohol use disorders. *Drug Alcohol Depend* 2008;96:145-54.
  23. Wilens TE, Adler LA, Tanaka Y, Xiao F, D'Souza DN, Gutkin SW, *et al.* Correlates of alcohol use in adults with ADHD and comorbid alcohol use disorders: Exploratory analysis of a placebo-controlled trial of atomoxetine. *Curr Med Res Opin* 2011;27:2309-20.