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Original Article

Study of Psychological Dysfunction and Cognitive impairment in Alcohol Dependence Patients

Sachin Kumar Prajapati[1] ,Neeti Kaushik*[2] ,Dr. Girijesh Kumar Yadav

[1]Consultant Clinical Psychologist) Department of Psychiatry, Autonomous State Medical College, Pilibhit.
Email:skprajapati865@gmail.com
*[2]Assistant Professor Department of (Special Education, Intellectual Disability) Composite regional Center for Skill development, Rehabitation and Empowerment of Person with Disability, Lucknow
Email: neetikaushik3@gmail.com
[3]Associate Professor, NCERT (Planning and Monitoring division), NCERT, New Delhi
Email:girijeshkrydv@gmail.com

***Corresponding Author:** Neeti Kaushik
Assistant Professor Department of Special Education, Intellectual Disability, Composite regional Center for Skill development, Rehabitation and Empowerment of Person with Disability, Lucknow
Email: neetikaushik3@gmail.com

Abstract
Alcoholism has a higher prevalence of comorbid psychiatric disorders than the general population. Heavy drinking has been shown to affect the neuropsychological performance (e.g., memory functions) of young people and may impair the growth and integrity of certain brain structures. Depression is also a common comorbid condition in recently detoxified alcoholics and may relate to both the physiological effects of alcohol withdrawal and psychological factors such as remorse over one's actions. An objective of the study will be to assess psychological dysfunction and cognitive impairment in alcohol-dependence patients and to compare them with healthy controls. Methodology- a Cross-sectional, non-interventional, case-control study would be applied for the present study. A total of 40 participants consisting of 20 Alcohol dependent patients and 20 Healthy controls will be randomly selected for the study. Data will be collected from the Drug De-addiction center in Delhi. Alcohol screening tools Michigan Alcohol Screening test (MAST) will be applied for alcohol dependence, Brief symptoms inventory to assess psychological dysfunction, Montreal cognitive assessment (MOCA) will assess for cognitive impairment. Depending on the nature of data appropriate statistical analysis would be carried out for the same.

Keywords: Psychological dysfunction, Cognitive impairment and Alcohol dependence

Introduction

Alcohol use disorders (AUDs) is a serious health problem globally The word-wide alcohol is third largest risk factor for disease and disability (Rocco A, et al., 2014). Alcohol use disorder have significant impact, such as medical conditions and psychiatric co-morbidities, on the overall well-being of a person. The latest findings from the Global Burden of Diseases report alcohol to be the seventh leading risk factor for mortality and disability-associated life years in the year 2016.The largest epidemiological survey for psychiatric disorders in India had been carried out in the year 2015–2016 and the report of this National Menta Health Survey shows a prevalence of 4.65% of Alcohol use disorder (Gururaj G, et al., 2016).Heavy drinking has been shown to affect the neuropsychological performance (e.g., memory functions) of young people and may impair the growth and integrity of certain brain structures. Alcohol use during adolescence and young adulthood is associated with poorer neuropsychological functioning, these impairments in young adults with alcohol use disorders (AUDs) (i.e., alcohol abuse and dependence) appear to be generally mild

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Rationale of the Study

There is high prevalence of Alcohol dependence and predominant cause of psychiatric co-morbidity.The minimal literature available has shown mixed results & neuropsychological and psychological dysfunction.It will help in developing better intervention programs, therapies and rehabilitation for alcohol dependence patients.

Aim & Objectives

To assess psychological dysfunction and cognitive impairment in alcohol-dependence patients and to compare them with healthy controls.

Hypothesis of the Study

There will be significant difference in psychological dysfunction between alcohol dependence patients and Healthy controls.

There will be significant difference in cognitive impairment between alcohol dependence patients and Healthy controls.

Material and Methods

• **Research design-** Cross-sectional, non-interventional, case-control study.

Procedure for Study group

•Written inform consent was obtained.
•The data collection was conducted in the rehabilitation centre.
•The socio-demographic proforma was completed to collect information about the socio-demographic and clinical details of the subjects.
•The time taken in tool administration was about 30-40 minutes in one session.
•The clinical tools- Michigan Alcohol Screening Test (MAST), Brief Symptom Inventory, (BSI) Montreal cognitive assessment (MOCA) were administered and thank was client for active participation.

Procedure for Healthy control

•The rehab staff and their relatives was contacted to participate in the study.
• The informed consent was obtained from; those will be willing to participate.
•General health questionnaire will be applied.
•The socio-demographic proforma was completed to collect information about the socio-demographic and clinical details of the subjects.
•The time taken in tool administration was about 30-40 minutes in one session.
•The Brief Symptom Inventory, (BSI) Montreal cognitive assessment (MOCA) was administered and thank was client for active participation.

Sample: A total of 40 participants will be randomly selected for the study, consisting of: 20 Alcohol dependent patients. 20 Healthy control subjects' data will be collected from Navjyoti rehab Noida Sector-112 and Healthy control subject comprised of rehab staff them having no history substance abuse. 2024 June-six month.

Inclusion and Exclusion Criteria

Inclusion criteria for study group

Willing to give informed consent. Patients aged between 18-60 years. Diagnosis with Alcohol dependence as per ICD-10 criteria. Individual free from significant Psychiatric and medical co-morbidity at the time of interview. • Should be able to read and comprehend the instructions of the tools. Should be able to cooperate during the interview and assessment.

Exclusion criteria for study Group

Patients suffering from unstable psychiatric and medical condition at the time of interview.

Michigan Alcohol Screening test (MAST)

•Michigan Alcohol Screening Test (MAST) was developed in 1971.
• Most accurate alcohol screening tests available, effective in identifying dependent drinkers with up to 98 percent accuracy.
•Questions on the MAST test relate to the patient's self-appraisal of social, vocational, and family problems frequently associated with heavy drinking.
•The test was developed to screen for alcohol problems in the general population.
•The following is the 22-question, self-administered MAST.

Brief symptoms inventory (BSI)

•Brief Symptom Inventory (BSI) is self-reported clinically relevant tools use for adolescents and adults.
•The Brief Symptom Inventory (BSI) consists of 53 items covering nine symptom dimensions and three global indices of distress: Global Severity Index, Positive Symptom Distress Index, and Positive Symptom Total.
•Time required 8-12 minutes and administration method self- or interviewer-administered

Montreal cognitive assessment (MOCA)

•Montreal cognitive assessment (MOCA) its design as a rapid screening instrument for mild cognitive impairment.
•Its assess 11 different cognitive domains and administered time 10 minutes.

Table -1 Comparison of Age Distribution Between Study Group and Healthy Controls.

Age (Years)	Study Group (n)	Healthy Controls (n)	p value
18–30	2	7	0.01*
31–45	9	6	
46–60	6	2	
Mean ± SD	41.41 ± 9.17	31.40 ± 7.02	

The mean age of the study group (41.41 ± 9.17 years) was higher than that of healthy controls (31.40 ± 7.02 years). This difference in age distribution between the two groups was statistically significant (p = 0.01)

Table 2: Participant Screening, Exclusion, and Inclusion Summary for Study and Control Groups

Category	Study Group	Healthy Controls
Total subjects screened	28	30
Excluded	11	15
Included	17	15

Out of the total subjects screened, 28 in the study group and 30 in the healthy control group, 11 and 15 participants were excluded respectively. Finally, 17 participants in the study group and 15 in the healthy control group were included for analysis. This shows a higher exclusion rate in the control group compared to the study group.

Table: 3 Distribution of Educational Status Among Study Group and Healthy Controls

Education Level	Study Group	Healthy Controls
Graduation	6	7
Intermediate	7	3
High School	2	2
Middle	2	3

The distribution of educational status was comparable between the two groups. In the study group, most participants had intermediate education (n = 7), followed by graduation (n = 6), high school (n = 2), and middle school (n = 2). In the healthy control group, the majority were graduates (n = 7), followed by intermediate (n = 3), high school (n = 2), and middle school (n = 3). The difference in educational distribution between the groups was not statistically significant (p = 0.62).

Table: 4 Comparison of Education Level Between Study Group and Healthy Controls.

Scale	Study Group (Mean ± SD)	Healthy Controls (Mean ± SD)	P-Value
BSI	48 ± 12.31	31.97 ± 20	0.19*
MOCA	24.27 ± 2.65	27.93 ± 1.16	0.13

The study group showed higher psychological distress on the Brief Symptom Inventory (BSI) and lower cognitive performance on the Montreal Cognitive Assessment (MOCA) compared to healthy controls. However, these differences were not statistically significant (BSI: p = 0.19; MOCA: p = 0.13), indicating no significant group differences in psychological dysfunction or cognitive impairment.

Discussion: The present study aimed to examine psychological dysfunction and cognitive impairment among individuals with alcohol dependence in comparison to healthy controls. Although the findings did not reach statistical significance, the observed trends provide meaningful insights into the potential impact of chronic alcohol use on mental health and cognitive functioning, in this study, alcohol-dependent participants

demonstrated higher levels of psychological distress, as measured by the Brief Symptom Inventory (BSI), compared to healthy controls. This aligns with existing literature suggesting that individuals with alcohol dependence frequently experience elevated levels of anxiety, depression, and overall psychological distress. Chronic alcohol use is known to disrupt neurochemical pathways, particularly those involving serotonin and dopamine, which play a crucial role in mood regulation. Additionally, psychological distress in alcohol-dependent individuals may also stem from social, occupational, and interpersonal difficulties associated with prolonged substance use. Feelings of guilt, social isolation, and impaired functioning may further exacerbate psychiatric symptoms, especially during early abstinence or detoxification phases, despite the lack of statistical significance ($p = 0.19$), the higher mean BSI scores in the study group suggest a clinically relevant trend. One possible explanation for the non-significant findings is the relatively small sample size, which may have limited the statistical power of the study to detect differences between groups. Furthermore, variability in symptom severity within the study group could have contributed to wider standard deviations, thereby reducing the likelihood of achieving statistical significance. It is also important to consider that participants in the study group were recruited from a rehabilitation setting, where some may have already begun recovery processes, potentially leading to partial improvement in psychological symptoms, in terms of cognitive functioning, the study group showed lower scores on the Montreal Cognitive Assessment (MOCA), indicating poorer cognitive performance compared to healthy controls. This finding is consistent with prior research that has documented cognitive deficits in individuals with alcohol use disorders, particularly in domains such as memory, attention, executive functioning, and visuospatial abilities. Chronic alcohol consumption has been associated with structural and functional brain changes, including reduced gray matter volume and impaired connectivity in frontal and temporal regions, which are critical for higher-order cognitive processes.

Although the difference in MOCA scores between the groups was not statistically significant ($p = 0.13$), the observed trend is noteworthy. Cognitive impairment in alcohol-dependent individuals can have significant implications for daily functioning, treatment adherence, and relapse risk. For example, deficits in executive functioning may impair decision-making and impulse control, increasing the likelihood of continued substance use. Similarly, memory impairments may affect the individual's ability to retain and apply therapeutic interventions learned during rehabilitation.

Another important aspect to consider is the role of age differences between the study and control groups. The mean age of the alcohol-dependent group was significantly higher than that of the control group ($p = 0.01$). Age is an important factor influencing both cognitive performance and psychological health. Older individuals may naturally exhibit some degree of cognitive decline, which could confound the relationship between alcohol use and cognitive impairment. Therefore, the age disparity between groups may have influenced the results, potentially exaggerating or masking true differences attributable to alcohol dependence, educational status, on the other hand, was comparable between the two groups ($p = 0.62$), suggesting that differences in cognitive performance were less likely to be influenced by educational background. Education is often considered a protective factor for cognitive functioning due to the concept of cognitive reserve; hence, the similarity in educational levels strengthens the internal validity of the findings related to cognitive outcomes.

The study also revealed a relatively high exclusion rate, particularly in the control group. This may reflect challenges in recruiting suitable participants who meet strict inclusion criteria, especially the absence of any substance uses or psychiatric history. The reduced final sample size (17 in the study group and 15 in the control group) further underscores the limitation of statistical power, which is a critical factor in detecting significant differences in case-control studies, it is also worth noting that the cross-sectional design of the study limits the ability to establish causal relationships. While the findings suggest an association between alcohol dependence and increased psychological distress as well as cognitive impairment, it cannot be definitively concluded that alcohol use is the direct cause of these deficits. Longitudinal studies would be more appropriate to examine the progression of cognitive and psychological changes over time and their relationship with duration and severity of alcohol use.

Additionally, the use of standardized and widely validated assessment tools such as MAST, BSI, and MOCA is a strength of the study. These instruments are efficient, reliable, and practical for clinical and research settings. However, they are screening tools and may not capture the full complexity of psychological and cognitive impairments. Comprehensive neuropsychological batteries and structured clinical interviews could provide more detailed and nuanced assessments in future research.

The findings of this study have important clinical implications. Even in the absence of statistically significant differences, the trends observed highlight the need for routine screening of

psychological and cognitive functioning in individuals with alcohol dependence. Early identification of these impairments can facilitate timely intervention, improve treatment outcomes, and enhance overall quality of life. Integrating cognitive rehabilitation strategies and psychological therapies into de-addiction programs may be particularly beneficial.

Clinical implication: The present study indicates that alcohol-dependent individuals show higher psychological distress and lower cognitive functioning compared to healthy controls. These findings highlight the importance of routine psychological and cognitive assessment in patients with alcohol dependence using tools such as the Montreal Cognitive Assessment, the results suggest that treatment should follow an integrated approach, addressing both substances use and associated psychological problems. Incorporating cognitive rehabilitation and psychological interventions can improve treatment participation, adherence, and reduce relapse risk.
Early identification and individualized treatment planning are essential for better clinical outcomes. Overall, a holistic and multidisciplinary approach is recommended for effective management of alcohol dependence.

Conclusion: The present study suggests that alcohol-dependent individuals tend to exhibit higher psychological distress and lower cognitive performance when compared to healthy controls, as assessed by the Brief Symptom Inventory (BSI) and the Montreal Cognitive Assessment (MOCA). Although the differences observed between the groups did not reach statistical significance, the consistent direction of the findings indicates a clinically meaningful trend that should not be overlooked. This pattern suggests a possible association between alcohol dependence, psychological dysfunction, and cognitive impairment.
The findings are in line with existing literature that highlights the negative impact of chronic alcohol use on emotional regulation, mental health, and neurocognitive functioning. Individuals with alcohol dependence often experience difficulties in domains such as memory, attention, executive functioning, and emotional stability, particularly during periods of active use or early abstinence. These impairments may contribute to reduced treatment engagement, poor decision-making, and increased risk of relapse, importantly; the lack of statistical significance in the present study may be attributed to methodological constraints such as the relatively small sample size and variability within groups, which may have reduced the statistical power to detect meaningful differences. Despite this, the observed trends remain clinically relevant and support the need for careful assessment in this population, the study underscores the importance of early screening and comprehensive evaluation of both psychological and cognitive domains in individuals with alcohol dependence. Incorporating standardized assessment tools in routine clinical practice can help in early identification of deficits and facilitate timely intervention. This may ultimately improve treatment planning, enhance rehabilitation outcomes, and support long-term recovery.

Limitations of the study:

- Methodological constraints: Small sample size and cross-sectional design limit statistical power and causal interpretation.
- Sampling issues: Single-center recruitment and high exclusion rate reduce representativeness and generalizability.
- Group imbalance: Significant age differences between groups may have influenced outcomes.
- Measurement limits: Reliance on brief screening tools such as the Montreal Cognitive Assessment may not capture detailed cognitive deficits.
- Uncontrolled confounders: Factors like duration and severity of alcohol use were not accounted for.
- Temporal limitation: Single-session assessment does not reflect changes over time.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the publication of this study.

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