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Original Article

Psychiatry/Mental Health Section

Impulsivity in Alcohol Dependence among Male Patients in Tamil Nadu: A Cross-sectional Study

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ABSTRACT

Introduction: Alcohol is one of the major substances used in our country, affecting people of young age to old age. It has become a significant concern as a public health burden across all of India. Although the consequences of alcohol dependence in terms of impulsivity are widely assessed, the depth of the burden of alcohol dependence changes with respect to place, time, and socio-economic conditions.

Aim: To understand the role of impulsivity and Adverse Childhood Events (ACE) in alcohol dependence among male patients.

Materials and Methods: A hospital-based cross-sectional study was conducted between January 2020 and December 2020 among 190 male cases of alcohol dependence syndrome based on ICD-10 criteria. These patients visited the outpatient or inpatient psychiatry department at SRM Medical College Hospital and Research Centre, Potheri, Chengalpattu, Tamil Nadu, India. During the first visit, socio-demographic and clinical details were collected, along with the Barratt Impulsiveness Scale (BIS) and ACE Questionnaire. During the second visit, the Adult Attention-Deficit/Hyperactivity Disorder (ADHD) Scale and Severity of Alcohol Dependence Questionnaire (SADQ) scales were used. Pearson's correlation was used for analysis using statistical software Statistical Package for Social Sciences (SPSS) version 21.0.

Results: Out of the 190 patients enrolled in the study, the majority had completed middle school level education (34.2%). Among the alcoholics, 63.7% were married, and approximately 73.2% were from the lower and middle socio-economic class. A family history of alcoholism was found in nearly 78% of the participants. The maximum number of participants had 1-3 months of abstinence. Pearson's correlation showed a positive correlation between impulsivity and its subscales with alcohol dependence score and ACE ($p<0.05$).

Conclusion: This study concludes that both impulsivity and alcohol dependence have a bidirectional relationship. ACE also has a positive relationship with impulsivity and alcohol use.

Keywords: Abstinence, Alcoholism, Relapse, Substance use

INTRODUCTION

Substance use has become a significant burden in both rural and urban areas across India [1]. There is an escalating trend in substance use disorders in epidemiological data being carried over across different parts of our country [2]. Alcohol is the major substance used across our country, affecting people of all ages, and it has become a significant concern as a public health burden across all of India, including union territories [3].

Not all individuals who consume alcohol develop an addiction. The answer lies in the fact that some drugs seem to be inherently more addictive than others. Another reason could be that some individuals are naturally impulsive. Additionally, environmental factors and genetically dysfunctional reward systems also play a role [4]. In the human brain, alcohol activates compulsive circuits and causes neuroplasticity effects, leading to dependence in individuals. Subclinical Hypothyroidism (SHT) plays a role in impulsivity and impaired inhibition, resulting in a loss of impulse control in the frontal cortex, particularly during adolescence. Later, reproductive hormones and neurodevelopment processes modulate impulsivity [5]. Alcohol use disorder has multifactorial causes, including biological, social, and psychological factors that predict alcohol dependence and relapse. Studies suggest that older populations commonly consume excessive amounts of alcohol units (more than four times a week) over a longer duration, while younger populations tend to have higher intake in a single sitting [5]. Impulsivity is influenced by various factors, including cognitive and personality factors.

Previous literature has shown that social problems and alcohol use disorders often coexist with impulsivity [6]. Attention Deficit Hyperactivity Disorder (ADHD) is also an important factor that plays a role in alcohol dependence. Alcohol use can exacerbate symptoms of ADHD, such as impulsiveness and difficulty focusing, and ADHD can also lead to excessive alcohol use, indicating a bidirectional relationship [6-8]. ADHD is five to ten times more common in adult alcoholics than in individuals without it. Additionally, around 25% of adults being treated for alcohol and substance use exhibit ADHD [8]. The aforementioned studies have compared impulsivity with alcohol or adverse childhood effects with alcohol dependence. Therefore, the present study was carried out to assess the relationship between impulsivity and severity of alcohol use and the relationship between ACE and impulsivity.

MATERIALS AND METHODS

A hospital-based cross-sectional study was conducted between January 2020 and December 2020 among 190 male cases of alcohol dependence syndrome based on ICD-10 criteria [9] who visited the outpatient or inpatient psychiatry department at SRM Medical College Hospital and Research Centre, Potheri, Chengalpattu, Tamil Nadu, India. This study was approved by the Institutional Ethics Committee (2115/IEC/2020).

Inclusion criteria: Male patient cases of alcohol dependence aged between 21 and 65 years were included in the study.

Exclusion criteria: Those patient cases in the withdrawal stage, other known substance abuse cases, and individuals with known co-morbid medical conditions such as heart disease, diabetes, bronchial asthma, and neurological cases such as a history of head injury, stroke, or seizure disorders were excluded from the study.

Sample size calculation: Considering the prevalence as 33.7%, the sample size was calculated using the formula $\{(Z\alpha/2)^2(1-P)\}/E^2$ and was found to be 190 [10].

Procedure

Before commencing the study, written consent was obtained from the participants. Socio-demographic data including educational status, occupational status, monthly income, marital status, habitat, mother tongue, religion, type of family, family history, and duration of abstinence were collected.

Prior permission was obtained before using each scale, and the English version of the respective scales was used. The BJ Prasad scale was used to determine socio-economic status. The BG Prasad scale was first formulated in 1961 and was later modified in 1968 and 1970 by the scale's developer. The scale is based on per capita monthly income (per capita monthly income=total monthly family income/total family members) and is applicable to individuals [11].

The lead investigator obtained each patient's medical history and conducted a clinical evaluation. For outpatients during the first visit, the BIS-11 [12] and ACE Questionnaire were used.

The BIS-11 is a 30-item self-report questionnaire scored on a 4-point scale. The severity scores are as follows: 1 (rarely/never), 2 (occasionally), 3 (often), 4 (almost always/always). This scale measures three subscales: attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness. Scores range from 30 to 120, with higher scores indicating higher levels of impulsivity. The Cronbach's alpha for the scale ranges from 0.79 to 0.83, indicating good internal consistency. It is a valid and reliable self-report measure of impulsivity in this population [12].

The ACE questionnaire is a 10-item measure used to assess childhood trauma, with each item answered with a simple yes or no response. A yes response has a score of 1, while a no response has a score of 0. Each type of trauma counts as one, regardless of how many times it occurs. The maximum score is 10, and the minimum score is 0. The ACE questionnaire has acceptable internal reliability consistency and test-retest reliability, with a threshold of 0.70 or higher [13].

During the second visit, the Severity of Alcohol Dependence Questionnaire (SADQ) was used. This scale is a short, easy-to-complete, self-administered questionnaire consisting of 20 items, designed to measure the severity of alcohol dependence. The SADQ was formulated by Edwards & Gross (1976) and Edwards (1978). It includes five subscales, each containing four items: physical withdrawal, affective withdrawal, withdrawal relief drinking, alcohol consumption, and rapidity of reinstatement. Each item is scored on a 4-point scale, ranging from "almost never" to "nearly always," resulting in a corresponding score of 0 to 3. Therefore, the total maximum score possible is 60, and the minimum score is 0. The Adult ADHD Self-Report Scale (ASRS) was also used, which is a screening questionnaire based on DSM-5 criteria to assess symptoms of ADHD in adults. This scale consists of a 20-item questionnaire with five subscales, each subdivided into four items: physical withdrawal, affective withdrawal, withdrawal relief drinking, alcohol consumption, and rapidity of reinstatement. Each item is graded on a 4-point scale from "almost never" to "nearly always," resulting in a score range of 0-3. A score of 0 indicates minimal symptoms, while a score of 60 indicates maximum symptoms [14]. All the data was entered into a spreadsheet for analysis.

STATISTICAL ANALYSIS

The data was sorted out and organised using the commercially available statistical software, SPSS version 21.0. Data were summarised using means and standard deviation for continuous variables and frequencies and percentages for categorical variables, when needed. Pearson's correlation was used for analysis. The statistical significance was defined at $p<0.05$.

RESULTS

Out of 190 participants, the majority completed middle school level (34.2%) or primary school level (23.2%), while 17.4% were uneducated. The occupation group was dominated by unskilled (35.5%), semiskilled (28.4%), and unemployed individuals (20%). According to [Table/Figure 1], it is clear that 23.2% of the participants' income falls below 1520 rupees per month, 32.1% falls between

S. No.	Socio-demographic variables	Participants n ((%) Total participants-190
1	**Educational status**	
	-illiterate	33 (17.3)
	-primary school	44 (23.1)
	-middle school	65 (34.2)
	-high school	38 (20)
	-diploma and above	10 (5.2)
2	**Occupational status**	
	-unemployed	38 (20)
	-unskilled	67 (35.2)
	-semiskilled	54 (28.4)
	-skilled	24 (12.6)
	-clerical	7 (3.7)
3	**Income status in rupees per month**	
	-less than 1520	44 (23.1)
	-1521-4550	61 (32.1)
	-4551-7593	63 (33.1)
	-7593-11361	21 (11.05)
	-11362-15187	1 (0.53)
4	**Marital status**	
	-newer married	53 (27.9)
	-married and staying	121 (63.7)
	-separated/divorce	16 (8.4)
5	**Socio-economic status [11]**	
	-lower	72 (37.8)
	-middle	67 (35.2)
	-upper middle	42 (22.1)
	-upper	9 (4.73)
6	**Habitat**	
	-rural	9 (4.73)
	-urban	181 (95.2)
7	**Mother tongue of participants**	
	-Tamil	121 (63.7)
	-English	53 (27.9)
	-others	16 (8.4)
8	Religion	
	-Hindus	157 (82.6)
	-Muslims	13 (6.8)
	-Christians	20 (10.5)
9	**Type of family**	
	-joint family	146 (76.8)
	-nuclear family	42 (23.2)
10	Prevalence of family history	
	-yes	148 (77.9)
	-no	42 (22.1)
11	**Duration of abstinence**	
	-less than one month	43 (22.6)
	-1 to 3 months	96 (50.5)
	-4 to 6 months	34 (17.9)
	-7 to 9 months	7 (3.7)
	-10 to 12 months	5 (32.6)
	-more than 12 months	5 (32.6)

[Table/Fig-1]: Socio-demographic details of the participants.

1521 and 4550 rupees, 33.2% falls between 4551 and 7593 rupees, 11.1% falls between 7594 and 11361 rupees, and only 0.1% falls between 11362 and 15187 rupees. Additionally, 63.7% of the alcoholics were married, and about 73.2% of the participants were from the lower and middle socio-economic class.

Among the 190 participants, nearly 24% lived as a single family, while 76.8% lived as a joint family. The family history of alcoholism was found to be approximately 78% among the participants. The majority of participants had 1-3 months of abstinence, followed by less than a month and 4-6 months of abstinence. The mean scores for impulsivity were 24.74, 17.99, and 24.33 for the motor, attention, and planning sub-scales, respectively. The severity of alcohol dependence had a mean score of 32.05, and the mean score of the adult ADHD self-report was 33.4, as shown in [Table/Fig-2]. The ACE had a mean score of 4.54 and a standard deviation of 2.00, also presented in [Table/Fig-2].

Variables	Mean	SD
Bar attention	17.99	5.47
Bar motor	24.74	7.1
Bar planning	24.33	7.01
SADQ	32.05	15.01
Adult ADHD	33.44	11.4
ACE	4.54	2.00

[Table/Fig-2]: Mean scores of subscales of Barratt Impulsiveness Scale-11 (BIS-11), SADQ, adult ADHD scale (n=190).

In this study, a positive correlation was observed between all the sub-scales of the BIS 11 questionnaire and the severity of alcohol dependence (SADQ, Adult ADHD scales), as shown in [Table/Fig-3].

[Table/Figure 4] describes the correlation between BIS and ACE.

Variables	Bar attention	Bar motor	Bar planning	SADQ	ADHD
Bar attention	-	0.322*	0.350*	0.500*	0.354*
Bar motor	0.322*	-	0.436*	0.665*	0.470*
Bar planning	0.350*	0.436*	-	0.679*	0.441*
SADQ	0.500*	0.665*	0.679*	-	0.702*
ADHD	0.0354*	0.0470*	0.0441*	0.0402*	-

[Table/Fig-3]: Pearson's correlation between subscales of Barrett impulsiviness SCALE-11, SADQ, Adult ADHD scale.
*Significant

Variables	ACE
Bar attention	0.423*
Bar motor	0.337*
Bar plan	0.519*

[Table/Fig-4]: Pearson's correlation between subscales of Barratt Impulsiveness Scale-11 (BIS-11) and Adverse Childhood Experience (ACE).
*Significant

DISCUSSION

It is a well-known fact that multiple substance abuse and frequent relapses have been associated with impulsivity [12]. Impulsivity and alcohol dependence have a bidirectional nature, and this strong relationship makes treatment difficult with poor prognosis [15]. Various studies have pointed out that not only personality traits but also addictive drugs have the capacity to increase the severity of impulsivity, and individuals who engage in substance use during their 30-40s are more prone to develop impulsivity [12,15].

Bjork JM et al., found that changes in impulsivity traits served as an indicator for the severity of substance use, particularly alcohol [16]. Moreover, not only adults but also children who have experienced physical violence, even in mild forms, tend to face adverse outcomes [16]. Recent studies state that not only the neurobiology of the body or genetic predisposition, but other environmental factors such as watching wrestling on television or playing real-time video games also contribute to impulsive behavior in both developed and developing countries [12,15,16].

The present study clearly shows the relationship between impulsivity and alcohol dependence in patients. Alcohol dependence at a high severity level was found to be significantly related to various subtypes of impulsivity.

When comparing socio-demographic details, a study conducted by Verdejo-García A et al., states that individuals who have completed middle school have a 40 percent higher chance of alcohol use, which coincides with our findings that 34 percent of participants who completed middle school had a higher number of alcohol use, followed by those with primary education [17]. According to Eashwar VA et al., who examined the burden and socio-economic impact of alcohol, 30-50% of alcohol consumers had a low level of education and an income below Rs. 7000 per month. Additionally, 20 to 35% of the study population belonged to the middle age group. They also mentioned that excessive alcohol-related problems were present in those who had started drinking at an early age. Nearly 30% regularly consumed alcohol for various reasons, mostly influenced by environmental factors such as peer pressure or being in the vicinity of a bar. Our study's results align with these findings [10].

According to Magid V et al., alcohol dependence was present in around 60% of married individuals, which again coincides with our study where nearly 64% of married patients had alcohol dependence syndrome [18]. In the present study, 78% of the participants had a family history of alcohol dependence, which is consistent with other studies [13,19]. Bjork JM et al., state that only one-fourth of the sample population had a negative history of alcohol dependence [16]. A study showed that impulsivity, social problem-solving, and alcohol dependency were contributors to aggression in a sample of provincially incarcerated offenders [20]. Another study stated that alcohol dependence was positively associated with impulsivity in almost all domains and concluded that 76 individuals with higher impulsivity scores also had higher rates of alcohol dependency, which aligns with the present study. This shows that alcohol use has a strong relationship with impulsivity [16]. A study conducted in Europe states that individual and environmental factors, such as stress and peer pressure, as well as living in high-risk areas of alcohol use, contribute to alcohol dependence.

These issues are considered biopsychosocial problems, and within three months of the abstinence period, 70 to 90 percent of people had relapsed [21]. The present study also found that the maximum number of cases relapsed within three months of abstinence. Some of the reasons for relapse included missed medications, lost follow-up, poor motivation at the time of discharge, and living alone. Once again, these findings were consistent with studies that reported a high number of participants relapsing during the first 1-3 months of the abstinence period [22,23].

Brown EA et al., state that psychosocial factors such as unemployment, poor economic situation, physical abuse, history of sexual abuse, and poor education have a positive influence on impulsivity in alcohol consumption. Similar findings were found in the present study, showing a strong positive relationship between impulsivity and alcohol-dependent participants, especially those who had experienced Adverse Childhood Experiences (ACE) [24]. Additionally, another study showed that experiencing adversity at a younger age has a positive impact on impulsivity and worsens the severity of alcohol dependence [25,26]. Therefore, it is likely that most alcohol-dependent individuals have experienced some kind of childhood trauma, which needs to be addressed during therapy [27].

The present study's findings align with the majority of studies conducted on impulsivity and alcohol dependence in relation to ACE.

Limitation(s)

The cross-sectional study design was one of the limitations of this study. A prospective study could provide better results. Additionally, there is a greater likelihood of bias due to a single interviewer managing the assessment-based questionnaires among the sample population. The sample size investigated in the study was small. A larger population size would be essential for further refining the analysis and revealing more differences related to the age groups involved in the study.

CONCLUSION(S)

Based on the findings of the current study, it can be concluded that impulsivity has a bidirectional relationship with alcohol use. Adverse Childhood Experiences (ACE) also have a positive relationship with impulsivity and alcohol use. These findings could serve as a suitable approach and could be utilised for future research in establishing an interventional treatment plan for patients with alcohol dependence and impulsivity.

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