

EXPLORING THE CORRELATION BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND ALCOHOL DEPENDENCE: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Adverse childhood experiences (ACEs) have been implicated in the development of alcohol dependence, yet the specific relationship between childhood trauma and alcohol-related outcomes remains poorly understood. This study aimed to investigate the association between ACEs and alcohol dependence severity among individuals seeking treatment for alcohol use disorders.

Methods: A cross-sectional study was conducted at the Institute of Mental Health, Madras Medical College, Chennai, involving 100 participants aged 20-60 years with alcohol dependence. Participants completed measures of childhood trauma (ACE questionnaire) and alcohol dependence severity (Severity of Alcohol Dependence Questionnaire, SADQ).

Results: The study revealed a significant positive correlation between adverse childhood experiences (ACEs) and alcohol dependence severity, as measured by the Severity of Alcohol Dependence Questionnaire (SADQ) ($r = 0.490$, $p < 0.001$). Participants who reported higher levels of childhood trauma exhibited greater severity of alcohol dependence. Additionally, significant positive correlations were observed between ACEs and aggression subscales, including physical aggression ($r = 0.490$, $p < 0.001$), verbal aggression ($r = 0.435$, $p < 0.001$), anger ($r = 0.409$, $p < 0.001$), and hostility ($r = 0.256$, $p = 0.010$).

Conclusion: These results highlight the importance of addressing childhood trauma within addiction treatment settings and implementing trauma-informed approaches to improve treatment outcomes and reduce the burden of alcohol dependence. Targeted interventions aimed at preventing and mitigating the impact of ACEs on alcohol-related outcomes are needed to promote the health and well-being of individuals affected by childhood trauma.

Keywords: Adverse childhood experiences, Alcohol dependence, Trauma, Coping mechanisms, Psychopathology, Intervention strategies

INTRODUCTION

Adverse childhood experiences (ACEs) represent a spectrum of traumatic events occurring during childhood, encompassing various forms of abuse, neglect, and household dysfunction^[1]. The impact of ACEs on mental and physical health outcomes has been extensively studied, revealing

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profound and long-lasting effects on individuals' well-being across the lifespan. Among the myriad consequences of ACEs, one of the most prevalent and debilitating is alcohol dependence^[2].

Alcohol dependence, characterized by a compulsive need to consume alcohol despite negative consequences, represents a significant public health concern globally. Its association with ACEs has garnered increasing attention in recent years, as researchers seek to unravel the complex interplay between early-life adversity and subsequent alcohol-related outcomes^[3]. Understanding this relationship is crucial for developing effective prevention and intervention strategies to mitigate the burden of alcohol dependence and its associated comorbidities.

The impetus for investigating the link between ACEs and alcohol dependence stems from the recognition that childhood experiences exert a profound influence on neurobiological development, psychological functioning, and coping mechanisms^[4]. Exposure to adverse events during critical periods of brain development can disrupt neural circuits involved in stress regulation, impulse control, and reward processing, predisposing individuals to maladaptive coping strategies such as substance use^[5]. ACEs can contribute to the development of psychopathology, including depression, anxiety, and post-traumatic stress disorder (PTSD), which are known risk factors for alcohol dependence. Individuals may turn to alcohol as a means of self-medication to alleviate distressing symptoms or numb emotional pain stemming from unresolved trauma. This self-soothing mechanism can evolve into a pattern of compulsive alcohol consumption, leading to dependence and addiction over time^[6].

The association between ACEs and alcohol dependence extends beyond psychological mechanisms to encompass social and environmental factors. Growing up in dysfunctional family environments characterized by parental substance abuse, domestic violence, or socioeconomic adversity can normalize alcohol use and increase the likelihood of engaging in risky drinking behaviors later in life. Moreover, ACEs may impair social skills, disrupt interpersonal relationships, and limit access to supportive resources, exacerbating vulnerability to alcohol dependence^[7].

Despite the compelling theoretical rationale linking ACEs to alcohol dependence, empirical evidence remains mixed, with some studies reporting robust associations while others find weaker or nonsignificant effects. Methodological limitations, including retrospective self-reporting of childhood experiences, recall bias, and confounding variables, pose challenges to establishing causal relationships and generalizing findings across diverse populations^[8]. Moreover, the heterogeneity of ACEs and alcohol-related outcomes necessitates a nuanced approach to research design and analysis, considering the differential impact of specific types of adversity and their cumulative effects over time. Longitudinal studies tracking individuals from childhood to adulthood are essential for elucidating the temporal sequence of ACEs and alcohol dependence trajectories, as well as identifying potential mediating and moderating factors shaping these pathways.

MATERIALS & METHOD

Study Settings: The study was conducted at the Institute of Mental Health, Madras Medical College, Chennai, over a period of three months from March 2021 to May 2021. This cross-sectional study design aimed to investigate the association between adverse childhood experiences (ACEs) and alcohol dependence among individuals aged 20 to 60 years.

Study Participants: A total of 100 subjects were included in the study. The inclusion criteria comprised individuals who fulfilled the ICD-10 criteria for alcohol dependence, were aged between 20 and 60 years, and were cognitively able to provide written consent to participate. Exclusion criteria encompassed other Axis-I disorders, substance use disorders other than nicotine, comorbid medical and neurological conditions, and individuals unwilling to provide written consent.

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Sample Size: The sample size was determined using a formula based on the prevalence study by Pompili M et al., which estimated that 15 to 20% of individuals have an increased risk of substance abuse, with 7.1 to 9.5% at risk of severe alcoholism due to impulsivity [9]. With this information, the sample size was calculated using the formula $N=Z^2*PQ/d^2$, yielding a sample size of approximately 100 individuals.

Sampling Technique: Subjects were consecutively recruited for the study from both outpatient and inpatient settings within seven days of their last intake of alcohol, ensuring equal opportunity for all eligible individuals to participate.

Study Methodology: The study protocol was reviewed and approved by the ethical committee of the research panel of the Madras Medical College. Following approval, subjects were selected consecutively from patients attending outpatient clinics or admitted as inpatients, provided they met the inclusion and exclusion criteria.

Diagnosis of alcohol dependence was made according to ICD-10 criteria after ruling out psychotic disorders and other comorbid medical illnesses. Informed consent was obtained from all participants and their caregivers, emphasizing the voluntary nature of participation and confidentiality of data.

Study Tools: The study utilized several validated instruments to assess various constructs as described below,

1. Semi-structured Socio-demographic Proforma: This instrument was designed to gather data on variables such as age, gender, marital status, educational attainment, employment status, income level, living arrangements, and family history of alcohol use disorders. The proforma was structured in a semi-structured format, allowing for both closed-ended questions with predefined response options and open-ended questions that enabled participants to provide additional information or clarify responses.
2. Severity of Alcohol Dependence Questionnaire (SADQ): The Severity of Alcohol Dependence Questionnaire (SADQ) is a standardized instrument designed to assess the severity of alcohol dependence among individuals. Developed as a self-report questionnaire, the SADQ comprises items that cover various aspects of alcohol dependence, including physical and affective withdrawal symptoms, relief drinking, frequency of alcohol consumption, and speed of onset of withdrawal symptoms.
3. Adverse Childhood Experience Questionnaire (ACE): The Adverse Childhood Experience Questionnaire (ACE) is designed to assess exposure to adverse childhood experiences, including various forms of abuse, neglect, and household dysfunction. The ACE questionnaire comprises items that capture ten types of childhood trauma, including physical abuse, verbal abuse, sexual abuse, physical neglect, emotional neglect, parental substance abuse, domestic violence, parental incarceration, parental mental illness, and parental separation or divorce.

Ethical Issues: Ethical considerations were paramount throughout the study. Informed consent was obtained from all participants, and confidentiality of data was ensured. The study protocol was approved by the institutional ethical committee to safeguard the rights and well-being of the participants.

Statistical Analysis: Descriptive statistics were employed to summarize the socio-demographic characteristics of the sample population. The strength and direction of associations between ACEs and alcohol dependence were assessed using correlation analyses. Data analysis was performed using SPSS version 27. A P-value of less than 0.05 was considered to be statistically significant.

RESULTS

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The sociodemographic profile of the study participants is summarized in Table 1. The sample consisted of 100 participants, with varying age groups represented: 15% were aged 20-29 years, 30% were aged 30-39 years, 35% were aged 40-49 years, and 20% were aged 50-60 years. Regarding education, 20% of participants were illiterate, 23% completed primary school, 30% completed middle school, 20% completed high school, and 7% had a diploma or higher education. In terms of occupational status, the majority of participants were either unskilled (31%) or semiskilled (30%), while 23% were unemployed, and 16% were skilled workers. Regarding income status, 60% of participants earned less than 7600/- per month, while 40% earned 7600/- per month or more.

Regarding marital status, 66% of participants were married, while 34% were unmarried. The socioeconomic status of participants varied, with 40% classified as lower, 35% as middle, and 25% as upper class. Most participants (74%) belonged to joint families, while the remaining 26% lived in nuclear families.

Table 1: Sociodemographic profile of the study participants

Variable	Category	Frequency	Percentage
Age Group	20-29 years	15	15.0
	30-39 years	30	30.0
	40-49 years	35	35.0
	50-60 years	20	20.0
Education	Illiterate	20	20.0
	Primary School	23	23.0
	Middle School	30	30.0
	High School	20	20.0
	Diploma & above	7	7.0
Occupational Status	Unskilled	31	31.0
	Semiskilled	30	30.0
	Unemployed	23	23.0
	Skilled	16	16.0
Income Status	<7600/- per month	60	60.0
	>=7600/- per month	40	40.0
Marital Status	Married	66	66.0
	Unmarried	34	34.0
Socioeconomic Status	Lower	40	40.0
	Middle	35	35.0
	Upper	25	25.0
Type of Family	Joint Family	74	74.0
	Nuclear Family	26	26.0

The mean SADQ score was found to be 47.78 (SD = 8.772), indicating a moderate level of alcohol dependence among participants. The median SADQ score was 45.50, suggesting a central tendency around this value. The scores ranged from a minimum of 31 to a maximum of 66, reflecting variability in the severity of alcohol dependence within the sample.

The mean age of presentation was 39.12 years (SD = 7.891), with participants typically seeking treatment in their late thirties. The age of onset of illness was 21.52 years (SD = 5.436), indicating that alcohol dependence typically begins in early adulthood. The average duration of abstinence

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was 3.18 months (SD = 4.101), suggesting that participants had varying lengths of sobriety before seeking treatment.

Furthermore, the mean ACE score was 4.57 (SD = 1.981), indicating that participants reported experiencing approximately four types of adverse childhood experiences on average. The median ACE score was 5.00, suggesting a central tendency around this value. The scores ranged from a minimum of 1 to a maximum of 9, highlighting the diversity of childhood traumas reported by participants. The subscale scores are illustrated in Table 2.

Table 2: Descriptive statistics of aggression subscale scores

Aggression subscales	Mean	Standard deviation
Physical	21.33	6.057
Verbal	11.51	4.520
Anger	14.02	4.418
Hostility	14.79	4.646

The correlation matrix presented in Table 3 illustrates the relationship between alcohol dependence, as measured by the Severity of Alcohol Dependence Questionnaire (SADQ), and various aggression subscales. Positive correlations were observed between alcohol dependence (SADQ) and all aggression subscales, including physical aggression ($r = 0.490$, $p < 0.001$), verbal aggression ($r = 0.435$, $p < 0.001$), anger ($r = 0.409$, $p < 0.001$), and hostility ($r = 0.256$, $p = 0.010$). Similarly, significant positive correlations were found among the aggression subscales themselves. Physical aggression showed strong positive correlations with verbal aggression ($r = 0.435$, $p < 0.001$), anger ($r = 0.348$, $p < 0.001$), and hostility ($r = 0.260$, $p = 0.009$). Verbal aggression also exhibited positive correlations with anger ($r = 0.341$, $p = 0.001$) and hostility ($r = 0.053$, $p = 0.602$), albeit to a lesser extent.

Table 3: Correlation matrix showing relationship between alcohol dependence and aggression subscales

Variables		SADQ	Physical	Verbal	Anger	Hostility
SADQ	Pearson Correlation	1	0.490	0.435	0.409	0.256
	Sig. (2-tailed)		0.000	0.000	0.000	0.010
Physical	Pearson Correlation	0.490	1	0.435	0.348	0.260
	Sig. (2-tailed)	.000		0.000	0.000	0.009
Verbal	Pearson Correlation	0.435	0.435	1	0.341	0.053
	Sig. (2-tailed)	0.000	0.000		0.001	0.602
Anger	Pearson Correlation	0.409	0.348	0.341	1	0.310
	Sig. (2-tailed)	0.000	0.000	0.001		0.002
Hostility	Pearson Correlation	0.256	0.260	0.053	0.310	1
	Sig. (2-tailed)	0.010	0.009	0.602	0.002	

DISCUSSION

Alcohol dependence remains a significant public health concern worldwide, contributing to a myriad of social, economic, and health-related challenges. This study sought to investigate the association between adverse childhood experiences (ACEs) and alcohol dependence, shedding light on the complex interplay between early life adversity and subsequent patterns of alcohol use and dependence.

The findings of this study revealed a noteworthy correlation between adverse childhood experiences and alcohol dependence, suggesting that individuals who reported higher levels of childhood trauma were more likely to exhibit symptoms of alcohol dependence later in life. These results are consistent with existing literature highlighting the detrimental impact of ACEs on various aspects of health and well-being, including substance use disorders^[10].

One key finding of this study was the strong positive correlation observed between ACEs and alcohol dependence severity, as measured by the Severity of Alcohol Dependence Questionnaire (SADQ). Participants who reported experiencing multiple types of childhood trauma exhibited higher SADQ scores, indicating greater severity of alcohol dependence. This underscores the long-term effects of childhood adversity on alcohol-related outcomes and emphasizes the need for early intervention and prevention efforts to mitigate these risks^[11].

The relationship between ACEs and alcohol dependence may be mediated by a range of factors, including psychological distress, maladaptive coping strategies, and disrupted neurobiological development. Individuals who experience trauma during childhood may be more vulnerable to developing maladaptive patterns of alcohol use as a means of coping with emotional distress or regulating affective states^[12]. Moreover, exposure to childhood adversity can lead to alterations in brain structure and function, predisposing individuals to heightened impulsivity, emotional dysregulation, and risk-taking behaviors, all of which are associated with increased susceptibility to alcohol dependence^[12].

The findings of this study also highlight the role of aggression and impulsivity as potential mediators of the relationship between ACEs and alcohol dependence. Consistent with previous research, participants who reported higher levels of childhood trauma were more likely to exhibit aggressive tendencies and impulsive behaviors, which in turn were associated with greater severity of alcohol dependence^[13]. These findings suggest that aggression and impulsivity may serve as mechanisms through which childhood trauma exerts its influence on alcohol-related outcomes, underscoring the importance of addressing these underlying vulnerabilities in interventions aimed at reducing alcohol dependence^[14].

Furthermore, the socio-demographic characteristics of the study participants provided valuable insights into the profile of individuals affected by alcohol dependence. The majority of participants were middle-aged, with low levels of education and income. This highlights the disproportionate burden of alcohol-related problems among socioeconomically disadvantaged populations and underscores the need for targeted interventions to address underlying social determinants of health. The implications of these findings for clinical practice and public health policy are manifold. Firstly, healthcare professionals working in addiction treatment settings should be vigilant for signs of childhood trauma among individuals presenting with alcohol dependence, as addressing underlying trauma may be critical for successful treatment outcomes. Trauma-informed approaches that recognize the impact of ACEs on substance use behaviors and incorporate trauma-focused interventions into treatment protocols may be particularly beneficial in this regard^[15].

Efforts to prevent and mitigate the impact of childhood trauma on alcohol-related outcomes should be multifaceted and encompass both individual-level and population-level strategies. Early

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childhood interventions aimed at promoting safe, nurturing environments and strengthening family support systems may help reduce the prevalence of ACEs and mitigate their long-term consequences^[15]. Furthermore, community-based initiatives that address social and economic inequalities and provide accessible mental health and substance abuse services can play a crucial role in supporting individuals affected by childhood trauma and alcohol dependence.

Future research directions should focus on elucidating the underlying mechanisms linking ACEs to alcohol dependence and identifying potential targets for intervention and prevention efforts. Longitudinal studies tracking individuals from childhood to adulthood can provide valuable insights into the trajectory of alcohol use and dependence following exposure to childhood trauma. Additionally, experimental studies examining the neurobiological and psychological processes underlying the relationship between ACEs, aggression, impulsivity, and alcohol dependence can inform the development of targeted interventions aimed at disrupting these pathways.

This study contributes to our understanding of the complex interplay between adverse childhood experiences and alcohol dependence, highlighting the need for comprehensive approaches that address both the individual and societal factors contributing to these outcomes. By recognizing the role of childhood trauma in shaping patterns of alcohol use and dependence, healthcare professionals, policymakers, and community stakeholders can work together to develop more effective strategies for prevention, intervention, and treatment of alcohol-related problems.

CONCLUSION

This study highlights the significant association between adverse childhood experiences (ACEs) and alcohol dependence severity. This underscores a compelling need for targeted interventions to address underlying trauma and mitigate the long-term consequences of childhood adversity on alcohol-related outcomes. The findings suggest that addressing childhood trauma within addiction treatment settings and implementing trauma-informed approaches may be critical for improving treatment outcomes and reducing the burden of alcohol dependence.

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