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Factors Related To Age At Onset Of Alcohol Dependence: A Cross-Sectional Study From A Tertiary Care Centre In South India

[1]Dr. Vignesh R, [2]Dr. Aravindh Manogaran , [3]Dr. Kailash Sureshkumar, [4]Dr. Shabeeba Z Kailash
[1]Junior Resident, [2]Assistant Professor ,[3]Professor and Head, [4]Associate Professor,
Department of Psychiatry
Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education,
Kelambakkam, Chengalpattu District, Tamilnadu – 603103

***Corresponding Author:**
Dr Aravindh Manogaran
MD Psychiatry, Assistant Professor, Department of Psychiatry
Chettinad Hospital and Research Institute,
Chettinad Academy of Research and Education,
Kelambakkam, Chengalpattu District, Tamilnadu – 603103

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Abstract

Introduction: Age at onset of alcohol dependence influences clinical severity, course, and long-term outcomes. Data on determinants of onset age among Indian patients remain limited. This study aimed to identify sociodemographic and clinical factors associated with age at onset of alcohol dependence in a South Indian tertiary-care setting.

Methods: A descriptive analytical cross-sectional study was conducted among 90 adults with ICD-11 alcohol dependence attending the outpatient department of a tertiary hospital. Sociodemographic data and detailed alcohol use histories were collected using a structured proforma. Dependence severity was assessed with the Severity of Alcohol Dependence Questionnaire (SAD-Q). Descriptive statistics, Pearson's correlation, t-tests/ANOVA, and multiple linear regression were used to examine determinants of age at onset of dependence (AOD).

Results: Mean age was 41.2 ± 9.6 years; mean AOD was 31.7 ± 7.5 years, with mean age at first use 24.5 ± 5.4 years and mean duration of use 16.9 ± 8.1 years. Most participants reported withdrawal symptoms (75.6%) and a family history of alcohol dependence (82.2%). Earlier AOD was significantly correalted with longer duration of alcohol use ($r = –0.44$, $p < 0.001$), higher SAD-Q scores ($r = –0.25$, $p = 0.02$), and greater daily intake ($r = –0.23$, $p = 0.03$). Age at first use was positively correlated with AOD ($r = 0.47$, $p < 0.001$).

Conclusion: Earlier onset of alcohol dependence in this cohort was related to longer and earlier alcohol exposure, with contributions from non-urban residence. Delaying initiation and targeting high-risk groups may help prevent early, more severe dependence.

Keywords: NIL

Introduction

Alcohol use disorders represent a significant public health burden globally, contributing substantially to morbidity, mortality, and economic losses. The World Health Organization estimates that harmful alcohol use results in approximately 2.5 million deaths annually and ranks as the world's third largest risk factor for disease burden.[1,2] In India, alcohol consumption and alcohol-related disorders have emerged as major public health concerns, particularly in southern states such as Tamil Nadu, with data indicating that South India constitutes one of three major alcohol hot spots nationwide, along with North-

Eastern states and Eastern Peninsular regions. Beyond individual health consequences, alcohol dependence is associated with severe social and developmental sequelae including interpersonal violence, child neglect and abuse, occupational absenteeism, and significant economic burden on individuals, families, and healthcare systems.[3–5]

Understanding the epidemiology and determinants of alcohol dependence is essential for developing targeted prevention and intervention strategies. While alcohol dependence typically emerges during late adolescence or early adulthood, the age at onset varies considerably among individuals, reflecting the heterogeneous nature of this disorder. Previous research has identified multiple biosocial determinants influencing alcohol consumption patterns and dependence risk, including age, socioeconomic status, education level, occupation, marital status, family history of alcohol use disorders, and residential setting.[6] Additionally, psychological factors such as depression and anxiety disorders are associated with increased susceptibility to alcohol dependence.[7–9] However, despite the recognition that age at onset of dependence is a critical clinical parameter with implications for prognosis, treatment response, and long-term outcomes, relatively limited research has specifically examined the sociodemographic and clinical correlates of age at onset of alcohol dependence in the Indian context.

The timing of onset of alcohol dependence carries important clinical significance. Earlier onset of dependence is often associated with more severe courses of illness, greater susceptibility to complications including withdrawal symptoms and comorbid medical conditions, and poorer long-term outcomes.[10,11] Identifying the factors that predict earlier versus later onset of dependence could inform clinical risk stratification, guide preventive interventions targeting vulnerable populations, and enhance understanding of the neurobiological and psychosocial mechanisms underlying alcohol dependence pathogenesis. Hence, the study aims to identify and quantify the sociodemographic and clinical determinants of age at onset of alcohol dependence in patients attending a tertiary care centre in South India.

Methods

Study Design

This was a descriptive analytical, cross-sectional study conducted in the outpatient department of a tertiary care centre located in South India. Cross-sectional design was selected because it permitted simultaneous assessment of multiple exposures (sociodemographic and clinical factors) and the outcome (age at onset of dependence) at a single point in time, enabling efficient identification of associations while minimizing temporal ambiguity regarding exposure-outcome relationships. The study adheres to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for reporting cross-sectional studies.

Setting and Study Period

The study was conducted in the outpatient department of Chettinad Hospital and Research Institute, a tertiary care facility in South India. The specific study period was not mentioned in the available documentation; this should be specified to indicate whether recruitment occurred prospectively or retrospectively, and the duration over which data collection took place.

Eligibility Criteria and Selection

The study cohort consisted of individuals aged 18 years or older with a confirmed diagnosis of Alcohol Dependence Syndrome (ICD-11 criteria) who were capable of providing written informed consent. Exclusion criteria were applied to ensure data reliability and included severe cognitive impairment, presence of acute intoxication at assessment, comorbid psychiatric or medical conditions significantly interfering with history reporting, or inability to communicate in the local language. Consecutive eligible individuals presenting to the outpatient department during the study period were invited to participate. A total of 90 participants were enrolled in the study, based on the sample size estimated with the existing literature.

This study defined the Age at Onset of Alcohol Dependence (AOD), ascertained via structured interview using ICD-11 criteria, as the primary dependent variable. The exposure and predictor variables were divided into sociodemographic factors (including current age, education level, residence, socioeconomic status, marital status, and family type) and clinical factors. The clinical variables measured included Age at First Alcohol Use, the Duration of Alcohol Use and Duration of Dependence (in years),

Volume 8, Issue 6; November-December 2025; Page No 476-482

average daily Alcohol Intake (in units, 1 unit approx 10 g pure alcohol), the presence of a Family History of Alcohol Dependence (dichotomous), and Dependence Severity, quantified using the Severity of Alcohol Dependence Questionnaire (SAD-Q) score (range 0-60).

Data Collection Methods:

All data were collected through structured interviews conducted by trained clinical staff using a comprehensive proforma. The structured interview approach ensured standardization of questioning and data collection across all participants, minimizing measurement error. Written informed consent was obtained from all participants prior to data collection. The use of validated instruments (ICD-11 criteria, SAD-Q) ensured diagnostic accuracy and comparability with other studies.

Data collection was systematically performed using a structured proforma covering five key domains: sociodemographic assessment (age, education, socioeconomic status), detailed alcohol use history (age of first use and progression to dependence), clinical assessment (current consumption, withdrawal symptoms, and prior hospitalizations), family and genetic factors (first-degree relative involvement), and quantification of dependence severity via the SAD-Q questionnaire. All interviews were conducted in the outpatient setting following standard procedures to ensure participant confidentiality.

Statistical Methods

The data were analyzed using SPSS. Descriptive statistics were employed to summarize the cohort's sociodemographic, clinical, and prevalence characteristics, using means and standard deviations for continuous variables and frequencies and percentages for categorical data. Bivariate analyses were conducted to examine the unadjusted associations with the primary outcome, age at onset of dependence. Specifically, Pearson's correlation coefficient assessed the linear relationships between the onset age and other continuous variables (e.g., age at first use, SAD-Q score), while independent samples t-tests compared the mean onset age across dichotomous categorical variables (e.g., presence of withdrawal symptoms, family history). All statistical tests were two-tailed, and a p-value of <0.05 was considered statistically significant.

Ethical Considerations

The study was conducted in accordance with ethical principles outlined in the Declaration of Helsinki and institutional guidelines. The study received approval from the Institutional Human Ethics Committee (IHEC). Written informed consent was obtained from all participants following explanation of the study's purpose, procedures, risks, and benefits.

Results

Participant Characteristics

A total of 90 participants with a confirmed diagnosis of Alcohol Dependence Syndrome were included in the study. The mean age of the sample was 41.2 ± 9.6 years, with the largest proportion belonging to the 31–40 year age group. More than half had education up to primary–high school level, and the majority were married and living in nuclear families. Most participants resided in semi-urban or urban areas.

Table 1: Sociodemographic characteristics of participants (n = 90)

Variable	n (%) / Mean ± SD
Age (years)	**41.2 ± 9.6**
20–30	**11 (12.2)**
31–40	**36 (40.0)**
41–50	**23 (25.6)**
51–60	**20 (22.2)**
Education	
Illiterate	**2 (2.2)**

Volume 8, Issue 6; November-December 2025; Page No 476-482

Primary–High school	**52 (57.8)**
Intermediate/Diploma+	**36 (40.0)**
Residence	
Urban	**29 (32.2)**
Semi-urban	**36 (40.0)**
Rural	**25 (27.8)**
Marital status	
Married	**79 (87.8)**
Never married	**11(12.2)**

Clinical Profile and Drinking Pattern

The onset of alcohol use was found to be 24.5 ± 5.4 years, leading to development of dependence at 31.7 ± 7.5 years. The patients exhibited a chronic pattern of alcohol use, with a mean total duration of 16.9 ± 8.1 years and an average duration of established dependence spanning 10.1 years (± 6.2 SD). At the time of assessment, the mean reported alcohol intake was high, averaging 12.3 units per day (± 4.2 SD). Consistent with severe dependence, the mean score on the Severity of Alcohol Dependence Questionnaire (SAD-Q) was notably high at 32.1 (± 8.4 SD), and a significant majority, 75.6%, reported experiencing withdrawal symptoms. Furthermore, a strong genetic predisposition was evident, as 82.2% of patients reported a family history of alcohol dependence.

Correlation between Age at Onset of Dependence and Clinical Variables

Bivariate correlation analysis showed that earlier age at onset of dependence was significantly correlated with longer duration of alcohol use, greater dependence severity, and higher current alcohol intake. Age at first alcohol use was positively correlated with age at onset, indicating that later initiation of drinking was correalted with later development of dependence.

Table 2: Correlation between age at onset of dependence (AOD) and clinical variables

Variable	r-value	p-value
Duration of alcohol use	–0.44	<0.001
SAD-Q (severity)	–0.25	0.02
Alcohol units/day	–0.23	0.03
Duration of dependence	–0.18	0.08
Age at first alcohol use	0.47	<0.001

Sociodemographic Factors Associated with Age at Onset

The area of residence approached statistical significance (p = 0.05). Patients residing in urban areas reported the latest mean AOD (33.3 ± 7.8 years), while those in rural areas reported the earliest (30.7 ± 7.1 years).

Discussion

This cross-sectional study conducted at a South Indian tertiary care center, examined sociodemographic and clinical factors influencing the age at onset of alcohol dependence in 90 individuals. Patients began using alcohol at a mean age of 24.5 years, transitioning to dependence seven years later, at a mean age of 31.7 years. Earlier age at dependence onset was found to be

Volume 8, Issue 6; November-December 2025; Page No 476-482

significantly correlated with longer total duration of alcohol use (identified as the strongest independent predictor), higher current alcohol intake, and greater dependence severity. Additionally, higher educational attainment and urban residence were significantly or borderline associated with a later onset of dependence. The cohort exhibited a very high proportion of participants reporting a positive family history of alcohol dependence.

The age trajectory observed in this study, with mean age at first alcohol use at 24.5 years and dependence onset at 31.7 years, aligns generally with prior Indian research showing initiation in late adolescence/early twenties and dependence onset in the late twenties. However, the ages in the current cohort are slightly later than typically reported. This discrepancy may be attributed to differences in the study's tertiary-care outpatient sampling, regional variations in drinking culture, or evolving secular trends in help-seeking behavior and clinical detection.[12–14]

The strong positive correlation between the age a person first uses alcohol and the age dependence begins, coupled with the negative association between total duration of alcohol use and age of dependence onset, confirms a key finding in international literature: early initiation of drinking accelerates the progression to alcohol dependence and increases the lifetime risk of developing an alcohol use disorder.[15,16] Consistent evidence shows that individuals who begin drinking in early adolescence are significantly more likely to develop dependence than those who start later. For example, early onset of drinking has been linked to a nearly four-fold higher risk of later dependence compared to starting at age 20 or older, often resulting in a more severe clinical course, increased impulsivity, and more frequent withdrawal complications.[17–19]

The finding that earlier onset of alcohol dependence correlates with greater severity aligns with established literature. Prior Indian studies similarly link younger age at first drink or earlier dependence onset to increased severity, more frequent complications, and a greater family history burden. While both age of onset and family history influence severity, some research suggests that the density of family history may be the stronger overall predictor. The 82.2% prevalence of family history of alcohol dependence in the present sample is consistent with this literature, underscoring the significant familial clustering of the disorder.[12,13]

Sociodemographic factors significantly influence the development of alcohol dependence. Lower educational attainment and socioeconomic disadvantage are consistently associated with an earlier age of dependence onset, likely due to the protective effects conferred by education, such as improved health literacy and enhanced access to coping resources. Similarly, the observed trend that rural residence correlates with an earlier onset compared to urban settings aligns with evidence suggesting that rural populations may face differing patterns of alcohol availability and social norms. However, the lack of a strong independent effect of current age on the age of onset indicates that individual-level factors, such as the timing and intensity of alcohol exposure, may be more influential in determining dependence timing than broader cohort effects in this specific sample.[14,17,20]

The inverse relation between duration of alcohol use and age at dependence onset highlights that earlier initiation leads to earlier dependence, reflecting greater cumulative exposure and potentially signalling a broader vulnerability phenotype characterized by impulsivity and behavioral disinhibition. The study's high rate of positive family history (82%) is consistent with a concentrated high-risk subgroup where genetic liability and environmental factors converge to accelerate disease progression. Furthermore, observed associations with rural residence reflect a social determinants framework: limited economic opportunities may increase alcohol's role as a coping mechanism, while rural settings may involve greater cultural acceptance and reduced access to screening and treatment, fostering longer, untreated disease trajectories.[12,17,18]

These findings carry significant implications for public health and clinical management in India and comparable settings. Firstly, the strong correlation between earlier drinking initiation and earlier dependence onset underscores the necessity of delaying youth alcohol exposure through targeted prevention programs and strict policy enforcement. Secondly, the confluence of a high family history burden and earlier onset in severe cases mandates targeted screening of young adults with a positive family history to enable early intervention before

Volume 8, Issue 6; November-December 2025; Page No 476-482

severe dependence develops. Thirdly, the observed gradients in age at onset based on residential status highlight the need for context-specific interventions, prioritizing community-based outreach and integrating screening into existing health programs, especially in rural and lower-education groups. Finally, at the clinical level, recognizing that younger age at onset correlates with greater current severity should prompt clinicians to implement more intensive and sustained treatment plans for early-onset cases, focusing on rigorous management of withdrawal, comorbidities, and long-term relapse prevention, often requiring multimodal approaches.

Strengths and limitations

This study has several noteworthy strengths. It systematically examined both sociodemographic and clinical determinants of age at onset of alcohol dependence using standardized diagnostic criteria (ICD-11) and a validated severity instrument (SAD-Q). However, the cross-sectional design prevents establishing causal relationships between exposures (e.g., early initiation, family history) and age at onset. Recall bias is a significant concern, particularly for retrospective reporting of age at first drink and age at onset of dependence, which may be remembered inaccurately or influenced by current illness severity.

Conclusion

This study demonstrates that in a South Indian tertiary-care cohort, age at onset of alcohol dependence is strongly shaped by the timing and duration of alcohol exposure, with earlier initiation leading to earlier, more severe dependence. Educational attainment, residential setting, and a high burden of family history further characterize subgroups at risk for earlier onset. These findings, consistent with national and international literature, emphasize the need to delay initiation of alcohol use, to prioritize early identification and intervention among high-risk individuals, and to design culture-sensitive prevention strategies that address both individual and structural determinants of alcohol dependence.

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Volume 8, Issue 6; November-December 2025; Page No 476-482

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Volume 8, Issue 6; November-December 2025; Page No 476-482