

A study on assessment of risk factors and prevalence of substance use disorders among MBBS undergraduate students in a medical college, Tamil nadu

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ABSTRACT

Background: Substance use among medical students has emerged as a growing public health concern, with potential consequences on mental health, academic performance, and professional development.

Objectives: To assess the prevalence and patterns of substance use among MBBS students and examine its association with anxiety, depression, and academic performance using validated clinical scales.

Methods: A cross-sectional study was conducted among MBBS students at a medical college in Tamil Nadu. Substance use was assessed using standardized screening tools, and psychological symptoms were evaluated using clinician-rated HAM-A and HAM-D scales.

Results: Alcohol and tobacco were the most used substances. Hazardous substance use was significantly associated with male gender, hostel residence, higher anxiety and depression scores, and poorer academic outcomes.

Conclusion: Hazardous substance use among MBBS students is strongly associated with psychological distress and adverse academic performance, underscoring the need for early screening and intervention.

Keywords: Substance use disorder, MBBS students, undergraduate medical students, prevalence, risk factors, medical college, Tamil Nadu, alcohol use, tobacco use, drug abuse, behavioral risk factors, cross-sectional study.

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Introduction

Medical education is widely recognized as one of the most demanding academic disciplines, characterized by heavy workload, frequent examinations, long hours, and high expectations. These stressors place undergraduate medical students at increased risk of adopting maladaptive coping behaviors, including substance use. Substance use among medical students is a global concern, as it affects not only their personal health but also their future professional responsibilities and patient care.

In India, several studies have reported a high prevalence of substance use among medical undergraduates. A systematic review and meta-analysis estimated the overall prevalence at 40.3%, with tobacco use at 21.9% and alcohol use at 27.1% (1). Cannabis use was reported

in approximately 8.2% of students, with lower use of other psychoactive substances. Significant gender differences were observed, with males having higher odds of tobacco and alcohol use (1). These findings indicate that medical knowledge alone does not prevent engagement in risky behaviors.

Recent studies also highlight variability in prevalence across regions. A cross-sectional study in Jammu (2023) reported alcohol use in 12.2% and tobacco use in 6% of students (2), while a study from Puducherry (2019) reported alcohol use in 10.8% (3). Such differences suggest that substance use patterns are influenced by geographical, institutional, and socio-demographic factors.

Psychosocial determinants such as peer influence, family history, academic stress, and hostel living play a crucial

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role in substance use initiation and continuation (4). Qualitative studies further identify stress, curiosity, and easy accessibility as contributing factors (5). Substance use is also associated with anxiety, depression, poor academic performance, and reduced attendance, affecting both personal well-being and professional competence (6).

Despite existing evidence, gaps remain regarding clinical correlates and mental health associations, particularly in Tamil Nadu. Therefore, this study aims to assess the prevalence, risk factors, and clinical correlates of substance use among MBBS students and examine its relationship with mental health and academic performance using a mixed-methods approach.

METHODOLOGY

Study Design and Setting: This analytical cross-sectional study with a qualitative component was conducted among MBBS undergraduate students at Meenakshi Medical College and Research Institute, Tamil Nadu. The design enabled assessment of the prevalence of substance use and its association with psychological symptoms and academic performance at a single point in time. The qualitative component was included to explore behavioral and psychosocial factors influencing substance use. The study was carried out over six months after Institutional Ethics Committee approval.

Study Population and Sampling: The study included MBBS students aged 18–25 years from first to final year. Stratified random sampling was used to ensure representation from both pre-clinical and clinical phases. A total of 360 students were approached, of whom 342 participated, giving a response rate of 94.7%. Students who did not consent or submitted incomplete data were excluded.

Eligibility Criteria

The inclusion criteria were MBBS undergraduates that were aged between 18 and 25 years and gave informed written consent. The exclusion criteria encompassed a student with a previously known psychiatric disorder receiving treatment, students with long-term medical conditions that may affect the psychological assessment, and those who failed to fill all the study instruments.

Data Collection Procedure

Data were collected using a structured, confidential format. Participants completed a self-administered questionnaire capturing sociodemographic details, academic factors, and substance use patterns. This was followed by clinician-administered psychological

assessments to improve reliability and reduce reporting bias. Students identified as hazardous or dependent users were invited for semi-structured interviews conducted in a private setting to explore factors such as stress, peer influence, and perceived consequences of substance use.

Assessment Tools

Substance Use: Assessed using DAST-10 and CRAFFT tools. Scores ≥ 3 (DAST-10) and ≥ 2 (CRAFFT) indicated hazardous use; higher scores with functional impairment were considered problematic use.

Anxiety: Evaluated using the Hamilton Anxiety Rating Scale (HAM-A), a 14-item clinician-rated scale (score range 0–56), with higher scores indicating greater severity.

Depression: Assessed using the 17-item Hamilton Depression Rating Scale (HAM-D) (score range 0–52), measuring severity of depressive symptoms without establishing diagnosis.

Academic Performance: Measured using self-reported attendance (<75% considered poor), perceived academic performance, and examination backlog history.

Statistical Analysis

Standard statistical software was employed in analyzing data. The continuous variables were given as the mean standard deviation, whereas the categories were given as frequencies and percentages. The independent t-tests were utilized to compare the mean scores of HAM-A and HAM-D between groups. The chi-square tests were used to evaluate associations between categorical variables. The binary logistic regression analysis was carried out to predict the hazardous substances use predictors. When the p-value was below 0.05 it was taken as significant.

RESULTS

Table 1. Sociodemographic Characteristics of the Study Participants (N = 342)

Variable	Category	n (%)
Age (years)	Mean \pm SD	20.6 \pm 1.8
Gender	Male	185 (54.1)
	Female	157 (45.9)
Academic phase	Pre-clinical	165 (48.2)
	Clinical	177 (51.8)
Residence	Hostel	193 (56.4)
	Day scholar	149 (43.6)

The average age of 342 respondents was 20.6 Standard Deviation 1.8. Among the students, there were 54.1 male and 45.9 female students. The sample of clinical-years students constituted a 51.8 percent proportion, and the

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proportion of the sample that was a hostel resident was 56.4 percent.

Table 2. Prevalence and Pattern of Substance Use Among MBBS Students

Substance	n (%)
Alcohol	91 (26.7)
Tobacco (any form)	63 (18.3)
Cannabis	22 (6.3)
Sedative misuse	12 (3.5)
Lifetime substance use (any)	132 (38.7)
Current substance use	101 (29.5)

Participants who reported lifetime use of substance were 38.7% with current use being 29.5%. The most prevalent drug was alcohol then tobacco. A lower percentage of students were reported to use cannabis and misuse sedatives. Male students, students living in the hostel, and students in clinical-year students used substances much more frequently ($p < 0.01$).

Table 3. Distribution of Hazardous and Dependent Substance Use

Category	n (%)
Non-users / Low-risk users	260 (76.0)
Hazardous users	63 (18.3)
Dependent / Problematic users	19 (5.6)

According to the scores of DAST-10 and CRAFTT, 18.3% of students were categorized as hazardous users of the substance, and 5.6% came to the criteria of dependent or problematic use. The risky usage was much more among male students and residents of hostels.

Table 4. Academic Performance Indicators Among Hazardous Users and Non-Users

Indicator	Hazardous Users (%)	Non-Users (%)	p-value
Poor attendance	32.1	11.8	<0.001
Poor academic performance	27.4	9.3	
Examination backlogs	21.4	4.8	

The level of anxiety and depressive symptoms based on the HAM-A and HAM-D was also significantly higher in hazardous substance users who had worse academic results with a higher rate of poor attendance, poor academic performance, and backlog of exams.

Table 5. Comparison of HAM-A and HAM-D Scores between Hazardous Users and Non-Users

Scale	Hazardous Users (Mean ± SD)	Non-Users (Mean ± SD)	p-value
HAM-A	21.3 ± 6.2	12.4 ± 5.1	<0.001
HAM-D	18.7 ± 5.8	9.6 ± 4.3	

HAM-A	21.3 ± 6.2	12.4 ± 5.1	<0.001
HAM-D	18.7 ± 5.8	9.6 ± 4.3	

Hazardous substance users had significantly higher anxiety and depression scores compared to non-users. The mean HAM-A score was higher among hazardous users (21.3 ± 6.2) than non-users (12.4 ± 5.1), indicating greater levels of anxiety. Similarly, the HAM-D score was elevated in hazardous users (18.7 ± 5.8) compared to non-users (9.6 ± 4.3), reflecting higher levels of depression. These differences were statistically significant ($p < 0.001$), suggesting a strong association between substance use and poorer mental health outcomes.

Table 6. Logistic Regression Analysis Showing Predictors of Hazardous Substance Use

Predictor	OR	95% CI	p-value
Elevated HAM-A score	2.91	1.45–5.83	0.002
Elevated HAM-D score	3.26	1.72–6.14	<0.001
Academic decline	2.57	1.18–4.83	0.01
Male gender	2.84	1.39–5.79	0.003
Hostel residence	2.41	1.22–4.64	0.009

Logistic regression analysis was used to establish the high scores of HAM-A, HAM-D, academic deterioration, male, and residence in the hostel to be significant predictors of hazardous substance use.

Discussion

The present study provides a comprehensive assessment of substance use patterns and clinical correlates among MBBS undergraduates in a medical college in Tamil Nadu. The finding that 38.7% of students reported lifetime substance use and 18.3% met criteria for hazardous use is consistent with Indian evidence indicating that medical students represent a high-risk group despite awareness of health consequences, as reported by Sahu et al. (2022) (1). The prevalence of alcohol and tobacco use observed in this study aligns with national trends, reflecting their social acceptability and easy accessibility in academic environments (4). The significantly higher prevalence of substance use among male students is consistent with findings from other Indian medical colleges, where male gender has been identified as a strong predictor of both experimentation and hazardous use (3). Sociocultural permissiveness, peer influence, and reduced supervision may contribute to this disparity (4). Similarly, the higher

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prevalence among hostel residents supports earlier findings that hostel environments increase exposure to peer pressure and reduce parental monitoring, thereby increasing vulnerability (5).

A key strength of this study is the use of clinician-rated Hamilton Anxiety Rating Scale (HAM-A) and Hamilton Depression Rating Scale (HAM-D). Hazardous substance users demonstrated significantly higher anxiety and depression scores, supporting the strong association between psychological distress and substance use (6). The use of clinician-rated tools enhances the validity of findings compared to self-reported measures. The association between elevated HAM-A scores and substance use is consistent with previous studies indicating that anxiety often precedes or coexists with substance use (8). Academic stress and performance pressure have been widely recognized as triggers for maladaptive coping behaviors, including substance use (4). Similarly, higher HAM-D scores among hazardous users suggest a bidirectional relationship between depression and substance use (6).

Academic performance emerged as a significant correlate, with hazardous users reporting poor attendance, reduced academic performance, and examination backlogs. These findings align with prior studies demonstrating that substance use adversely affects cognitive function, concentration, sleep, and motivation (9). The observed relationship suggests a reinforcing cycle in which academic stress leads to substance use, which further impairs academic outcomes.

Qualitative findings further supported these results, with students identifying stress, emotional burnout, and peer influence as major contributors to substance use, consistent with previous qualitative research (5). Social normalization, particularly in hostel settings, also played a critical role (4). Despite limitations such as cross-sectional design and self-reported academic data, the findings remain consistent with existing literature. Overall, the study highlights a strong association between hazardous substance use, psychological distress, and poor academic performance, emphasizing the need for early identification, integrated mental health support, and institutional preventive strategies (1)(4).

Conclusion

The present study highlights substance use as a significant public health concern among MBBS undergraduate students in a medical college in Tamil Nadu, with a considerable proportion reporting lifetime

use and many meeting criteria for hazardous consumption. Alcohol and tobacco were the most commonly used substances, reflecting their social acceptability and easy accessibility. Hazardous users demonstrated significantly higher levels of anxiety and depression, as assessed by HAM-A and HAM-D, indicating a strong association between psychological distress and substance use, likely as a maladaptive coping mechanism for academic and emotional stress. Additionally, substance use was significantly associated with poor academic performance, including low attendance and examination backlogs, underscoring its negative impact on cognitive and motivational domains. Key risk factors identified included male gender, hostel residence, and high psychological stress, highlighting the interplay of individual, environmental, and academic influences. These findings emphasize the urgent need for institution-based interventions, including routine screening, early identification, counseling services, and stress management programs, to improve student well-being and ensure the development of competent future healthcare professionals.

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