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Original Research

Substance Use Disorders Among College Students In Chennai: Pattern, Prevalence And Associated Psychiatric Comorbidities

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Abstract

Background: Substance use among college students is a growing public health concern globally. In India, limited data exists on the prevalence, patterns, and psychiatric comorbidities associated with substance use in college populations, particularly using standardized diagnostic instruments. Understanding these associations is crucial for developing targeted prevention and intervention strategies. ***Objective:***To determine the prevalence and patterns of substance use among college students in Chennai, examine associations with depression and anxiety, assess impact on academic performance, and identify independent predictors through multivariate analysis. ***Methods:*** A cross-sectional study was conducted among 612 college students from six colleges in Chennai during September to October 2025. Substance use was assessed using standardized questionnaires. Depression (PHQ-9), anxiety (GAD-7), and academic performance were evaluated. Statistical analysis included chi-square test, t-test, ANOVA, Pearson correlation, and multiple logistic regression. ***Results:*** Overall substance use prevalence was 28.4 %. Alcohol was most common (22.1 %), followed by tobacco (18.3 %) and cannabis (7.5 %). Male students showed significantly higher prevalence (40.5 % vs 14.2 %, p<0.001). Poly-substance use was present in 11.6 %. Depression was present in 41.4 % of substance users vs 18.7 % of non-users (OR=3.06, p<0.001). Anxiety prevalence was 38.5 % vs 16.2 % (OR=3.24, p<0.001). Substance users had lower CGPA (6.8±1.4 vs 7.8±1.2, p<0.001). Independent predictors included peer substance use (OR=4.42), male gender (OR=3.83), family history (OR=2.44), depression (OR=2.28), and anxiety (OR=2.11). Only 13.8 % sought professional help. ***Conclusion:*** Substance use prevalence among Chennai college students is high with significant psychiatric comorbidities and academic impairment. Strong associations with depression, anxiety, and poor academic performance necessitate comprehensive prevention programs and accessible mental health services in colleges.

Keywords: *Substance Use Disorder, College Students, Depression, Anxiety, Academic Performance, Alcohol, Tobacco, Cannabis*

Introduction

Substance use among college students represents a significant global public health challenge, with prevalence rates ranging from 20-45 % across different countries.1 The college years represent a critical developmental period characterized by increased independence, peer influence, and exposure to stress, making students particularly vulnerable to substance experimentation and misuse.2 Substance use during this period can lead to academic difficulties, mental health problems, and long-term addiction.

In India, substance use among youth has shown an alarming upward trend over the past decade. The National Survey on Extent and Pattern of Substance Use in India reported that 14.6 % of individuals aged 18-29 years used alcohol, while tobacco use prevalence was 28.5 %.3 However, college-specific data using validated instruments remains limited, particularly regarding psychiatric comorbidities and academic impact.[4]

Substance use frequently co-occurs with mental health disorders. Studies have documented strong associations between substance use and depression, anxiety, and stress among college students.5,6 This bidirectional relationship creates a vicious cycle where substance use exacerbates psychiatric symptoms, which in turn may lead to increased substance use as a maladaptive coping mechanism. Academic performance also suffers significantly, with substance-using students demonstrating lower grades, higher dropout rates, and reduced career prospects.[7]

While international research has extensively documented these associations, Indian studies remain scarce, particularly comprehensive assessments examining multiple substances simultaneously along with detailed psychiatric and academic correlates. This study aimed to determine the prevalence and patterns of substance use among college students in Chennai, examine associations with depression and anxiety, assess academic performance impact, and identify independent predictors to inform evidence-based interventions.

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Materials and Methods

This cross-sectional study was conducted in six colleges in Chennai, Tamil Nadu, including three engineering colleges, two arts and science colleges, and one medical college during September to October 2025. The study was designed to assess substance use prevalence, patterns, and associated psychiatric comorbidities among undergraduate students. Students with severe psychiatric illness requiring hospitalization or those unable to provide informed consent were excluded.

Sample size was calculated using $n = Z^2pq/d^2$, with expected substance use prevalence of 25 % based on previous Indian studies and 4 % precision, yielding 450 students. Accounting for 20 % non-response, 560 were targeted. Using stratified random sampling by college type and academic year, 680 students were approached and 612 completed questionnaires (response rate 90.0 %).

A structured questionnaire collected demographics, academic data, and detailed substance use history including type, frequency, age of initiation, and reasons for use. Depression was assessed using PHQ-9 (cut-off ≥10, sensitivity 88 %, specificity 88 %).8 Anxiety was measured using GAD-7 (cut-off ≥10).9 Stress was evaluated using Perceived Stress Scale-10 (PSS-10), and sleep quality using Pittsburgh Sleep Quality Index (PSQI >5 indicates poor sleep). Academic performance data including CGPA, attendance, and failures were obtained from institutional records with student consent. After ethical clearance from Institutional Ethics Committee, Tagore Medical College (IEC/TMC/2024/089), questionnaires were self-administered in classroom settings with informed consent and assured confidentiality. Data were analyzed using SPSS 26.0. Descriptive statistics, chi-square test, t-test, ANOVA with Tukey post-hoc, Pearson correlation, and multiple logistic regression were performed. Effect sizes (Cohen's d, odds ratios) were calculated. Significance was set at $p<0.05$.

Results

A total of 680 college students were approached, of which 612 completed questionnaires (response rate 90.0 %). Mean age was 20.2±1.8 years. Male students constituted 54.1 % (n=331), female students 45.9 % (n=281). Overall substance use prevalence in past 12 months was 28.4 % (95 % CI: 24.9-32.1 %). Alcohol was most common (22.1 %, n=135), followed by tobacco (18.3 %, n=112) and cannabis (7.5 %, n=46). Poly-substance use affected 11.6 % (n=71).

Table 1: Demographic Characteristics and Substance Use Prevalence (N=612)

Variable	Category	n (%)	Any Use n (%)	Alcohol n (%)	Tobacco n (%)	Cannabis n (%)	p-value
Gender							<0.001*
	Male	331 (54.1)	134 (40.5)	108 (32.6)	89 (26.9)	38 (11.5)	
	Female	281 (45.9)	40 (14.2)	27 (9.6)	23 (8.2)	8 (2.8)	
Academic Year							<0.001*
	First	160 (26.1)	32 (20.0)	24 (15.0)	19 (11.9)	6 (3.8)	
	Second	152 (24.8)	40 (26.3)	30 (19.7)	26 (17.1)	10 (6.6)	
	Third	156 (25.5)	50 (32.1)	38 (24.4)	33 (21.2)	14 (9.0)	
	Fourth	144 (23.5)	52 (36.1)	43 (29.9)	34 (23.6)	16 (11.1)	
College Type							<0.001*
	Engineering	258 (42.2)	92 (35.7)	70 (27.1)	58 (22.5)	25 (9.7)	
	Arts & Science	216 (35.3)	58 (26.9)	44 (20.4)	38 (17.6)	15 (6.9)	
	Medical	138 (22.5)	24 (17.4)	21 (15.2)	16 (11.6)	6 (4.3)	
Residence							<0.001*
	Hostel	368 (60.1)	126 (34.2)	97 (26.4)	78 (21.2)	34 (9.2)	
	Day scholar	244 (39.9)	48 (19.7)	38 (15.6)	34 (13.9)	12 (4.9)	

**Statistically significant at p<0.05*

Table 1 demonstrates male students showed significantly higher prevalence (40.5 % vs 14.2 %, OR=4.12, 95 % CI: 2.78-6.10, p<0.001). Substance use increased progressively from First year (20.0 %) to Fourth year (36.1 %, p<0.001). Engineering students showed highest prevalence (35.7 %), followed by arts and science (26.9 %) and medical students (17.4 %, p<0.001). Hostel residents had higher prevalence (34.2 % vs 19.7 %, OR=2.14, p<0.001).

Figure 1: Prevalence of Substance Use by Gender and Type

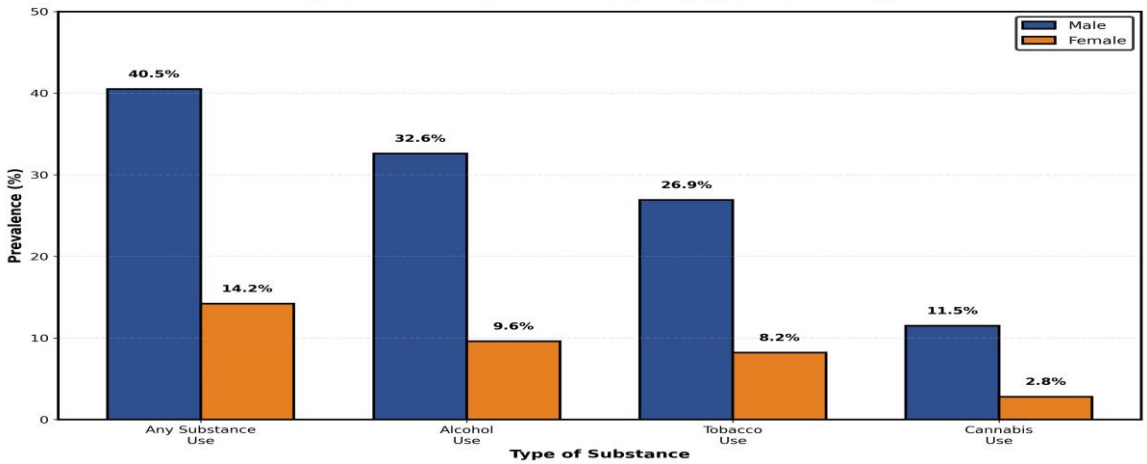

Figure 1: Prevalence of Substance Use by Gender and Type

Among substance users, 40.8 % reported poly-substance use. The most common combination was alcohol and tobacco (n=48, 27.6 % of substance users), followed by alcohol, tobacco and cannabis (n=18, 10.3 %). Students using multiple substances had significantly higher mean age (21.2±1.6 vs 19.8±1.7 years, t=5.67, p<0.001) and were more likely to be in senior academic years (Third/Fourth year: 71.8 % vs 48.5 %, p=0.003).

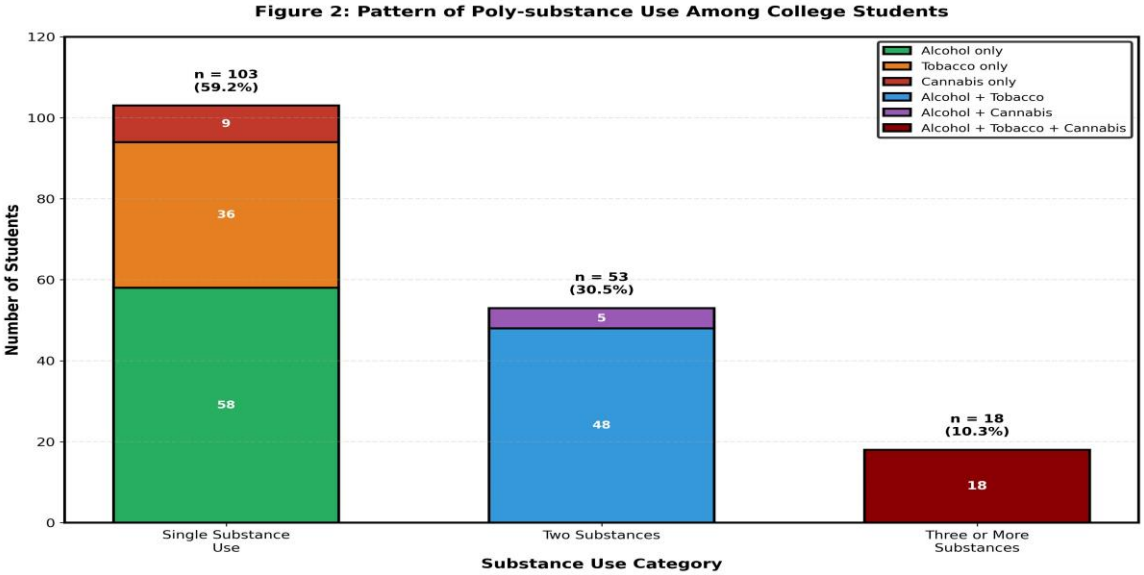

Figure 2: Pattern of Poly-substance Use Among College Students

Table 2: Psychiatric Comorbidities Among Substance Users vs Non-users

Condition	Users (n=174)	Non-users (n=438)	Test Statistic	p-value	OR (95% CI)
Depression (PHQ-9≥10)	72 (41.4%)	82 (18.7%)	χ^2=38.45	<0.001*	3.06 (2.12-4.42)
Mean PHQ-9±SD	10.8±5.6	6.2±4.8	t=9.24	<0.001*	-
Anxiety (GAD-7≥10)	67 (38.5%)	71 (16.2%)	χ^2=36.78	<0.001*	3.24 (2.22-4.73)
Mean GAD-7±SD	9.6±5.2	5.8±4.4	t=8.42	<0.001*	-
Both Dep & Anxiety	48 (27.6%)	38 (8.7%)	χ^2=36.12	<0.001*	4.02 (2.56-6.31)
High Stress (PSS≥27)	58 (33.3%)	72 (16.4%)	χ^2=21.45	<0.001*	2.54 (1.72-3.75)
Poor Sleep (PSQI>5)	118 (67.8%)	186 (42.5%)	χ^2=34.56	<0.001*	2.85 (1.98-4.10)
Suicidal Ideation	28 (16.1%)	24 (5.5%)	χ^2=18.92	<0.001*	3.29 (1.87-5.79)
Self-harm Behavior	18 (10.3%)	16 (3.7%)	χ^2=11.23	0.001*	3.02 (1.52-6.01)

**p<0.05; PHQ-9: Patient Health Questionnaire-9; GAD-7: Generalized Anxiety Disorder-7; PSS: Perceived Stress Scale*

Table 2 shows depression prevalence was 41.4 % among users versus 18.7 % in non-users (OR=3.06, p<0.001). Anxiety was present in 38.5 % versus 16.2 % (OR=3.24, p<0.001). Co-occurring depression and anxiety affected 27.6 % of users versus 8.7 % (OR=4.02, p<0.001). Cannabis users showed highest comorbidity rates (depression 52.2 %, anxiety 47.8 %). Poly-substance users showed higher psychiatric comorbidity: depression 56.3 % versus 33.0 % in single substance users (p=0.002). Suicidal ideation was significantly more common among users (16.1 % vs 5.5 %, OR=3.29, p<0.001).

Table 3: Academic Performance Among Substance Users vs Non-users

Indicator	Users (n=174)	Non-users (n=438)	Test Statistic	p-value
Mean CGPA±SD	6.8±1.4	7.8±1.2	t=8.34	<0.001*
CGPA <6.0 (Poor)	38 (21.8%)	42 (9.6%)	χ^2=34.56	<0.001*
Academic Failures	62 (35.6%)	68 (15.5%)	χ^2=29.45	<0.001*
Mean Attendance %±SD	68.4±14.2	78.6±12.8	t=8.12	<0.001*
Attendance <75%	98 (56.3%)	142 (32.4%)	χ^2=30.12	<0.001*
Frequent Concentration	86 (49.4%)	102 (23.3%)	χ^2=42.34	<0.001*
Low Motivation (≤4/10)	68 (39.1%)	72 (16.4%)	χ^2=35.67	<0.001*
Drop-out Contemplation	42 (24.1%)	46 (10.5%)	χ^2=19.67	<0.001*

**Statistically significant at p<0.05*

Table 3 demonstrates substance users had significantly lower CGPA (6.8±1.4 vs 7.8±1.2, t=8.34, p<0.001, Cohen's d=0.77), higher academic failures (35.6 % vs 15.5 %, OR=3.01, p<0.001), and lower attendance (68.4 % vs 78.6 %, p<0.001). Concentration problems were reported by 49.4 % of users versus 23.3 % of non-users (p<0.001). Frequency of substance use correlated negatively with CGPA (r=-0.512, p<0.001), attendance (r=-0.468, p<0.001), and academic motivation (r=-0.534, p<0.001). Poly-substance users showed poorest academic performance with mean CGPA 6.2±1.6 compared to single substance users (7.1±1.3) and non-users (7.8±1.2, F=28.45, p<0.001).

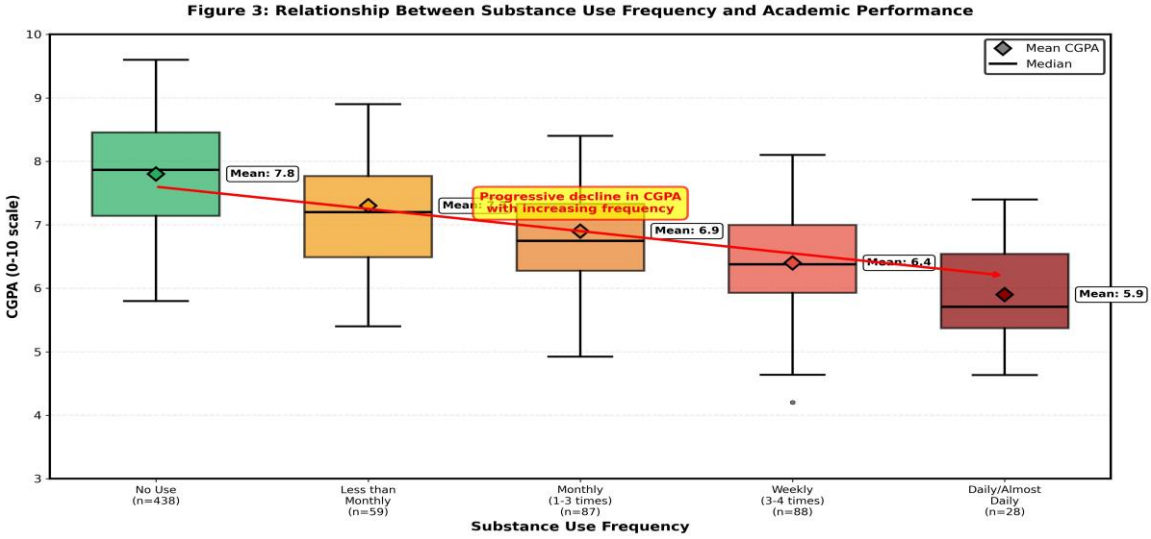

Figure 3: Relationship Between Substance Use Frequency and Academic Performance

Cannabis users demonstrated lowest mean CGPA (6.1±1.8). Among substance users, 14.9 % reported frequently missing classes due to substance use. Mean age of initiation was 16.9±2.4 years for tobacco, 17.8±2.1 years for alcohol, and 18.3±1.9 years for cannabis. Peer pressure (57-61 %) and curiosity (50-70 %) were primary reasons for initiation across all substances.

Table 4: Pattern and Reasons for Substance Use Among Users

Characteristic	Alcohol (n=135)	Tobacco (n=112)	Cannabis (n=46)
Mean Age of Initiation±SD	17.8±2.1 years	16.9±2.4 years	18.3±1.9 years
Mean Duration of Use±SD	2.4±1.6 years	3.2±1.9 years	2.1±1.4 years
Frequency - Daily/Weekly	51 (37.8%)	50 (44.7%)	15 (32.6%)
Primary Substance Type	Beer/Spirits 93 (68.9%)	Cigarettes 76 (67.9%)	Marijuana 40 (87.0%)
Reasons (Multiple):			
Peer pressure	78 (57.8%)	64 (57.1%)	28 (60.9%)
Curiosity	68 (50.4%)	58 (51.8%)	32 (69.6%)
Academic stress	52 (38.5%)	42 (37.5%)	24 (52.2%)
Relaxation	64 (47.4%)	48 (42.9%)	36 (78.3%)
Perceived as Harmful	55 (40.7%)	62 (55.4%)	20 (43.5%)

Note: %ages may exceed 100% for multiple response questions

Table 4 presents substance use patterns. Tobacco showed earliest initiation (16.9±2.4 years) and longest duration (3.2±1.9 years). Among alcohol users, beer/spirits were most common (68.9 %). Cigarettes were primary tobacco product (67.9 %). Notably, 78.3 % of cannabis users cited relaxation as a reason, suggesting self-medication. Only 40-55 % perceived their substance use as harmful.

Table 5: Independent Predictors of Substance Use - Multiple Logistic Regression

Predictor Variable	Adjusted OR	95% CI	p-value
Peer substance use (present)	4.42	2.68-7.29	<0.001*
Male gender	3.83	2.37-6.19	<0.001*
Family history of substance use	2.44	1.53-3.89	<0.001*
Engineering college (vs medical)	2.35	1.31-4.22	0.004*
Depression (PHQ-9≥10)	2.28	1.42-3.66	0.001*
Senior years (3rd/4th vs 1st/2nd)	2.19	1.43-3.35	<0.001*
Anxiety (GAD-7≥10)	2.11	1.29-3.45	0.003*
Poor academic performance (CGPA<7)	1.88	1.19-2.98	0.007*
Hostel residence	1.84	1.19-2.85	0.006*
High academic stress	1.76	1.13-2.75	0.013*
Higher pocket money (>₹5000/month)	1.69	1.08-2.64	0.020*
Low parental monitoring	1.61	1.05-2.47	0.028*

**p<0.05; Model: Nagelkerke R^2=0.468, Hosmer-Lemeshow χ^2=7.82, p=0.452; Overall classification 78.6%; ROC AUC=0.867*

Table 5 presents multiple logistic regression results. The model showed good fit (Nagelkerke R^2=0.468, Hosmer-Lemeshow p=0.452) with 78.6 % correct classification. Peer substance use emerged as the strongest predictor (OR=4.42, p<0.001), followed by male gender (OR=3.83), family history (OR=2.44), and depression (OR=2.28). Significant interaction existed between gender and peer influence (interaction OR=2.18, p=0.012). Among substance users, only 13.8 % sought professional help. Primary barriers included stigma (65.3 %), lack of awareness (54.7 %), and fear of consequences (50.7 %).

Discussion

This study revealed 28.4 % substance use prevalence among Chennai college students, comparable to national estimates.10,11 The striking gender disparity (male 40.5 % vs female 14.2 %) reflects global patterns and Indian cultural contexts.12,13 Progressive increase across academic years (20.0 to 36.1 %) demonstrates cumulative exposure effects.14

The strong association between substance use and psychiatric comorbidities has critical implications. Depression prevalence of 41.4 % among users versus 18.7 % among non-users (OR=3.06) suggests bidirectional relationships.15,16 The particularly high rates among cannabis users (depression 52.2 %, anxiety 47.8 %) align with research documenting cannabis-associated psychopathology.17 Co-occurring depression and anxiety in 27.6 % of substance users (OR=4.02) represents a critical target for integrated interventions.

The profound academic impact demonstrated by 1.0 point lower CGPA among substance users has serious implications.18 Peer substance use emerged as the strongest predictor (OR=4.42), consistent with extensive literature.19 The strong independent associations with depression (OR=2.28) and anxiety (OR=2.11) suggest these conditions represent primary risk factors.20

The alarmingly low help-seeking rate (13.8 %) despite high prevalence reflects multiple barriers including stigma, lack of awareness, and fear of consequences. Study strengths include adequate sample size, validated instruments, and robust multivariate analysis. Limitations include cross-sectional design, potential underreporting, and generalizability limited to Chennai colleges.

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Findings necessitate comprehensive campus-based prevention programs, routine screening for substance use and psychiatric comorbidities, accessible stigma-free counseling services, academic support for at-risk students, and policy interventions addressing availability near educational institutions.

Conclusion

Substance use among Chennai college students shows alarmingly high prevalence (28.4 %) with significant gender disparities, progressive increase across academic years, and strong associations with depression (OR=3.06), anxiety (OR=3.24), and poor academic performance. Peer influence, male gender, family history, and psychiatric comorbidities emerge as key predictors. The low help-seeking rate (13.8 %) underscores urgent requirement for comprehensive, integrated campus-based programs addressing substance use, mental health, and academic support simultaneously.

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