

Original Research Article

Prevalence, patterns of addictions and its impact on mental health among undergraduate medical students in Belagavi: a cross-sectional study

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Received: 15 October 2025

Accepted: 20 November 2025

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ABSTRACT

Background: Undergraduate medical students are vulnerable to various forms of addiction owing to academic stress and lifestyle. Both substance use and internet addiction are recognized as determinants of psychological morbidity, potentially affecting their academic performance. This study aimed to assess the prevalence and patterns of substance use and internet addiction and their impact on mental health among undergraduate medical students in Belagavi.

Methods: A cross-sectional study was conducted among 498 undergraduate medical students in November–December 2024. Data were collected using a structured, pretested questionnaire which included socio-demographic data, ASSIST (Alcohol, Smoking and Substance Involvement Screening Test), AUDIT (Alcohol Use Disorders Identification Test), GHQ-28 (General Health Questionnaire-28) and Young's Internet Addiction Test. Statistical analysis was performed using SPSS v25.0 with association assessed using the chi-square test with a significant level ($p < 0.05$).

Results: Most participants (91.4%) were aged 19–25 years, with 57.2% males. Internet addiction was found in 58.6% (mild–moderate) and 0.4% (severe). Substance use was low sedatives (4.4%), inhalants (0.6%) and risky alcohol use in 23.9% of the participants. Psychological distress was mild in 16.9% and moderate in 2%. Tobacco, alcohol use and internet addiction were significantly associated with anxiety and depression ($p < 0.001$).

Conclusions: Internet addiction and substance use though varying in prevalence, A significant proportion of medical students had internet and substance-related addictions, with significant mental health effects. Targeted interventions such as counseling, stress management and digital hygiene training are warranted to mitigate these risks.

Keywords: Digital hygiene, GHQ-28, Internet addiction, Medical students, Mental health, Substance use

INTRODUCTION

Addiction is increasingly recognized as one of the most pressing global public health challenges of 21st century, defined as a chronic disorder characterized by compulsive drug seeking, persistent use despite harm and long-term neurobiological changes.¹ It includes substance dependence (e.g., alcohol, tobacco, cannabis) and behavioural addictions such as internet and gaming disorders, which are increasingly prevalent among youth, particularly medical students. Internet addiction, as defined by Young (1998), refers to excessive or poorly

controlled preoccupations, urges or behaviours regarding internet use that cause impairment or distress.² Globally, the UNODC World Drug Report 2024 estimates 300 million drug users, with cannabis the most commonly used (228 million), followed by opioids (60 million), amphetamines (30 million) and cocaine (23 million).³

Alcohol consumption affects 2.3 billion people, contributing to an estimated 0.9 million injury related deaths annually. Tobacco remains a leading preventable cause of death, killing over 8 million annually; in 2020,

22.3% of the global population used tobacco, with more than 80% residing in low- and middle-income countries.⁴

India reflects these global trends with the state of Karnataka reporting that nearly one in four adults use tobacco (22.8%) and almost a quarter of men (23.6%) use alcohol.⁵ Among students, however the concern is even more pronounced. Academic pressure, stress, peer influence has been linked to risky behaviour, placing them at elevated risk for substance use and behavioural addictions.

Internet addiction has emerged as a contemporary behavioural epidemic, especially among students who rely heavily on digital resources for academic and social needs. The study, based on the Health Behaviour in School-aged Children (HBSC) survey, found that the prevalence of problematic social media use increased from 7% in 2018 to 11% in 2022. Additionally, 12% of adolescents were identified as being at risk of problematic gaming. These findings underscore the growing public health concern regarding excessive internet use among youth.⁶ A cross-sectional study in 2021 among Indian medical students revealed that 59% were addicted to the internet, with 18.4% having moderate and 0.8% severe addiction levels.⁷

Medical students are uniquely vulnerable due to a demanding curriculum, long study hours and the emotional stress of clinical training. This combination of academic pressure, emotional exhaustion and limited leisure increases susceptibility to addictive behaviours and psychological distress. The National Medical Commission (2024) reports that 8% of undergraduate medical students experience mental health disorders and 16% report suicidal thoughts.⁸

Despite the growing body of evidence, most studies focus separately on either substance use or internet addiction. There is a significant gap in literature assessing both these addictions and their combined impact on mental health among undergraduate medical students in the Karnataka region. Moreover, limited studies have assessed associations with anxiety, depression and social dysfunction using validated tools such as GHQ-28. This study aims to address these gaps by estimating the prevalence and patterns of substance use and internet addictions among undergraduate medical students in Belagavi, Karnataka and furthermore exploring their impact on mental health and overall well-being, an area of increasing urgency for safeguarding the further healthcare workforce.

METHODS

A cross-sectional study was conducted among 498 undergraduate medical students in Belagavi North Karnataka, during November-December 2024. Undergraduate medical students from all academic years, including interns, were eligible. Students with psychiatric

illness and on medication were excluded. Finally, 498 students were enrolled using universal sampling from an eligible pool of 600. Ethical clearance was obtained from the Institutional Ethics Committee (BIMS-IEC/358/2024-25) and written informed consent was taken from all participants. Confidentiality and anonymity were strictly maintained.

Data were collected using a validated, structured questionnaire. It included socio-demographic details, the WHO Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), Alcohol Use Disorders Identification Test (AUDIT), General Health Questionnaire-28 (GHQ-28) and Young's Internet Addiction Test (IAT). ASSIST and AUDIT assessed substance and alcohol use, GHQ-28 screened for psychological distress across four domains and IAT evaluated severity of internet addiction. Questionnaires were self-administered during class hours, with 30 minutes allocated per session. Data were entered in Microsoft Excel 2019 and analyzed using SPSS v25.0. Categorical variables were expressed as frequencies and percentages and associations between addictions and psychological outcomes were examined using chi-square tests, with $p < 0.05$ considered significant.

RESULTS

Socio-demographic profile

Of the 498 medical students enrolled, most (91.4%) were aged 19-25 years and 57.2% were male. Majorities were from urban areas (72.3%), lived in hostels (84%) and belonged to nuclear families (77.7%). Nearly half (43.4%) were from the middle socioeconomic class. The highest number of students were in their third year (34.1%), followed by those in their first and second years (Table 1).

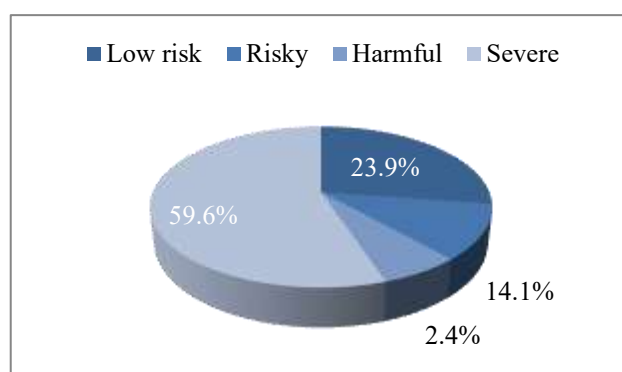


Figure 1: Distribution of study participants based on health problems due to alcohol consumption (n=498).

Substance use patterns

As shown in table 2, cannabis use was reported by 4.4% of students, with 0.6% at high risk. Use of sedatives, inhalants and prescription drugs was reported by 0.4–

0.6% of students, while 93.9% reported no substance use. Regarding alcohol consumption, assessed by AUDIT, 59.6% of participants fell into the low-risk category, 23.9% were risky users, 14.1% harmful users and 2.4% had severe risk (Figure 1).

The distribution of internet usage is presented in figure 2. About 41% of students had no addiction, while 29.5% showed mild addiction, 29.1% moderate addiction and 0.4% severe addiction. According to the GHQ-28 (Figure 3), 81.1% of participants reported normal mental health, 17% had mild distress and 2% had moderate distress. No student reported severe psychological distress.

Associations between addictions and psychological distress

The findings from the (Table 3) reveal a significant link between various forms of addiction and psychological distress among undergraduate medical students. As internet addiction severity increased, so did the proportion of students experience psychological distress, with 10.3% in the no addiction group and 50% in the severe addiction group ($\chi^2=18.92$, $p<0.001$).

Similarly, alcohol use showed a strong association with mental health outcomes only 2.4% of students with low-risk drinking reported distress, compared to 31.9% in the risky use group and 61.4% in the harmful use group ($\chi^2=47.52$, $p<0.001$). Substance use also demonstrated a significant correlation, where 14.6% of non-users reported distress, rising sharply to 54.5% among those in the moderate to high-risk group ($\chi^2=21.63$, $p<0.001$).

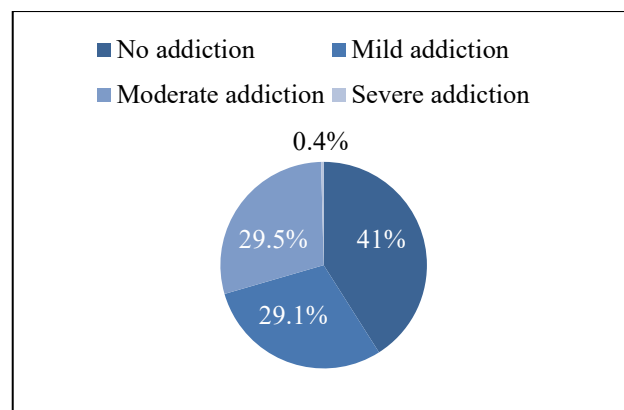


Figure 2: Distribution of study participants based on internet usage.

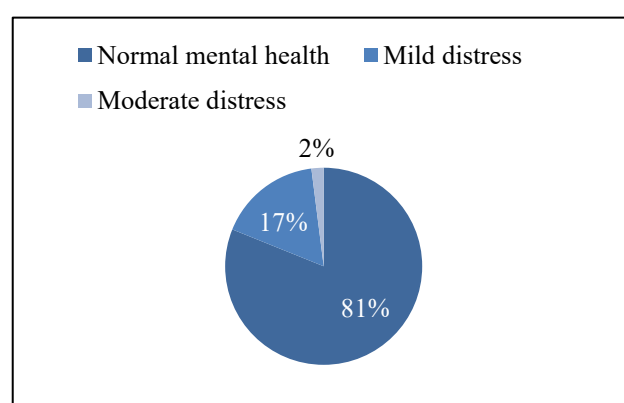


Figure 3: Distribution of study participants based on GHQ-28 (n=498).

Table 1: Socio-demographic profile of study participants (n=498).

Variables	Frequency (N)	(%)
Age (in years)		
17-18	41	8.2
19-20	222	44.6
21-25	233	46.8
26-30	2	0.4
Gender		
Female	213	42.8
Male	285	57.2
Area of residence		
Rural	138	27.7
Urban	360	72.3
Current place of stay		
Home with parents	60	12.0
Hosteller	418	84
Non hosteller / home with friends	20	4.0
Year of study		
1 st year	144	29
2 nd year	141	28.3
3 rd year	170	34.1
Final year	28	5.6
Internship	15	3.0

Continued

Variables	Frequency (N)	(%)
Socioeconomic class		
Lower class	8	1.6
Lower middle class	72	14.4
Middle class	216	43.4
Upper class	113	22.7
Upper middle class	89	17.9
Type of family		
Nuclear family	387	77.7
Joint family	58	11.6
Three generation	49	9.8
Others	4	0.8

Table 2: Distribution of study participants based on the patterns of substance use using an ASSIST score (n=498).

Substance use	Low risk (%)	Moderate risk (%)	High risk	No use (%)
Cannabis	22 (4.4)	3 (0.6)	—	473 (94.9)
Prescription drugs	3 (0.6)	3 (0.6)	—	492 (98.8)
Inhalants	3 (0.6)	3 (0.6)	—	492 (98.8)
Sedatives	2 (0.4)	3 (0.6)	—	493 (99.0)

Table 3: Association between addictions and psychological distress among undergraduate medical students (n=498).

Addiction type	Category	Normal mental health (N, %)	Distress (mild+moderate) (N, %)	Total (N)	Chi-square (χ^2)	P value
Internet addiction	No addiction	183 (89.7)	21 (10.3)	204	$\chi^2=18.92$	<0.001
	Mild	114 (77.6)	33 (22.4)	147		
	Moderate	106 (73.1)	39 (26.9)	145		
	Severe	1 (50.0)	1 (50.0)	28		
	Total	404 (81.1)	94 (18.9)	498		
Alcohol use	Low risk	290 (97.6)	7 (2.4)	297	$\chi^2=47.52$	<0.001
	Risky	81 (68.1)	38 (31.9)	119		
	Harmful	27 (38.6)	43 (61.4)	70		
	Severe	6 (50.0)	6 (50.0)	12		
	Total	404 (81.1)	94 (18.9)	498		
Substance use	No use	394 (83.3)	79 (16.7)	473	$\chi^2=21.63$	<0.001
	Low risk	10 (45.5)	12 (54.5)	22		
	Moderate–high risk	0	3 (100)	3		
	Total	404 (81.1)	94 (18.9)	498		

DISCUSSION

This study assessed the prevalence of substance use and internet addiction among undergraduate medical students along with their impact on mental health. The findings highlight the growing concern of behavioural and substance-related addictions within this academically and emotionally vulnerable group.

Substance use patterns

The prevalence of cannabis, sedatives, inhalants and prescription drug use ranged from 0.4% to 4.4%, with most students categorized as low-risk or non-users. These findings are comparable with Lokesh et al, in Puducherry, where 1.6% of students reported cannabis use and 5.3%

reported sedative use.⁹ Regarding alcohol consumption, 23.9% of students were at risk of developing health problems, while 2.4% were in the severe-risk category. This is lower than the prevalence reported by Verenkar et al where 39.4% of students consumed alcohol and 7.2% fell into the high-risk category.¹⁰ Gender-specific patterns are notable, as previous research suggests that females may initiate alcohol use in response to psychosocial stressors. Umesh et al and Olickal et al reported that female college students in urban Bengaluru exhibited initiation of alcohol use during the COVID-19 pandemic primarily due to academic stress, peer influence and coping with emotional pressures. This finding aligns with the observed trends in our study, highlighting the influence of psychosocial and contextual factors on substance use behaviors among medical students.¹¹ A systematic review and meta-analysis by Sahu et al,

estimated pooled prevalence of 8.2% for cannabis, 27.1% for alcohol and 21.9% for tobacco among Indian medical students.¹² Compared with these figures, the lower prevalence in Belagavi may reflect institutional regulations, sociocultural norms or underreporting due to social desirability bias. Regional variability within Karnataka is evident Das et al (Tumkur) reported 7% cannabis use, 19% alcohol consumption and moderate awareness among medical students.¹³ Dinna Bant et al, observed alcohol, marijuana and cigarette use with a rising trend across academic years, ranging from 10–18% for alcohol and 3–7% for marijuana.¹⁴ Similarly, Sharma et al, reported 23.3% of students used substances, predominantly alcohol 19.3%.¹⁵

Internet addiction

59% of students exhibited internet addiction: 29.5% mild, 29.1% moderate and 0.4% severe. These figures are consistent with Raveendran et al who reported a prevalence of 59% with 31% mild, 27% moderate and 1% severe among medical students.⁷ By contrast, Abbas et al (Delhi) reported a substantially higher prevalence of 90%, with 40% mild, 38% moderate and 12% severe, indicating regional and institutional differences.¹⁶ Srijampana et al found a significant negative impact on academics and increased depression and anxiety scores in students with internet addiction.¹⁷ Prakash et al reported positive correlations between internet addiction and stress ($r=0.63$), depression ($r=0.59$) and anxiety ($r=0.58$).¹⁸ Similarly, a cross-sectional study in Nagpur also found 63.6% of medical students exhibited internet addiction and 99.2% had nomophobia.¹⁹

Mental health and psychological distress

Based on GHQ-28, 18.9% of participants exhibited psychological distress. This is lower than the 39.2% prevalence of depression reported by Paul et al, but still clinically significant, as even mild distress may progress to more severe disorders.²⁰ Prakash et al reported strong correlations between internet addiction and depression, anxiety and stress among medical students ($r=0.59$ – 0.63), while Abbas et al found that students with higher internet addiction scores had elevated stress and mental health burden.^{16,18} Das et al (Tumkur) reported variable emotional coping abilities and psychological strain, emphasizing the widespread nature of mental health challenges in this group.¹³

Association between addiction and mental health

A statistically significant association was found between internet addiction and psychological distress ($p<0.001$), with the likelihood of distress increasing with the severity of internet addiction. Similarly, substance use particularly tobacco and alcohol was associated with higher levels of anxiety and depression, echoing findings from Garg et al and Saxena et al, reported strong links between substance use, coping mechanisms and mental health morbidity in medical students.^{21,22} Gender-based differences were

evident, with males showing higher substance use and females reporting greater psychological distress. Umesh and Olickal similarly highlighted that female students may initiate alcohol use in response to academic and social pressures, emphasizing the role of gender-specific psychosocial factors in substance use patterns and mental health outcomes. Living arrangements and peer environments also influenced addiction behaviour students staying with friends were more likely to use substances, while hostellers in our study exhibited higher internet use, suggesting that social context plays a key role.¹¹ A similar study by Niranjjan et al among medical students in Puducherry reported 21.4% substance abuse and 20.7% psychological distress, significantly associated with each other ($p=0.005$). In comparison, the present study found a lower prevalence of substance use (0.4–4.4%) but similar psychological distress (18.9%), indicating regional and institutional variations.²³ The Puducherry study identified sleep deprivation as a strong predictor of both substance use and psychological distress, highlighting the need to consider sleep hygiene as an important factor influencing mental well-being among medical students. These findings are consistent with Prakash et al who reported strong correlations between internet addiction and stress ($r=0.63$), depression ($r=0.59$) and anxiety ($r=0.58$) among medical graduates.¹⁸ Similarly, Srijampana et al, (2023), in a meta-analysis of Indian medical students, found that internet addiction was associated with poorer mental health outcomes, with a standardized mean difference (SMD) of 0.45 for depression and anxiety, supporting the observed linkage in our cohort.¹⁷

Limitations include the single-center design, which may restrict generalizability and findings may not be generalized to all the medical institutions across different regions, Cross-sectional study design limits causal inference between addiction and psychological distress, self-reported data may be influenced by recall bias/ under reporting bias due to social desirability and focus on selected addiction may differ the results. Psychosocial distress assessment relied on GHQ-28 without clinical diagnostic confirmation. Despite these limitations, the study emphasizes the importance of proactive strategies to safeguard mental health, promote healthy behaviours and support the development of resilient future healthcare professionals.

CONCLUSION

The study demonstrates that while substance use among undergraduate medical students remains relatively low, internet addiction was notably prevalent and significantly associated with psychological distress. Additionally alcohol misuse continue to be a concern with considerable proportion of students engaging in risky health problems. The combined burden of addiction and mental health issues highlights a vulnerable population that requires urgent attention. Unchecked, these issues can impair professional performance,

empathy and clinical decision-making, ultimately affecting patient care and safety.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Periyasamy M, Chingale AL. Prevalence, patterns of addictions and its impact on mental health among undergraduate medical students in Belagavi: a cross-sectional study. *Int J Community Med Public Health* 2025;12:5713-8.