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ORIGINAL PAPER

Risk and associates of tobacco, alcohol and cannabis use among undergraduate university students – a Pan-India cross-sectional study

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ABSTRACT

Introduction and aim. Substance abuse and its associated problems are a global concern. Young adults, particularly college-going students, remain among the highest at-risk groups for various substance use disorders. So, this study was conducted to find out the prevalence of substance use and its correlates among undergraduate (UG) university students.

Material and methods. We did an online cross-sectional survey among 1003 undergraduate university students across India using a pre-structured, self-reported questionnaire consisting of basic demographic details, standard tool (WHO-ASSIST), and the results were tabulated. A multivariable binary logistic regression analysis was performed to find out the correlates of substance use and Pearson correlation to find a correlation between ASSIST scores. Significance was attributed to a p-value <0.05.

Results. A total of 320 (31.9%), 167 (16.7%), and 125 (12.5%) among 1003 students used alcohol, tobacco, and cannabis respectively. 70 (21.9%), 116 (69.5%), and 62 (49.6%) were at moderate-high risk of abuse for alcohol, tobacco, and cannabis respectively. There was a strong positive statistically significant (p<0.001) correlation between all three substance-specific scores (Pearson's Coefficients r = 0.643, 0.763, and 0.725 respectively).

Conclusion. One, two, and three out of every ten students used cannabis, tobacco, and alcohol respectively. Many of them fall into the moderate-high risk category. The data suggest that a student at high risk for any one substance is also at a higher risk of using another substance as well. This calls for an integrated 'bundle' approach to focus on all substances together as one unit.

Keywords. alcohol, cannabis, India, substance use, tobacco, WHO-ASSIST

Introduction

Substance abuse and its associated problems are a global concern. WHO estimates published in 2022, report that around 3 million deaths every year result from harmful use of alcohol, tobacco use kills more than 8 million people each year and about 0.5 million deaths annually are attributable to drug use.[1–3] These are important contributors to the global disease burden with studies showing that around 4.2% of all DALYs (disability-adjusted life-years) are attributable to alcohol use, and 1.3% of all DALYs are attributable to drug use as a risk factor.[4] According to the Global Adult Tobacco Survey (GATS-2), India report, 28.6 percent of all Indian adults currently either smoke tobacco and/or use smokeless tobacco; khaini and bidi being the most commonly used tobacco products.[5,6] The report on 'Magnitude of Sub-

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stance Use in India 2019' estimated that 14.6% of the population of India (between the ages of 10 and 75) uses alcohol and 2.8% of the population uses cannabis products either in the legal form (bhang) or in illegal forms (ganja and charas).[7]

Substance use disorder (SUD) is the persistent use of drugs despite substantial harm and adverse consequences. They are characterized by an array of mental/emotional, physical, and behavioral problems such as chronic guilt; an inability to reduce or stop consuming the substance(s) despite repeated attempts; driving while intoxicated; physiological withdrawal symptoms.[8,9]

Adolescence is the period when the initiation of these habits usually takes place. During adolescence, students are more vulnerable due to increased academic pressure, peer group influence, and increased popularity and availability of substances. Understanding the pattern and circumstances leading to substance abuse will help guide appropriate interventions to protect young adults from substance abuse and its consequences like dependence and injuries.[10–12]

Educational institutes around the globe have long tried various ways to restrict or decrease the prevalence of substance use on their campuses but their success is highly questionable. This may be attributed to the lack of proper data that makes the formulation of appropriate interventions a shot in the dark for the authorities. Moreover, most strategies have a telescopic narrow approach to tobacco/alcohol/cannabis control, by focusing only on one substance, but maybe it will be more effective if all the substances were targeted together as one unit to bring down the risk of abuse for each substance.

Systematic reviews and meta-analysis studies have tried to gauge the effectiveness of various types of interventions for reducing substance use, and while some strategies seem to show minor improvements, the need for more research that identifies the most effective combinations of intensive behavioral, pharmacologic and newer interventions for these substance use disorders, has been reported,[13,14] which bears the weight for the collection of data on the determinants influencing the use of such substances. Studies conducted worldwide have estimated a prevalence rate of substance abuse to be around 20-40 percent among university students; however, these restrict themselves to tobacco or alcohol use or are stream specific and many of these are gender-biased. Additionally, not many multi-center studies have been conducted in developing countries.[15] So, unlike previous studies, we tried to focus on all undergraduate students from various educational streams across India and living in different places.

There are only limited studies in India (8-10) that have estimated the prevalence of substance abuse among university students.[16,17]

Aim

Hence, the present study was designed to estimate the prevalence of substance abuse (mainly alcohol, tobacco, and cannabis), determine the prevalence of risk associated with these substance use, and identify factors that may have an association with the different substances used among university students from various streams across India.

Material and methods

Study design and duration

This was an online cross-sectional study that was carried out for a duration of 3 months (November 2021 to January 2022). All participants gave their informed consent for inclusion before they participated in the study. The approval from the Institute Ethics Committee (IEC) was taken (AIIMS/Pat/IEC/2022/930).

Study setting

This study was primarily conducted at All India Institute of Medical Sciences (AIIMS) Patna, a 960 bedded tertiary care hospital & medical college and an institute of national importance under the Ministry of Health and Family Welfare, Government of India.

The study was conducted via online mode with undergraduate university students from different streams participating from all over India.

Study population

The study population included all undergraduate university students from various streams across India. The study tool was shared with students of AIIMS Patna and undergraduate university students from all over India. All the students above 17 years (age for admission into undergraduate courses) were included and students who did not consent to participate in the study were excluded. (Figure 1)

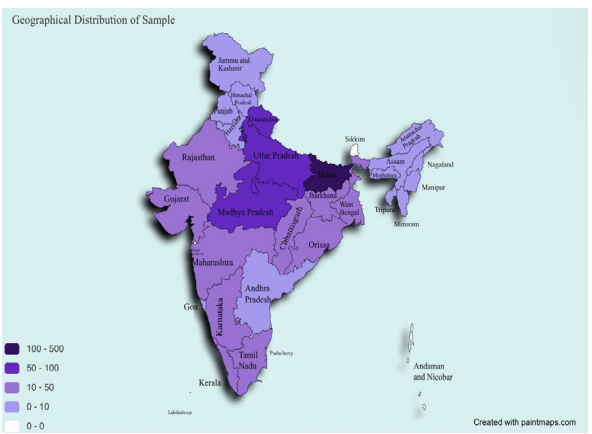

Fig. 1. Distribution of study participants across India (n=1003)[18]

Sample size and sampling technique

Considering the prevalence of tobacco use to be around 28%, with absolute precision of 5%, the mini-

mum sample size was calculated to be 310 at 95% confidence intervals (CI).[5] Nonetheless, we intended to include all eligible students in the study.

The list of all students of AIIMS Patna and their contact numbers were obtained from the AIIMS Patna administration section and the study tool was shared with them over WhatsApp/email and they were asked to participate voluntarily. They were also asked to share the study tool among their contacts from various streams and also the study tool was sent to universities all over India via emails of student unions/official WhatsApp groups/Instagram handles and all undergraduate students were urged to participate if they were willing. A total of 1003 students participated across India.

Study tool and technique

Information was collected using a predesigned, structured, standard questionnaire on "Google forms" that was sent to all students via WhatsApp and email. Digital consent was encrypted into the Google form link, and participants could proceed only after giving consent. 'ASSIST version 3.0' given by WHO was used.[19]

The questionnaire was divided into two sections and all questions were in the English language. The first section included socio-demographic details of the students like the basic details (age, gender and place of stay), educational stream, substance use habits (alcohol, tobacco, and cannabis), and associated drives behind them. The second section included questions related to the prevalence of substance use mainly alcohol, tobacco, and cannabis, and the risk associated with them using the WHO-ASSIST (version 3.0) questionnaire.[19]

In the ASSIST questionnaire, specific substance involvement scores were given.

A 6-item tool for tobacco products with 4 items on a 5-point Likert scale ranging from 'never' to 'daily/almost daily' and 2 items on a 3-point Likert scale ranging from 'no-never' to 'yes, in the last three months', with the scores ranging from 0–31 with 0–3, 4–26 & 27+ scores signifying low, moderate & high-risk levels respectively. For alcoholic beverages, a 7-item tool was used with 5 items on a 5-point Likert scale ranging from 'never' to 'daily/almost daily' and 2 items on a 3-point Likert scale ranging from 'no-never' to 'yes, in the last three months' with the scores range from 0–39 with 0–10, 11–26 & 27+ scores signifying low, moderate & high-risk levels respectively. For cannabis, a 7-item tool was used with 5 items on a 5-point Likert scale ranging from 'never' to 'daily/almost daily' and 2 items on a 3-point Likert scale ranging from 'no-never' to 'yes, in the last three months' scores range from 0–39 with 0–3, 4–26 & 27+ scores signifying low, moderate & high-risk levels respectively.

The tool had good concurrent, construct, predictive and discriminant validity, including the development of cut-off scores for 'lower', 'moderate', and 'high' risk.[19] According to WHO-ASSIST, the moderate-high risk category signifies hazardous use/at risk of dependency for a particular substance and warrants brief interventions and/or treatment to prevent progression to substance abuse.[20]

The questionnaire has been validated in an Indian setting and was found to have a good internal consistency (Cronbach's alpha: 0.8–0.86 for alcohol, tobacco, and cannabis).[20,21]

Statistical analysis

The collected information was entered in MS Excel and statistical analysis was done by Jamovi software[22] and IBM SPSS ver. 22.0 (IBM Corp., Armonk, NY, USA). The results were tabulated or represented as figures wherever necessary. A descriptive analysis was done to describe the socio-demographic details of the students. The continuous variables like age, age of initiation of substance use, and ASSIST scores were expressed as mean (SD) after checking the normality of the data.

The categorical variables like different streams, place of stay, and risk quantification of ASSIST scores were shown as frequencies and proportions. A univariate analysis was performed and the variables with p value less than 0.2 were considered for multivariate analysis model. The crude odds ratio (OR) with 95% CI was reported. A multivariable binary logistic regression analysis was done to find out the associates of substance use among students. We used 'Enter Method' in SPSS to build the models and the model fit was assessed by Hosmer-Lemeshow goodness of fit test and the model variability was given by Nagelkerke's R^2 (pseudo R square). An adjusted odds ratio was calculated with a 95% CI. Statistical significance was attributed to $p<0.05$.

Results

Out of 1003 participants, it was found that the maximum number, i.e. 806 (80.3%) belonged to the 20-25 year age category, with the mean (SD) age of 21 (1.65) years. Almost two-thirds, 632 (63%) were males. We found that 719 (71.7%) participants resided in hostels. It was seen that a maximum of 668 (66.6%) belonged to the medical and allied fields (Table 1).

The mean (SD) age of initiation for alcohol, tobacco, and cannabis was found to be 19.6 (1.94), 19.6 (2.25), and 20.6 (2.21) years respectively.

Among the sample of 1003 participants, 320 (31.9%, 95% CI: 29.07–34.85%) self – reported that they consumed alcohol, 167 (16.7%, 95% CI: 14.47–19.08%) used tobacco products, and 125 (12.5%, 95% CI: 10.56–14.65%) engaged in the use of cannabis products (Figure 2).

Table 1. Socio-demographic details of students (n=1003)

Variable	Category	n (%)
Age (years)	<20	184 (18.3)
	20-25	806 (80.4)
	>25	13 (1.3)
Gender	Male	632 (63)
	Female	371 (37)
Place of Stay	Hostel	719 (71.7)
	own residence	211 (21)
	Rental Apartment	73 (7.3)
Stream/Course*	Medical field & allied	668 (66.6)
	Sciences & allied	63 (6.3)
	Engineering	209 (20.8)
	Commerce & allied	18 (1.8)
	Arts	27 (2.7)
	Law	18 (1.8)
Academic year of college	First year	260 (25.9)
	Second year	206 (20.5)
	Third Year	334 (33.3)
	Fourth year	138 (13.8)
	Fifth year	13 (1.3)
	Internship	52 (5.2)

*Medical & allied – MBBS, nursing, and dental students; Sciences & allied – basic science stream, home science, and life science students; Commerce & allied – commerce, economics, management, and business administration students

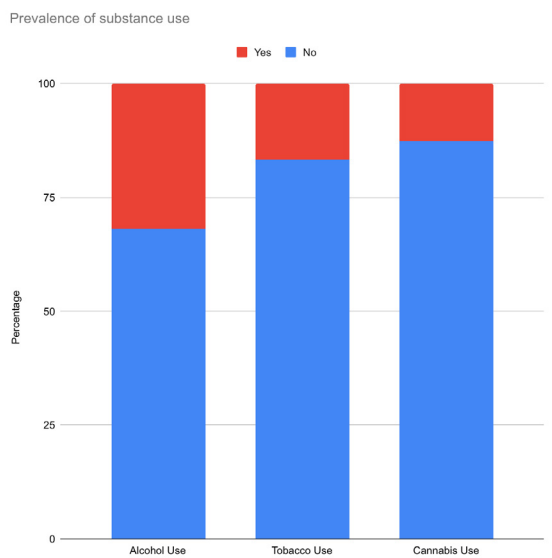

Fig. 2. Prevalence of substance use among students (n=1003)

Upon calculation of substance – specific risk for abuse using ASSIST, for alcohol, out of 320 students, 70 (21.9%, 95% CI: 17.69–26.72%) fell into the category of moderate – high risk; for tobacco, out of 167 students, 116 (69.5%, 95% CI: 62.1–75.94%) fell into the category of moderate – high risk; and for cannabis, out of 125 students, 62 (49.6%, 95% CI: 40.98–58.24%) fell into the category of moderate – high risk (Table 2).

Table 2. Risk stratification of various substance use (WHO-ASSIST)

Variable	Category	n (%)
Alcohol risk (n=320)	Lower Risk	250 (78.1)
	Moderate Risk	54 (16.9)
	Higher Risk	16 (5)
Tobacco risk (n=167)	Lower Risk	51 (30.5)
	Moderate Risk	105 (62.9)
	Higher Risk	11 (6.6)
Cannabis risk (n=125)	Lower Risk	63 (50.4)
	Moderate Risk	48 (38.4)
	Higher Risk	14 (11.2)

In the univariate analysis, for alcohol, age (crude OR, 1.390; 95% CI, 1.274–1.515), male gender (crude OR, 1.540; 95% CI, 1.160–2.044), living in a hostel (crude OR, 1.630; 95% CI, 1.195–2.223), and later academic year (second year: crude OR, 2.783; 95% CI, 1.803–4.295, third – year: crude OR, 2.535; 95% CI, 1.702–3.776, fourth – year: crude OR, 3.259; 95% CI, 2.031–5.231, and fifth year/internship: crude OR, 7.605; 95% CI, 4.197–13.778) were found to be significant predictors of substance use.

For tobacco, age (crude OR, 1.454; 95% CI, 1.314–1.608), male gender (crude OR, 2.338; 95% CI, 1.582–3.455), living in a hostel (crude OR, 1.669; 95% CI, 1.113–2.501), and later academic year (second year: crude OR, 2.618; 95% CI, 1.5–4.567, third – year: crude OR, 1.874; 95% CI, 1.101–3.19, fourth – year: crude OR, 3.018; 95% CI, 1.664–5.472, and fifth year/internship: crude OR, 7.242; 95% CI, 3.739–14.027) were found to be significant predictors of substance use.

For cannabis, age (crude OR, 1.417; 95% CI, 1.271–1.579), male gender (crude OR, 3.497; 95% CI, 2.127–5.747), living in a hostel (crude OR, 2.118; 95% CI, 1.297–3.459), studying in the medical field (crude OR, 0.623; 95% CI, (0.405 – 0.956) and later academic year (second year: crude OR, 3.724; 95% CI, 1.812 – 7.652, third – year: crude OR, 3.735; 95% CI, 1.896 – 7.358, fourth – year: crude OR, 2.981; 95% CI, 1.342 – 6.618, and fifth year/internship: crude OR, 11.628; 95% CI, 5.262 – 25.693) were found to be significant predictors of substance use.

These variables were considered in the multivariable logistic regression.

Age (for alcohol: AOR, 1.215; 95% CI, 1.089–1.356, for tobacco: AOR, 1.328; 95% CI, 1.173–1.503, for cannabis: AOR, 1.179; 95% CI 1.02–1.362), male gender (for alcohol: AOR, 1.415; 95% CI, 1.050– 1.907, for tobacco: AOR, 2.184; 95% CI, 1.456–3.275, for cannabis: AOR, 3.323; 95% CI, 1.990–5.546), living in hostels (for alcohol: AOR, 1.554; 95% CI, 1.079–2.239, for tobacco: AOR, 1.634; 95% CI 1.068–2.501, for cannabis: AOR, 1.923; 95% CI, 1.098–3.368) and later academ-

Table 3. Associates of various substance use among students (n=1003)*

Parameter	Categories	Alcohol use (n=320)		Tobacco use (n=167)		Cannabis use (n=125)	
		Crude OR (95% CI)	Adjusted OR (95% CI)	Crude OR (95% CI)	Adjusted OR (95% CI)	Crude OR (95% CI)	Adjusted OR (95% CI)
Age (years)		1.390 (1.274–1.515)	1.215 (1.089–1.356)	1.454 (1.314–1.608)	1.328 (1.173–1.503)	1.417 (1.271–1.579)	1.179 (1.02–1.362)
Gender	Male	1.54 (1.16–2.044)	1.415 (1.05–1.907)	2.338 (1.582–3.455)	2.184 (1.456–3.275)	3.497 (2.127–5.747)	3.323 (1.99–5.546)
	Female	1	1	1	1	1	1
Place of stay[a]	Hostel	1.63 (1.195–2.223)	1.554 (1.079–2.239)	1.669 (1.113–2.501)	1.634 (1.068–2.501)	2.118 (1.297–3.459)	1.923 (1.098–3.368)
	Others	1	1	1	1	1	1
Stream[b]	Medical field & allied	1.256 (0.943–1.672)	0.825 (0.565–1.203)	0.826 (0.576–1.185)	–	0.623 (0.405–0.956)	0.737 (0.427–1.273)
	Non-medical fields	1	1	1	–	1	1
Academic year	First Year	1	1	1	1	1	1
	Second Year	2.783 (1.803–4.295)	2.455 (1.559–3.868)	2.618 (1.5–4.567)	2.000 (1.127–3.55)	3.724 (1.812–7.652)	3.109 (1.474–6.558)
	Third year	2.535 (1.702–3.776)	2.09 (1.325–3.297)	1.874 (1.101–3.19)	1.207 (0.686–2.126)	3.735 (1.896–7.358)	3.062 (1.453–6.454)
	Fourth year	3.259 (2.031–5.231)	2.740 (1.549–4.845)	3.018 (1.664–5.472)	1.895 (0.998–3.597)	2.981 (1.342–6.618)	2.611 (1.047–6.515)
	Fifth year & internship*	7.605 (4.197–13.778)	4.023 (1.943–8.329)	7.242 (3.739–14.027)	2.611 (1.159–5.883)	11.628 (5.262–25.693)	6.633 (2.466–17.84)
	Nagelkerke R Square	0.128		0.14		0.164	

* OR – odds ratio; AOR – adjusted OR; CI – confidence interval; [a] Place of stay was clubbed into hostel and others (which included home and rental apartment); [b] The stream was clubbed into medical fields and non-medical fields (which included sciences and allied, engineering, arts, commerce, and allied and law)

ic year (for alcohol: from second year – AOR, 2.455; 95% CI, 1.559–3.868 to fifth year/internship – AOR, 4.023; 95% CI, 1.943–8.329, for cannabis: from second year – AOR, 3.109; 95% CI, 1.474–6.558 to fifth year/internship – AOR, 6.633; 95% CI, 2.466–17.840, and for tobacco: only for second year – AOR, 2.000; 95% CI, 1.127– 3.550 and for fifth year/internship – AOR, 2.611; 95% CI, 1.159–5.883) were found to be independent predictors for substance use (Table 3).

There was a strong positive correlation between all three substance-specific scores, i.e., for alcohol, tobacco, and cannabis (as suggested by the Pearson's Coefficients of 0.643, 0.763, and 0.725) and all correlations were statistically significant (p<0.001). (Table 4)

Table 4. Correlation matrix for various substances used

Variables	ASSIST Alcohol Score Correlation coefficient (p-value)	ASSIST Tobacco Score Correlation coefficient (p-value)	ASSIST Cannabis Score Correlation coefficient (p-value)
ASSIST Alcohol Score	1		
ASSIST Tobacco Score	0.643 (<0.001)	1	
ASSIST Cannabis Score	0.763 (<0.001)	0.725 (<0.001)	1

For alcohol, social events were the leading reason (reported by 50.3% of alcohol users), followed by personal desire and interest (45.3%) and inexperience and curiosity (33.8%).

For tobacco products, personal desire and interest were the leading drivers (reported by 44.3% of tobacco users), followed by social events (39.5%) and stress (34.7%).

For cannabis products, social events and personal desire and interest were both the leading causes (both reported by 50.4% of cannabis users), followed by inexperience and curiosity (37.6%) and stress (23.2%). (Figure 3)

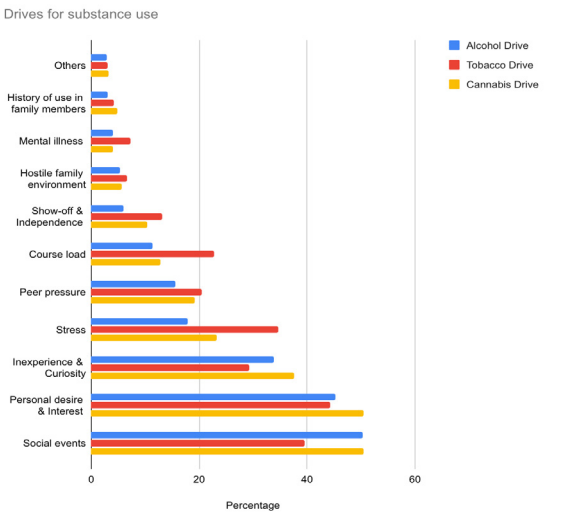

Fig. 3. Drives for alcohol, tobacco, and cannabis use (self-reported)

Discussion

The prevalence of alcohol, tobacco and cannabis use among undergraduate university students was found to

be 31.9%, 16.7% and 12.5% respectively. Out of those who use these substances, 21.9%, 69.5% and 49.6% users were at moderate-high risk of abuse for alcohol, tobacco and cannabis respectively. Age, male gender, living in hostels and later academic years were found to be significant predictors of substance use. A strong positive correlation between all three ASSIST substance specific scores was observed. Social events, personal desire & interest, inexperience & curiosity and stress were reported as the leading drives which lead to substance use.

In the National Drug Dependence Treatment Centre (NDDTC), All India Institute of Medical Sciences (AIIMS), New Delhi's 2019 report on 'Magnitude of Substance Use in India', the prevalence of alcohol use among males was 27.3%,[7] which is close to the prevalence of 31.9% that we found in our study. In the study conducted by Baba et al.[23] the prevalence of substance use they found i.e. 31.3% was remarkably close to our finding of alcohol use being prevalent in around 31.9% of students. Although contrary to their findings, we found that alcohol and not tobacco was the most commonly used substance among undergraduate students.

Compared to the GATS-2 India report,[5] the prevalence of tobacco use we found, i.e. 16.7% was much lower than the 28.6% prevalence of tobacco use in the Indian population aged 15 and above. Again, the prevalence was far less than the 55.6% found in adolescent males by Saddichha et al.[24] This can maybe be explained by observational bias, or inadequacy of samples equally from all parts of India, or maybe the prevalence among this age group and demographic is less, but this could not be verified due to the non-availability of specific data.

Upon risk stratification using ASSIST, we observed that 21.9% of alcohol users, 69.5% of tobacco users, and 49.6% of cannabis users fell into the moderate-high risk category, which is close to findings by McNeely et al.[25] for alcohol (24.8% users) but significantly higher compared to 34.6% tobacco users and 23.8% cannabis users falling into the moderate-high risk category as reported by them. Similar comparisons can be drawn with other previous studies as well which report a lower proportion of users falling into the moderate-high risk category.[26] This may be explained by the difference in calculation of the proportion (i.e. inclusion of participants who reported no lifetime use of any substance for calculating the proportion), the difference arising due to selection of participants, reporting bias or it is also possible that the risk is higher in this population i.e. the undergraduate university students.

In our study, it was observed that age and male gender were predictors of substance use, consistent with the conclusions of many studies.[27–30] We found that males were 2-3 times more likely to use substances compared to females, same as reported by Obadeji et al.[31]

Our finding that location/place of stay (at home or hostel) is a predictor of substance use, was similar to that of Jinyoung et al. and Muskoya et al.[11,32] It was observed that students living in hostels were 1.5 times more likely to indulge in alcohol consumption, 1.6 times more likely to use tobacco products, and almost twice as likely to use cannabis. Thus, regular raids and checks, more stringent vigilance by campus security, installation of smoke detectors, prohibiting the sale of such substances inside campus premises, etc. are all steps that can be taken to reduce the prevalence of these substances in hostels.

A Arora et al.[15] and their finding that the prevalence was higher among medical students in later academic years was also corroborated in our study, and we found that it held true for other educational streams as well. In our study, it was observed that compared to the first year, students in later academic years were 2-6 times more likely to engage in substance use. This may be due to the exposure they get with age and peer pressure as they move to higher classes. This points to the need to strengthen the efforts to control substance use in later academic years.

The most significant finding was the strong positive correlation observed between all three ASSIST substance-specific scores. This kind of association between the use of all three substances was also reported by Simon et al.[27] This points toward the need for an '*integrated combined approach*' for controlling substance use. A student who is at high risk for tobacco abuse is more likely to show high-risk behavior for alcohol and cannabis use as well. Therefore, strategies must be formulated to include not just tobacco but other substances as well. Thus, it can be reasoned that if the use of all the substances is considered and targeted as one unit, the prevalence of each substance might be brought down. Conversely, it also points to the possibility that maybe the current control strategies for decreasing an individual substance's use, like tobacco or alcohol, have been less successful, due to a 'narrow' approach and a lack of a broader, more well-rounded approach that focuses on many risk factors simultaneously.

Social events, inexperience & curiosity, and personal desire were the three leading drives behind substance use. This finding that occasional celebrations (social events) were among the leading reasons for substance use, was also similar to observations by Baba et al.[23] Peer pressure and academic load/performance were also identified as causes leading to substance use, similar to findings by Tomczyk et al.[33] Stress was also reported as a major drive behind substance use, especially for tobacco products.

This gives us a potential way to decrease the use of substances by targeting these drives; like chaperones at school sanctioned social events might discourage their use, early education about the risks associated with using them may help curb the curiosity & desire to try them and providing university students with effective

tools/ strategies to deal with stress like ensuring easy access to a therapist, yoga and meditation sessions, might stop students from turning to substances as a coping mechanism.

The study has potential limitations which may help explain some of the discrepancies in our findings compared to previously established reports and future studies should address them. In order to get a pan-India sample, the data was collected through online mode for a wider reach, but the selection of participants depended on our ability to gain access to the geographical scope of the participants, which was limited. Although we did get participants from every state of India, the contribution from each state is not equal or in proportion to its population size. The sampling technique in this study was not random but a mixture of snowball sampling (as students of AIIMS Patna were asked to forward the Google form to their friends in other colleges and other streams) and convenient sampling (as the authors sent the link to participate in the study to other universities via emails, official WhatsApp groups and Instagram accounts of college administrators/student unions), which is a potential selection bias. Despite assuring the participants that no personal identifiers will be collected and that all data will be kept confidential, there exists a possible reporting bias due to the inherent taboo associated with substance use, especially with cannabis use, since most forms of it are illegal in India, which could have compelled some subjects to withhold information. Also, we couldn't eliminate the bias administered due to self-administered nature of the study tool.

Conclusion

One, two, and three out of every ten undergraduate students were found to use cannabis, tobacco, and alcohol, respectively. Two out of ten alcohol users, seven out of ten tobacco users, and five out of ten cannabis users were identified to fall into the category of hazardous use/at risk of dependent use.

It was seen that age, male sex, living in hostels (compared to homes or rental apartments), and later/ higher academic years (second, third, fourth, and fifth compared to the first year) were significant predictors of substance use. These findings substantiate the need for creating control strategies for college-going students focusing on these factors. A strong positive correlation was seen between the usages of all three substances, which calls for a 'bundle' approach to control them, instead of focusing on only one substance.

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Author contributions

Conceptualization, R.B. and R.Rao; Methodology, R.B. and R.Rao; Software, R.Rao and R.J.; Validation, R.Rao and R.; Formal Analysis, R.B., R.J. and R.Rao; Investigation, R.B. and R.J.; Resources, R.Rao and R.; Data Curation, R.B., R.Rajan, R. and S.S.; Writing – Original Draft Preparation, R.B.; Writing – Review & Editing, R.J., R.Rao, R.Rajan, R.G., R. and S.S.; Visualization, R.J., R.G. and S.S.; Supervision, R.Rao; Project Administration, R.Rajan and R.G.; Funding Acquisition, Not applicable.

Conflicts of interest

The authors do not have any conflicts of interest to declare.

Data availability

The datasets are not publicly available but are available from the corresponding author on reasonable request.

Ethics approval

All participants gave their informed consent for inclusion before they participated in the study. The approval from the Institute Ethics Committee (IEC) was taken (AIIMS/Pat/IEC/2022/930).

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