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RESEARCH ARTICLE

Prevalence of substance abuse and its associated factors among medical students: a cross-sectional study [version 1; peer review: 1 approved]

Mitesh Karn ¹, Dipendra Kandel ¹, Nuwadatta Subedi ²

¹School of Medicine, Gandaki Medical College Teaching Hospital and Research Centre, Pokhara, Gandaki, 33700, Nepal

²Department of Forensic Medicine, Gandaki Medical College Teaching Hospital and Research Centre, Pokhara, Gandaki, 33700, Nepal

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Abstract

Background: Substance abuse by medical students poses a significant risk not only on their personal life but also on their professional life by putting their patients at risk. Our study aims to find out the prevalence of substance abuse and factors associated with it among medical students.

Methods: A descriptive, online-questionnaire based, cross-sectional study was carried out at Gandaki Medical College, a medical school in Gandaki Province of Nepal. Whole sampling technique was used. SPSS-25.0 software was used for statistical analysis. Descriptive statistics were used for analyzing demographic and substance abuse related variables. Chi square and Fishers exact test was used to find out if any differences existed in substance abuse by demographic characteristics.

Results: Among 420 eligible participants, 219 participated in the survey (response rate: 52.2%). Alcohol was the most commonly used substance with overall lifetime prevalence of 58% followed by cigarette smoking and illegal drug abuse at 21.9% and 13.7%, respectively. The abuse of substances was significantly higher ($p < 0.05$) in males, who were offered substances by friends, and amongst study participants who worked with an intoxicated colleague. The most common reason for substance abuse was "For pleasure, curiosity or to go along with friends" (23%, $n=18$). Major and minor dysfunction due to alcohol abuse was reported by 8(3.7%) and 33(15.1%) participants, while the same dysfunctions due to drug abuse were reported by 1(0.5%) and 14(6.4%) participants, respectively.

Conclusions: The prevalence of substance abuse was high among medical students and was found to be associated with male gender, if offer of substances were made by friends, and amongst those who worked with an intoxicated colleague. This problem of substance abuse among medical students should be addressed timely as failing

Open Peer Review

Approval Status

1

version 2

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version 1

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1. **Prerna Bansal** , College of Medical Sciences, Bharatpur, Nepal

Any reports and responses or comments on the article can be found at the end of the article.

to do so might have serious consequences on the healthcare system of the country.

Keywords

medical students, substance-related disorders, alcohol abuse, smoking, drug abuse, consequences, health education, Nepal.

This article is included in the **Addiction and Related Behaviors** gateway.

Corresponding author: Nuwadatta Subedi (drndsubedi@gmail.com)

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Introduction

Substance abuse refers to the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs and is one of the major problems globally.¹ According to the Global Burden of Disease Study 2017, there were 585,000 deaths and 42 million years of “healthy” life lost as a result of the substance abuse.² The World Drug Report 2019 estimated 271 million people, or 5.5% of the global population aged 15–64 years, had used drugs in the previous year, while 35 million people are estimated to be suffering from drug use disorders.³

Medical students, the future healthcare professionals to be involved in the task of diagnosing and treating substance abuse are not immune to drug abuse, and the history of substance abuse within the medical fraternity is not new.⁴ Substance abuse by medical students poses risks and can also have serious consequences on their effectiveness and fitness to practice as good clinicians.⁵ Substance abuse by health care professionals can seriously influence their professional behavior, compromising the standard of delivered health care services and in turn, placing their patients at risk.⁶ It is believed that substance abuse among physicians starts early in their careers, and the importance of studying the lifestyles of medical students to detect substance abuse is well recognized.⁷ Researchers have suggested that substance abuse in medical school may be the root of the ongoing problem of increased substance abuse in practicing physicians.^{8–10}

Data concerning substance abuse by medical students is scarce in Southeast Asia, especially from Nepal. To find out the prevalence of various types of substance abuse and factors associated with it, including consequences among Nepalese medical students, a cross-sectional study was carried out at a medical college in western Nepal.

Methods

Study design and setting

A descriptive cross-sectional study was carried out among medical students (1st to 5th year) enrolled at Gandaki Medical College Teaching Hospital and Research Center (GMCTHRC), Nepal from 1st June 2020 to 1st July, 2020. Whole sampling technique was used. Data was collected from the study participants through a questionnaire sent via Google form which was sent to their email through class representatives of each year. Students who were not available through email contact or did not consent for their participation in the digital consent form were not included in the study. The participation was completely voluntary and no incentives were offered to the study participants. Anonymity was maintained throughout.

Study sample

All the medical students enrolled in the Bachelor of Medicine and Bachelor of Surgery (MBBS) program at GMCTHRC (n = 420) were included in the study. The study objectives and its implications were explained to the participants through the questionnaire sent via Google form on their email. The online method was preferred as physical classes had completely been cut down by the College administration in line with the COVID-19 protocols set up by the Government of Nepal.

Study instrument

Data was collected using a modified, online version of the Health Professional Questionnaire developed by Kenna and Wood.¹¹ Permission was taken from Elsevier for using the questionnaire in our research. This tool was preferred as it had already been used successfully in a similar study among other healthcare students in Nepal.¹² The final version of the survey did not require major changes and contained demographic information as well as the details and effects of substance abuse. We did not include the questions about university of study, faculty, course undertaken and religious beliefs that were originally present in the questionnaire.

Demographic characteristics

The study participants were asked about their age, gender, year of study, place of stay and if there was a problem of alcohol and drug abuse in their family.

Substance abuse related characteristics

We asked the study participants about alcohol, cigarette and illegal as well as prescription drug use. The questions “how many times, if ever, have you smoked cigarettes?” and “recognize yourself as: Nondrinker/infrequent drinker/light drinker/moderate drinker/heavy drinker” were used, respectively, for lifetime cigarette smoking and alcohol use. The participants were asked about their lifetime experience and tendency of use of both prescription as well as illegal drugs, e.g. “how many times, if ever, have you smoked marijuana or hashish?” Participants were asked to rate the frequency of

their use, varying from “0” times to “>30 times”. The prescription drugs under consideration were major opiates, minor opiates, stimulants, sedative-hypnotics, tranquilizers, anxiolytics and other prescription pain medicines. Illegal drugs included marijuana, cocaine and designer drugs such as ecstasy, LSD, Meth and Ketamine.

The study participants were also asked about how often they were offered alcohol and drugs by friends and how often they worked with colleagues who were intoxicated by such substances. We also asked about the reasons for substance abuse and the dysfunction it had on their daily life using a series of questions. The list of dysfunctions included 1) falling behind in work; (2) calling in sick or being late; (3) having trouble getting along with people; (4) worrying that you might be using too much or too often; (5) seriously considered suicide; (6) having an automobile accident or other type of accident; (7) seeing a psychiatrist, psychologist, or a counselor.¹² The initial four effects were grouped as “minor dysfunction” and the remainder as “major dysfunction”. Subsequently, the minor and major dysfunction due to alcohol and drug abuse was calculated.

Statistical methods

The data collected through Google forms were extracted to Microsoft Excel-13. Any response with missing data was excluded from the study. After data cleaning, it was imported and analyzed by using SPSS (Statistical Package for Social Sciences) 25. Demographic variables and substance abuse were analyzed using descriptive statistics. The frequency of use was recorded as 0 = never used and 1 = any use. Chi square test was used to examine any differences in substance abuse by demographic characteristics. Fisher’s exact test was applied for cell count less than 5. P value for statistical significance was set as less than 0.05.

Ethical consideration

This study was approved by the Institutional Review Committee of GMCTHRC (Ref no: 023/2076/2077). All the participants were informed about the study through the online form attached in the questionnaire sent to them and informed consent was obtained. Anonymity of the study participants was maintained throughout.

Results

General characteristics

Table 1 shows detailed demographic and general characteristics of study participants. Out of 420 medical students, 219 students participated in the study (response rate = 52.2%). There were considerably less participants from non-clinical years (n = 56, 35%) of medical school when compared to clinical years (n = 163, 63%). The mean age of study participants was 21.32 years, ranging from 18-30 years. Majority of respondents were females (n = 115, 52.5%) and most of them lived out of a rented property (n = 118, 53.9%).

Prevalence of substance abuse

Table 2 shows the detailed prevalence of various substances abused by medical students. Alcohol was the most commonly abused substance with overall lifetime prevalence of 58% (n = 127), followed by cigarette smoking and illegal drug abuse at 21.9% (n = 48) and 13.7% (n = 30), respectively.

Correlates of substance abuse

When analyzing the distribution of substance use with various demographic variables, it was shown that the abuse of substances was significantly higher ($p < 0.05$) in males, if substances were offered by friends and amongst study participants who worked with an intoxicated colleague (**Table 3**).

Reasons for substance abuse

Out of all the study participants, 78 respondents stated the reason for using substances. The most common reasons included: 1) for pleasure, curiosity or to go along with friends (n = 29, 37%); 2) supervising self for medical condition (n = 18, 23%); and 3) originally prescribed but now using on my own (n = 14, 18%). **Table 4** shows the details regarding other reasons for substance abuse among the study participants.

Effect of alcohol and drug abuse

As stated earlier, we grouped the harmful effects of substance abuse into “major” and “minor” dysfunction. Details of these dysfunctions due to alcohol and drug abuse have been presented in **Table 5**. Alcohol caused dysfunction in 41 respondents while drugs caused dysfunction in 15 respondents respectively.

Inappropriate use of substances

In addition to all the other questions pertaining substance abuse, we also asked the study participants if they felt they used alcohol or drugs more than they would consider appropriate (**Table 6**). A total of 84% of the study participants (n = 184)

Table 1. Demographic characteristics of the study population.

Demographic variables	Total (N = 219)	Percentage
Sex		
Male	104	47.5
Female	115	52.5
Year of study		
First	28	12.8
Second	28	12.8
Third	59	26.9
Fourth	74	33.8
Fifth	30	13.7
Place of stay		
College hostel	46	21.0
Own house	53	24.2
Rental stay	118	53.9
Others	2	.9
Alcohol abuse problem in the family		
Yes	37	16.9
No	182	83.1
Drug abuse problem in the family		
Yes	8	3.7
No	211	96.3
Offer of alcoholic beverage by friends		
Yes	150	68.5
No	69	31.5
Offer of drugs by friends		
Yes	8	3.7
No	211	96.3
Ever worked with a colleague who was under influence of substances		
Yes	31	14.2
No	188	85.8

Table 2. Prevalence of substance abuse.

Substance abuse during lifetime	Frequency	Percentage
Alcohol		
Yes	127	58.0
No	92	42.0
Cigarette		
Yes	48	21.9
No	171	78.1
Illegal drugs		
Yes	30	13.7
No	189	86.3

Table 3. Correlates of substance abuse.

Variables	Alcohol abuse	Cigarette abuse	Illegal drug abuse	Prescription drug abuse
Sex				
Male (n = 104)	54 (51.9%)	31 (29.8%)	23 (22.1%)	17 (16.3%)
Female (n = 115)	43 (37.4%)	17 (14.8%)	7 (6.1%)	37 (32.2%)
P value	0.031	0.007*	0.001*	0.007*
Phase of study				
Basic (n = 56)	22 (39.3%)	12 (21.4%)	4 (7.1%)	9 (16.1%)
Clinical (n = 163)	75 (46.0%)	36 (22.1%)	26 (16.0%)	45 (27.6%)
P value	0.382	0.918	0.098 [#]	0.084
Place of stay				
Rental (n = 118)	50 (42.4%)	27 (22.9%)	18 (15.3%)	34 (28.8%)
Non-rental (n = 101)	47 (46.5%)	21 (20.8%)	12 (11.9%)	20 (19.8%)
P value	0.537	0.709	0.469	0.123
Alcohol abuse in family				
Yes (n = 37)	18 (48.6%)	11 (29.7%)	7 (18.9%)	8 (21.6%)
No (n = 182)	79 (43.4%)	37 (20.3%)	23 (12.6%)	46 (25.3%)
P value	0.558	0.208	0.311	0.638
Offer of alcohol or other substances by friends				
Yes (n = 150)	88 (58.7%)	44 (29.3%)	29 (19.3%)	40 (26.7%)
No (n = 69)	9 (13.0%)	4 (5.8%)	1 (1.4%)	14 (20.3%)
P value	<0.001*	0.001* [#]	0.001* [#]	0.309
Worked with an intoxicated colleague				
Yes (n = 31)	17 (54.8%)	13 (41.9%)	9 (29.0%)	9 (29.0%)
No (n = 188)	80 (42.6%)	35 (18.6%)	21 (11.2%)	45 (23.9%)
P value	0.202	0.004*	P = 0.007*	P = 0.542

*Significant.

[#]Fishers Exact test.**Table 4. Reasons for substance abuse (n = 78).**

Reasons	Frequency	Percentage
Supervising ownself for their medical condition	18	23
Peer Pressure	10	13
For pleasure, curiosity or to go along with friends	29	37
To stay awake, perform better or lose weight	5	6
Can't quit their use	2	3
Originally prescribed but now using on my own	14	18

Table 5. Effects of alcohol and drug abuse.

Variables	Effects	Frequency (%)
Alcohol abuse	Major Dysfunction	8 (3.7)
	Minor Dysfunction	33 (15.1)
Drug abuse	Major Dysfunction	1 (0.5)
	Minor Dysfunction	14 (6.4)

Table 6. Ever felt used alcohol or drugs more than you would consider appropriate?

Response	Frequency (%)
No	184 (84)
Yes, alcohol	33 (15.1)
Yes, drug	1 (0.5)
Yes, both alcohol and drugs	1 (0.5)

responded that they didn't feel they did, while 15.1% (n = 33) participants felt they used alcohol inappropriately. Only one participant each felt they used drugs and both substances inappropriately.

Discussion

From our study, the prevalence of substance abuse was found to be 58% for alcohol, 21.9% for cigarette smoking and 13.7% for illegal drug use. Alcohol was the most commonly abused substance. Peer influence and sharing the workspace with an intoxicated colleague were significant predictors of substance abuse by medical students in our study. The most common reason for substance abuse was for pleasure, curiosity or to go along with friends. Our study participants also reported both major and minor dysfunctions due to substance abuse. The dysfunctions were higher among the alcohol using group and a majority of study participants admitted that they used alcohol inappropriately.

The overall prevalence of substance abuse among medical students varies from as low as 3% to as high as 84%.¹³ The prevalence varies widely between the geographic regions with higher rates in the more developed regions like Europe and North America. An extensive study carried out in medical students across the south-east Asian region reported the prevalence of smoking to be 31.7%.¹⁴ A multi-centric cross-sectional study carried out in India states the prevalence of substance abuse among medical students to be 31.5%.¹⁵ The precise prevalence of substance abuse is currently not known in Nepal for both the general population as well as the healthcare students. Among various single-institution studies in Nepal, the prevalence of substance abuse by medical students varies from 28% to about 64%.^{12,14,16–18} In a multi-centric study carried across three universities of Nepal, the overall prevalence of substance abuse among healthcare students was stated to be 42.8%¹² but this study included only paramedical and allied science students. Nevertheless, comparison with available data showed that prevalence of substance abuse was higher in our study population.

Medical students are the future doctors of the nation. That the high rate of substance abuse and its effects among medical students may significantly impair their learning ability and clinical judgement as physicians, affecting patient outcomes, cannot be denied. Further, substance abuse by medical students tarnishes the image that physicians have held for a long time as healers. Now is high time that this problem is seriously looked upon by stakeholders and policymakers for production of efficient and competent physicians both locally and globally.

Limitations

Due to the COVID-19 pandemic, the study was carried out through an online questionnaire. In a country where the internet penetration is only 57% and majority of students were stuck at home due to travel restrictions imposed by the Government of Nepal, this may have led to a decreased response rate in our study.¹⁹ Further, ours is a sensitive topic and there is a risk of response bias in our study. Another limitation is that our study is a single center study and the results from our study may not be generalizable across other parts of the country.

Conclusion

The prevalence of substance abuse was high among medical students and was found to be associated with male gender, if offer of substances were made by friends and amongst those who worked with an intoxicated colleague. Substance abuse by medical students may affect their professional career as independent physicians and significantly alter patient outcomes. Peer support programs and reward-punishment system may be effective interventions to curb this problem.

Data availability

Underlying data

In this study, participant-level data were collected. No data are available publicly because consent for publication of raw data was not obtained and the dataset could in theory pose a threat to confidentiality. Researchers interested in accessing the data will need to submit an official letter of request for the data to Gandaki Medical College Institutional Review Committee, and will be asked to confirm that they will not violate the ethical standards of the ethical committee

and protect the anonymity of the participants. Researchers can contact the corresponding author, who can facilitate this process.

Reporting guidelines

This article was written in accordance with the STROBE guidelines.

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Reviewer Report 23 December 2021

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Perna Bansal

Department of Community Medicine, College of Medical Sciences, Bharatpur, Nepal

The research title seems fine. The introduction can include the expected outcome of the research at the end. In methodology it is mentioned descriptive cross-sectional study design though some analytical tests like chi square and fishers exact test has been used. Kindly rectify. How the students were verified for identification via email is not mentioned. The result section is fine. In the discussion part the factors associated with substance abuse can be discussed more if literature available. Further scope of research and recommendations can be added at the end of discussion and conclusion. The limitations has been well addressed. The overall manuscript seems sound and clear. The problem has been highlighted well in the research. With minor revisions the manuscript can be accepted for indexing so that further scope of research can increase in the topic.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public health, preventive medicine, community medicine, diabetes

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 30 Dec 2021

Mitesh Karn, Gandaki Medical College Teaching Hospital, Pokhara, Nepal

Thank you Dr. Bansal for taking out your time to review our manuscript. Based on your recommendations, we have added the expected outcome of the research in the last paragraph of the introduction section. We have rectified the design of the study as "cross sectional analytical".

Regarding how we verified emails of the study participants- we gave access to the google form to all the students enrolled in MBBS program in our system. Those students who logged in with their email in the google forms could fill the form. This way we indirectly verified their email but at the same time let them be anonymous by not collecting the emails of participants.

Regarding the factors associated with substance abuse, studies exploring this aspect is scarce from Nepal. But we have added a short discussion about it from the available literature. We have also added further scope and recommendations.

Competing Interests: No competing interests.

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