

ORIGINAL ARTICLE

TRENDS OF SEDATIVE-HYPNOTICS CONSUMPTION AMONGST THE MEDICAL STUDENT POPULATION OF MULTAN

Noaman Ishaq, Nausheen Ata*, Hamnah Fatima**, Mahwish Gul***, Saba Batool†, Maryam Saqib††

Department of Pharmacology, Quaid-e-Azam Medical College, Bahawalpur, *Foundation University Medical College, Islamabad, **Bakhtawar Amin Medical and Dental College, Multan, ***Ayub Medical College, Abbottabad, †Nishtar Medical University, Multan, ††King Edward Medical University, Lahore, Pakistan

Background: Medical curriculum has a notoriety of causing work life imbalance and frequent burn outs. To overcome this mental health dilemma the medical students resort to consumption of sedatives. This study aimed to evaluate the tendency of medical students in Multan towards usage of benzodiazepine with emphasis on understanding prevalence rates, drug consumption pattern, and associated socioeconomic factors. **Methods:** This study was conducted under collaboration of Pharmacology Departments of Nishtar Medical University and Bakhtawar Amin Medical and Dental College, Multan. Data was collected through a modified questionnaire from 400 undergraduate medical students. The sample population was categorized into two groups based on benzodiazepine users and non-users. Data was analysed and interpreted using SPSS-25. **Results:** On gender comparison female user exhibited a lower odds ratio (OR=1.67, $p=0.047$). In academic perspective the senior students exhibited varied odds of consumption. Parental with higher literacy level were associated with reduced odds of sedative use (OR=0.48, $p=0.035$). Individual lifestyle including smoking habits, exercise, and intake of stimulants also displayed significant associations. Students with previous history of drug consumption expressed less intent towards continuation (OR=0.53, $p=0.01$). **Conclusion:** The number of female students consuming sedatives was significantly higher than their male counterparts. The progression through academic years significantly correlates with increased sedative consumption particularly peaking in 4th year. Students reporting poor sleep quality were less likely to consume sedatives, a finding that challenges assumptions about the direct relationship between sleep quality and sedative use.

Keywords: Anxiety, Benzodiazepine, Insomnia, Medical Students

Pak J Physiol 2025;21(5):67–71, DOI: <https://doi.org/10.69656/pjp.v21i1.1680>

INTRODUCTION

Benzodiazepines form the principal drug group of sedative-hypnotics. These drugs bind to molecular component of gamma amino butyric acid (GABA) receptors in neuronal membranes in central nervous system. Benzodiazepines activate receptors by increasing the frequency of chloride ion passage helping in sleep onset and to alleviate anxiety.¹ Most commonly referred as sleeping pills, these drugs are globally popular for overcoming insomnia and anxiety disorders.²

With an increasing prevalence of complains associated with altered sleep pattern and sleep hygiene a dangerous raise in non-prescription trade and misuse has also raised concerns. One of the major cohorts which are exposed to unwarranted risk of sedative hypnotic consumption is undergraduate medical students.^{3,4}

Curriculum burden of medical students are hard-hitting. Students need to attend lengthy overwhelming lectures/practical/discussion/wards and other academic activities throughout the year. Their exam pattern has a higher difficulty index where they have to appear not only in written examination but also

in practical and viva voce.⁵ To prepare these professional exams they have to spend long hours of self-study which demands sleepless nights often. It can alter their sleeping habits and may bring in complaints of insomnia and anxiety.⁶ Some students avail cognitive approaches like stress management methods, improved assertiveness skills, time management plans and counselling sessions to manage their respective anxiety and insomnia.⁷

Nonetheless, some students opt for medical formulas to alleviate their indications. Sedative hypnotics are the most commonly used drug by medical students for this purpose. The use of these drugs by them may allure them to become habitual which may lead to numerous undesirable consequences such as drowsiness, poor physical synchronization, lack to focus and lethargy.⁸

Studies conducted in different constituency of world have evaluated prevalence of sedative drugs usage in the medical student population of their region and identified various confounding variables.^{9,10} Aim of this study was to evaluate popularity of benzodiazepine in medical students of Multan, Pakistan and to inculcate our outcome with related studies.

METHODOLOGY

This study was conducted in the Department of Pharmacology, Nishtar Medical University, Multan, in collaboration with Department of Pharmacology, Bakhtawar Amin Medical and Dental College, Multan. The study was ethically reviewed by Institutional Review Board of Nishtar Medical University (IRB letter No. 6985).

A questionnaire that was used in previous similar study¹¹ was integrated in this study with minor modifications. Four-hundred students of MBBS (1st year–5th year) were selected in this study through non-probability convenient sampling. Participants were divided into two groups: sedative users and non-users.⁸ Informed written consent was obtained before enrolling them in the study.

Statistical analyses were done using SPSS-25. Demographic and routine life factors were expressed as percentages and differences between two groups were compared through Chi-square test with $p \leq 0.05$ considered as statistically significant.

RESULTS

The analysis of sedative use among medical students reveals several key insights related to gender, academic year, GPA, marital status, parental education, income level, and residence. Females showed a significantly lower odds ratio (OR=1.67, $p=0.047$) of sedative use as compared to males.

Academic performance and year in school also significantly influenced sedative use; students in their 4th year exhibited the lowest odds (OR=0.29, $p=0.003$) compared to 1st year students, suggesting that academic pressure may affect sedative use differently across years.

Parental education level, particularly fathers with a Master's degree, was associated with a reduced odds of sedative use (OR=0.48, $p=0.035$). Income level and residence did not significantly impact sedative use, although trends suggested varying effects.

Overall, these findings highlight the complex interplay between academic stress, gender, marital status, and family background in the prevalence of sedative use among medical students, suggesting targeted interventions could be beneficial. (Table-1).

Analysis of sedative use among medical students in relation to lifestyle habits and sleep patterns reveals multifaceted insights. Smoking and exercise routine significantly influence sedative consumption; non-smokers and those who do not exercise regularly exhibiting higher odds of sedative use, although the relationship with smoking was not statistically significant. Consumption of stimulants, including coffee, tea, cola drinks, and others, showed varied odds of sedative use, with none showing a significant impact.

Interestingly, during non-exam periods, students who occasionally experienced stress had significantly higher odds of sedative use, suggesting acute stressors might prompt sedative consumption. Conversely, during exam periods, students rarely stressed showed significantly lower odds, indicating perhaps a habituation effect or different coping mechanisms.

Study habits and sleep patterns, including hours spent studying, sleeping, time needed to fall asleep, and sleep quality, demonstrated complex associations with sedative use. Notably, those with a night and day sleeping pattern showed significantly higher odds of using sedatives, highlighting the impact of irregular sleep patterns on sedative use.

These findings underscore the intricate relationships between lifestyle, sleep habits, and sedative consumption among medical students, suggesting that interventions aimed at improving sleep hygiene and stress management could potentially reduce the reliance on sedatives. (Table-2).

Table-3 provides a nuanced exploration of the relationship between sleep quality, presence of sleeping disorders, and the use of sedative drugs among medical students. Data suggest that students who describe their sleep quality as poor have significantly lower odds (OR=0.54, $p=0.013$) of sedative use compared to those who report good sleep quality, indicating a possible under use of sedatives among students struggling with sleep quality or an indication of sedatives not being the primary solution for their sleep issues.

Regarding sleeping disorders, the odds ratios reveal no significant association between having specific disorders like insomnia, sleep apnoea, restless legs syndrome, narcolepsy, or none and the use of sedatives, with insomnia being used as the reference category. This suggests that the presence of these specific sleeping disorders does not significantly influence sedative use among this population, possibly reflecting a cautious approach to sedative use regardless of diagnosed sleep conditions.

Interestingly, students who have used sedative drugs or other sleep aids since entering medical college are less likely to do so again compared to their counterparts who haven't (OR=0.53, $p=0.01$), suggesting a potential reconsideration or discontinuation after initial use. This could reflect a variety of factors including efficacy, side effects, or changing perceptions of sedative use over time.

Overall, these findings underscore the complex interplay between sleep quality, the presence of sleeping disorders, and the propensity towards sedative use among medical students, highlighting the need for targeted interventions to address sleep health without over-reliance on sedatives.

Table-1: Factors influencing sedative use among medical students: A comparative analysis

Characteristics	Sedative use, n (%)		OR	p
	Yes	No		
Gender				
Male	60 (27.3)	160 (72.7)	1	
Female	33 (18.3)	147 (81.7)	1.67	0.047
Academic year				
1 st	7 (10.9)	57 (89.1)	1	
2 nd	21 (22.8)	71 (77.2)	0.42	0.088
3 rd	19 (25.0)	57 (75.0)	0.37	0.048
4 th	42 (30.0)	98 (70.0)	0.29	0.003
5 th	4 (14.3)	24 (85.7)	0.74	0.73
cGP in previous year				
2.5 or less	10 (13.2)	66 (86.8)	1	
2.5-3	26 (23.2)	86 (76.8)	0.50	0.093
3-3.5	30 (31.3)	66 (68.8)	0.33	0.006
3.5-4	15 (26.8)	41 (73.2)	0.41	0.071
4-4.5	12 (20.0)	48 (80.0)	0.61	0.35
Fathers' level of education				
High school	16 (15.4)	88 (84.6)	1	
Bachelors	41 (25.6)	119 (74.4)	0.53	0.066
Masters	33 (27.5)	87 (72.5)	0.48	0.035
PhD	3 (18.8)	13 (81.3)	0.79	0.720
Mothers' level of education				
High school	27 (25.0)	81 (75.0)	1	
Bachelors	19 (20.7)	73 (79.3)	1.28	0.503
Masters	47 (25.0)	141 (75.0)	1.00	1.000
PhD	0 (0.0)	12 (100.0)	-	-
Average family income per month in PKR				
1000 to 5000	18(20.5)	70 (79.5)	1	
5000 to 10,000	20(16.1)	104 (83.9)	1.34	0.469
10,000 to 15,000	22(32.4)	46 (67.6)	0.54	0.100
15,000 to 20,000	18(23.7)	58 (76.3)	0.83	0.706
More than 20,000	15(34.1)	29 (65.9)	0.50	0.094
Residence				
Home	51(20.9)	193 (79.1)	1	
Hostel	42(26.9)	114 (73.1)	0.72	0.204

Table-2: Associations between lifestyle habits, sleep patterns, and sedative use among medical students

Characteristics	Sedative use, n (%)		OR	p
	Yes	No		
Are you a smoker?				
Yes	48 (21.1)	180 (78.9)	1	
No	45 (26.2)	127 (73.8)	0.75	0.23
Do you exercise regularly?				
Yes	52 (19.4)	216 (80.6)	1	
No	41 (31.1)	91 (68.9)	0.53	0.01
Do you use any type of stimulants including?				
Coffee	19 (25.0)	57 (75.0)	1	
Tea	33 (17.6)	155 (82.4)	1.57	0.18
Cola drinks	18 (30.0)	42 (70.0)	0.78	0.56
Others	23 (30.3)	53 (69.7)	0.77	0.59
Do you use sedatives during non-exam periods?				
Never	9 (32.1)	19 (67.9)	1	
Rarely	67 (27.5)	177 (72.5)	1.25	0.66
Occasionally	5 (6.6)	71 (93.4)	6.73	0.002
Always	12 (23.1)	40 (76.9)	1.58	0.43
Do you use sedatives during exam periods?				
Never	16 (15.4)	88 (84.6)	1	
Rarely	24 (33.3)	48 (66.7)	0.36	0.006
Occasionally	47 (26.1)	133 (73.9)	0.51	0.039
Always	6 (13.6)	38 (86.4)	1.15	1.00
On average how much time do you spend studying per week?				
4-6	16 (26.7)	44 (73.3)	1	
6-8	40 (18.2)	180 (81.8)	1.64	0.15

8-10	37 (30.8)	83 (69.2)	0.82	0.61
On average how many hours do you sleep per day?				
4-6	34 (23.0)	114 (77.0)	1	
6-8	15 (14.4)	89 (85.6)	1.77	0.11
8-10	44 (29.7)	104 (70.3)	0.70	0.23
On average how much time do you need to fall asleep?				
0-30 min	16 (15.4)	88 (84.6)	1	
30-60 min	41 (25.0)	123 (75.0)	0.55	0.067
> 60 min	36 (27.3)	96 (72.7)	0.48	0.039
Can you specify your sleeping pattern?				
Night only	72 (30.0)	168 (70.0)	1	
Night and day	21 (13.1)	139 (86.9)	2.84	<0.001
Excellent	52 (31.0)	116 (69.0)	0.96	0.91

Table-3: Influence of sleep quality and disorders on sedative use among medical students

Characteristics	Sedative use, n (%)		OR	p
	Yes	No		
How can you describe your sleep quality?				
Excellent	52 (31)	116 (61)		
Good	20 (18.5)	88 (81.5)	1	
Poor	21 (16.9)	103 (83.1)	0.54	0.013
Do you experience any of these sleeping disorders?				
Insomnia	12 (23.1)	40 (76.9)	1	
Sleep apnoea	11 (22.9)	37 (77.1)	1.01	1.00
Restless legs syndrome	19 (15.8)	101 (84.2)	1.59	0.28
Narcolepsy	43 (32.6)	89 (67.4)	0.62	0.22
None	8 (16.7)	40 (83.3)	1.50	0.46
Since entering the college of medicine have you ever used sedative drugs or any other drugs that help you fall asleep?				
Yes	46 (20.5)	178 (79.5)	1	
No	47 (26.7)	129 (73.3)	0.53	0.01

DISCUSSION

Benzodiazepines augment the neuro-inhibitory action of GABA which grants it the therapeutic potential against anxiety, panic and sleep disorders. However they acts as a double edged sword as with increasing dose it tones down the skeletal muscles and triggers dopamine outbursts turning on the reward and pleasure centers in ventral tegmental area of brain.⁷ Hence, while keeping in consideration their side-effects including memory and cognitive impairment, respiratory depression, behavioural disorders and blood pressure changes, it is also imperative to highlight the most controversial yet harrowing issue of its addiction and misuse.¹²

Global statistics mark an age cohort of 18-24 years as the biggest consumer of sleep industry market amongst which medical students are the most susceptible individuals owing to their work routine with reports of overburdening, frequent burnout episodes and attacks of severe panic and anxiety.⁴ This cross-sectional study conducted in Pakistan is a continuum to the surveys taking place globally to assess the frequency of the medical students consuming these sedative hypnotics.

In our study the total ratio of students taking benzodiazepines came out to be an alarming total of 23%. This percentage was in line with a recent study in Iran where 20% of the study participants admitted to

use the pills.¹³ However, both ours and Iranian study were in a complete contrast with a study conducted in Serbian students where though 19% males and 12.8% females reported with complete burn out but the benzodiazepines consumption was reported by 3.4% only, close to the one in Ethiopian medical students with 6.2% of total medicos.¹⁴ While compiling the respective gender ratio of all other aforementioned studies no remarkable difference was seen. However, in our study male students showed higher relative compliance. The varying numbers amongst these studies can be owing to their significant association with factors including use of other stimulant drugs, smoking and alcohol whereas our study could not develop any such association.

The social factors raising the consumption bar were students living in hostels which were in line with a Spanish online survey with 6,798 volunteers; these were all diverse students with a considerable fraction hosteller medical students who reported a massive inclination towards acquiring diazepam and lorazepam without a prescription.¹⁵

Economically, children belonging to household with middle class income and literate background, pertaining to both parents education, were at higher stake. On exactly similar lines, a research⁷ was published by a North Eastern Ethiopian University validating our findings, this research had widens the scope of research by underlining the concurrent abuse of antihistamines as well.

Last and more important aspect to be covered is academic position of these students, as a series of direct questions helps us categorize the students grades, and it turned out that the students who came in the window of average scorers with 8–10 hours of study schedule had highest rate of frequent pill popping with a higher trend in exam period for which the curricular burden is the main malefactor. The students who exercise regularly demonstrated an ability to overcome this urge with a lower ratio in comparison. A descriptive study conducted in India had exact aforementioned results with higher occurrence in average scorers; the study also depicted multi-tiered factors similar to ours like gender, place to stay and seniority.¹⁶

Allied sleeping habits affect the number too, here we observed a mixed interplay of sleep aspects as majority sedative hypnotic users marked variable responses with the greater credit to 8–10 hours of night sleep with excellent quality. It is worth mentioning that the users also shared the problem of narcolepsy and insomnia as well, which is polls apart in sleep architecture. Benzodiazepines do improve the sleep quality with no awakening episode; time for stage 3, however, may be reduced.¹⁷ We were unable to find more studies commenting in these points so this was a

rather novel part of the study which may lead further to better understanding with more data compiled.

This study adds onto the pool of global data alarming the authorities regarding the speedily trending use of benzodiazepines as not merely mental health aids but also as an illicit substance abuse. It also warrants a change in medical education system which buds so much anxiety in young brain that they resort to such ‘short-cuts’. Such studies should be conducted on massive level to identify precise magnitude of problem and address it as a matter of utmost importance and urgency.

CONCLUSION

The number of female students consuming sedatives was significantly higher than their male counterparts. The progression through academic years significantly correlates with increased sedative consumption particularly peaking in 4th year. Students reporting poor sleep quality were less likely to consume sedatives, a finding that challenges assumptions about the direct relationship between sleep quality and sedative use.

ACKNOWLEDGEMENT

Authors are grateful to Hafiz Bilal Murtaza, PhD Scholar at Agriculture University, Faisalabad for assisting us in statistical analysis of this project. We owe special thanks to all participants to be part of this research project.

DISCLOSURE

We are highly obligated to Nishtar Medical University and Bakhtawar Amin Medical College for allowing us to carry out this study.

REFERENCES

1. Chang Y, Xie X, Liu Y, Liu M, Zhang H. Exploring clinical applications and long-term effectiveness of benzodiazepines: An integrated perspective on mechanisms, imaging, and personalized medicine. *Biomed Pharmacother* 2024;173:116329–40.
2. Broberg M, Helaakoski V, Kiiskinen T, Paunio T, Jones SE, Mars N, *et al.* Genetics of sleep medication purchases suggests causality from sleep problems to psychiatric traits. *Sleep* 2024;47(2): 279–89.
3. Ishaq N, Ilyas MU, Maria, Malik KA, Rahman Z, Ata N, *et al.* Self-medication practices in medical students of Nishtar Medical University: A cross sectional study. *Esculapio: J Services Inst Med Sci* 2023;19(3):300–4.
4. Sarangi A, McMahon T, Gude J. Benzodiazepine misuse: an epidemic within a pandemic. *Cureus* 2021;13(6):15816.
5. Dhar R, Dalvi A, Sahu S, Tambekar M, Kotecha B. OSPE as a method of learning and assessment for undergraduate practical pathology versus traditional learning and assessment. *J Med Sci Health* 2023;9(2):146–51.
6. McKerrow I, Carney PA, Caretta-Weyer H, Furnari M, Miller Juve A. Trends in medical students’ stress, physical, and emotional health throughout training. *Med Educ Online* 2020;25(1):1709278.
7. Mekonnen GB, Debeb SG, Getaw NS, Kifle ZD. Self-reported sedative drug use among students attending at University of Gondar, Gondar, Northwest, Ethiopia: A cross-sectional study. *Subst Abuse Rehabil* 2021;12:49–57.

8. Akvardar Y, Demiral Y, Ergor G, Ergor A. Substance use among medical students and physicians in a medical school in Turkey. *Soc Psychiatry Psychiatr Epidemiol* 2004;39(6):502–6.
9. Mohammed KA, Abdellaif AO, Abd Eldaiem NA, Ibrahim BA, Elshiekh M. Sedative drug self-medication practice, attitude, and knowledge among medical students at the University of Dongola during 2022. *J Appl Health Sci Med* 2023;3(7):1–10.
10. Safaie N, Mirmohammadkhani M, Mashhadi HK. Evaluation of sleep quality of medical interns of Semnan University of Medical Sciences and its relationship with arbitrary use of stimulants or hypnotics. *Int J Early Child Spec Educ* 2022;14(3):3506–14.
11. Al-Sayed AA, Al-Rashoudi AH, Al-Eisa AA, Addar AM, Al-Hargan AH, Al-Jerian AA, *et al.* Sedative drug use among King Saud University medical students: a cross-sectional sampling study. *Depress Res Treat* 2014;2014:378738.
12. Fond G, Bourbon A, Boucekine M, Messiaen M, Barrow V, Auquier P, *et al.* First-year French medical students consume antidepressants and anxiolytics while second-years consume non-medical drugs. *J Affect Disord* 2020;265:71–6.
13. Zavarmousavi MS, Isanazar A, Ezbarami ZT, Mossalat M, Massoodi A, Novin MH. Frequency of the benzodiazepines and serotonin-specific reuptake inhibitors use in medical students: a mixed method study. *Clin Cancer Investig J* 2021;8(S1):220370.
14. Ilic I, Zivanovic Macuzic I, Kocic S, Ilic M. High risk of burnout in medical students in Serbia, by gender: A cross-sectional study. *PLoS One* 2021;16(8):e0256446.
15. Pérez T, Pardo MC, Cabellos Y, Peressini M, Ureña-Vacas I, Serrano DR, González-Burgos E. Mental health and drug use in college students: Should we take action? *J Affect Disord* 2023;338:32–40.
16. Sapkota A, Silvanus V, Shah P, Gautam SC, Chhetri A. Psychoactive substance use among second-year and third-year medical students of a medical college: A descriptive cross-sectional study. *J Nepal Med Assoc* 2021;59(238):571–6.
17. de Mendonça FMR, de Mendonça GPRR, Souza LC, Galvao LP, Paiva HS, de Azevedo Marques Périco C, *et al.* Benzodiazepines and sleep architecture: a systematic review. *CNS Neurol Disord Drug Targets* 2023;22(2):172–9.

Address for Correspondence:

Dr Mahwish Gul, Department of Pharmacology, Ayub Medical College, Abbottabad, Pakistan. **Cell:** +92-344-9444188

Email: dr.mahwishayub@gmail.com

Received: 9 May 2024

Reviewed: 20 Mar 2025

Accepted: 27 Mar 2025

Contribution of Authors:

NI: Conceptualization and study design

NA: Data collection and drafting

HF: Data collection and drafting

MG: Study design, review of work

SB: Statistics and accountability for all aspect of work

MS: Critical review and proof reading

Conflict of Interest: There is no conflict of interest to be declared

Funding: None received from any governmental or private agency