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Prevalence of anxiety among medical students in a northern state of India and gaps in mental health service utilization: a cross-sectional study

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Evidence in Context

- The study identified a 24.2% anxiety prevalence among medical students in New Delhi, India
- Second-year students exhibited the highest anxiety levels, whereas physical activity acted as a protective factor.
- Only 23.9% of students who recognized a need for mental health services actually sought help.
- The challenges are intensified by academic pressures and cultural stigma in India.
- Study identified key factors like academic year and physical activity, and gaps in mental health service utilization among medical students.

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Abstract

Background: Medical students face high levels of anxiety, exacerbated by academic and lifestyle pressures. In India, cultural stigma and limited mental health access further complicate addressing these challenges. This study investigates the prevalence of anxiety among medical students, explores associated factors, and evaluates gaps in mental health service utilization.

Methods: A cross-sectional study was conducted at a medical college in New Delhi, India, in June 2023. Anxiety was assessed using the Generalized Anxiety Disorder-7 (GAD-7) scale, with a score ≥10 indicating significant anxiety. Data on sociodemographic, academic, and lifestyle factors, along with perceived mental health needs and service utilization, were collected. Logistic regression analyses identified significant predictors of anxiety.

Results: Among 413 participants, the prevalence of anxiety was 24.2% (95% CI: 20.1%–28.6%). Second-year students showed the highest vulnerability (adjusted OR = 1.9, 95% CI 1.1-3.5), while physical activity was protective (adjusted OR = 0.57; 95% CI 0.35-0.94). Despite 46% of anxious students recognizing the need for mental health services, only 23.9% sought professional help.

Conclusion: Anxiety among medical students is prevalent, with academic year and physical activity emerging as significant predictors. The findings underscore the importance of tailored mental health programs and institutional support to address unmet mental health needs and encourage service utilization.

Keywords: *Medical students face high levels of anxiety, exacerbated by academic and lifestyle pressures*

Introduction

Medical education is widely recognized as one of the most demanding and psychologically challenging academic disciplines. Compared to other professional training programs, it requires higher levels of academic rigor, prolonged study hours, and emotional resilience to cope with the intense academic and clinical workload [1,2]. The extended duration of training, coupled with the need to develop advanced professional skills, places significant mental strain on medical students, often adversely affecting their well-being [3,4]. Additionally, factors such as strict schedules, high performance expectations, separation from loved ones, adaptation to clinical environments, sleep deprivation, financial pressures, and limited opportunities

For relaxation contribute to elevated stress levels [5]. Collectively, these stressors increase the risk of psychological challenges among medical students, including anxiety, depression, substance abuse, and suicidal ideation.

Global studies consistently report a high prevalence of mental health concerns among medical students, with anxiety being one of the most critical issues [6,7]. Approximately one-third (33.8%) of medical students worldwide are affected by anxiety, with even higher rates observed in the Middle East and Asia. A recent systematic review and meta-analysis conducted by Kaur et al. reported the prevalence of anxiety among medical students in India to be 50% (95% CI 42% - 58%) [4]. Evidence suggests that these vulnerabilities often emerge during medical school and, if left unaddressed, can persist into professional practice [8]. These psychological challenges not only impair students' interpersonal relationships and academic performance but also undermine their professionalism and empathy toward patients, potentially affecting the quality of care they provide [9,10].

This global burden of anxiety is further compounded in the Indian context, where cultural stigma surrounding mental health and limited access to professional support act as additional barriers to care. Although previous research has identified anxiety as a significant issue among medical students, there are notable gaps in the literature. Most studies focus exclusively on the prevalence of anxiety or its associated factors, with limited attention given to students' perceptions of their mental health needs. Furthermore, the extent to which students access mental health services remains underexplored. Studies have rarely investigated the disparity between the perceived need for mental health care and actual service utilization, leaving critical questions unanswered about the unmet needs in accessing mental health support.

The primary objective of this study is to estimate the prevalence of anxiety among undergraduate medical students. Additionally, it aims to identify the sociodemographic, academic, and lifestyle factors that are associated with anxiety within this population. Furthermore, the study seeks to evaluate the gap between the perceived mental health needs of students and their actual utilization of mental health services.

Methods

Study setting and design

This cross-sectional study was conducted at a medical college in New Delhi, India, during June 2023. The study aimed to estimate the prevalence of anxiety among undergraduate medical students and identify associated factors.

Study participants

Undergraduate medical students from all semesters enrolled in the MBBS program at the institution were invited to participate. Inclusion criteria required students to provide written informed consent, while students under the age of 18 and those who did not give consent were excluded from the study.

Sample size and sampling method

The sample size was calculated to be 430 students, based on a prevalence of anxiety of 20.2%, with a 4% absolute error and a 10% non-response rate [11]. A list of all enrolled students was obtained, and each was assigned a unique serial number. Simple random sampling was employed using computer-generated random numbers to select participants. Students who could not be contacted after three attempts were classified as non-responders.

Study tools

Data collection for the study was conducted using a structured, self-administered questionnaire designed to gather comprehensive information on various aspects relevant to the research objectives. The questionnaire included three main sections. The first section captured sociodemographic details such as age, gender, academic semester, and other relevant variables. We have used modified Kuppuswamy Scale 2023 to assess for socio-economic status [12]. The second section focused on screening for anxiety using the GAD-7 scale, a validated and reliable tool widely

Used for assessing anxiety. A GAD-7 score of 10 or more was used as the threshold for identifying cases of generalized anxiety disorder [13]. The third section explored participants' mental health needs, incorporating questions to assess perceived unmet mental health requirements and their utilization of professional mental health services within the past 12 months. For this study, mental health care professionals were defined as those holding a postgraduate degree in psychiatry, medical doctors trained under the National Mental Health Programme, or qualified psychologists.

Study procedure

A sampling frame was developed from the list of undergraduate medical students. Selected students were approached individually and briefed about the study objectives. Written informed consent was obtained from all participants. Non-responders were identified after three contact attempts. The final sample consisted of 425 students who completed the questionnaire.

Statistical analysis

Data were analyzed using STATA 18 software. Qualitative data were presented as proportions, while quantitative variables were summarized using mean and standard deviation (SD) for normally distributed data and median with interquartile range (IQR) for non-normally distributed data. Prevalence rates for anxiety were calculated, and associated factors were examined using univariate and multivariate logistic regression analyses. Variables with a p-value <0.2 in univariate analysis were included in multivariate logistic regression. Results were expressed as odds ratios (ORs) with 95% confidence intervals (CIs), and a p-value <0.05 was considered statistically significant.

Ethical considerations

The study adhered to ethical guidelines outlined in the Declaration of Helsinki. Ethical clearance was obtained from the Institutional Ethical Committee under reference IEC/VMMC/SJH/Project/06-2023/CC-01. Participants were provided with a detailed participant information sheet outlining the study objectives, procedures, risks, and benefits. Written informed consent was obtained from all participants prior to data collection. To ensure confidentiality, all data were anonymized by assigning unique codes to participants and securely storing the key linking these codes to individual identities. Only the research team had access to the data, which were stored in password-protected electronic files. Participants scoring above the cut off on the GAD-7 scale were informed of their results privately and provided with contact information for mental health resources available at the institution.

Results

Socio-demographic factors

Out of 430 students, 413 undergraduate medical students participated in the study, achieving a response rate of 96%. The mean age of participants was 20.5 years (SD ± 1.6). The majority were male (61.7%), and the largest group of participants were first-year students (33.6%). Most students (78.2%) belonged to the highest socioeconomic status category (class I), and 63.4% resided in hostels or paying guest accommodations. Regarding academic and lifestyle factors, 9.2% of students reported appearing in supplementary examinations. Physical activity was practiced by 54.7% of participants, while 65.3% used social media for 1 to 4 hours daily. Tobacco use was reported by 13.8% of students [Table 1].

Prevalence of anxiety

Among the 413 participants, 100 students were identified as having anxiety, resulting in a prevalence of 24.2% (95% CI: 20.1%–28.6%). The distribution of anxiety severity, as assessed by the GAD-7 scale, is illustrated in Figure 1. Nearly half of the participants (47.9%) exhibited minimal anxiety symptoms, while 27.9% reported mild symptoms. Moderate and severe anxiety symptoms were observed in 16.9% and 7.3% of students, respectively.

Table 2 presents the associations between various factors and anxiety among participants, revealing several significant relationships. Anxiety prevalence varied notably across professional

Years, with second-year students reporting the highest prevalence (36.9%) and third-year students the lowest (11.7%; p < 0.01). No significant associations were observed for gender, socioeconomic status, place of origin, or living arrangements. Lifestyle factors, however, were strongly linked to anxiety. Students who did not engage in physical activity exhibited a higher prevalence of anxiety (31%) compared to those who were physically active (18.6%; p < 0.01). Tobacco use was also significantly associated with anxiety, with a prevalence of 35.1% among users compared to 22.5% among non-users (p = 0.03). Social media use was another notable factor, as students using social media for more than 4 hours daily demonstrated a prevalence of 41%, which was significantly higher than those with lesser use or no use (p < 0.01). Additionally, students with alcohol use disorder showed a significantly higher prevalence of anxiety (48%) compared to those without (22.7%; p = 0.01).

Table 1: Sociodemographic and lifestyle characteristics of study participants (n=413)

Variables	Categories	n (%)
Gender	Male	255 (61.7)
	Female	158 (38.3)
Mean Age	Male	20.5 (SD 1.6)
	Female	20.2 (SD 1.5)
	Total	20.3 (SD 1.5)
Years of study	1st Year	139 (33.6)
	2nd Year	111 (26.9)
	3rd Year	94 (22.7)
	4th Year	69 (16.8)
Socio economic status (Modified Kuppuswamy scale 2023)	Class 1	323 (78.2)
	Class 2	52 (12.5)
	Class 3	13 (3.2)
	Class 4	20 (4.9)
	Class 5	5 (1.2)
Currently live	Hostel or PG	262 (63.4)
	Living with parents	151 (36.6)
Appearance in supplementary exam	Yes	38 (9.2)
	No	375 (90.8)
Adequate physical activity (> 600 METS a week)	Yes	226 (54.7)
	No	186 (45.3)
Social Media use	No use at all	9 (2.2)
	Less than 1 hour	73 (17.7)
	1 to 4 hours	270 (65.3)
	More than 4 hours	61 (14.8)
Tobacco use	Yes	57 (13.8)
	No	356 (86.2)
Alcohol use disorder	Yes	25(6.1)
	No	388(93.9)

Further analysis using multivariate logistic regression is summarized in Table 3. After adjusting for potential confounders, the professional year remained significantly associated with anxiety. Second-year students had nearly twice the odds of experiencing anxiety compared to first-year students (adjusted OR = 1.9; 95% CI: 1.1–3.5; p = 0.03). Conversely, third-year students exhibited significantly lower odds of anxiety (adjusted OR = 0.35; 95% CI: 0.16–0.78; p = 0.01), suggesting a protective effect in this cohort. Final-year students, however, did not show a statistically significant association with anxiety after adjustment (adjusted OR = 0.76; 95% CI: 0.4–1.6; p = 0.47) (Table 3).

Physical activity emerged as a protective factor, with physically active students having significantly lower odds of anxiety compared to those who were inactive (adjusted OR = 0.57; 95% CI: 0.35–0.94; p = 0.02).

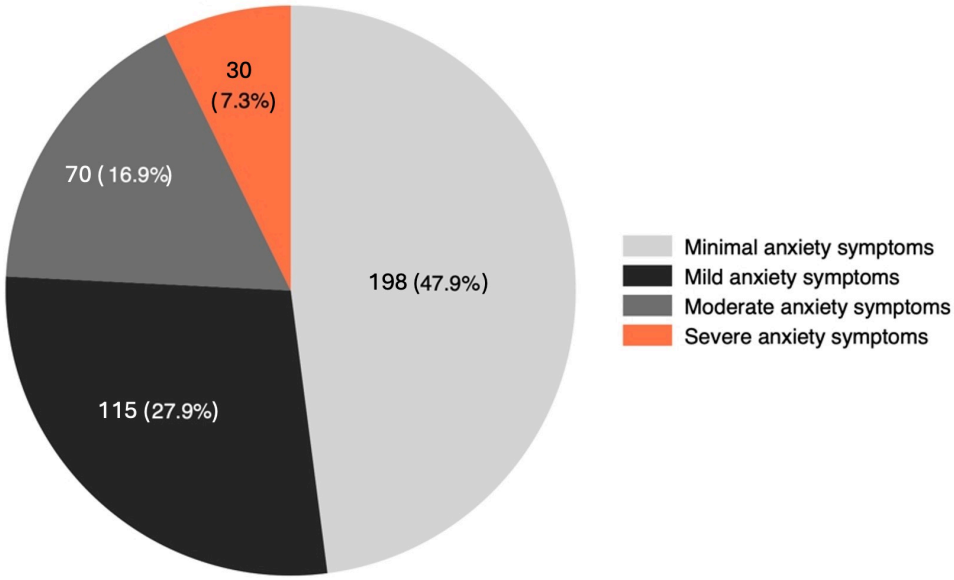

Figure 1: Distribution of anxiety severity among study participants

Table 2: Factors associated with anxiety among study participants

	Variables	TotalN = 413 (%)	Anxiety		p-value#
			Yes [n = 100 (%)]	No [n = 313(%)]	
Gender	Male	255 (100)	64 (25.1)	191 (74.9)	0.5
	Female	158 (100)	36 (22.8)	122 (77.2)	
Professional year	1styear	139(100)	31 (22.3)	108 (77.7)	<0.01*
	2ndyear	111(100)	41 (36.9)	70 (63.1)	
	3rdyear	94(100)	11 (11.7)	83 (88.3)	
	Final year	69(100)	17 (24.6)	52 (75.4)	
Socio economic status	Class 1	323(100)	76 (23.5)	247 (76.5)	0.34
	Class 2	52 (100)	16 (30.8)	36 (69.2)	
	Class 3	13 (100)	4 (30.8)	9 (69.2)	
	Class 4	20(100)	2 (10)	18 (90)	
	Class 5	5(100)	2 (40)	3 (60)	
Place of origin	Delhi NCR	174(100)	36 (20.7)	138 (79.3)	0.15
	Outside Delhi NCR	239(100)	64 (27.8)	175 (73.2)	
Currently live	Hostel or PG	262(100)	70 (26.7)	192 (73.3)	0.11
	With parents	151(100)	30 (19.9)	121 (80.1)	
Gave supplementary exam	Yes	38(100)	6 (15.8)	32 (85.2)	0.2
	No	375(100)	94 (25.1)	281 (74.9)	
Adequate physical activity (> 600 METS a week)	Yes	226(100)	42 (18.6)	184 (81.4)	<0.01*
	No	186(100)	58 (31)	129 (69)	
Tobacco used (ever)	Yes	57(100)	20 (35.1)	37 (64.9)	0.03*
	No	356(100)	80 (22.5)	276 (77.5)	
Social media use	Not use at all	9(100)	1 (11.1)	8 (88.9)	<0.01*
	Less than 1 hour	73(100)	14 (19.2)	59 (80.8)	
	1 to 4 hours	270(100)	60 (22.2)	210 (77.8)	
	More than 4 hours	61(100)	25 (41)	36 (59)	
Alcohol use disorder	Yes	25(100)	12 (48)	13 (52)	0.01*
	No	388(100)	88 (22.7)	300 (77.3)	

Chi square test, * = Statistically significant

In contrast, the association between tobacco use and anxiety, significant in the univariate analysis, lost statistical significance in the adjusted model (adjusted OR = 1.47; 95% CI: 0.71–3.03; p = 0.54). Similarly, social media use, particularly for more than 4 hours daily, showed elevated odds of anxiety in the adjusted analysis (adjusted OR = 3.04; 95% CI: 0.33–27.9; p = 0.3), but this finding was not statistically significant. Alcohol use disorder, despite being significant in the univariate analysis, did not maintain significance in the adjusted model (adjusted OR = 2.48; 95% CI: 0.91–6.74; p = 0.2). Other variables, including place of origin and living arrangements, also did not show significant associations with anxiety after adjustment.

Table 3: Multivariate logistic regression analysis of factors associated with anxiety

		Unadjusted Odds ratio	P value	Adjusted Odds ratio	P value
Professional Year	1styear	Ref		Ref	
	2ndyear	2.04 (1.17 – 3.580	0.012	1.9 (1.1 – 3.5)	0.03
	3rdyear	0.46 (0.21 – 0.97)	0.042	0.35 (0.16 – 0.78)	0.01
	Final year	1.13 (0.57 – 2.24)	0.7	0.76(0.4 – 1.6)	0.47
Place of origin	Delhi NCR	Ref		Ref	
	Outside Delhi NCR	1.40 (0.88 – 2.23)	0.15	1.14(0.65 – 1.99)	0.62
Currently live	Hostel or PG	Ref		Ref	
	With Parents	0.68 90.41 – 1.1)	0.11	0.60 (0.3 – 1.09)	0.09
Adequate physical activity (> 600 METS a week)	Yes	0.50 (0.32 – 0.80)	<0.01	0.57 (0.35 – 0.94)	0.02
	No	Ref		Ref	
Tobacco used (ever)	Yes	1.86 (1.02 – 3.39)	0.03	1.47 (0.71 – 3.03)	0.54
	No	Ref		Ref	
Social media use	Not use at all	Ref		Ref	
	Less than 1 hour	1.89 (0.21 – 16.44)	0.5	1.28 (0.13 – 11.8)	0.8
	1 to 4 hours	2.28 (0.28 – 18.63)	0.44	1.27 (0.14 – 11.15)	0.8
	More than 4 hours	5.55 (0.65 – 47.24)	0.11	3.04 (0.33 – 27.9)	0.3
Alcohol use disorder	Yes	3.14 (1.38 – 7.14)	0.01	2.48 (0.91 – 6.74)	0.2
	No	Ref		Ref	

Among the 100 anxious students, 46 felt the need for mental health services, but only 11 accessed them, resulting in a utilization rate of 23.9% among those in need and 11% overall. Notably, 76.1% of those who recognized the need did not seek support, highlighting a significant gap in service utilization.

Discussion

The prevalence of anxiety among undergraduate medical students in this study was 24.2%, as assessed using the GAD-7 scale. This prevalence, while concerning, is notably lower than those reported in other Indian studies. For instance, Chakraborty et al. found a prevalence of 52.4% in Darjeeling, Merchant et al. reported 66.11% in Maharashtra, and Karmakar et al. documented 96.8% in North East India [14-16]. These differences likely reflect variations in methodology, population characteristics, and institutional contexts. The use of the GAD-7 in this study, a targeted tool for generalized anxiety, provides a narrower focus compared to the Depression, Anxiety, and Stress Scale (DASS) used in other studies, which assesses broader constructs of psychological distress and may inflate estimates due to overlapping stress-related symptoms.

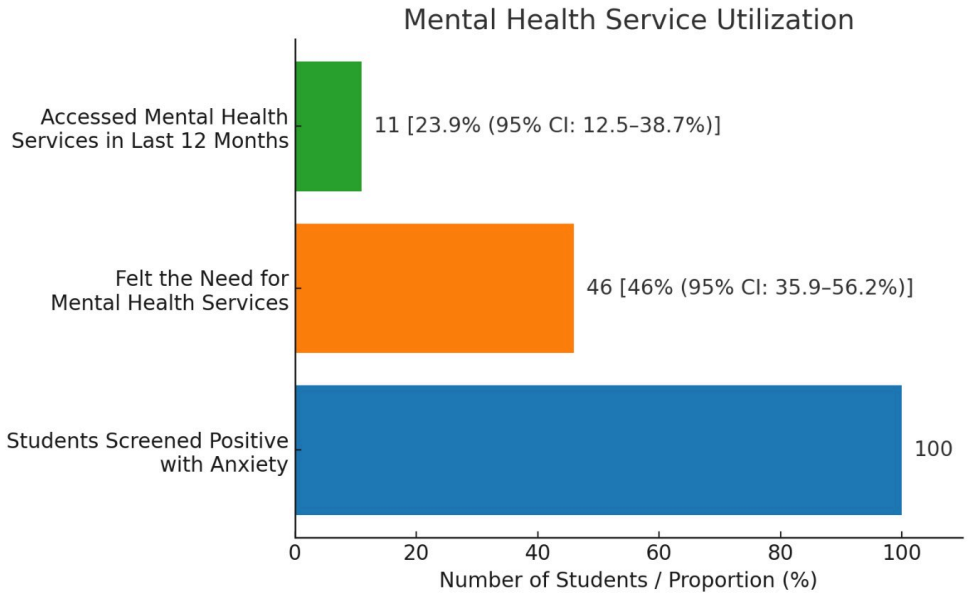

Figure 2: Mental health services utilization among students suffering from anxiety

Regional and institutional factors also contribute to the observed variation. Higher prevalence rates in studies like Merchant et al. may reflect systemic academic pressures and gaps in mental health support in those regions [15]. Conversely, the relatively lower prevalence in this study may indicate better access to mental health services and structured academic policies at the New Delhi institution. Differences in sampling strategies further influence results; Karmakar et al.'s focus on highly stressed students may have inflated prevalence rates, whereas the random sampling in this study captured a broader, more representative cohort [16].

The academic year emerged as a significant predictor of anxiety, with second-year students reporting the highest prevalence (36.9%), while third-year students demonstrated a protective effect (adjusted OR = 0.35). These findings align with Merchant et al. who noted elevated anxiety in junior students due to transitional challenges and increased academic demands. By the third year, students may experience a plateau in academic intensity or have developed coping mechanisms, reducing anxiety levels [15]. Physical activity also played a significant protective role, with physically active students showing significantly lower odds of anxiety (adjusted OR = 0.57). This finding aligns with studies by Kumar et al. and Deekala et al., which highlighted the mental health benefits of regular exercise, including physiological effects like cortisol regulation and psychological improvements in self-esteem and resilience [17-18].

Several factors may explain the differences in prevalence across studies. Gender differences, often highlighted in other research, were not significant in this study, possibly due to institutional or regional factors that buffer gender-specific stress. Timing also plays a critical role; studies conducted during or shortly after the COVID-19 pandemic, such as Merchant et al., captured heightened anxiety due to pandemic-related disruptions [15]. In contrast, this study reflects a post-pandemic stabilization of stressors, which may contribute to the lower prevalence observed.

This study has notable strengths, including the use of the validated GAD-7 scale and a large, randomly selected sample that enhances the generalizability of findings. Its focus on modifiable predictors, such as physical activity and academic year, offers actionable insights for interventions targeting mental health in medical students. However, the cross-sectional design limits causal inference, and reliance on self-reported data introduces potential bias. The single-center setting restricts generalizability to other regions, and qualitative aspects, such as coping mechanisms and interpersonal factors, were not explored.

Future research should prioritize longitudinal cohort studies with repeated measurements at key academic milestones to track the progression of anxiety and establish causal relationships. Such studies would provide deeper insights into the interplay of predictors like physical activity, academic transitions, and institutional support. These findings could inform targeted interventions at critical stages of medical education, ultimately improving mental health outcomes for medical students.

Conclusion

This study identified a high prevalence of anxiety among undergraduate medical students. Significant predictors includedtheacademic year, with second-year students showing the highest vulnerability, and physical activity, which demonstrated a protective effect. The findings underscore the need for targeted interventions, such as promoting physical activity, supporting junior students, and addressing academic pressures. Longitudinal research is essential to understand anxiety trajectories and inform tailored mental health strategies for medical students.

Abbreviations

CI: Confidence intervals

DASS: Depression, Anxiety, and Stress Scale

GAD-7: Generalized Anxiety Disorder-7

ORs: Odds ratios

Supporting information: Annexure-I

Ethical Considerations: The study adhered to ethical guidelines outlined in the Declaration of Helsinki. Ethical clearance was obtained from the Institutional Ethical Committee under reference IEC/VMMC/SJH/Project/06-2023/CC-01.

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Consent for publication: Note applicable

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