## ORIGINAL ARTICLE

# Depression in Medical Academia: A Study on Prevalence and Risk Factors among Undergraduate Students in Jammu, India

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## Abstract

**Background and Aim:** Medical students endure elevated stress levels. Contemporary data on the epidemiology of depression and its concomitant risk factors in this demographic is pivotal in comprehending its ubiquity and for instituting preventative strategies. This research endeavors to scrutinize the prevalence of depression in undergraduate medical students and identify the diverse risk factors implicated.

**Methods:** In February 2023, a cross-sectional investigation was undertaken at a private medical institution in North India. A cohort of 302 medical students underwent depression screening and evaluation of related factors through the utilization of the 9-Item-Patient Health Questionnaire (PHQ-9).

**Results:** A substantial proportion, 71.2% (215/302), exhibited varying degrees of depression. The PHQ-9 responses facilitated the categorization of students into distinct severity brackets: 28.8% mild, 19.9% moderate, 11.6% moderately severe, and 10.9% severe depression. Implementing a PHQ-9 score threshold of $\geq 10$ delineated an overarching depression prevalence of 42.38%. Univariate logistic regression identified numerous significant correlates of depressive symptoms, including urban habitation, having a limited number of siblings, engaging in moderate physical activity, and enrollment in specific professional academic years. Nevertheless, multivariable logistic regression affirmed only urban dwelling and the academic duress experienced in the first, third or fourth professional years as persistent significant correlates.

**Conclusion:** The study unveiled a high prevalence (42.38%) of moderate to severe depression among medical students, advocating for meticulous surveillance and further assessment of the affected individuals. It is imperative to devise and implement robust strategies to mitigate academic stressors and forestall the descent into depressive states.

**Keywords:** Depression, PHQ-9, University students, Prevalence, Medical students, Predictors

## Introduction

Depression, a prevalent mental health issue, manifests through a spectrum of symptoms including persistent sadness, a diminished ability to enjoy previously pleasurable activities, feelings of worthlessness, and impaired concentration, persisting for at least a fortnight.[1] It is imperative to address this condition

promptly, as neglecting it, especially during the formative years, can escalate to severe complications encompassing academic setbacks, substance misuse, and in extreme cases, suicide.[1]

The transition from adolescence to adulthood, a phase many university students are navigating, is fraught with a myriad of challenges ranging from emotional and economic shifts to sexual maturation and identity formation. This period, marked by significant psychosocial changes, is a crucible for mental health issues, making the wellbeing of students a pivotal aspect of societal health.

In the context of medical education, students find themselves grappling with an intense and demanding curriculum, a journey that transforms them from unsure individuals to competent young doctors. This educational pathway, while enriching, is also a source of considerable stress, with repercussions not just on their personal health but extending to their academic performance and future patient care. The potential for compromised communication and increased likelihood of medical errors due to psychological distress cannot be understated.

Research has delved into the mental health landscape among medical students, uncovering a correlation between academic performance and mental wellbeing. A competitive spirit, while driving academic excellence, can foster increased stress levels.[2] Conversely, students facing academic struggles are more prone to depression.[3] Globally, systematic reviews have shown the prevalence of depressive symptoms among medical students to be approximately 27.2% to 28.0%.[4,5] In India, the prevalence has been reported in various studies to vary broadly between 21.5% to 41%, with some studies indicating rates as high as 50.5%.[6-10] Despite the pressing need, many students refrain from seeking professional help, fearing damage to their professional reputation and social acceptance.

Adding to the existing literature, it is pertinent to note that depression among medical students is a topic warranting deeper exploration. The pressures of medical education can sometimes be overwhelming, leading to a heightened risk of depression. Understanding the complexities nuances of this issue is not just vital for the wellbeing of the students, but also has a far-reaching impact on their future careers and the quality of healthcare they will be equipped to provide. It is therefore a subject of utmost importance, deserving of detailed study and proactive measures for mitigation.

In North India, particularly in regions like Jammu, there exists a significant gap in the research concerning depression among university medical students. In light of the increasing awareness of mental health issues, this study endeavours to bridge this gap, aiming to gauge the prevalence of depressive symptoms and identify the primary factors influencing it among medical students in North India.

## Materials and Methods

### Study design and studied population

In February 2023, a cross-sectional analysis was undertaken after obtaining permission from the institutional ethical committee of a private medical institution affiliated with the University of Jammu vide letter no. ASCOMS/IEC/2023/MeetingII/FM/01. The survey involved 302 undergraduate medical students. The data collection phase was strategically positioned to avoid the periods, two weeks before and after examinations to ensure a more accurate representation of the students' regular mental state. Individuals unable to respond due to illness, interns, students who were absent on the date of data collection or unwilling to partake were excluded from the study.

### Sample size and technique

Drawing from a prior study conducted in New Delhi which reported a 21.5% prevalence rate of depression among medical students, the sample size was determined with a 95% confidence interval and a 0.05 alpha error at 80% power, resulting in a minimum requisite of 260 participants.[10] Anticipating a 15% non-response rate, the sample size was increased to approximately 300. Although 400 students were initially approached with the questionnaire, the final tally of complete responses stood at 302, spanning across all four academic years.

### Instrument utilized

The self-administered questionnaire was bifurcated into two segments:

1. Socio-demographic details encompassing age, gender, residential background, family structure, daily exercise duration, and academic year.

2. The Patient Health Questionnaire (PHQ-9): A renowned tool for diagnosing and gauging the gravity of depressive symptoms, incorporating a series of nine questions structured on a Likert scale ranging from 0 to 3 (not at all = 0, several days = 1, more than half the days = 2, and nearly every day = 3).[11] The PHQ-9 facilitated a detailed nuanced understanding of the

participants' mental health over the preceding two weeks, with scores categorized into various levels of depression severity; minimal depression (score 0-4), mild depression (score 5-9), moderate depression (score 10-14), moderately severe depression (score 15-19) and severe depression (score 20-27). A threshold score of 10 was employed to demarcate the presence or absence of depressive symptoms ($\geq 10$ cut-off score includes moderate + moderately severe and severe depression).

**Statistical analysis**

The Statistical Package for Social Science (SPSS) version 26.0 and Jamovi version 2.3.21 facilitated the data analysis process, with mean and standard deviation illustrating quantitative data and frequencies and percentages delineating qualitative data. Comparative analyses were conducted using Chi-square ($\chi^2$), to discern differences between groups. Logistic regression models, both unadjusted and adjusted, were leveraged to pinpoint potential predictors of depression among the medical student populace. The statistical significance was affirmed at a *P* value less than 0.05.

## Results

Of the 400 undergraduate students, 305 students returned the questionnaires (response rate 76.25%), out of which 302 (75.5%) were completely filled and included in this study. Minimum and maximum ages of respondents were 17 and 26 years, respectively. The mean age of the total participants was 21.10 years with a standard deviation of 1.49. Mean ages of males and females were 21.27 ($\pm$ 1.51) years and 20.58 ($\pm$1.32) years, respectively.

**Table 1:** Socio-demographic characteristics of the respondents (n=302)

| Characteristics | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Gender | Female | 73 | 24.2 |
| | Male | 229 | 75.8 |
| Residence | Rural | 133 | 44.0 |
| | Urban | 169 | 56.0 |
| Siblings | 0 | 17 | 5.6 |
| | 1 | 127 | 42.1 |
| | 2 | 93 | 30.8 |
| | 3 | 37 | 12.3 |
| | >3 | 27 | 8.9 |
| Family type | Nuclear | 201 | 66.6 |
| | Joint | 71 | 23.5 |
| | 3 generation | 30 | 9.9 |
| Exercise in minutes | 0-15 min | 139 | 46.0 |
| | 15-30 min | 82 | 27.2 |
| | 30-60 min | 45 | 14.9 |
| | >60 min | 36 | 11.9 |
| Professional | First | 72 | 23.8 |
| | Second | 70 | 23.2 |
| | Third | 82 | 27.2 |
| | Final | 78 | 25.8 |

As indicated in Table 1, 75.8% male students and 24.2% female students participated in the study. There was nearly equal representation of rural and urban participants in the study. Out of the surveyed sample, 72.3% mentioned having one or two siblings, while very few were either single or had more than three siblings. About 66.6% of the students came from nuclear families, and roughly half of the students surveyed said they only exercised for 0-15 minutes each day. Only a small fraction, around one-tenth of the group, reported exercising for over an hour daily. An equal number of participants were involved from all four academic years.

As observed in Table 2, approximately 46.7% of the students expressed minimal interest or pleasure in engaging in activities over the past two weeks on multiple occasions. Additionally, 39.2% indicated feeling down, depressed or hopeless on several days during this period. Roughly one-third of the participants reported experiencing difficulty falling asleep, staying asleep, or sleeping excessively, coupled with feeling tired or lacking energy on multiple days. Moreover, 41.7% did not report issues with their appetite or overeating, and 46% never experienced negative thoughts about themselves, feelings of failure, or concerns about letting their family down. About 38.7% of the students struggled with maintaining concentration on tasks such as reading newspapers or watching television on several days, while nearly two-thirds did not mention exhibiting slow movements or restlessness noticeable to others. The vast majority, approximately 71.2% of the respondents, stated that they never had thoughts of being better off dead or harming themselves in any way.

**Table 2:** PHQ-9 depression questionnaire response among students in February 2023

| Question | Response | Frequency | Percent |
|---|---|---|---|
| Little interest or pleasure in doing things | Not at all | 77 | 25.5 |
| | Several days | 141 | 46.7 |
| | More than half of the days | 35 | 11.6 |
| | Nearly everyday | 49 | 16.2 |
| Feeling down depressed or hopeless | Not at all | 97 | 32.1 |
| | Several days | 119 | 39.4 |
| | More than half of the days | 37 | 12.3 |
| | Nearly everyday | 49 | 16.2 |
| Trouble falling or staying asleep or sleeping too much | Not at all | 96 | 31.8 |
| | Several days | 98 | 32.5 |
| | More than half of the days | 51 | 16.9 |
| | Nearly everyday | 57 | 18.9 |
| Feeling tired or having little energy | Not at all | 80 | 26.5 |
| | Several days | 112 | 37.1 |
| | More than half of the days | 51 | 16.9 |
| | Nearly everyday | 59 | 19.5 |
| Poor appetite or overeating | Not at all | 126 | 41.7 |
| | Several days | 86 | 28.5 |
| | More than half of the days | 42 | 13.9 |
| | Nearly everyday | 48 | 15.9 |
| Feeling bad about yourself, or that you are a failure, or that you have let yourself or your family down | Not at all | 139 | 46.0 |
| | Several days | 87 | 28.8 |
| | More than half of the days | 26 | 8.6 |
| | Nearly everyday | 50 | 16.6 |
| Trouble concentrating on things, such as reading the newspaper or watching television | Not at all | 81 | 26.8 |
| | Several days | 117 | 38.7 |
| | More than half of the days | 47 | 15.6 |
| | Nearly everyday | 57 | 18.9 |
| Moving or speaking so slowly that other people could have noticed? Or the opposite, being so fidgety or restless that you have been moving around a lot more than usual | Not at all | 199 | 65.9 |
| | Several days | 49 | 16.2 |
| | More than half of the days | 24 | 7.9 |
| | Nearly everyday | 30 | 9.9 |
| Thoughts that you would be better off dead, or of hurting yourself in some way | Not at all | 215 | 71.2 |
| | Several days | 46 | 15.2 |
| | More than half of the days | 18 | 6.0 |
| | Nearly everyday | 23 | 7.6 |

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**Table 3:** Grading of depression and its prevalence in February 2023 (n=302)

| Grade of Depression | Frequency (n) | Percentage (%) |
|---|---|---|
| None | 87 | 28.8 |
| Mild | 87 | 28.8 |
| Moderate | 60 | 19.9 |
| Moderately severe | 35 | 11.6 |
| Severe | 33 | 10.9 |
| Total | 302 | 100.0 |

The study showed that 71.2% (215/302) of the students who participated in the study were provisionally diagnosed to have a certain level of depression. Table 3 displays proportions of depressive symptom grades among surveyed students: about 28.8% of students had mild depressive symptoms while 19.9%, 11.6%, and 10.9% students had moderate, moderately severe, and severe depressive symptoms, respectively, according to the PHQ-9 tool. On classifying depressive symptoms according to PHQ-9 scores, using cut-off point $\geq 10$, the overall prevalence of depression was 42.38% (Figure 1).

Univariate logistic regression delineated a number of elements markedly correlated with manifestations of depressive symptoms, encompassing domicile in urban locales, the presence of one or two siblings, partaking in a moderate duration of physical activity ranging from 15 to 60 minutes, and being enrolled in first, third, or fourth years of professional studies. Nonetheless, the subsequent multivariable logistic regression scrutiny, as explicated in Table 4, ascertained that solely residing in urban environments and the scholastic stressors encountered during the first, third, or fourth years of professional academia sustained their significance as substantial determinants of depression among medical students.
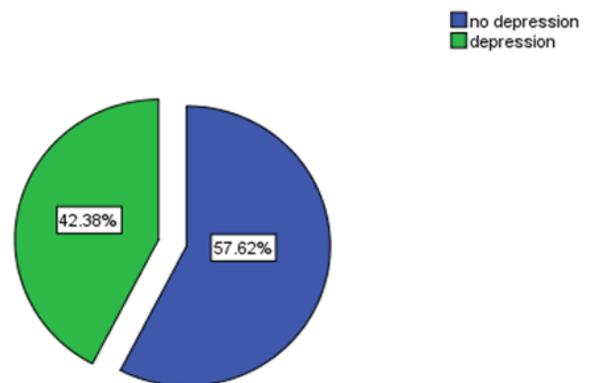


**Figure 1:** Categorization of students as depressed and non-depressed on basis of PHQ-9 scores' cut off $\geq 10$

**Table 4:** Logistic regression analysis for correlates of moderate to severe depression (PHQ-9 scores $\geq 10$) among medical students (n= 302)

| Variable | Category | No Depression n (%) | Depression n (%) | OR Univariate (95% CI, *P* value) | OR Multivariable (95% CI, *P* value) |
|---|---|---|---|---|---|
| Age | Mean (SD) | 21.2 (1.5) | 21.0 (1.5) | 0.91 (0.78-1.06, *P* = 0.221) | 0.81 (0.63-1.04, *P* = 0.096) |
| Gender | Female | 40 (54.8) | 33 (45.2) | - | - |
| | Male | 134 (58.5) | 95 (41.5) | 0.86 (0.51-1.47, *P* = 0.576) | 1.46 (0.77-2.83, *P* = 0.250) |
| Residence | Rural | 88 (66.2) | 45 (33.8) | - | - |
| | Urban | 86 (50.9) | 83 (49.1) | 1.89 (1.18-3.03, *P*=0.008) | 1.85 (1.03-3.33, *P*=0.040) |

| | | | | | |
|---|---|---|---|---|---|
| Siblings | 3 | 27 (73.0) | 10 (27.0) | - | - |
| | 2 | 50 (53.8) | 43 (46.2) | 2.32 (1.03-5.54, *P*=0.047) | 1.81 (0.75-4.60, *P*=0.198) |
| | 1 | 64 (50.4) | 63 (49.6) | 2.66 (1.22-6.19, *P*=0.017) | 1.70 (0.69-4.40, *P*=0.259) |
| | 0 | 13 (76.5) | 4 (23.5) | 0.83 (0.20-3.03, *P*=0.785) | 0.48 (0.10-1.94, *P*=0.315) |
| | >3 | 20 (71.4) | 8 (28.6) | 1.08 (0.35-3.23, *P*=0.890) | 0.81 (0.25-2.60, *P*=0.728) |
| Family type | Nuclear | 111 (55.2) | 90 (44.8) | - | - |
| | Joint | 42 (59.2) | 29 (40.8) | 0.85 (0.49-1.47, *P*=0.566) | 0.80 (0.43-1.47, *P*=0.472) |
| | 3 generation | 21 (70.0) | 9 (30.0) | 0.53 (0.22-1.18, *P*=0.132) | 0.73 (0.28-1.84, *P*=0.518) |
| Exercise in minutes | 0-15 min | 68 (48.9) | 71 (51.1) | - | - |
| | 15-30 min | 54 (65.9) | 28 (34.1) | 0.50 (0.28-0.87, *P*=0.015) | 0.59 (0.32-1.08, *P*=0.088) |
| | 30-60 min | 30 (66.7) | 15 (33.3) | 0.48 (0.23-0.96, *P*=0.040) | 0.56 (0.26-1.19, *P*=0.134) |
| | >60 min | 22 (61.1) | 14 (38.9) | 0.61 (0.28-1.28, *P*=0.195) | 0.61 (0.27-1.37, *P*=0.238) |
| Professional | 2 | 54 (77.1) | 16 (22.9) | - | - |
| | 3 | 46 (56.1) | 36 (43.9) | 2.64 (1.32-5.47, *P*=0.007) | 3.25 (1.45-7.58, *P*=0.005) |
| | 4 | 41 (52.6) | 37 (47.4) | 3.05 (1.51-6.34, *P*=0.002) | 5.57 (2.22-14.70, *P*<0.001) |
| | 1 | 33 (45.8) | 39 (54.2) | 3.99 (1.96-8.41, *P*<0.001) | 3.58 (1.64-8.06, *P*=0.002) |

OR: Odds ratio and CI: Confidence interval

## Discussion

The present study delineates a substantial prevalence of depressive symptoms among medical students, with a significant 42.38% grappling with moderate to severe depression underscoring the imperative of vigilant monitoring and intervention strategies. This finding is in harmony with the global narrative of escalating mental health issues in this demographic, corroborated by various studies conducted both in India and globally. The demographic dynamics revealed a higher mean age for male participants, a detail warranting further exploration in future studies to discern any potential correlations with depression trajectories.

A study conducted in Vietnam reported a prevalence of depression in 20.7% of medical students, with higher rates observed in females and those experiencing academic pressure. The study also highlighted the role of family factors and personal issues as significant contributors to depression, emphasizing a multifaceted approach to address this issue in the student community.[12]

Similarly, research undertaken in a Mexican public university revealed a prevalence of depressive symptoms in 20.2% of the medical students surveyed, with a significant proportion experiencing severe or moderately severe symptoms. The study underscored the heightened risk among female students and the urgent need for preventive strategies.[13] Echoing these findings, a study in Odisha, India, emphasized the critical role of regular monitoring and intervention to curb the growing concern of depression among medical students.[14] Historical data from studies conducted by Supe AN and Sidana *et al.* have consistently highlighted the high prevalence of stress and depression among medical students, accentuating the urgent need for preventive measures.[2,10] Moreover, recent studies by Pham *et al.* and Marishet Agumasie Tamene have further substantiated the pervasive nature of depression and its associated risk factors among university students globally.[15,16] A meta-analysis conducted in China by Zeng *et al.* utilized the PHQ-9 tool to assess the prevalence of mental health problems among medical students, and revealed a significant prevalence of depressive symptoms, thereby underscoring the universal nature of this issue across different geographical locations.[17]

The academic year of the students emerged as a significant correlate with their mental health status, a finding echoed in various studies conducted in different geographical locations including New Delhi and Odisha.[10,12] While some research highlights the vulnerability of first-year students owing to a plethora of adjustments including acclimatizing to a novel academic rigour and environment, others pinpoint the escalated stress levels in the final years due to the impending professional responsibilities and competitive exams.[14-16] The transitional phase from home to a university setting often engenders a sense of loneliness and difficulty in

adapting, potentially fostering depressive symptoms, a sentiment echoed in studies from different parts of the world including Mexico and Vietnam.[14,15]

Our study identified urban dwelling as a significant predictor of depression among medical students, a finding that necessitates a deeper delve. Urban environments often come with their own set of stressors including a fast-paced lifestyle, noise pollution, and sometimes, a lack of green spaces which can potentially affect mental health adversely. Moreover, students from urban backgrounds might face higher academic and societal pressures. It would be beneficial for future research to explore this avenue extensively, comparing it with findings globally to establish a more comprehensive understanding, a phenomenon that has been observed in studies conducted in China and other regions.[17,18]

It is pertinent to note the limitations of the present study, including its cross-sectional design which does not allow for the establishment of causality and the confinement to a single institution which may not comprehensively represent the broader population of medical students. The reliance on self-reported measures, although a practical approach, might introduce a bias due to the subjective nature of the responses.

Future studies with a larger and more diverse sample size, encompassing various institutions, could provide a more holistic understanding of the prevalence and dynamics of depression among medical students.

### Recommendations

In light of these findings, educational institutions bear the responsibility to foster environments that prioritize mental well-being alongside academic excellence. Implementing regular mental health screenings, fostering peer support groups, encompassing avenues like sports and music to serve as stress busters, a recommendation that finds resonance in studies conducted in different parts of the world,[19,20] and facilitating access to mental health resources could be pivotal in mitigating the adverse effects of depression and nurturing a healthier student community. Furthermore, the integration of online anonymous helplines, corroborated with psychiatry and clinical psychology departments, could offer a safe space for students to voice their concerns and seek help, a strategy underscored in various research endeavors.[12,13]

## Conclusion

In conclusion, the study sheds light on the pressing issue of depression among medical students, highlighting the critical role of academic year and urban dwelling as significant predictors. The study accentuates the necessity for psychosocial counseling and targeted interventions to address the prevalent issue of depression among medical students, a recommendation echoed in a plethora of studies. It calls for a multi-faceted approach to address this concern, integrating preventive strategies and fostering a supportive educational environment to safeguard students' mental well-being, a sentiment echoed globally in various studies.

It paves the way for expansive, nationwide longitudinal studies to encompass a broader spectrum of factors influencing students' mental health, thereby facilitating a more nuanced understanding and effective preventative strategies.

## Conflict of Interest

None

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