

Original Research Article

Prevalence of depression, anxiety, and stress among medical undergraduate students of a Medical College in Central India: a cross-sectional study

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Received: 21 July 2026

Revised: 28 July 2026

Accepted: 01 August 2026

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ABSTRACT

Background: Depression, anxiety, and stress are common psychological problems among medical students and may adversely affect their academic performance and overall well-being. Medical training involves substantial academic pressure and lifestyle changes that predispose students to psychological distress. The present study was conducted to estimate the prevalence of depression, anxiety, and stress and assess their association with selected personal characteristics among undergraduate medical students.

Methods: A cross-sectional study was conducted among 210 undergraduate medical students of a Government Medical College in Central India from September to November 2025. Data were collected using a pre-designed semi-structured questionnaire. Depression, anxiety, and stress were assessed using the Depression Anxiety Stress Scale-21 (DASS-21). Associations between depression, anxiety, stress, and selected personal characteristics were assessed using the Chi-square test, with $p < 0.05$ considered statistically significant.

Results: The prevalence of depression, anxiety, and stress was 47.1%, 61.0%, and 26.7%, respectively. Depression was significantly associated with satisfaction with education ($\chi^2=6.26$, $p=0.044$). Anxiety showed significant associations with gadget use ($\chi^2=14.2$, $p=0.003$) and substance use ($\chi^2=5.30$, $p=0.021$). Stress was significantly associated with year of study ($\chi^2=12.4$, $p=0.006$), satisfaction with education ($\chi^2=15.8$, $p<0.001$), sleeping duration ($\chi^2=15.3$, $p<0.001$), and water consumption ($\chi^2=10.3$, $p=0.006$).

Conclusions: Nearly half of the medical students experienced depression, more than half had anxiety, and about one-fourth had stress. Depression was significantly associated with educational satisfaction, anxiety with gadget use and substance use, and stress with year of study, educational satisfaction, sleep duration, and water consumption. Strengthening mental health promotion through regular screening, counselling services, healthy lifestyle practices, and academic support programmes may help improve the psychological well-being of medical students.

Keywords: Depression, Anxiety, Stress, DASS-21, Undergraduate medical students, Mental health

INTRODUCTION

Mental health is a fundamental component of overall well-being and a prerequisite for optimal cognitive, emotional, and social functioning. It encompasses an individual's ability to cope with the normal stresses of life, work productively, and realise their own potential,

and is recognised by the World Health Organisation as an integral and essential component of health.¹ Globally, mental disorders represent a substantial and growing public health burden: in 2021, nearly 1 in every 7 people worldwide (1.1 billion) were living with a mental disorder, of whom an estimated 280 million had depression and 359 million had an anxiety disorder, with

anxiety and depressive disorders together accounting for 12 billion productive workdays lost annually at a cost of nearly USD 1 trillion.² Depression, anxiety, and stress are among the most common psychological disturbances encountered in the general population, and their frequently overlapping symptomatology has led to their conjoint assessment as a triad of negative emotional states using validated instruments.³ Medical education is widely acknowledged to be one of the most academically demanding and emotionally taxing professional courses, characterised by an extensive curriculum, frequent high-stakes examinations, prolonged duty hours, early clinical exposure, and intense competition, all of which predispose medical undergraduates to considerable psychological distress. Globally, medical students have been shown to experience substantially higher rates of anxiety and depression than their age-matched peers in the general population, with pooled meta-analytic prevalence estimates of approximately 33.8% for anxiety (from 69 studies across 40,348 students) and 27.2% for depression or depressive symptoms (from 167 studies across 116,628 students), alongside a pooled suicidal-ideation prevalence of 11.1%.^{4,5}

In India, the national mental health survey (2015-16) estimated the current prevalence of any mental morbidity in the general adult population at 10.56%, with a stark treatment gap wherein nearly 150 million Indians were estimated to require mental health care while fewer than 30 million were actually receiving it.⁶ Several institution-based studies from different Indian medical colleges have reported a wide and inconsistent range of prevalence, at times documenting depression in nearly half (48.3%-48%), anxiety in more than half (60.6%-54.5%), and stress in roughly a quarter to a third (27.2%-31%) of the student population.^{7,8}

Despite this considerable and possibly under-recognised burden, robust epidemiological data specific to medical undergraduates from Central India remain scarce. With this background, the present study was conducted to estimate the prevalence of depression, anxiety, and stress among medical undergraduates of a medical college in Central India and to determine the association of some personal characteristics with depression, anxiety, and stress in this population.

METHODS

This cross-sectional study was conducted among the medical undergraduate students enrolled in Government Medical College, Nagpur. It was conducted for a period from September 2025 to November 2025. Undergraduate MBBS students (First to Final Year) and those who were present on the day of data collection were included in the study. Students who declined to participate or did not provide informed consent and interns were excluded from the study. Informed consent was taken from all participants in their vernacular language before data collection. Data were collected through face-to-face

interviews using a pre-designed semi-structured questionnaire covering sociodemographic details and personal characteristics (study hours, hours of gadget use, sleeping hours, daily water consumption, substance use, satisfaction with own education, financial stress).

The sample size was calculated by using a prevalence of anxiety of 64.2%. With an absolute precision of 7% and 95% confidence interval, the calculated sample size was 181. After adding 10% for non-response, the final sample size was 202 participants. A total of 210 participants were recruited and included in final analysis.

Depression anxiety stress scale 21

A previously validated and standardized survey instrument, DASS 21 was used to collect information on depression, anxiety, and stress.^{9,10} DASS is a short scale that allows simultaneous assessment of the three emotional states of depression, anxiety, and stress and each domain contains 7 items, divided into subscales with similar content. Each item within the subscale is graded on a 4-point severity/frequency scales to rate the extent to which they have experienced each state over the past week. The scale ranges from; did not apply to me at all=0; to applied to me very much or most of the time=3. Scores for depression, anxiety and stress are calculated by summing and multiplying the scores by two for the relevant items and analyzed as per guidelines.

Data were entered into Microsoft excel, checked for completeness and consistency, and analysed using Jamovi software (Version 2.6.26). Categorical variables were summarized as frequencies and percentages. The association between Depression, anxiety and stress and some study variables, including year of study, study hours, gadget use, satisfaction with own education, sleeping hours, daily water consumption, substance use and financial stress. was assessed using the Chi-square test. A p value of less than 0.05 was considered statistically significant.

RESULTS

A total of 210 adults were included in the analysis. Table 1 represents Sociodemographic details and personal characteristics of the study participants. Nearly half of the participants (47.6%) belonged to the 18–20 years age group, followed by 31.4% in the 21–23 years age group and 21.0% aged 24 years or above. The study population comprised 122 (58.1%) males and 88 (41.9%) females. The majority of the participants were Hindus (81.0%), followed by Buddhists (13.3%). Most students (77.6%) resided in the hostel, while 11.9% stayed in rented accommodation. The distribution of participants across the four years of MBBS was nearly uniform. Regarding study habits, almost half of the participants (49.0%) studied for 2 to <5 hours per day, whereas 33.8% studied for less than 2 hours. Gadget use was high among the participants, with 44.3% reporting 5–7 hours/day of usage

and 40.5% reporting 2 to <5 hours/day. More than half of the students (53.3%) were partially satisfied with their education, 24.3% were not satisfied. With respect to lifestyle characteristics, the majority (71.9%) reported sleeping for 6–8 hours per day, while 19.5% slept for less than 6 hours. Almost equal proportions of participants consumed 1–2 litres (48.6%) and more than 2 litres (48.1%) of water per day. Only 6.2% of the participants reported substance use. Additionally, 28.1% of the students reported experiencing financial stress.

Table 2 shows prevalence of depression, anxiety and stress among the study participants. The prevalence of depression, anxiety, and stress was 47.1%, 61.0%, and 26.7% respectively. Among the 210 study participants, 52.9% had normal depression scores, while 12.9%, 22.4%, 3.8%, and 8.1% had mild, moderate, severe, and extremely severe depression, respectively. For anxiety, 39.0% had normal scores, whereas 9.0%, 24.3%, 13.3%, and 14.3% had mild, moderate, severe, and extremely severe anxiety, respectively. The majority of participants (73.3%) had normal stress scores, while 10.0%, 7.6%, 7.6%, and 1.4% had mild, moderate, severe, and extremely severe stress, respectively.

Table 3 shows association of personal characteristics with depression among the study participants. Satisfaction with one's education was significantly associated with depression ($\chi^2=6.26$, $p=0.044$). A higher proportion of depression was observed among students who were not satisfied with their education compared to those who were satisfied or partially satisfied. No statistically significant association was observed between depression and year of study ($p=0.215$), study hours per day ($p=0.960$), gadget use ($p=0.461$), sleeping hours ($p=0.422$), water consumption ($p=0.183$), substance use

($p=0.617$), or financial stress ($p=0.057$). Table 4 shows the association between personal characteristics and anxiety. Gadget use was significantly associated with anxiety ($\chi^2=14.2$, $p=0.003$). Participants reporting 5–7 hours of gadget use per day had a higher proportion of anxiety compared to those with lower daily gadget use. Substance use was also significantly associated with anxiety ($\chi^2=5.30$, $p=0.021$), with anxiety being more prevalent among participants who did not report substance use. No statistically significant association was observed between anxiety and year of MBBS ($\chi^2=6.73$, $p=0.081$), study hours per day ($\chi^2=1.55$, $p=0.672$), satisfaction with own education ($\chi^2=0.93$, $p=0.628$), sleeping hours per day ($\chi^2=0.53$, $p=0.767$), water consumption ($\chi^2=5.90$, $p=0.052$), or financial stress ($\chi^2=0.41$, $p=0.521$).

Table 5 shows the association between personal characteristics and stress. Year of study was significantly associated with stress ($\chi^2=12.4$, $p=0.006$), with a higher proportion of stress observed among 1st and 4th MBBS students. Satisfaction with own education also showed a significant association with stress ($\chi^2=15.8$, $p<0.001$), with students who were not satisfied with their education reporting higher levels of stress. A significant association was also observed between sleeping hours per day and stress ($\chi^2=15.3$, $p<0.001$), with stress being more common among students sleeping less than 6 hours or more than 8 hours per day. Water consumption was significantly associated with stress ($\chi^2=10.3$, $p=0.006$), with higher stress levels observed among participants consuming less than 1 litre of water per day. No statistically significant association was found between stress and study hours per day ($\chi^2=2.29$, $p=0.515$), substance use ($\chi^2=0.091$, $p=0.763$), financial stress ($\chi^2=3.34$, $p=0.067$) and gadget use ($\chi^2=7.80$, $p=0.050$).

Table 1: Sociodemographic details and personal characteristics of study participants (n=210).

Variable	Categories	N (%)
Age group (in years)	18-20	100 (47.6)
	21-23	66 (31.4)
	≥24	44 (21)
Gender	Male	122 (58.1)
	female	88 (41.9)
Religion	Hindu	170 (81.0)
	Buddhist	28 (13.3)
	Muslim	8 (3.8)
	Other	4 (1.9)
Place of residence	Hostel	163 (77.6)
	Home	22 (10.5)
	Rental	25 (11.9)
Year of study	1st MBBS	56 (26.7)
	2nd MBBS	53 (25.2)
	3rd MBBS	49 (25.3)
	4th MBBS	52 (24.8)
Study hours/day	<2	71 (33.8)
	2- <5	103 (49.0)
	5- 7	26 (12.4)

Continued.

Variable	Categories	N (%)
Gadget use (hours/day)	>7	10 (4.8)
	<2	14 (6.7)
	2- <5	85 (40.5)
	5- 7	93 (44.3)
	>7	18 (8.6)
Satisfaction with own education	Satisfied	47 (22.4)
	Partially satisfied	112 (53.3)
	Not satisfied	51 (24.3)
Sleeping hours/day	<6	41 (19.5)
	6-8	151 (71.9)
	>8	18 (8.6)
Water consumption (l/day)	<1	7 (3.3)
	1-2	102 (48.6)
	>2	101 (48.1)
Substance use	Yes	13 (6.2)
	No	197 (93.8)
Financial stress	Yes	59 (28.1)
	No	151 (71.9)

Table 2: Prevalence of depression, anxiety and stress among study participants (n=210).

Subscale	Normal N (%)	Mild N (%)	Moderate N (%)	Severe N (%)	Extremely severe N (%)
Depression	111 (52.9)	27 (12.9)	47 (22.4)	8 (3.8)	17 (8.1)
Anxiety	82 (39.0)	19 (9.0)	51 (24.3)	28 (13.3)	30 (14.3)
Stress	154 (73.3)	21 (10.0)	16 (7.6)	16 (7.6)	3 (1.4)

Table 3: Association between personal characteristics and depression (n=210).

Variables	Category	Depression N (%)	No Depression N (%)	χ^2 value	P value
Year of study	1 st MBBS	32	24	4.47	0.215
	2 nd MBBS	22	31		
	3 rd MBBS	19	30		
	4 th MBBS	26	26		
Study hours/day	<2	34	37	0.30	0.960
	2 to <5	49	54		
	5-7	11	15		
	>7	05	05		
Gadget use (hours/day)	<2	05	09	2.58	0.461
	2 to <5	41	44		
	5-7	47	46		
	>7	06	12		
Satisfaction with own education	Satisfied	25	22	6.26	0.044*
	Partially satisfied	44	68		
	Not satisfied	30	21		
Sleeping hours/day	<6	20	21	1.72	0.422
	6-8	68	83		
	>8	11	07		
Water consumption (L/day)	<1	04	03	3.40	0.183
	1-2	54	48		
	>2	41	60		
Substance use	Yes	07	06	0.25	0.617
	No	92	105		
Financial stress	Yes	34	25	3.62	0.057
	No	65	86		

*Statistically significant.

Table 4: Association between personal characteristics and anxiety (n=210).

Variables	Category	Anxiety N (%)	No anxiety N (%)	χ^2 value	P value
Year of MBBS	1 st	41	15	6.73	0.081
	2 nd	26	27		
	3 rd	30	19		
	4 th	31	21		
Study hours/day	<2	44	27	1.55	0.672
	2 to <5	65	38		
	5–7	13	13		
	>7	06	04		
Gadget use (hours/day)	<2	06	08	14.2	0.003*
	2 to <5	51	34		
	5–7	66	27		
	>7	05	13		
Satisfaction with own education	Satisfied	28	19	0.930	0.628
	Partially satisfied	66	46		
	Not satisfied	34	17		
Sleeping hours/day	<6	27	14	0.530	0.767
	6–8	90	61		
	>8	11	07		
Water consumption (L/day)	<1	05	02	5.90	0.052
	1–2	70	32		
	>2	53	48		
Substance use	Yes	04	09	5.30	0.021*
	No	124	73		
Financial stress	Yes	38	21	0.411	0.521
	No	90	61		

*Statistically significant.

Table 5: Association between personal characteristics and Stress (n=210).

Variables	Category	No Stress N (%)	Stress N (%)	χ^2 value	P value
Year of MBBS	1 st MBBS	36	20	12.4	0.006*
	2 nd MBBS	45	08		
	3 rd MBBS	41	08		
	4 th MBBS	32	20		
Study hours/day	<2	78	25	2.29	0.515
	2 to <5	21	05		
	5–7	48	23		
	>7	07	03		
Gadget use (hours/day)	<2	10	04	7.80	0.050
	2 to <5	71	14		
	5–7	61	32		
	>7	12	06		
Satisfaction with own education	Satisfied	42	05	15.8	<0.001*
	Partially satisfied	84	28		
	Not satisfied	28	23		
Sleeping hours/day	<6	22	19	15.3	<0.001*
	6–8	122	29		
	>8	10	08		
Water consumption (L/day)	<1	02	05	10.3	0.006*
	1–2	71	31		
	>2	81	20		
Substance use	Yes	10	03	0.091	0.763
	No	144	53		
Financial stress	Yes	38	21	3.34	0.067
	No	116	35		

*Statistically significant.

DISCUSSION

In the present study, the overall prevalence of depression was 47.1%, which was lower than that reported by Albasheer et al who found a prevalence of 61.8% among medical students in Saudi Arabia. In both studies, moderate depression was the most common severity category.¹⁵ The difference in prevalence may be attributed to variations in the study setting, academic environment, sociocultural background and timing of data collection. In the present study, the overall prevalence of anxiety among undergraduate medical students was 61.0%. This prevalence was higher than that reported by Raja et al who found an anxiety prevalence of 43.0% among medical and paramedical students in South India, but was comparable to Albasheer et al who reported an anxiety prevalence of 62.6% among medical students at Jazan University, Saudi Arabia.^{15,16} The variation in prevalence may be attributed to differences in the study population, academic environment.

The overall prevalence of stress among undergraduate medical students was 26.7%. This prevalence was lower than that reported by Merchant et al who found a stress prevalence of 34.46% among undergraduate medical students in Maharashtra, India, and substantially lower than that reported by Taneja et al who observed a stress prevalence of 43.8% among medical students in New Delhi.^{11,17} The comparatively lower prevalence of stress in the present study may be attributed to, participant characteristics, academic environment and timing of data collection.

In the present study, satisfaction with education was significantly associated with depression ($\chi^2=6.26$, $p=0.044$), with a higher prevalence of depression among students who were not satisfied with their education. Similar findings were reported by Iqbal et al who found significantly lower depression scores among students satisfied with their education ($p<0.0001$), and Ganguly et al who identified dissatisfaction with choosing MBBS as a career as an independent predictor of depression (AOR=3.3, $p=0.03$).^{18,19}

In the present study, gadget use was significantly associated with anxiety ($\chi^2=14.2$, $p=0.003$). A similar finding was reported by Nikolic et al who found that smartphone use of more than 4 hours/day was significantly associated with increased anxiety (OR=2.04, $p<0.001$).²⁰ Substance use was also significantly associated with anxiety ($\chi^2=5.30$, $p=0.021$) in the present study. In contrast, Iqbal et al found no significant association between smoking/alcohol use and anxiety.¹⁹ The difference may be due to variations in the study population, sample size, and assessment of substance use.

In the present study, year of study was significantly associated with stress ($\chi^2=12.4$, $p=0.006$), with higher stress observed among 1st and 4th MBBS students. Similar findings were reported by Raja et al who found

that final-year students had significantly higher odds of stress (aOR=2.0; 95% CI: 1.2–3.5). Water consumption was also significantly associated with stress in the present study ($\chi^2=10.3$, $p=0.006$), with higher stress levels observed among students consuming less than 1 litre of water per day. Similar findings were reported by Alduraywish et al who found that medical students consuming less than 2 litres of water per day had significantly higher academic stress ($p=0.007$).¹³ A significant association was also observed between sleeping hours and stress ($\chi^2=15.3$, $p<0.001$), with higher stress among students sleeping less than 6 hours or more than 8 hours per day. Similarly, Valladares-Garrido et al reported that students sleeping 8 hours or more per day had a significantly lower prevalence of stress symptoms (PR=0.84; 95% CI: 0.74–0.97).¹⁴ Adequate sleep may help maintain emotional regulation and reduce physiological stress responses. Further, satisfaction with one's education showed a significant association with stress ($\chi^2=15.8$, $p<0.001$), with higher stress among students who were not satisfied with their education. Similar findings were reported by Iqbal et al who observed that students satisfied with their education had significantly lower stress scores ($p<0.001$).¹⁹

Limitations

As it was a cross-sectional study, only associations could be identified, and causal relationships between the associated factors and depression, anxiety, and stress could not be established. Information on lifestyle characteristics and psychological status was obtained through self-reported questionnaires and may be subject to recall and social desirability bias. In addition, the study was conducted among undergraduate medical students of a single medical college, which may limit the generalizability of the findings to other medical colleges or the general student population.

CONCLUSION

Nearly half of the medical students experienced depression, more than half had anxiety, and about one-fourth had stress. Depression was significantly associated with satisfaction with education, while anxiety was significantly associated with gadget use and substance use. Stress was significantly associated with year of study, satisfaction with education, sleeping duration, and water consumption. These findings highlight the importance of strengthening mental health promotion, healthy lifestyle practices, and academic support programmes to improve the psychological well-being of medical students.

Recommendations

Health education on mental health promotion and healthy lifestyle practices should be strengthened among medical students. Regular screening for depression, anxiety, and stress, along with easily accessible counselling services,

should be implemented in medical colleges. Students should be encouraged to adopt healthy sleep habits, responsible gadget use, adequate hydration, and effective stress management strategies to promote their psychological well-being.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Innani RN, Thakre SS, Deshmukh J, Garole P. Prevalence of depression, anxiety, and stress among medical undergraduate students of a Medical College in Central India: a cross-sectional study. *Int J Community Med Public Health* 2026;13:xxx-xx.