



Depression, Anxiety and Stress among Undergraduate Medical Students of a Medical College in Nepal: A Descriptive Cross-Sectional Study

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ABSTRACT

Introduction: Medical school has a stressful environment where students are confronted with significant academic, psychological and existential stressors that are often under-recognized and undertreated. The Medical education system has been improving in Nepal; however, only limited research has been conducted concerning the mental health status of medical students.

Objective: To estimate the prevalence of depression, anxiety, and stress and their associated risk factors among medical students of a teaching hospital in Nepal.

Methods: This was a descriptive cross-sectional online questionnaire-based survey conducted over a period of one month from September to October 2020 in the Department of Forensic Medicine at Manipal College of Medical Sciences (MCOMS), Pokhara, Nepal. The study included undergraduate students from the first to the fifth year. The sample was collected using a convenience sampling method. The Depression Anxiety and Stress Scale (DASS-21) was used as a tool to evaluate depression, anxiety, and stress among medical students.

Results: The overall prevalence of depression, anxiety and stress among undergraduate medical students was 143(46.43 %), anxiety 180(58.44%) and stress 90(29.22%) respectively. Female students reported higher levels of depression 87(53.40%), anxiety 104(63.80%) and stress 53(32.52%) than male students 56(38.60%), 76(52.41%) and 37(25.52%) respectively. The major risk factors associated with depression, anxiety, and stress were a personal history of psychiatric illness and academic dissatisfaction.

Conclusions: Depression, anxiety, and stress were all prevalent among undergraduate medical students. Understanding mental problems among medical students would help develop and incorporate student wellness programs to prevent the negative effects of poor mental health.

Keywords: Anxiety; depression; stress; undergraduates.

INTRODUCTION

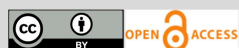
Globally, mental health among medical students is an important public health concern.¹ These mental health problems among students are

on the rise and are more prevalent in medical students than in non-medical students and the general public.² Epidemiological data showed that the total estimated number of people living with depression has increased by (18.4%) from 2005 to 2015.³ A systematic review estimated that the mean prevalence of depressive disorders in

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university students was (30.6%), which was considerably higher than the rates reported in general populations.⁴

The prevalence of anxiety among medical students has been reported in different regions and countries. According to a cross-sectional study carried out in Pakistan, a high prevalence of anxiety (47.7%) was found among medical students. Mild, moderate, and severe anxiety symptoms were present in (27.6%), (13.6%), and (6.5%) of the students, respectively.⁵ An Indian study reported that (66.9%) of medical undergraduates suffered from anxiety during the medical course.⁶ On the other hand, studies have estimated the prevalence of stress among medical students to be 28.5% to 78%.^{7,8} These mental health problems among students lead to poor academic performance, dissatisfaction, substance abuse, and major psychological conditions like depression, anxiety, stress, and suicidal behaviors.⁹

There is limited data on the mental health state among Nepalese medical students as, there are limited studies that have been conducted in this context. A few studies on the prevalence of anxiety and depressive disorders among medical students in Nepal have shown a high prevalence of anxiety and depressive disorders.^{10,11,12} In developing countries like Nepal, medicine is seen not just as a profession, but also as a means of social advancement. This may place students

under more stress than their counterparts in developed countries.¹³ It is extremely important for medical educators to understand the magnitude of psychological health problems among medical students and the factors that contribute to it, that not only affect their health and academic achievement but could also lead to potentially fatal consequences like suicide. Thus, this study aims to find the prevalence of depression, anxiety, and stress and their associated factors among undergraduate medical students at a teaching hospital in Nepal.

METHODS

This was a descriptive cross-sectional web-based survey carried out between September to October 2020 at Manipal College of Medical Sciences (MCOMS), Pokhara; Nepal after acquiring ethical approval from the Institutional Review Committee (IRC) with IRC No. 399/GA. The study included medical students at various years of undergraduate education who had spent at least a year in medical school. The participants were chosen from two groups: pre-clinical sciences (1st and 2nd year) and clinical sciences (3rd, 4th and 5th year). To ensure anonymity, informed consent was obtained by signing an online consent form. The participants who did not respond during the data-collection period, and those who were unable to provide consent and submit the questionnaire within one month, were excluded from the study.

A convenience sampling technique was followed to obtain the required sample. The sample size was calculated using the following formula $n = Z^2 \times p \times q / e^2$ where, n = minimum required sample size, $Z = 1.96$ at 95% Confidence Interval (CI), p = prevalence taken as 44%¹⁴ for maximum sample size calculation, $q = 1-p$, e = margin of error, 6%. The minimum sample calculated was 263. However, a sample size of 308 was considered for the study. An online questionnaire using Google Forms was used to collect the data that consisted of questions on sociodemographic factors, academic performance, and personal and family history of psychiatric disorders.

The online questionnaire also included risk factors for anxiety, stress, and depression. To collect information on depression, anxiety, and stress, the 21-item Depression Anxiety Stress Scale (DASS-21)¹⁵ was used. This self-reported tool has 21 items, with 7 items assigned to each of the three subscales (i.e., depression, anxiety, and stress). Items are scored on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (Applied to me very much, or most of the time). For depression, the "Normal" score ranged from 0-9, for anxiety, 0-7, and for stress, 0-14. The "mild" depression score ranged from 10-13, for anxiety 8-9, and stress 15-18. The "Moderate" score for depression ranged from 14-20, for anxiety 10-14, and stress 19-25. The "Severe" score for depression ranged from 21-27, for

anxiety 15-19, and stress 26-33. The "Extremely severe" score for depression was 28+, for anxiety, it was 20+, and for stress 34+. Scores for depression, anxiety and stress were added and multiplied by two and analyzed as per guidelines.

A pre-test of the data collection tool was carried out to enhance the reliability and validity of the tool. Inter-item reliability (Cronbach's alpha) of the DASS-21 scales in this study was 0.89 whereas the depression, anxiety and stress items of the scale were at 0.77, 0.70 and 0.72 respectively. Descriptive statistics like frequency, percentage, mean and standard deviation were calculated for the sociodemographic characteristics of the participants. The association between the independent and dependent variables was analyzed using the chi-square test. Spearman's correlation coefficient (r) was applied to assess the relationship between depression, anxiety and stress levels. Data were analyzed using SPSS for Windows Version 21.0 (SPSS Inc; Chicago, IL, USA). The statistical significance level for all tests was set at $p < 0.05$ and 95% confidence interval.

RESULTS

A total of 308 students participated in the study giving a response rate of (77.0%). Out of them, 145(47.07%) were male and 163(52.92%) were female with a male-to-female ratio of 1:1.1. The mean age of the students in years was

21.43(SD±1.81) with a range of 18 to 26 years. The overall prevalence of depression was 143(46.43 %), anxiety 180 (58.44%), and stress 90(29.22%) respectively. In total, 99(32.14%) students had moderate to extremely severe

depression, 140 (45.45%) students had moderate to extremely severe anxiety, and 55(17.85%) students had moderate to extremely severe stress (Table 1).

Table 1: Grades of Depression, Anxiety and Stress among Students

Category	Depression		Anxiety		Stress	
	Number (N)	Percentage (%)	Number (N)	Percentage (%)	Number (N)	Percentage (%)
Normal	165	53.57	128	41.56	218	70.78
Mild	44	30.77	40	22.22	35	38.89
Moderate	57	39.86	66	36.67	32	35.56
Severe	19	13.29	29	16.11	13	14.44
Extremely Severe	23	16.08	45	25	10	11.11

Preclinical students had higher rates of depression 83(51.20%), anxiety 99(61.11%) and stress 52(32.10%) than clinical students 60(41.10%), 81(55.48%) and 38(26.03%) respectively. This, however, was not statistically significant in our study. Female students reported higher levels of depression 87(53.40%), anxiety104(63.80%) and stress 53(32.52%) than male students 56(38.60%),76(52.41%) and 37(25.52%) respectively. (Table 2, 3, 4)

The prevalence of depression was significantly associated with gender (P=0.010), family history

of the psychiatric condition (P=0.033), personal history of mental disorder (P=0.000), and academic dissatisfaction (P=0.000). Similarly, the prevalence of anxiety was significantly associated with gender (P=0.043), personal history of mental disorder (P=0.000), and academic dissatisfaction (P=0.000) (Table 2,3). Stress, however, was not significantly associated with gender (P= 0.178) but was strongly associated with a personal history of mental disorder (P=0.000), academic dissatisfaction (P=0.000) and a family history of mental disorder (P=0.040) (Table 4).

Table 2. Factors associated with Depression, among medical students

Variables	Depression				Total	χ^2	p-value
	Yes		No				
	N	%	N	%	N	%	
Age group(n=308)							

15-19	19	51.40	18	48.60	37	12.01	0.501	0.779
20-24	118	45.55	141	54.44	259	84.09		
25+	6	50.00	6	50.00	12	3.90		
Total	143	46.43	165	53.57	308	100		
Gender(n=308)								
Male	56	38.60	89	61.40	145	47.07	6.176	0.010
Female	87	53.40	76	46.60	163	52.92		
Total	143	46.40	165	53.60	308	100		
Year of MBBS((n=308)								
Preclinical	83	51.20	79	48.80	162	52.59	5.468	0.141
Clinical	60	41.10	86	58.90	146	47.40		
Total	143	46.40	165	53.60	308	100		
Family Type(n=308)								
Dual parent	134	47.2	150	52.80	284	92.2	4.261	0.119
Single parent	7	31.8	15	68.20	22	7.14		
Stepparent	2	100	0	0.00	2	0.64		
Total	143	46.4	165	53.60	308	100		
Residence(n=308)								
Campus hostel	53	51	104	33.77	104	33.76	1.297	0.255
Outside campus	90	44.1	114	55.9	204	66.23		
Total	143	46.4	165	53.6	308	100		
Family history of mental disorder (n=308)								
Yes (31)	20	64.5	11	35.5	31	10.06	4.534	0.033
No (277)	123	44.4	154	55.6	277	89.93		
Total	143	46.4	165	53.6	308	100		
Personal history of mental disorder 308)								
Yes (51)	46	90.2	5	9.8	51	19.84	47.073	0.000
No (257)	97	37.7	160	62.3	257	83.44		
Total	143	46.4	165	53.6	308	100		
Academic dissatisfaction (308)								
Yes (153)	95	62.1	58	37.9	153	49.67	29.987	0.000
No (155)	48	31	107	69	155	50.32		
Total	143	46.4	165	53.6	308	100		

Table 3. Factors associated with Anxiety, among medical students

Variables	Anxiety				Total		χ^2	p-value
	Yes		No		N	%		
Age group(n=308)	N	%	N	%	N	%		
15-19	23	62.16	14	37.84	37	12.01	0.241	0.887
20-24	150	57.92	109	42.08	259	84.09		
25+	7	58.33	5	41.67	12	3.90		
Total	180	58.44	128	41.56	308	100.00		
Gender(n=308)								
Male	76	52.41	69	47.59	145	47.08	4.099	0.043
Female	104	63.80	59	36.20	163	52.92		
Total	180	58.44	128	41.56	308	100.00		
Year of MBBS (n=308)								
Preclinical	99	61.11	63	38.89	162	52.60	1.386	0.709
Clinical	81	55.48	65	44.52	146	47.40		
Total	180	58.44	128	41.56	308	100.00		
Family Type(n=308)								
Dual parent	169	59.51	115	40.49	284	92.21	0.884	0.643
Single parent	11	50.00	11	50.00	22	7.14		
Stepparent	0	0.00	2	100.00	2	0.65		
Total	180	58.44	128	41.56	308	100.00		
Residence(n=308)								
Campus hostel	53	50.96	51	49.04	104	33.77	1.297	0.255
Outside campus	90	44.12	114	55.88	204	66.23		
Total	143	46.43	165	53.57	308	100.00		
Family history of mental disorder (n=308)								
Yes (31)	20	64.52	11	35.48	31	10.06	0.524	0.469
No (277)	160	57.76	117	42.24	277	89.94		
Total	180	58.44	128	41.56	308	100.00		
Personal history of mental disorder (308)								
Yes (51)	43	84.31	8	15.69	51	16.56	16.845	0.000
No (257)	137	53.31	120	46.69	257	83.44		
Total	180	58.44	128	41.56	308	100.00		
Academic dissatisfaction (308)								
Yes (153)	106	69.28	47	30.72	153	49.68	14.708	0.000
No (155)	74	47.74	106	68.39	155	50.32		
Total	180	58.44	153	49.68	308	100.00		

Table 4. Factors associated with stress, among medical students

Variables	Stress				Total		χ^2	p-value
	Yes		No		N	%		
Age group(n=308)	N	%	N	%	N	%		
15-19	12	32.43	25	67.57	37	12.01	1.101	0.577
20-24	76	29.34	183	70.66	259	84.09		
25+	2	16.67	10	83.33	12	3.90		
Total	90	29.22	218	70.78	308	100.00		
Gender(n=308)								
Male	37	25.52	108	74.48	145	47.08	1.817	0.178
Female	53	32.52	110	67.48	163	52.92		
Total	90	29.22	218	70.78	308	100.00		
Year of MBBS(n=308)								
Preclinical	52	32.10	110	67.90	162	52.60	3.613	0.306
Clinical	38	26.03	108	73.97	146	47.40		
Total	90	29.22	218	70.78	308	100.00		
Family Type(n=308)								
Dual parent	84	29.58	200	70.42	284	92.21	0.884	0.643
Single parent	6	27.27	16	72.73	22	7.14		
Step parent	0	0.00	2	100.00	2	0.65		
Total	90	29.22	218	70.78	308	100.00		
Residence(n=308)								
Campus hostel	34	32.69	70	67.31	104	33.77	1.176	0.759
Outside campus	56	27.45	148	72.55	204	66.23		
Total	90	29.22	218	70.78	308	100.00		
Family history of mental disorder (n=308)								
Yes (31)	14	45.16	17	54.84	31	10.06	4.235	0.040
No (277)	76	27.44	201	72.56	277	89.94		
Total	90	29.22	218	70.78	308	100.00		
Personal history of mental disorder (308)								
Yes (51)	32	62.75	19	37.25	51	16.56	33.213	0.000
No (257)	58	22.57	199	77.43	257	83.44		
Total	90	29.22	218	70.78	308	100.00		
Academic dissatisfaction (308)								
Yes (153)	63	41.18	90	58.82	153	49.68	21.012	0.000
No (155)	27	17.42	128	82.58	155	50.32		
Total	90	29.22	218	70.78	308	100.00		

Table 5 shows the correlation between the DASS-21 tool subscales to study the association between depression, anxiety, and stress. There was a significant correlation ($p < 0.001$) found between depression,

anxiety and stress scores, correlation coefficients (r) of depression vs anxiety, depression vs stress and anxiety vs stress were 0.508, 0.561 and 0.426 respectively.

Table 5. Correlation between depression anxiety and stress scores

Variables	r	p-value
Depression *Anxiety	0.508	<0.001
Depression *Stress	0.561	<0.001
Anxiety *Stress	0.426	<0.001

DISCUSSION

Depression, anxiety, and stressful life events among medical students are often under-recognized and undertreated. Medical students seldom seek professional help, mostly because of shame and taboos concerning mental health.¹⁶ This study included medical students from various years of undergraduate training who had spent at least a year in medical school. Participants were divided into two groups: pre-clinical sciences (1st and 2nd year) and clinical sciences (3rd, 4th, and 5th year). The overall prevalence of depression was (46.43 %), anxiety (58.44%), and stress (29.22%) respectively.

The prevalence of depression was found to be high in our study (46.43% vs 29.9%) compared to a study conducted in two medical colleges in Nepal, whereas the level of anxiety and stress was found to be at a similar rate (58.1% vs 41.1%) and (29.22% vs 27%) respectively.¹¹ In our study, preclinical students experienced higher rates of depression (58.04% vs 41.95%), anxiety (55.0% vs 45.0%), and stress (57.77% vs 42.22%) than

clinical students. Our finding is consistent with studies from Nepal and Pakistan.^{10,17} However, a similar study from India reported a higher prevalence rate of depression (89.0%) in clinical students than in preclinical students (53.5%).¹⁸ In Nepal, students enroll in medical colleges just after graduating high school.

The challenge of a new environment, leaving one's family and making a new start elsewhere, as well as the great pressure of academic workload after joining the medical college, might contribute to the higher rate of depression, anxiety, and stress among pre-clinical medical students. These increased levels of stress and depression indicate a decrease in the psychological health of the students, which may impair student's behavior, diminish learning and ultimately affect patient care.¹⁹ Anxiety and depression have been associated with dissatisfaction with examination criteria, overburdening test schedules, and the pressure to pass examinations.²⁰

The prevalence of depression and anxiety was significantly higher in female students than in male students. Studies on mental distress using other survey methods and tools have also reported a higher prevalence of depression and anxiety among female students.^{13,21} This could be because when females and males experience similar stressors, females have greater reactivity and may

be more susceptible to depression than males due to factors such as biological responses, self-concepts, and coping strategies.²²

This study found that depression was high among those students with a family history of depression and stress which is consistent with the findings of other studies.^{19, 22} Also, the occurrence of depression, anxiety, and stress was higher among students who had lower academic performance, which lines with studies conducted among students from different academic disciplines.^{23,24}

In this study, sociodemographic factors, like family type and living conditions, showed no association with depression, anxiety, or stress. This study found a significant association between depression, anxiety, and the stress scale. This finding is consistent with a previous study conducted among the medical students of two medical colleges in Nepal.¹¹

Stressful life events have been identified as risk factors for the onset of anxiety and depression.^{25,26} According to a prospective study, patients with anxiety are more likely to be depressed following stressful life events.²⁷ Various studies have suggested that these risk factors can be prevented by developing and implementing appropriate strategies at educational institutions to support the social and academic performance of students.^{11,21}

Our study has a few limitations, as only students from one medical institution were included in the study, the findings cannot be generalized to other medical students. Large-scale multicentric studies at various times of the academic year are required to assess these psychological issues among medical students. Since the sampling method was a convenient type; there were no specific requirements for participant inclusion, which could have led to bias in the result. In addition, as the participants had to fill in the questionnaire via a Google form, many of them might not have had access to the internet, which could have led to non-response bias resulting in a small sample size. Some participants may have felt under pressure to give socially acceptable answers, resulting in response bias.

CONCLUSIONS

The prevalence of depression, anxiety, and stress was high among undergraduate medical students. These mental problems were strongly associated with family and personal history of psychiatric disorders, as well as academic dissatisfaction. Understanding mental health among medical students would encourage developing and integrating student wellness programs to prevent the negative effects of poor mental health. To recognize, manage, and treat students at risk, interventions such as student monitoring and assistance, student counseling and a stress management training program or workshop on a

timely basis could be effective in higher education institutions. Barriers that prevent medical students from seeking medical care for mental health disorders should also be addressed.

Conflict of interest: None

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