Original Article

Assessment of Anxiety Status and its Impact on Academic Performance of Undergraduate Medical Students of Bangladesh

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Abstract

Background: Mental health is essential for the well-being of both individuals and communities. Undergraduate medical students travel medical course with tremendous psychological stress because of new environment, language difficulties, curricular overload and frequent examinations. This may hamper their academic performance and mental strength. This study aimed to observe the anxiety status and academic performance of undergraduate medical students of Bangladesh. **Methods:** This cross-sectional study was performed among 1921 undergraduate medical students from five medical colleges in Bangladesh, who were selected using convenience sampling method. The study was conducted from July 2023 to June 2024. For assessment of anxiety level generalized anxiety disorder 7 (GAD 7) questionnaire was used. The academic performance of the students was self-reported by students as passed (regular/irregular) MBBS professional examinations. **Results:** The mean score to different questions related to determine their anxiety status were ranged from 31.83% to 39.5%. It was found that out of 1921 medical students, 40.6%, 29.6%, 17.9% and 11.9% had minimal, mild, moderate and moderately severe anxiety respectively. Different categories of anxiety level were found significantly higher among the female participants and in first academic phase. Majority of the participants passed regularly (>90%) in their professional examinations. **Conclusion:** Based on the findings of the present study it can be concluded that undergraduate medical students suffer from varying degrees of Anxiety. Different socio-demographic variables have found significantly associated with different categories of anxiety status. Academic performances have been found affected by the different categories of anxiety as well. It can be concluded that anxiety should be reduced for the betterment of their academic performance and mental strength and ultimately to produce quality physicians to serve the community.

Keywords: *Psychological stress, Anxiety status, Academic performance, Undergraduate medical student, Mental health.*

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Original Article

Introduction

The World Health Organization defines mental health as 'a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community'[1]. Mental health is essential for the well-being of both individuals and communities. Medical college is considered stressful due to the heavy workload, extensive study hours, frequent exams and lack of leisure hours. Medical college students deal with a lot of challenges that can be detrimental to their mental health and lead to things like anxiety, poor academic performance, or dropping out of medical college[2,3,4]. At the onset of medical college, the mental health of medical students is comparable to that of their non-medical peers[5]. Numerous studies have indicated that this kind of anxiety starts to show signs as early as the first year of medical college[4]. Unfortunately, a number of studies suggest that students' anxiety level worsens during the course of undergraduate medical training[7,8,9]. In order to succeed during their training time, students must exhibit specific personal attributes assertiveness, the capacity to decline requests, confrontational abilities, self-esteem, and interpersonal relationships[10]. Ignorance of these attributes could endanger students' anxiety status, academic performance and eventually, the quality of care they give patients in clinical practice[11]. Global prevalence rate of moderate to severe anxiety were reported to be 73%[12]. In Bangladesh, the prevalence of anxiety was found to be as high as 64.8% among first year MBBS students of a public medical college[13]. Understanding anxiety status and the relationship between anxiety status with socio-demographic characteristics and academic performance among undergraduate medical students is essential for both educators and healthcare institutions. This research aims to identify the pattern, prevalence and severity of psychological stress among undergraduate medical students and its impacts on their academic achievements. By addressing these issues comprehensively, it is expected to provide valuable insights that can help to develop support systems and interventions to enhance the overall well-being and academic success of these future healthcare professionals.

Methods

This descriptive type of cross-sectional study was conducted from 1st July 2023 to 30th June 2024 over a one year period among all four phases of undergraduate medical students. Data were collected from five medical colleges of Bangladesh. Out of the five, one government and two non-government medical colleges were located in Dhaka, and one government and one non-government medical colleges were located outside the Dhaka. Convenience sampling technique was adopted in this study to collect data. The sample size was 1921. Out of 1921, 515 were of 1st phase students, 500 were of 2nd phase student, 453 were of 3rd phase student and rest 453 were of 4th phase students. A self-administered semi-structured questionnaire was used to collect data from the students. Anxiety was measured using the Generalized Anxiety Disorder (GAD-7) questionnaire. A 4-point Likert like scale serves as the foundation for this 7-item tool. The appropriate values for the scales are: not at all = 0, a few days = 1, more than half the days = 2, and almost every day = 3. With score "0-4" indicates minimal Anxiety, "5-9" indicates mild Anxiety, "10-14" indicates moderate Anxiety, "15-21" moderately severe Anxiety The GAD-7 total score for the seven items ranges from 0 to 21. The instrument was pretested in medical colleges other than the study area. The students gave their prior

Vol.-16, Issue-01, January, 2025

Original Article

permission before participating in the study. Data were manually checked and edited after collection, and then these were processed and analyzed by using 'Statistical Package for Social Science' Version 19 (SPSS -19).

Relationship between anxiety status with socio-demographic characteristics and academic performance were measured by appropriate statistical tests.

Results
Table 1: Socio-demographic characteristics of undergraduate medical students

Distribution of medical students by	Male		Female		Others	
1) Gender	729 (37.5%)		1195 (96.2%)		**4 (0.2%)**	
	Married		**Unmarried**		**Widow**	
2) Marital status (n=1921)	48(2.5%)		1867(97.4%)		2 (0.1%)	
	Government			**Non- government**		
3) Ownership of medical college (n=1921)	908 (47.2%)			1013 (52.8%)		
	Dhaka			**Outside Dhaka**		
4) Location of medical college (n=1921)	1355 (70.5%)			566 (29.5%)		
	Hostel		**With family**		**Mess**	
5) Residence (n=1921,multiple response)	1220 (60.5%)		662(32.9%)		133 (6.6%)	
	Family		**Self**		**Other sources**	
6) Source of educational expenditure (n=1921,Multiple response)	1804 (80.9%)		400 (17.9%)		26 (1.2%)	
	Up to 50,000 Tk	50,000-100,000 Tk	100,000-500,000 Tk	500,000-10,00000 Tk	1000000-2000000 Tk	
7) Monthly family income (n=1496)	914(61.1%)	454(30.3%)	119(8%)	7(0.5%)	2(0.1%)	
	Tuition	**Coaching**		**Others**		**None**
8) Involvement in income generating activities (n=1921,multiple response)	335 (17.1%)	73 (3.7%)		41 (2.1%)		1514 (77.1%)

Table 1 revealed the majority of the participants were female, unmarried, and from non-government medical colleges of Dhaka. The majority (80.9%) of them continued their education, remaining in hostels, and their educational expenditure was borne mainly by their family and 17.9% participants contributed by themselves. The majority of the participant's monthly family income was less than or equal to 50,000 taka, and the majority did not engage in any income-generating activities.
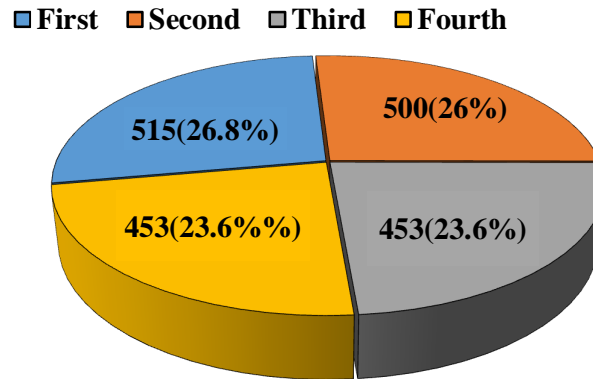
Original Article

Figure 1 Distribution of the medical students by their academic phase (n = 1921)

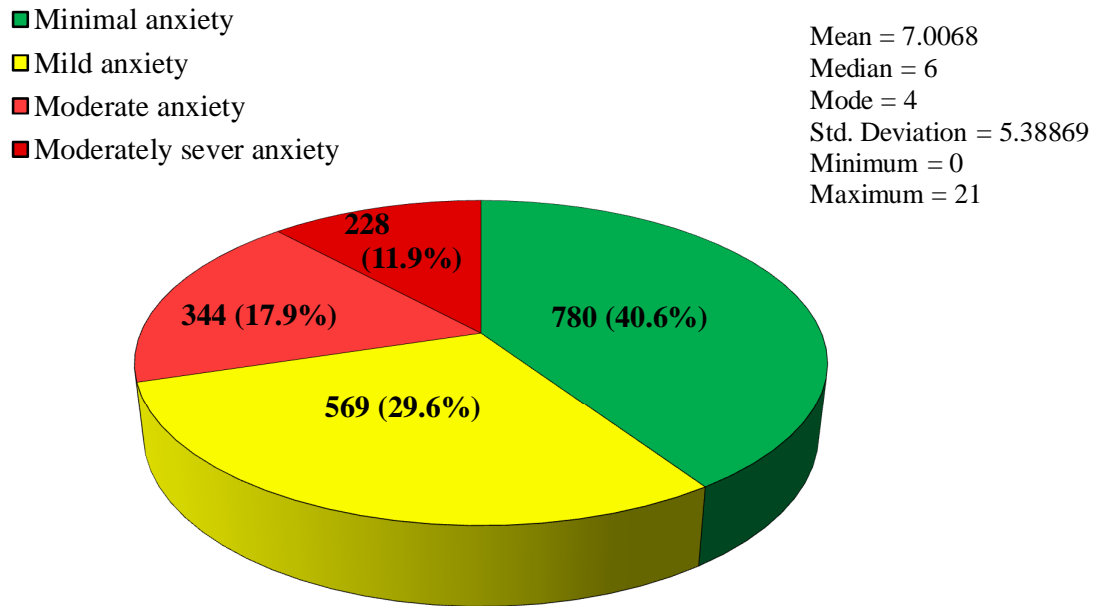Figure 1 revealed majority of the participants were from first academic phase.

Figure 2: Distribution of the medical students by their anxiety level according to their agreement (n = 1921)

It was revealed that out of 1921 medical students, 40.6%, 29.6%, 17.9% and 11.9% had minimal, mild, moderate and moderately severe anxiety respectively. The mean and standard deviation of their anxiety score is 7.0 and 5.3 respectively.

Original Article

Table 2: Distribution of medical students by their gender and anxiety level (n = 1917)

Gender	Anxiety level				Statistical inference
	Minimal anxiety	**Mild anxiety**	**Moderate anxiety**	**Moderately sever anxiety**	
Male	332	190	126	72	Pearson Chi-Square = 16.246
	46.1%	26.4%	17.5%	10.0%	df =3
Female	446	377	218	156	P value (2 sided) = .001
	37.3%	31.5%	18.2%	13.0%	
	Anxiety score				**Statistical inference**
	n	**Mean**	**Standard deviation**		
Male	720	6.44	5.49		F = .560 (P of F = .455)
Female	1197	7.35	5.31		t = -3.571, df =1915, P of t =.000

It was revealed that combined percentages of mild, moderate and moderately severe anxiety and mean anxiety scores were statistically significantly higher among female students than the male medical students.

Table 3: Distribution of medical students by their anxiety level, location and ownership of medical colleges (n=1921)

Location of medical colleges	n	Anxiety level		Statistical inference
		Mean	**Standard deviation**	
Dhaka	1355	7.0664	5.36208	F = .225 (P of F = .636)
Outside Dhaka	566	6.8640	5.45400	t = .751, df =1919, P of t =.453
Ownership of medical colleges	**n**	**Anxiety level**		**Statistical inference**
		Mean	**Standard deviation**	
Govt.	908	6.3877	5.24647	F = 5.227 (P of F = .022)
Non govt.	1013	7.5617	5.45620	t = -4.805, df =1909.553, P of t =.000

It was revealed that there was no significant difference of mean anxiety score of the medical students of Dhaka and outside Dhaka (P = 0.453). On the other hand, students of the non-government medical colleges had higher mean anxiety score than the students of government medical colleges (P = 0.000).

Original Article

Table 4: Distribution of medical students by their marital status and anxiety level (n = 1919)

Marital status	Anxiety level				Statistical inference
	Minimal anxiety	Mild anxiety	Moderate anxiety	Moderately sever anxiety	
Married	20	20	5	3	Pearson Chi-Square = 5.299 df =3
	41.7%	41.7%	10.4%	6.3%	P value (2 sided) = 0.151
Unmarried	759	548	339	225	
	40.6%	29.3%	18.1%	12.0%	
	Anxiety score				Statistical inference
	n	Mean	Standard deviation		
Married	48	5.6667	4.78621		F = 3.535 (P of F = .060) t = -1.747, df =1917, P of t =0.081
Unmarried	1871	7.0428	5.40205		

It was revealed that the percentage of moderate and moderately severe anxiety are higher in unmarried students than the married medical students. Similarly, the mean score of anxiety were higher in unmarried medical students than the married students. But these differences were not statistically significant ($P = .151$ and $P = .081$ respectively).

Table 5: Relation between the medical students' anxiety level with their academic phases (n = 1921)

Anxiety level	Academic phase of the students				Statistical inference
	First (n=515)	Second (n=500)	Third (n=453)	Fourth (n=453)	
Minimal anxiety	200	203	204	173	Pearson Chi-Square = 11.216 df =9
	38.8%	40.6%	45.0%	38.2%	P value (2 sided) = .261
Mild anxiety	144	146	133	146	
	28.0%	29.2%	29.4%	32.2%	
Moderate anxiety	102	87	76	79	
	19.8%	17.4%	16.8%	17.4%	
Moderately sever anxiety	69	64	40	55	
	13.4%	12.8%	8.8%	12.1%	
Mean ±SD	7.524 ±5.5507	7.070 ±5.4726	6.298 ±5.0652	7.057 ±5.3643	F=4.235, df=3 (BG) & 1917 (WG), P =.005

It was revealed that combined percentages of moderate anxiety and moderately severe anxiety and mean anxiety scores were highest among students of first academic phase. Though the different categories of anxiety level did not differ statistically by chi-square test among the students of different academic phases but the mean anxiety score of the students of different academic phases is statistically highly significantly different by one way ANOVA. The Post HOC LSD test found that only the mean anxiety score of the third academic phase is different from first, second and fourth phase.

Original Article

Table 6: Relation between the medical students' anxiety level with their monthly family income (n = 1921)

Anxiety group	Income in taka			Statistical inference
	</=50000	50001 - 100000	>100001	
Minimal anxiety	402	181	197	Pearson Chi-Square value = 13.627
	44.0%	39.9%	35.6%	
Mild anxiety	264	139	166	
	28.9%	30.6%	30.0%	df = 6
Moderate anxiety	149	76	119	
	16.3%	16.7%	21.5%	P value (2-sided) = .001
Moderately severe anxiety	99	58	71	
	10.8%	12.8%	12.8%	

It was observed that the moderate and moderately severe anxiety level were higher among high income groups. On the other hand, minimal anxiety level was more in low income group than that of high income group and these differences were statistically highly significant (chi-square = 13.627,df = 2, P = 0.001)

Table 7: Distribution of medical students by their way of passing in the professional examinations

Way of passing in prof. exam.	Professional examination					
	1st Prof.		2nd Prof.		3rd Prof.	
	Frequency	%	Frequency	%	Frequency	%
Regular	844	92.95	411	90.53	359	90.66
Irregular	64	7.048	43	9.471	37	9.343
Total	908	100	454	100	396	100

It was revealed that majority of the students passed regularly in their professional examinations.

Table 8: Distribution of medical students by their level of anxiety in the professional examinations

		Minimal or Mild anxiety		Moderate or Moderately severe anxiety		
		Frequency	%	Frequency	%	
1st prof.	Regular	615	72.9	229	27.1	Pearson Chi-Square value = 1.560, df = 1, P value (2-sided) = 0.212
	Irregular	42	65.6	22	34.4	
2nd	Regular	292	71.0	119	29.0	

	Irregular	27	62.8	16	37.2	Pearson Chi-Square value = 1.270, df = 1, P value (2-sided) = 0.260
3rd prof.	Regular	248	69.1	111	30.9	Pearson Chi-Square value = 4.800, df = 1, P value (2-sided) = 0.028
	Irregular	19	51.4	18	48.6	

It was revealed that on the basis of regularity in passing the professional examinations, moderate or moderately severe anxiety level were higher among the students who passed .

irregularly in different professional examinations. These differences was statistically significant only in 3rd professional examination

Discussion

This study was carried out among 1921 undergraduate medical students of five different medical colleges to assess the anxiety status, academic performance and impact of anxiety on academic performances. The study was conducted in five medical colleges. According to the results of this study, 40.6%, 29.6%, 17.9%, and 11.9% of the participants experienced minimal, mild, moderate, and moderately severe anxiety, respectively (Figure 2). This suggests that a significant proportion of medical students experience anxiety. These results were remarkably comparable to those of Karim et al[14]. He studied 840 medical students from four public medical colleges in Bangladesh who were chosen at random for the study. Among the participants, 7.02% experienced moderately severe anxiety, 19.64% had moderate anxiety and 37.98% had mild anxiety and 36.36% had minimal anxiety with GAD 7 questionnaire. Using DASS surveys, Aghajani Liasi et al. studied medical students (120 participants) at Islamic Azad University of Tehran in 2017[15]. Of them fourteen students (14.7%) reported mild anxiety, fifteen (15.8%) moderate anxiety, and two (2.1%) extremely severe anxiety. These results were comparable to those of the

current research; the few differences could have been caused by variations in the questionnaire, sample size, or geographic location. Shawahna et al. carried out a study among the medical students in a major university in the West Bank of Palestine[16]. She found, out of 286 students, mild to moderate anxiety were among 29.7%, moderate to severe anxiety among 25.5% and severe anxiety among 21.3% students. These findings were also dissimilar to the current findings, the variations may be due to use of different scale (BAI) and small sample size.

The percentage and mean anxiety scores were higher among female students than the male medical students (Table 3) and these differences were statistically highly significant both by chi-square test and independent sample t test (P = .001 and .000). Thus the study indicates female are more prone to develop anxiety than male during study in medical colleges. Azad et al. in his study in a private medical college of Rawalpindi found that the frequency was more among the female than male students and gender is significantly associated with anxiety (P = 0.3) [17]. Kebedy et al. in his study at St. Paul Hospital millennium medical college, Addis Ababa, Ethiopia found the

frequency of anxiety were six times more in female than male students[18]. The cause of increase frequency among the female may be due to gender roles, fewer social networks, and greater exposure to intense life events. Shawahna et al.carried out a study among the medical students in a major university in the West Bank of Palestine[16]. She found no significant association with gender. This may be due to small sample size (286) and different scale of measurement.

The students of the non-government medical colleges had higher mean anxiety score (7.5617) than the students of government medical colleges (6.3877) and this difference was statistically highly significant (P = .000, Table 4). But a contrast findings were found by Ahad et al[19]. He conducted a study on 776 students and interns from five different dental colleges (two from the government and three from non-government) in North India by DASS questionnaire and found that the frequency of anxiousness among the government medical colleges and the non-government medical colleges students and interns were 69.63% and 65.33% respectively, but chi-square test showed no significant difference between them ($\chi 2$ = 1.17, P = 0.279). This contrast findings may be due to small sample size and different questionnaire.

The unmarried medical students' mean anxiety score was greater (7.0428) than that of married students (5.6667).The value of P = .081 indicates that these variations were not statistically significant. In a research done in 2021 on 597 medical students at Benha University's Benha Faculty of Medicine, Abed and Abd El-Raouf found that 499 of them were unmarried and 8 were married[20]. Students who were unmarried had a mean anxiety level of 9.67 ± 5.65, whereas those who were married had a mean anxiety score of 9.75 ± 6. However, statistically he found no significant difference (P = 1.3). Shawahna et al. found that the median anxiety score were higher among the married than unmarried students but the difference was not statistically significant (P = 0.941) [16]. These findings are dissimilar to the current study. These may be due to small sample size and different scale of measurement.

Table 6 showed the percentage and mean anxiety score of the students with their academic phases. Though the percentages of different anxiety level did not differ statistically by chi-square test (P = .261) among the students of different academic phases but the mean anxiety score of the students of different academic phases is significantly different by one way ANOVA (P = .005). The Post HOC LSD test showed that only the mean anxiety score of the third academic phase is different from first, second and fourth phase. Shawahna et al. found in her research that students in the clinical stage (academic years 4 to 6) of medical studies had significantly lower BAI scores (P < 0.001) than those in the basic stage (academic years 1 to 3).[16]The results of the current study demonstrated a significant difference (P = .005) between the pre-clinical and clinical periods in the mean GAD 7 score. This could be brought on by being in a new setting, making new friends outside of one's family or experiencing a novel teaching-learning procedure. According to Ahad et al. study, anxiety prevalence patterns were greater in the first year, somewhat decreased in the second, and then continued to rise until the last year.[19] The current study showed almost similar picture. But Ahad et al found anxiety was significantly higher among the clinical students than in the preclinical students (Phase 1 & 2).

Moderate and moderately severe anxiety level were higher among high income groups than the middle and lower income groups and these differences were statistically highly significant ($\chi2$ = 13.627, df = 2, P = 0.001) (Table 7). But Shawahna et al. found a dissimilar result in her study. She found that the median anxiety score was statistically significantly (P = 0.044) higher among the lower income groups.[16] But Aghajani Liasi et al. found no significant relationship between financial status and anxiety (P = 0.99), this findings might be due to small sample (120 students) size.[15]

Majority of the students (90%) passed regularly in their professional examination (Table 8) but with the different category of anxiety level moderate or moderately severe anxiety level were higher among the students who passed irregularly in different professional examinations (Table 9). Thus the study indicates that the level of anxiety are more who passed irregularly in their professional examinations. These differences was statistically significant only in 3rd professional examination. Similar results were obtained by Shawahna et al., who studied medical students at a university in the West Bank of Palestine.[16] They found that while there was a negative correlation (correlation coefficient −0.05) between GPA score (out of 4, GPA is divided into > 3 and < 3), this correlation was not statistically significant (P = 0.379).[18] Additionally,

Aghajani Liasi et al. found no evidence of a significant correlation (P = 0.16) between anxiety and students' academic average.[15].

Conclusion

Based on the findings of the present study it can be concluded that undergraduate medical student suffers from varying degrees of Anxiety. Among the 1921 medical students, 40.6% 29.6% 17.9% and 11.9% suffered from minimal, mild, moderate and moderately severe anxiety respectively. Mild, moderate and moderately severe anxiety score were found significantly higher among the female participants than the male. Although location of medical colleges did have any significant relationship with anxiety status but ownership of medical colleges were found significantly associated with anxiety status. Marital status was found no significant relationship with anxiety sores but different academic phase and family income were found significantly associated with anxiety status Overall the academic achievements of the students appeared good. However the study revealed that moderate and moderately severe anxiety were found higher among the irregularly passed students. Finally it can be concluded that anxiety should be reduced for the betterment of their academic performance and mental strength and ultimately to produce quality physicians to serve the community.

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Original Article

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