

## **Mental health issues among medical students: Exploring predictors of mental health in Dhaka during COVID-19 pandemic**

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### **ABSTRACT**

**Background:** Mental health has always been under the shadow of everyone's belief about their health. Concerns about mental health have already risen in the whole world. The COVID-19 pandemic has caused havoc worldwide, notably in the educational system. It has been difficult to quantify the influence of COVID-19 on the mental health of medical students in Bangladesh.

**Aims:** This study was conducted to assess medical students' mental health status in Dhaka during COVID-19 pandemic.

**Methods:** This study was undertaken at Dhaka Medical College, Dhaka, Bangladesh and 359 medical students were the primary respondents for this study.

**Results:** Depression, anxiety and stress were found in around half of the study participants. Overall, three-fourth of the medical students had poor mental health status. The research study showed that depression, anxiety and stress were dependent on various socio-demographic and behavioral characteristics of medical students.

**Conclusion:** Poor mental health is still highly prevalent in the medical students. Different factors like age, gender, academic year, and physical exercise behavior have affected medical students' mental health. This calls for attention towards the needs of the more vulnerable demographics and creating a welcoming environment for medical students.

**Keywords:** Mental health, medical students, COVID-19, Dhaka

### **Introduction**

Mental health has always been under the shadow of everyone's health beliefs. According to World Health Organization, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." [1] Along with physical health, this concept encompasses mental and social well-being. Concerns about the mental health have

already risen in whole world. Depression is one of the greatest reasons of disability in the world [2]. In people aged 15 to 29, suicide is the fourth highest cause of mortality [3].

Before joining M.B.B.S. course, medical students already have to deal with a stressful entrance exam [4]. After joining the M.B.B.S. course, the burdens of various new medical subjects are added along with everyday exams. Medical studies have always been one of the toughest course to study [5].

With the recent COVID-19 pandemic, everything has changed in the world. New methods and new rules were implemented to tackle the pandemic and continue the studies [6]. The most popular study method became virtual learning and it was seen fruitful in learning of medical students [7]. It has been difficult to quantify the influence of COVID-19 on the mental health of medical students in Bangladesh. Medical students are already more prone to poor mental health globally.

Medical students during their course, medical students have high pressure from loads of studies and exams. Repeated everyday exams and exhausting level of study have a delirious effect on medical students' mental health [8]. With the COVID-19 pandemic, every physical class has stopped and online classes have taken place. Mental health has not been the same as how it has been used to during the physical classes [9,10]. Medical students with poor mental health are vulnerable to dropping out of the medical course [11] and suicidal ideation.

## **Materials and Methods**

### ***Design, setting and participants***

This was an analytical cross-sectional study conducted at Dhaka Medical College from October till December 2021. Cochran's formula [12] was used to figure out the sample size

for this study, where anticipated prevalence rate of poor mental health was assumed from the findings of the study done by Hasan et al. [13]. Calculating through the formula, 342 samples were enough for the present study. Considering a 5% non-response rate, 359 medical students under M.B.B.S. course were considered and recruited using a convenience sampling approach.

### ***Measurements***

The data were gathered utilizing a structured questionnaire that was handed out to the study participants in person. The questionnaire included socio-demographic and behavioral characteristics, COVID-19 status as well as Depression, Anxiety and Stress Scale – 21 (DASS-21). Any medical students under mild to extremely severe depression, anxiety, or stress were considered having poor mental health.

### ***Data analysis***

The data were examined and double-checked for completeness and correctness. Statistical Package for Social Sciences (SPSS) version 25.0 was used to de-identify, clean, code, categorize, input, and analyze data. To see if there was a link between variables, Pearson chi-squared tests or Fisher's exact tests (if cell frequency was less than 5) were used. For all tests, the statistical significance threshold was set at  $p < 0.05$  (two-tailed).

### ***Ethical consideration***

The study received ethical approval (Issue Number: 01/2022) from the Ethical Review Committee of American International University - Bangladesh. The study's background, aims, risks, and benefits were all explained to all participants. Informed written consent were obtained from each of the participants. Only those who were willing to participate and offer informed consent were included in the study. Participants were able to exit the study at any

time and were not penalized. The participant's anonymity and confidentiality were preserved throughout the study.

## Results

Among the 359 participants, age between 21 and 24 years (65.5%) was the majority age group in the study, followed by age less-than and inclusive of 20 years (30.6%). The mean age came in at 21.54 years, with a standard deviation of 1.743. Females made up 58.8% of the study participants, while males made up 41.2%. Most of the study participants were unmarried (94.2%) and having family sizes of two to five members (79.7%). Regarding family income, 21.4%, 46.5%, and 32.0% of the study participants had family income of less than BDT 30,000, between BDT 30,000 & BDT 60,000 and more than BDT 60,000 respectively. Of the total participants, 71.6% resided in hostels, 23.7% resided at home with their parents, and 4.7% resided in flats or apartments. 21.4% of the study participants were in first year, 19.8% were in second year, 18.9% were in third year, 18.7% were in fourth year and 21.2% were in fifth year of their medical studies.

**Table 1: Characteristics of the study participants (n=359)**

Variable	Frequency	Percentage(%)
<b>Socio-demographic characteristics</b>		
Age (years)		
≤ 20	110	30.6
21 - 24	235	65.5
≥ 25	14	3.9
Gender		
Male	148	41.2
Female	211	58.8
Marital status		
Unmarried	338	94.2
Married	18	5.0
Divorced/Separated	3	0.8
Family size		
Two to five members	286	79.7
Six to ten members	71	19.8

More than ten members	2	0.6
Family income		
Less than BDT 30,000	77	21.4
Between BDT 30,000 to BDT 60,000	167	46.5
More than BDT 60,000	115	32.0
Residence		
Hostel	257	71.6
Home with parents	85	23.7
Flat or apartment	17	4.7
Academic year		
First year	77	21.4
Second year	71	19.8
Third year	68	18.9
Fourth year	67	18.7
Fifth year	76	21.2
<b>Behavioral characteristics</b>		
Physical exercise		
Yes	235	65.5
No	124	34.5
Hours of sleep		
Less than 8 hours	271	75.5
More than 8 hours	88	24.5
Smoking status		
Not smoking	348	96.9
Smoking	11	3.1
<b>COVID-19 related information</b>		
Vaccination status		
Unvaccinated	4	1.1
Vaccinated (Single dose)	5	1.4
Vaccinated (Both dose)	350	97.5
Previous COVID-19 infection status		
Not infected before	259	72.1
Infected before	100	27.9

65.5% of the study participants didn't have the habit of exercising or playing sports for at least thirty minutes three or more times a week, while 34.5% had the habit. Sleeping hours of less than 8 hours were also seen in 75.5% of the study participants, whereas 24.5% slept longer than 8 hours. Only 3.1% of the study participants had the habit of smoking.

97.5% of the study participants already had both dose of vaccine against COVID-19, whereas 1.4% had single dose of vaccine and 1.1% were still unvaccinated against COVID-19. Of the total participants, 27.9% had been infected with COVID-19 before while 72.1% didn't have any infection with COVID-19 before.

40.9% of the study participants didn't have depression, whereas 12.8%, 20.1%, 9.7% and 16.4% had mild, moderate, severe and extremely severe level of depression respectively. 37.3% of the study participants didn't have anxiety, whereas 9.5%, 25.3%, 11.1% and 16.7% had mild, moderate, severe and extremely severe level of anxiety respectively. 58.8% of the study participants didn't have stress, whereas 14.2%, 10.6%, 10.9% and 5.6% had mild, moderate, severe and extremely severe level of stress respectively. Overall, 73.8% of the study participants had poor mental health i.e. with either only depression, only anxiety, only stress, or combination.

**Fig 1. Proportion of severities of depression, anxiety and stress among the study participants (n=359)**

**Fig 2. Mental health status of the study participants (n=359)**

A higher percentage of individuals aged 21 to 24 years experienced depression (60.8%) compared to other age groups, and this difference was statistically significant ( $p = 0.034$ ). Although females had a higher rate of depression (62.7%), this was not statistically significant. Unmarried individuals (94.3%), those from families with two to five members

(79.2%), and those with a family income between BDT 30,000 and BDT 60,000 (44.3%) were more likely to experience depression, as were those residing in a hostel (68.4%) and in their first year of medical studies (25.0%), although these differences were not statistically significant. Similarly, anxiety was more common in the 21 to 24 age group (59.6%) and was statistically significant ( $p = 0.004$ ). Females had a significantly higher rate of anxiety (63.6%), and anxiety was more common in unmarried individuals (95.1%), those from families with two to five members (78.2%), and those with a family income between BDT 30,000 and BDT 60,000 (44.0%). Hostel residents (70.2%) and first-year medical students (24.9%) were also more likely to experience anxiety, although these differences were not statistically significant. The study found that stress was higher among female participants, unmarried individuals, those living in hostels, and those in the age group of 21 to 24 years and with a family size of two to five members. However, these differences were not statistically significant. The academic year of the participants was a significant predictor of stress, with first and second-year students reporting more stress than other years. Depression and anxiety were more prevalent in participants who did not have a habit of physical exercise, slept less than 8 hours, and were non-smokers. However, only physical exercise habit was significantly associated with depression and anxiety. Stress was also higher in participants without a habit of exercising, sleeping less than 8 hours, and not smoking, but the differences were not statistically significant.

**Table 2: Association of depression, anxiety and stress with factors of the study participants**



Variable	Depression		$\chi^2$	P-value	Anxiety		$\chi^2$	P-value	Stress		$\chi^2$	P-value
	Normal	Depressive symptoms			Normal	Anxiety symptoms			Normal	Stress symptoms		
<b>Socio-demographic factors</b>												
Age												
≤ 20	34 (23.1%)	76 (35.9%)	6.740 (df=2)	<b>0.034*</b>	27 (20.1%)	83 (36.9%)	11.074 (df=2)	<b>0.004*</b>	57 (27.0%)	53 (35.8%)	3.303 (df=2)	0.192
21 – 24	106 (72.1%)	129 (60.8%)			101 (75.4%)	134 (59.6%)			146 (69.2%)	89 (60.1%)		
≥ 25	7 (4.8%)	7 (3.3%)			6 (4.5%)	8 (3.5%)			8 (3.8%)	6 (4.1%)		
Gender												
Male	69 (46.9%)	79 (37.3%)	3.353 (df=1)	0.067	66 (49.3%)	82 (36.4%)	5.687 (df=1)	<b>0.017*</b>	95 (45.0%)	53 (35.8%)	3.047 (df=1)	0.081
Female	78 (53.1%)	133 (62.7%)			68 (50.7%)	143 (63.6%)			116 (55.0%)	95 (64.2%)		
Marital status												
Unmarried	138 (93.9%)	200 (94.3%)	4.231	0.105	124 (92.5%)	214 (95.1%)	1.711	0.460	199 (94.3%)	139 (93.9%)	0.306	0.918
Married	6 (4.1%)	12 (5.7%)			8 (6.0%)	10 (4.4%)			10 (4.7%)	8 (5.4%)		
Divorced/ Separated	3 (2.0%)	0 (0.0%)			2 (1.5%)	1 (0.5%)			2 (1.0%)	1 (0.7%)		
Family size												
Two to five members	118 (80.3%)	168 (79.2%)	2.708	0.244	110 (82.1%)	176 (78.2%)	1.305	0.526	166 (78.7%)	120 (81.1%)	0.686	0.801
Six to ten members	27 (18.4%)	44 (20.8%)			23 (17.2%)	48 (21.3%)			44 (20.9%)	27 (18.2%)		
More than ten members	2 (1.3%)	0 (0.0%)			1 (0.7%)	1 (0.5%)			1 (0.4%)	1 (0.7%)		
Family income												
Less than BDT 30,000	30 (20.4%)	47 (22.2%)	0.997 (df=2)	0.607	25 (18.7%)	52 (23.1%)	1.736 (df=2)	0.420	44 (20.9%)	33 (22.3%)	0.376 (df=2)	0.829
Between BDT 30,000 and BDT 60,000	73 (49.7%)	94 (44.3%)			68 (50.7%)	99 (44.0%)			101 (47.9%)	66 (44.6%)		
More than BDT 60,000	44 (29.9%)	71 (33.5%)			41 (30.6%)	74 (32.9%)			66 (31.2%)	49 (33.1%)		
Residence												
Hostel	112 (76.2%)	145 (68.4%)	2.990 (df=2)	0.224	99 (73.9%)	158 (70.2%)	0.963 (df=2)	0.618	154 (73.0%)	103 (69.6%)	0.565 (df=2)	0.754
Home with parents	28 (19.0%)	57 (26.9%)			28 (20.9%)	57 (25.3%)			48 (22.7%)	37 (25.0%)		
Flat or apartment	7 (4.8%)	10 (4.7%)			7 (5.2%)	10 (4.5%)			9 (4.3%)	8 (5.4%)		
Academic year												
First year	24 (16.3%)	53 (25.0%)	9.200 (df=4)	0.056	21 (15.7%)	56 (24.9%)	9.362 (df=4)	0.053	44 (20.8%)	33 (22.3%)	12.053 (df=4)	<b>0.017*</b>
Second year	23 (15.7%)	48 (22.6%)			21 (15.7%)	50 (22.2%)			30 (14.2%)	41 (27.7%)		
Third year	34 (23.1%)	34 (16.0%)			32 (23.9%)	36 (16.0%)			42 (19.0%)	26 (17.6%)		
Fourth year	30 (20.4%)	37 (17.5%)			27 (20.1%)	40 (17.8%)			46 (21.8%)	21 (14.2%)		

Fifth year	36 (24.5%)	40 (18.9%)			33 (24.6%)	43 (19.1%)			49 (23.2%)	27 (18.2%)		
<b>Behavioral factors</b>												
Physical exercise												
No	82 (55.8%)	153 (72.1%)	10.311 (df=1)	<b>0.001*</b>	78 (58.2%)	157 (69.8%)	4.971 (df=1)	<b>0.026*</b>	133 (63.0%)	102 (68.9%)	1.333 (df=1)	0.248
Yes	65 (44.2%)	59 (27.9%)			56 (41.8%)	68 (30.2%)			78 (37.0%)	46 (31.1%)		
Hours of sleep												
Less than 8 hours	112 (76.2%)	159 (75.0%)	0.066 (df=1)	0.797	104 (77.6%)	167 (74.2%)	0.522 (df=1)	0.470	159 (75.4%)	112 (75.7%)	0.005 (df=1)	0.945
More than 8 hours	35 (23.8%)	53 (25.0%)			30 (22.4%)	58 (25.8%)			52 (24.6%)	36 (24.3%)		
Smoking status												
Not smoking	140 (95.2%)	208 (98.1%)		0.132	127 (94.8%)	221 (98.2%)		0.109	202 (95.7%)	146 (98.6%)		0.133
Smoking	7 (4.8%)	4 (1.9%)			7 (5.2%)	4 (1.8%)			9 (4.3%)	2 (1.4%)		
<b>COVID-19 related factors</b>												
Previous COVID-19 infection status												
Not infected before	108 (73.5%)	151 (71.2%)	0.217 (df=1)	0.641	104 (77.6%)	155 (68.9%)	3.180 (df=1)	0.075	159 (75.4%)	100 (67.6%)	2.625 (df=1)	0.105
Infected before	39 (26.5%)	61 (28.8%)			30 (22.4%)	70 (31.1%)			52 (24.6%)	48 (32.4%)		
Vaccination status												
Unvaccinated	2 (1.4%)	2 (0.9%)	1.051	0.760	0 (0.0%)	4 (17.8%)	2.138	0.414	2 (1.0%)	2 (1.4%)	0.379	1.000
Vaccinated (single dose)	1 (0.7%)	4 (1.9%)			2 (1.5%)	3 (13.3%)			3 (1.4%)	2 (1.4%)		
Vaccinated (both dose)	144 (97.9%)	206 (97.2%)			132 (98.5%)	218 (96.9%)			206 (97.6%)	144 (97.2%)		
Total	147 (100%)	212 (100%)			134 (100%)	225 (100%)			211 (100%)	148 (100%)		

\* Pearson chi-squared test was done.

Although participants who were not previously infected with COVID-19 and had received both doses of the vaccine showed comparatively more depression, anxiety, and stress, the COVID-19 related factors did not show any significant association with these mental health issues.

## Discussion

Medical students have always been subjected to more psychological abuse than others, given that medical science has one of the most difficult course curriculums [5]. Mental health has been under question of everyone with the rise of COVID-19 pandemic. Medical students with

their prevalent poor mental health before COVID-19, is under dilemma about their mental health amid the COVID-19 pandemic.

This study's findings revealed an alarmingly high prevalence of poor mental health, which is comparable to a study conducted in 12 nations [8]. This shows significant rise of poor mental health during the COVID-19 pandemic when compared to previous study by Hasan et al [13]. Anxiety came in the most prevalent mental health disorder, followed by depression in this study participants. Around 3 out of 5 medical students had either depression or anxiety, which is consistent with other studies [14], while 2 out of 5 medical students had stress.

Given the current pandemic, financial crisis and educational burden, such a high proportion of poor mental health is to be foreseen. In this study, female students were shown to be more likely to suffer from depression, anxiety, and stress, with anxiety having the significant link. This is consistent with other studies [10,15–17] but contradicts the study by Hasan et al [13]. where male predominance was seen for poor mental health. Younger medical students were associated with depressive along with anxiety symptoms. Other study conducted in United Kingdom[10] had similar findings with younger medical students and junior doctors having poorer mental health when compared to seniors.

New information keeps on adding with elevating medical academic year but joining the medical studies for first time has feeling of whole new world. New environment, new friends, new teacher and different level of educational expectation affects the mental health of medical students in their freshman years. Increase in academic year showed relatively decrease in depression, anxiety and stress in this study. This is easily expected as medical students in first year become used to with the medical educational system in the later years. Other studies also show similar findings regarding the academic year of medical students and

their mental health [13,18,19]. Interestingly, the during COVID-19 pandemic, doing physical exercise was linked to decreased depression and anxiety. Other studies among medical students support this [20,21].

In conclusion, poor mental health is still highly prevalent in the medical students. Depression, anxiety and stress has always been terrorizing the medical students and COVID-19 pandemic has kept adding the more misery. Different factors like age, gender, academic year, and physical exercise behavior have affected medical students' mental health. This information is very crucial in order to create a welcoming environment for medical students. Attention should be given towards the needs of the more vulnerable demographics like the female students and the medical students in first and second year. Screening and counselling program should be conducted regularly in timely interval. Self-care is very essential to preserve a good mental health. Further study is essential to see the bigger picture of the mental health of the medical students as this study had big time constraint.

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### **References**

1. Constitution of the World Health Organization – Basic Documents, Forty-fifth edition, Supplement, October 2006. World Health Organization; 2006.

2. Depression (Fact-sheet) [Internet]. World Health Organization. 2021 [cited 2021 Oct 12]. Available from: <https://www.who.int/news-room/fact-sheets/detail/depression>
3. World Health Organization (WHO). Suicide worldwide in 2019: global health estimates. 2021.
4. Mamun MA, Safiq MB, Hosen I, al Mamun F. Burnout, does the university entrance test failing attribute? A Bangladeshi exploratory study. PLoS One [Internet]. 2021;16(10):e0258100. Available from: <http://dx.doi.org/10.1371/journal.pone.0258100>
5. Willcock SM, Daly MG, Tennant CC, Allard BJ. Burnout and psychiatric morbidity in new medical graduates. Medical Journal of Australia. 2004;181(7):357–60.
6. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. Cureus. 2020;2019(4):4–9.
7. Almarzooq ZI, Lopes M, Kochar A. Virtual Learning During the COVID-19 Pandemic: A Disruptive Technology in Graduate Medical Education. Journal of the American Cardiology. 2020;75(20):2635–8.
8. Molodynski A, Lewis T, Kadhum M, Farrell SM, Lemtiri Chelieh M, Falcão De Almeida T, et al. Cultural variations in wellbeing, burnout and substance use amongst medical students in twelve countries. International Review of Psychiatry [Internet]. 2021;33(1–2):37–42. Available from: <https://doi.org/10.1080/09540261.2020.1738064>
9. Khani A, Res BMC, Murhaf A, Khani A, Sarhandi MI, Zaghoul MS, et al. A cross - sectional survey on sleep quality , mental health , and academic performance among medical students in Saudi Arabia. BMC Res Notes [Internet]. 2019;12(1):1–5. Available from: <https://doi.org/10.1186/s13104-019-4713-2>
10. Bhugra D, Sauerteig SO, Bland D, Lloyd-Kendall A, Wijesuriya J, Singh G, et al. A descriptive study of mental health and wellbeing of doctors and medical students in the UK. International Review of Psychiatry [Internet]. 2019;31(7–8):563–8. Available from: <https://doi.org/10.1080/09540261.2019.1648621>
11. Hashmat S, Hashmat M, Amanullah F, Aziz S. Factors causing exam anxiety in medical students. J Pak Med Assoc. 2008;58(4):167.
12. Cochran WG. Sampling techniques. 3rd Editio. New York: John Wiley & Sons; 1977.
13. Hasan MT, Hossain S, Gupta R das, Podder V, Mowri NA, Ghosh A, et al. Depression, sleeping pattern, and suicidal ideation among medical students in Bangladesh: a cross-sectional pilot study. Journal of Public Health (Germany). 2020;
14. Alim SAHM, Rabbani MG, Karim E, Mullick MSI, Mamun A al, Fariduzzaman -, et al. Assessment of depression, anxiety and stress among first year MBBS students of a public medical college, Bangladesh. Bangladesh Journal of Psychiatry. 2017;29(1):23–9.
15. Adhikari A, Dutta A, Sapkota S, Chapagain A, Aryal A, Pradhan A. Prevalence of poor mental health among medical students in Nepal: A cross-sectional study. BMC Med Educ. 2017;17(1):1–7.

16. Sultana DrA. Prevalence and Associated Behavioral Factors of Depression among Private Medical Students in Bangladesh. *Scholars Journal of Applied Medical Sciences*. 2021;9(1):54–9.
17. Safa F, Anjum A, Hossain S, Trisa TI, Alam SF, Abdur Rafi M, et al. Immediate psychological responses during the initial period of the COVID-19 pandemic among Bangladeshi medical students. *Child Youth Serv Rev*. 2021;122(January).
18. Puthran R, Zhang MWB, Tam WW, Ho RC. Prevalence of depression amongst medical students: A meta-analysis. *Med Educ*. 2016;50(4):456–68.
19. Malik Uttra DrA, Muhammad Uttra DrMG, Rauf DrA, Uttra MM, Habiba Hasan DrU, Batool DrA. Prevalence of Depression; a Cross-Sectional Study Among Mbbs Students of Sargodha Medical College, Sargodha Pakistan. *the Professional Medical Journal*. 2017;24(03):482–9.
20. Bitonte RA, Desanto DJ. Mandatory physical exercise for the prevention of mental illness in medical students. *Ment Illn*. 2014;6:5549.
21. Terebessy A, Czeglédi E, Balla BC, Horváth F, Balázs P. Medical students' health behaviour and self-reported mental health status by their country of origin: A cross-sectional study. *BMC Psychiatry* [Internet]. 2016 May 28 [cited 2022 Jan 1];16(1):1–9. Available from: <https://link.springer.com/articles/10.1186/s12888-016-0884-8>

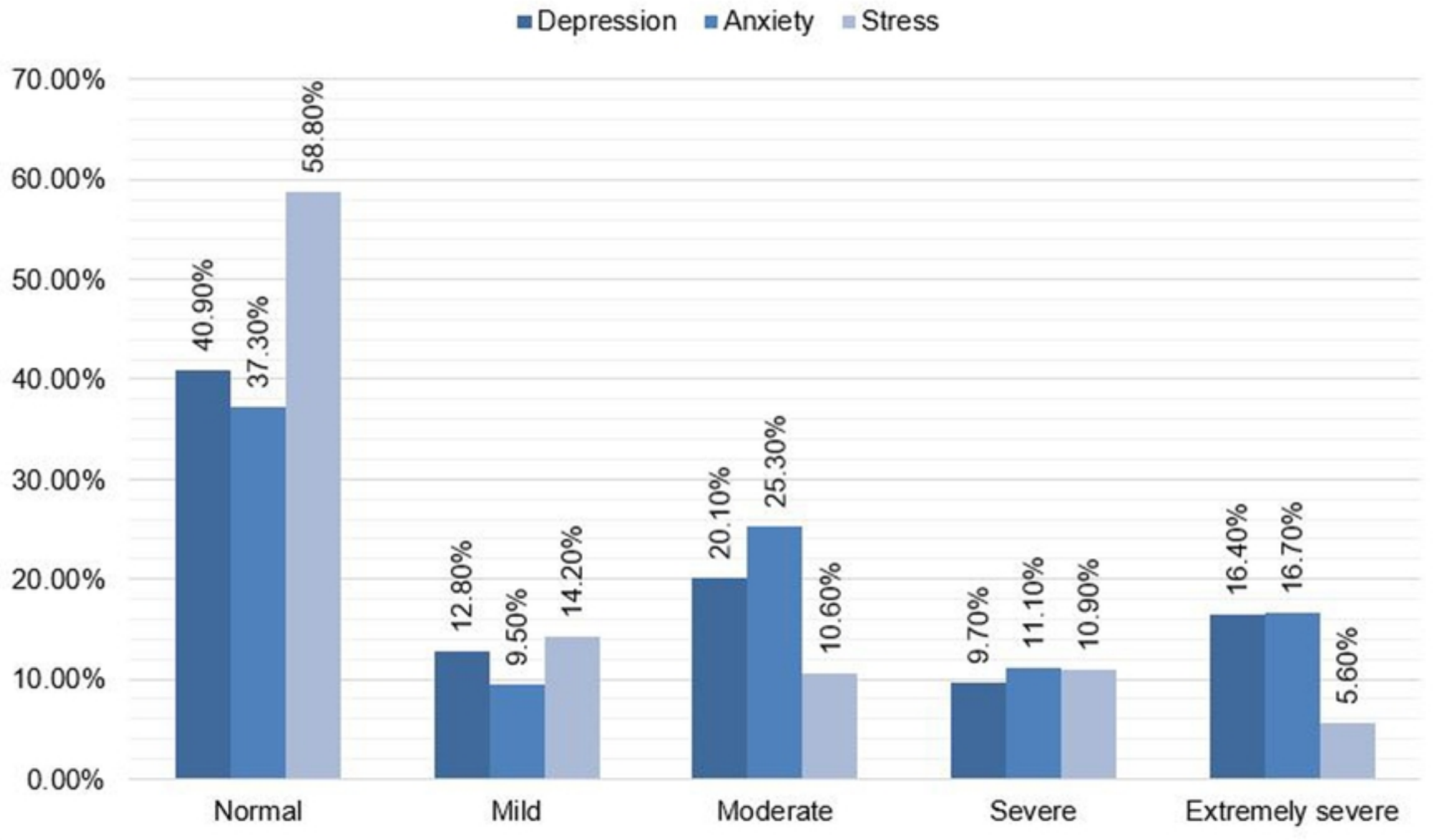
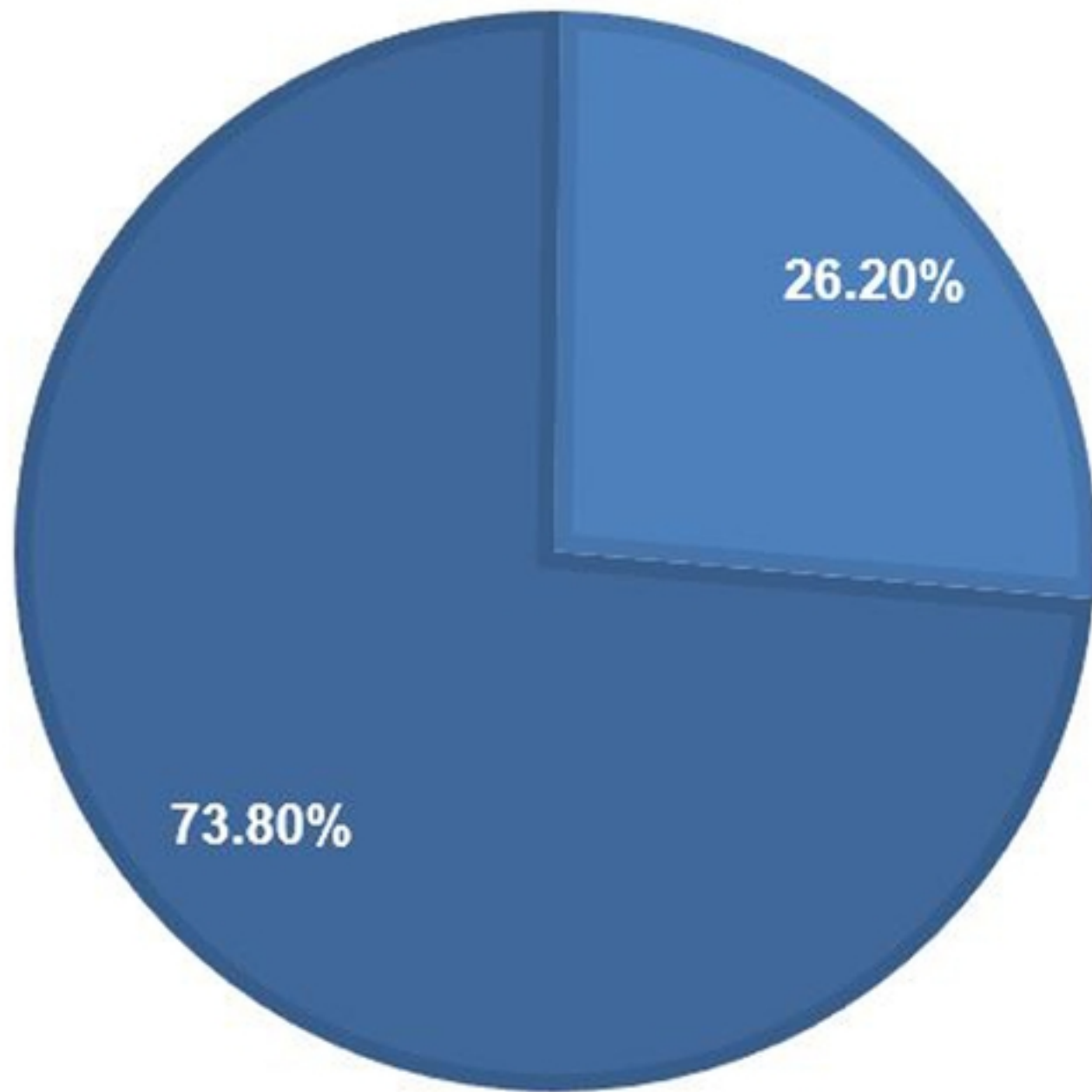


Fig 1



- Poor mental health
- Normal mental health

Fig 2