

## *Depression, anxiety, and stress among public university students in Bangladesh during the COVID-19 pandemic*

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### **ABSTRACT**

*“Coronaphobia” has spread across the world due to the overwhelming impact of coronavirus-2019 (COVID-19). The education sector has suffered from the pandemic, and university students find themselves in an unprecedented situation. Many university students in Bangladesh require psychological intervention due to adverse mental health conditions created by the COVID-19 pandemic. This cross-sectional study was conducted to evaluate the psychological conditions among public university students in Bangladesh during university campus closures necessitated by the pandemic. It also sought to ascertain factors associated with adverse psychological conditions during this period. Convenience and snowball sampling techniques were employed. In all, 1,382 university students participated in an online survey during the COVID-19 pandemic. Relationships between student demographic factors and DASS 21 subscales were determined using linear regression models. Students were classified as suffering from anxiety (26.85 percent), normal depression (25.47 percent), moderate depression (29.52 percent), or extremely severe depression (17.73 percent). Students who lived with their families reported less adverse mental health. Factors strongly associated with students’ psychological conditions include age, academic field, university year, perception of their own mental health condition during the COVID-19*

*pandemic, safety concerns about their living place relative to COVID-19, perceptions about social life, academic profile, academic performance, concerns about pandemic impact on their studies, and part-time jobs during the pandemic. Outcomes of this research may assist social organizations and health workers to identify psychologically vulnerable university students in order to support them more effectively. Our findings could also be integrated into comprehensive pandemic control efforts.*

*Key words: COVID-19, university students, mental health, stress, tertiary education*

### **INTRODUCTION**

Coronavirus-2019 (COVID-19) has become one of the most significant pandemics in human history, and the term “coronaphobia” has now been adopted globally.<sup>1</sup> This pandemic has created unforeseen situations for many people.<sup>1,2</sup> However, long-term psychological impacts may be ignored, as in previous disasters,<sup>3-6</sup> despite the evidence from previous studies regarding the seriousness of such impacts.<sup>7-11</sup> The COVID-19 pandemic requires urgent psychological intervention from public health organizations.<sup>2,12</sup> Along with other South Asian countries, Bangladesh has experienced severe impacts from the pandemic not only on health but also in social, economic, and education sectors. It was one of the worst hit countries, and its capital city, Dhaka, suffered especially

heavily.<sup>13,14</sup> India, the neighboring country, had the second highest number of COVID-19 cases during this study.<sup>13</sup>

The psychological impact of this pandemic is already evident in the general population of Bangladesh,<sup>15-18</sup> creating an unprecedented situation for the education sector.<sup>19,20</sup> The Bangladesh government had to close all educational institutions to mitigate the spread of infection. University students were not only afflicted with the disease but they were also faced with uncertainty about their academic and future careers. Bangladeshi families normally depend financially and mentally on family members who study in universities. They expect that these members will be able to support the family after graduation. COVID-19 has complicated matters by delaying graduations and subsequent employment for university students.

Public universities in Bangladesh were not prepared for the pandemic.<sup>21</sup> Despite some online activities, university students faced various difficulties, such as poor network connectivity, high internet access charges, inadequate classroom environments at home, and lack of understanding exacerbated by the lack of face-to-face contact with professors. University students have become one of the groups most vulnerable to the pandemic. Direct and indirect COVID-19 impacts among university students of Bangladesh necessitate psychological support from relevant organizations. Faster tracking and intervention may be highly beneficial.

This study assessed student psychological conditions by evaluating depression, anxiety, and stress among the university students of Bangladesh at a public university located in Dhaka. It evaluated psychological conditions of participants relative to their sociodemographic information, socioeconomic conditions, perceptions about their social life, confidence about their residences, academic profiles, and academic performance during the pandemic. Outcomes of this study may assist in psychological interventions from social organizations and health professionals, and may be integrated into the comprehensive pandemic response and recovery process.

## MATERIALS AND METHODS

### *Research design and ethical issues*

An online survey was conducted among students at the Bangladesh University of Professionals (BUP), a public university located in the capital city of Dhaka. All educational institutions, including university campuses, were closed due to the COVID-19 pandemic. Surveys had already been employed successfully in previous studies.<sup>2,17,22-25</sup> Psychological conditions among participating university students were assessed through the association of their demographic and academic profiles, socioeconomic and academic conditions, and university support during the pandemic. This study was part of a research project approved by the Student Institutional Review Board (Research Ethics Committee), where all ethical issues were considered. Participants were assured that all responses would remain confidential and would be used only for research purposes.

### *Survey tool*

Previous research and discussions with experts were used to prepare the questionnaire.<sup>2,3,17,26-29</sup> Both English and Bangla versions of the Depression Anxiety Stress Scale-21 (DASS 21) questions were administered to assess the psychological conditions among university students.<sup>26,27,29,30</sup>

### *Data collection*

The online survey was conducted from the beginning of August to the end of September 2020. A group of BUP students was formed to disseminate the questionnaire among students from four majors (Arts and Social Sciences, Business Studies, Security

**Table 1. Cutoff scores for Depression, Anxiety, and Stress Scale-21 items (DASS 21)<sup>27</sup>**

Severity label	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

and Strategic Studies, and Science and Engineering). Participants were also encouraged to make the questionnaire known among their peers. Thus, this cross-sectional study employed both convenience and snowball sampling techniques; 235 students were required as a minimal sample size (of a student population of about 5000 BUP regular students)<sup>31</sup> to achieve a 5 percent margin of error, a 95 percent confidence level, and an 80 percent response distribution. In total, 1,382 students participated through different online platforms such as Facebook, Google Classroom, WhatsApp, and email services.

#### Data analysis

'R' programming language, version 3.6.3,<sup>32</sup> was used for all statistical analyses. Descriptive statistics were calculated as required. Linear regression models were employed to determine the associations between student information and DASS 21 subscales.

### RESULTS

The majority of students reported moderate depression (29.52 percent) followed by normal depression (25.47 percent) and extremely severe depression (17.73 percent) (Table 2). Participants also demonstrated normal anxiety (28.44 percent) followed by extremely severe anxiety (26.85 percent). The majority of them showed normal stress (46.53 percent) followed by moderate stress (18.16 percent).

The majority of participants were between 22–25 (68.09 percent) and 18–21 (25.25 percent) years of age (Table 3). Female participants comprised 53.04 percent of all respondents. With regard to the current location, 50.43 percent were Dhaka residents and 49.57 percent lived outside the city.

Most university students lived with their families (71.49 percent). Third-year (31.11 percent) and fourth-year (29.59 percent) students comprised a majority of respondents, the largest percentage of which were Business Studies (35.46 percent) and Arts and Social Science majors (30.61 percent). Students aged 22–25 and 26–30 reported significantly higher anxiety ( $B = 1.31$ , 95% CI: 0.16; 2.46 and  $B = 3.85$ , 95% CI: 1.56; 6.13, respectively). Students living with their families had significantly less anxiety ( $B = -1.83$ , 95% CI:  $-2.92$ ;  $-0.73$ ). Third-year students showed significantly higher anxiety ( $B = 2.63$ , 95% CI: 1.02; 4.25) compared to first-year students, and Science and Engineering majors reported significantly lower depression ( $B = -3.83$ , 95% CI:  $-5.54$ ;  $-2.11$ ), lower anxiety ( $B = -4.95$ , 95% CI:  $-6.44$ ;  $-3.47$ ), and lower stress ( $B = -3.54$ , 95% CI:  $-5.18$ ;  $-1.90$ ).

Table 4 presents the association of students' socioeconomic and academic conditions with DASS 21 subscales. Students with moderate or low concern about their mental health during the COVID-19 pandemic demonstrated significantly lower depression, lower anxiety, and lower stress, compared to highly concerned students. Similarly, students who thought that their current residence was relatively safe from COVID-19 showed significantly lower depression ( $B = -2.13$ , 95% CI:  $-3.67$ ;  $-0.59$ ) and lower stress ( $B = -1.71$ , 95% CI:  $-3.18$ ;  $-0.24$ ), where significantly higher anxiety ( $B = 3.00$ , 95% CI: 1.12; 4.88) and higher stress ( $B = 2.35$ , 95% CI: 0.31; 4.40) were found among students who regarded their domiciles as very unsafe from COVID-19. Students who were very satisfied or satisfied with their social lives reported significantly lower depression, lower anxiety, and lower stress, compared to less satisfied students. Students

**Table 2. Depression, anxiety, and stress among public university students of Bangladesh during the COVID-19 pandemic (following Table 1)**

Severity label	Depression ( <i>n</i> ( percent))	Anxiety ( <i>n</i> ( percent))	Stress ( <i>n</i> ( percent))
Normal	352 (25.47)	393 (28.44)	643 (46.53)
Mild	154 (11.14)	99 (7.16)	205 (14.83)
Moderate	408 (29.52)	309 (22.36)	251 (18.16)
Severe	223 (16.14)	210 (15.20)	199 (14.40)
Extremely severe	245 (17.73)	371 (26.85)	84 (6.08)

**Table 3. Association of the university student participants' demographics and academic profiles with the prevalence of depression, anxiety, and stress during the COVID-19 pandemic in Bangladesh**

Features	n (percent)	Depression		Anxiety		Stress	
		R <sup>2</sup>	β <sup>#</sup> (95% CI)	R <sup>2</sup>	β (95% CI)	R <sup>2</sup>	β (95% CI)
<b>1. Age</b>							
a. 18–21	349 (25.25)		Reference		Reference		Reference
b. 22–25	941 (68.09)	0.006	1.25 (–0.07; 2.56)	0.009	1.31 (0.16; 2.46)*	0.002	0.40 (–0.86; 1.65)
c. 26–30	79 (5.72)		1.96 (–0.65; 4.58)		3.85 (1.56; 6.13)***		0.65 (–1.85; 3.15)
d. 31–35	13 (0.94)		–5.50 (–11.43; 0.43)		–1.56 (–6.75; 3.62)		–4.62 (–10.30; 1.05)
<b>2. Gender</b>							
a. Male	649 (46.96)	0.000	–0.42 (–1.55; 0.71)	0.001	–0.75 (–1.75; –0.24)	0.000	–0.54 (–1.63; –0.54)
b. Female	733 (53.04)		Reference		Reference		Reference
<b>3. Current location</b>							
a. Dhaka	697 (50.43)	0.000	Reference	0.002	Reference	0.000	Reference
b. Outside Dhaka	685 (49.57)		–0.26 (–1.39; 0.87)		0.84 (–0.15; 1.83)		–0.46 (–1.54; 0.62)
<b>4. Living with family</b>							
a. Yes	988 (71.49)	0.002	1.18 (–0.07; 2.43)	0.007	–1.83 (–2.92; –0.73)**	0.001	0.95 (–0.25; 2.14)
b. No	394 (27.79)		Reference		Reference		Reference
<b>5. University Year</b>							
a. First year	186 (13.46)	0.002	Reference	0.009	Reference	0.002	Reference
b. Second year	330 (23.88)		0.85 (–1.07; 2.78)		1.66 (–0.02; 3.34)		0.74 (–1.10; 2.58)
c. Third year	430 (31.11)		1.73 (–0.11; 3.57)		2.63 (1.02; 4.25)**		1.37 (–0.39; 3.13)
d. Fourth year	409 (29.59)		1.28 (–0.58; 3.14)		0.97 (–0.66; 2.59)		0.90 (–0.88; 2.67)
e. Masters	27 (1.95)		1.39 (–2.94; 5.73)		3.40 (–0.38; 7.18)		1.44 (–2.70; 5.58)
<b>6. Major</b>							
a. Arts and Social Sciences	423 (30.61)	0.015	Reference	0.036	Reference	0.014	Reference
b. Business Studies	490 (35.46)		–0.51 (–1.89; 0.88)		–52 (–1.72; 0.68)		–0.67 (–1.99; 0.66)
c. Security and Strategic Studies	240 (17.37)		–0.81 (–2.58; 0.80)		0.06 (–1.40; 1.52)		–0.33 (–1.94; 1.28)
d. Science and Engineering	229 (16.57)		–3.83 (–5.54; –2.11)***		–4.95 (–6.44; –3.47)***		–3.54 (–5.18; –1.90)***

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; and β<sup>#</sup> = beta.

<b>Table 4. Association of student participants' socioeconomic and academic states with the prevalence of depression, anxiety, and stress during the COVID-19 pandemic in Bangladesh</b>							
Features	n (percent)	Depression		Anxiety		Stress	
		R <sup>2</sup>	β <sup>#</sup> (95% CI)	R <sup>2</sup>	β (95% CI)	R <sup>2</sup>	β (95% CI)
<b>1. Concerned about mental health</b>							
a. Highly	640 (46.31)		Reference		Reference		Reference
b. Moderately	585 (42.33)	0.052	-4.73 (-5.90; -3.55)***	0.017	-2.42 (-3.46; -1.37)***	0.06	-4.79 (-5.91; -3.67)***
c. Lowly	157 (11.36)		-5.44 (-7.26; -3.61)***		-2.58 (-4.21; -0.95)**		-5.51 (-7.25; -3.77)***
<b>2. Confidence on current place for COVID-19</b>							
a. Very safe	140 (10.13)		-1.70 (-3.69; 0.29)		0.85 (-2.13; 2.59)		-1.20 (-3.10; 0.70)
b. Safe	286 (20.69)		-2.13 (-3.67; -0.59)**		-0.78 (-0.900; 0.56)		-1.71 (-3.18; -0.24)*
c. Moderately safe	522 (37.77)	0.012	Reference	0.011	Reference	0.015	Reference
d. Unsafe	317 (22.94)		0.51 (-0.97; 2.00)		0.89 (-0.42; 2.19)		1.24 (-0.18; 2.67)
e. Very unsafe	117 (8.47)		1.55 (-0.59; 3.69)		3.00 (1.12; 4.88)**		2.35 (0.31; 4.40)*
<b>3. Perception of current social life</b>							
a. Very satisfied	151 (10.93)		-3.97 (-5.84; -2.09)***		-0.76 (-2.42; 0.89)		-3.88 (-5.67; -1.29)***
b. Satisfied	536 (38.78)	0.018	-2.38 (-3.58; -1.18)***	0.000	-0.47 (-1.53; -0.58)	0.019	-2.43 (-3.57; -1.29)***
c. Least satisfied	695 (69.83)		Reference		Reference		Reference
<b>4. Perception of academic performance</b>							
a. Very satisfied	155 (11.22)		-2.50 (-4.37; -0.63)**		0.63 (-1.01; 2.27)		-1.59 (-3.38; 0.20)
b. Satisfied	580 (41.97)	0.012	-2.28 (-3.48; -1.08)***	0.008	-1.59 (-2.64; -0.54)**	0.008	-1.95 (-3.09; -0.80)***
c. Least satisfied	647 (46.82)		Reference		Reference		Reference
<b>5. Concerned about the hampering of study</b>							
a. High	518 (37.48)		Reference		Reference		Reference
b. Medium	641 (39.15)	0.007	-1.83 (-3.07; -0.59)**	0.001	-0.37 (-1.46; 0.72)	0.002	-1.82 (-3.00; -0.64)**
c. Low	223 (16.14)		-2.13 (-3.81; -0.45)*		0.54 (-0.94; 2.01)		-2.14 (-3.75; -0.54)**
<b>6. Concerned about the hampering of part-time job</b>							

**Table 4. Association of student participants' socioeconomic and academic states with the prevalence of depression, anxiety, and stress during the COVID-19 pandemic in Bangladesh (continued)**

		Depression		Anxiety		Stress	
a. High	350 (25.33)	0.012	Reference	0.000	Reference	0.008	Reference
b. Medium	316 (22.87)		-1.48 (-3.11; 0.14)		-0.09 (-1.52; 1.34)		-1.36 (-2.91; 0.19)
c. Low	224 (16.21)		-1.79 (-3.58; 0.00)		-0.30 (-1.88; 1.28)		-1.85 (-3.56; -0.13)*
d. No Part-time job	492 (35.60)		1.07 (-0.39; 2.54)		-0.60 (-1.89; 0.69)		-0.53 (-0.87; 1.93)
7. Need to go outside for earning							
a. Yes	564 (40.81)		-0.86 (-2.01; 0.29)		0.58 (-0.42; 1.59)		-0.45 (-1.55; 0.65)
b. No	818 (59.19)	0.001	Reference	0.000	Reference	0.000	Reference

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; and β# = beta.

who were less concerned about the impact of the pandemic on their studies demonstrated significantly less depression and lower stress compared to highly concerned students. Students who were less concerned about their part-time jobs during the pandemic reported significantly lower stress (B = -1.85, 95% CI: -3.56; -0.13) compared to highly concerned students. There was no significant association between university support and DASS 21 subscales (Table 5).

#### DISCUSSION

This study revealed that a large number of university students in Bangladesh experienced mental health problems during the COVID-19 pandemic. It supports previous studies reporting a high risk of psychological impacts among university students.<sup>2,17,30</sup> University students experienced great concerns about their academic and future careers, due to the COVID-19 pandemic<sup>33,34</sup>; however, many students also demonstrated normal psychological states. BUP started online educational activities for its students before other public universities in Bangladesh, and online learning may have supported students psychologically. BUP also supported many students both financially and emotionally (Table 5). However, more students need to receive such assistance. Moreover, online portals and web and smartphone-based applications should also be employed to reduce the long-term psychological impact among students.<sup>2,35,36</sup>

Psychoeducation should also be considered with expert intervention. The current study also revealed that older students were more anxious than younger students. From a Bangladeshi perspective, age limitations affect enrollment in government jobs,<sup>37</sup> and many students were anxious about their job opportunities after graduation. The Bangladesh government has already considered this an important issue.<sup>37</sup> This study also revealed that students experienced less adverse mental health when they lived with their families. Interactions among family members provided more stability during the COVID-19 crisis. A recent study has also indicated the importance of family interactions during the COVID-19 pandemic.<sup>38</sup> Freshmen and sophomores had fewer mental health issues compared to juniors and seniors. Older students may have been more concerned about their academic activities and future job opportunities. Science and Engineering majors had fewer mental health problems. These students may have experienced less academic pressure because laboratory courses could not be held during this period, whereas students with other majors carried heavier academic loads.

Many students were concerned about their mental health, social life, academic performance, and their part-time jobs due to the COVID-19 pandemic. This study revealed associations between these factors and their psychological conditions, and between their perception of their own mental health and DASS 21

Features	n ( percent)	Depression		Anxiety		Stress	
		R <sup>2</sup>	β <sup>#</sup> (95% CI)	R <sup>2</sup>	β (95% CI)	R <sup>2</sup>	β (95% CI)
<b>1. Subject related to COVID-19</b>							
a. Yes	342 (24.75)		-0.47 (-2.15; 1.21)		-0.46 (-1.93; 1.01)		-0.38 (-1.99; 1.22)
b. No	751 (54.34)	0.003	0.95 (-0.50; 2.41)	0.000	-0.37 (-1.64; 0.91)	0.003	0.90 (-0.48; 2.29)
c. May be	289 (20.91)		Reference		Reference		Reference
<b>2. Financial/mental support for COVID-19</b>							
a. Yes	528 (38.21)	<0.000	-0.05 (-1.22; 1.11)	0.000	-0.54 (-1.56; 0.48)	<0.000	-0.14 (-1.56; 0.48)
b. No	854 (61.79)		Reference		Reference		Reference

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; and β<sup>#</sup> = beta.

subscales.<sup>26,27</sup> This study identified the socioeconomic condition as an important predictor of mental health, which also supports previous studies.<sup>30,39-41</sup> Many students lacked confidence about their living places as refuges from COVID-19 infection. It also revealed that maintaining good academic performance was important to reduce the psychological trauma.

This study only considered a public university students, who may not reflect all university students. However, this exploratory study can assist organizations and the health sector in tracking university students based on their demographics during the pandemic in order to better support this psychologically vulnerable group.

### CONCLUSION

COVID-19 has caused trauma among different segments of the Bangladesh society. The high mortality and morbidity, along with the overwhelming socioeconomic impact of this pandemic, has caused long-term adverse psychological impacts in many people. This study postulated a high frequency of adverse psychological states among public university students in Bangladesh during the pandemic. Participants demonstrated psychological conditions related to their sociodemographic status. This study identified ameliorating and aggravating factors, such as living with

family, safety of the current domicile, socioeconomic condition, and academic profile and performance. This information may assist health organizations to identify and assist psychologically vulnerable students and may further assist pandemic mitigation efforts.

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