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Depression and Anxiety among University Students: A Comparison between COVID-19 Pandemic Panic Period and Post-panic Period in Bangladesh

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Abstract

BACKGROUND: In Bangladesh, the rapid spread of COVID-19 virus created a panic situation among the citizen. Specially, the psycho-emotional disorder of the university students is increasing which has not been adequately investigated.

AIM: Relating this, the study aimed to assess the psycho-emotional changes of the university students through investigating their level of depression and anxiety during panic and post-panic period of COVID-19 pandemic in Bangladesh.

METHOD: A cross-sectional online survey was conducted among the university students in Bangladesh from April to July 2020 (panic period, n = 170) and then from August to November 2020 (post-panic period, n = 170). The Patient Health Questionnaire (PHQ)-9 and Generalized Anxiety Disorder-7 questionnaires were used to assess the depression and anxiety levels of the students, respectively. Various univariate and multivariable statistical techniques were used to analyze the data.

RESULTS: The proportion of depression symptoms was 49.4% and 52.4% during the panic period and post-panic period, respectively. Anxiety symptoms were experienced by 38.2% of students during the panic period, and the percentage was nearly identical in the post-panic interval. In post-panic period, depression levels found a slight increase. Urban students reported significantly ($p < 0.05$) higher levels of depression and anxiety than their counterparts. Female students also exhibited significantly more anxiety symptoms ($p < 0.002$) than male. Depression symptoms significantly varied by family types and student's place of residence.

CONCLUSIONS: This study compared the depression and anxiety symptoms of the university students during two periods of the COVID-19 pandemic. Although the difference was small, it remains an issue for the university students in Bangladesh due to the disruption to their academic lives.

Introduction

The acute respiratory syndrome coronavirus 2 (SARS-Cov-2) detected in Wuhan, Hubei Province, caused the emergence of novel coronavirus disease 2019, referred to as COVID-19 [1], [2], [3]. In response to this dire situation, the World Health Organization (WHO) declared a global pandemic on March 11, 2020 [4]. The pandemic has rapidly spread around the world and created a global public health threads. The pandemic prompted the implementation of emergency health protocols to control the spread of the infection, many of which included a series of lockdowns with home quarantine, social distancing, wearing face masks, travel restrictions, and the closure of academic institutions and government organizations [5], [6], [7]. As a result, it caused widespread public distress as well as widespread fear and panic, particularly among students [8], [9].

Due to the unprecedented experience of "home quarantine" under lockdown with uncertainty of academic and professional career, the university students of Bangladesh have multifaceted impacts on their mental health [8]. In the normal situation, several previous studies stated that a large number of university students, particularly, senior students, were experiencing moderate to severely depression and anxiety, which has a negative impact on their daily activities [9], [10], [11], [12]. However, in the current COVID-19 pandemic, the depression and anxiety problems were more triggered in university students [8], [9], [13], [14]. Furthermore, the ongoing pandemic has created a psycho-emotional panic situation, with countries reporting an alarming spread

of the virus, which has increased the risk of suicidal behavior [15], [16].

In Bangladesh, the rapid spread of the virus created a panic situation among the citizen at early stage of the pandemic (March–July 2020). The frighten situation reduced later and all organizations are coming back to their regular activities except educational institutions [17], [18], [19]. Since the educational institution was closed for long time, the students had to face different embarrassing conditions in their family as well as the society. Specially, university students suffer more because they were in their last stage of their education and their family is eagerly waiting to their financial support. That's why, learning on the psycho-emotional changes among university students is important which is not yet sufficiently investigated. Given the circumstances, we aimed to assess the university student's psycho-emotional changes through investigating their level of depression and anxiety effects during panic and post-panic period of COVID-19 pandemic in Bangladesh.

Methods

Study design and data collection

A cross-sectional online survey was conducted among the university students in Bangladesh using a Google Form questionnaire. In Bangladesh, COVID-19 infection was first detected on March 8, 2020 and the infection was getting viral gradually experiencing double consecutively within a short time [3]. Due to rapid transmission of the infection, the people were suffering from massive fear which created a panic period and stayed up to July 2020. Then, the pandemic panic started reducing due to low detection rate of daily confirmed new cases and deaths [18], [19], and daily case detections on 13 July decreased by 30.7% in comparison to previous week, reported by the WHO [17]. The survey was conducted to collect information in both panic period (April to July, 2020) and post-panic period (August to November, 2020). For panic period, the data were collected in July, 2020 and for post-panic period the data were collected in November, 2020.

University students from various divisions in Bangladesh were contacted through different social networks. Three hundred and sixty university students (175 from panic period and 185 from post-panic period) were responded to this survey and their sociodemographic, depression and anxiety related information were collected. Among the 360 students, 20 (05 from panic period and 15 from post-panic period) students responded the questionnaire incompletely and their responses were excluded from the analysis. Finally, 340 samples (170 from panic period and 170 from post-panic period) were included in the data analysis. The details data sampling design is presented in the Figure 1.

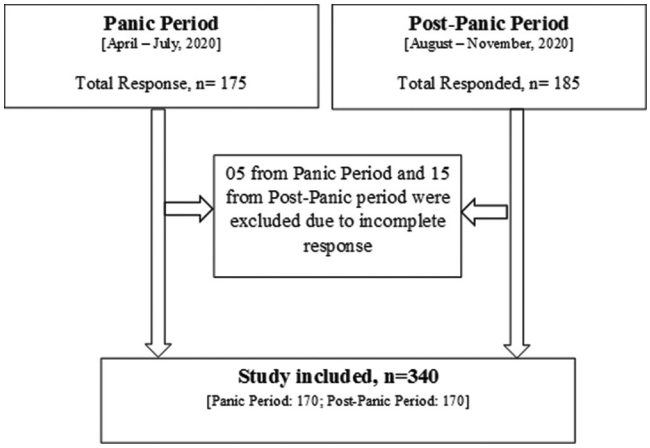

Figure 1: Sampling design of the study

Measures

A semi-structured and self-reported e-questionnaire containing informed consent, questions regarding sociodemographics, depression and anxiety were used.

Sociodemographic information

'Sociodemographic information included age ("17–21;" "21–26" years), gender ("male;" "female"), family types ("nuclear;" "joint/extended"), place of residence ("rural;" "urban"), education ("first-third;" "fourth and higher years"), family economic condition ("lower class;" "lower middle class;" "middle and upper class"), family head's occupation ("unemployed;" "agriculture/labor work;" "business;" "service"), and family earning members ("none;" "one;" "two and more").

Outcome variables

Depression and anxiety were the two outcome variables to assess psycho-emotional changes of the university students. Respondent's depression was determined using Patient Health Questionnaire (PHQ-9) [20]. PHQ-9 is a well-established and simple questionnaire for screening depression of an individual and what state he/she is in during the survey. The codes for PHQ-9 questions are "0 = not at all" to "3 = nearly every day." Using the PHQ-9 questionnaire, we calculated a score variable to measure the level of depression symptoms and later categorized as: score <10 for absence of depression symptoms and score ≥10 for the presence of depression symptoms [20].

Student's anxiety was evaluated using the Generalized Anxiety Disorder (GAD-7) questionnaire,

the questions were used for screening anxiety state of the students on a scale starting from “0 = no at all sure” to “3 = nearly every day” [20]. GAD-7 has been found successful in identifying anxiety among different populations and thus used for its reliability. The overall level of anxiety was computed and categorized as: score <10 for absence of anxiety symptoms and score ≥10 for the presence of anxiety symptoms [20]. The coding and scaling were evident for both the cases. The detail list of questions and scaling used in PHQ-9 and GAD-7 questionnaires were tabulated in Table 1.

Table 1: PHQ-9 and GAD-7 questionnaire with their classifications

Question number	PHQ-9 questions		GAD-7 Questions
01	Little interest or pleasure in doing things	01	Feeling nervous, anxious, or on edge
02	Feeling down, depressed, or hopeless	02	Not being able to stop or control worrying
03	Trouble falling or staying asleep, or sleeping too much	03	Worrying too much about different things
04	Feeling tired or having little energy	04	Trouble relaxing
05	Poor appetite or overeating	05	Being so restless that it is hard to sit still
06	Feeling bad about yourself - or that you are a failure or have let yourself or your family down	06	Becoming easily annoyed or irritable
07	Trouble concentrating on things, such as reading the newspaper or watching television	07	Feeling afraid, as if something awful might happen
08	Moving or speaking so slowly that other people could have noticed		
09	Thoughts that you would be better off dead, or of hurting yourself		

PHQ-9 and GAD-7 classification: “Absence of Depression/Anxiety Symptoms<10” and “Presence of Depression/Anxiety Symptoms≥10”. PHQ: Patient Health Questionnaire, GAD: Generalized anxiety disorder.

Reliability and validity of the data were ensured using a number of techniques: (1) Apply SPSS 23.0 in data analysis; (2) explore descriptive statistics; (3) reliability analyses of the variables used in calculating student’s depression and anxiety (Cronbach’s alpha, the reliability coefficient values for the variables used in depression and anxiety were found 0.77 and 0.84, respectively) and (4) use of two statistical techniques, namely Chi-square test and logistic regression [21], [22], [23].

Statistical analysis

To discover the respondent’s sociodemographic characteristics, frequency distribution were used and depression/anxiety status were summarized through bar diagram. Chi-square test was used as the univariate analysis to determine the joint frequency as well as association of “depression” and “anxiety” with socio-demographic characteristics. Student’s t-test were performed to check the significant difference of depression and anxiety according to between two period (panic versus post-panic period); male-female and urban-rural [21]. Unadjusted and adjusted odds ratio (OR) were observed [21], [22] using logistic regression analysis to identify the factors of depression and anxiety of the university students. To do this, the dependent variables (anxiety and depression) were categorized into two categories, that is, absence of depression/anxiety symptoms (depression/anxiety score <10) and presence of depression/anxiety symptoms (depression/anxiety score ≥10). All the statistical analysis was performed using SPSS (version-23).

Results

Sociodemographic information of different selected variables of the university students in Bangladesh was presented in Table 2. All most two-third (65.9%) of the students who participated in panic period were 22–26 years old whereas this percentage was 54.7% in post-panic period. Male students were more participated in the study in both panic and pre-panic periods (Male: 62.4% and 54.7%). In the panic period, rural students responded more (52.9%), while in the post-panic period, 57.1% of students were from urban areas. In panic period, 60.0% students were from middle- and upper-class family where this percentage was 67.1% in post-panic period. In both periods, the majority family head’s occupation was service, and the maximum number of earning members was one (Table 2).

Table 2: Demographic profile of the students during COVID-19 panic and post-panic period (n = 170 for both panic and post-panic period)

Characteristics	Time	
	Panic period, n (%)	Post-panic period, n (%)
Age		
17–21 years	58 (34.1)	77 (45.3)
22–26 years	112 (65.9)	93 (54.7)
Gender		
Male	106 (62.4)	93 (54.7)
Female	64 (37.6)	77 (45.3)
Family types		
Nuclear	90 (52.9)	86 (50.6)
Joint/Extended	80 (47.1)	84 (48.2)
Place of residence		
Rural	90 (52.9)	73 (42.9)
Urban	80 (47.1)	97 (57.1)
Family economic condition		
Lower class	14 (8.2)	8 (4.7)
Lower middle class	54 (31.8)	48 (28.2)
Middle and upper class	102 (60.0)	114 (67.1)
Family head’s occupation		
Unemployed	20 (12.3)	22 (13.8)
Agriculture/Labor	44 (27.0)	28 (17.6)
Business	35 (21.5)	37 (23.3)
Service	64 (39.3)	72 (45.3)
Family earning members		
None	2 (1.2)	2 (1.2)
One	124 (72.9)	119 (70.0)
Two and more	44 (25.9)	49 (28.8)

Level of depression and anxiety symptoms during panic and post-panic periods

Figure 2 represent the prevalence of depression and anxiety symptoms during panic and post-panic periods. In panic period, the proportion of depression symptoms was 49.4% where the proportion increased to 52.4% in the post-panic period. In case of anxiety symptoms, 38.2% students were experienced

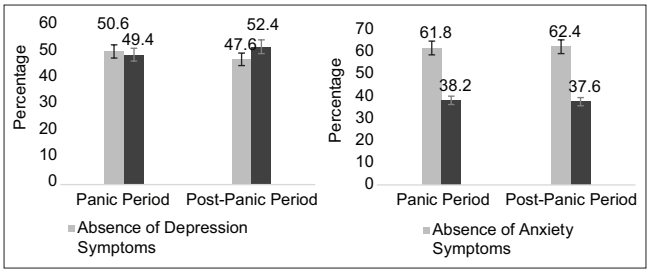

Figure 2: Depression and anxiety symptoms distribution during panic and post-panic periods

in anxiety symptoms during panic period where this proportion was almost similar in the post-panic period (Figure 2).

Test of significance of depression and anxiety

The significant difference of depression and anxiety between the two time periods (panic versus post-panic period) was examined through Student's t-test. We also showed the depression and anxiety difference according to respondent's gender and place of residence (Table 3). We found that the student's reported higher depression in post-panic period compared to panic period at 7% level of significant. Similarly, urban students were also experiencing significantly more depression and anxiety symptoms than their counterparts. Female students significantly reported more anxiety symptoms than the male ($p<0.01$).

Table 3: Test of significance of the depression and anxiety symptoms among university students

Variables	Depression		Anxiety	
	Mean(± SD)	p-value	Mean(± SD)	p-value
Period				
Panic period	9.50 (5.10)	0.070	8.38 (5.31)	0.740
Post-panic period	10.60 (5.80)		8.58 (5.06)	
Gender				
Male	9.65 (5.53)	0.160	7.76 (5.16)	0.002
Female	10.50 (5.37)		9.49 (5.05)	
Place of residence				
Rural	9.05 (5.11)	0.020	7.36 (4.68)	0.0001
Urban	10.89 (5.66)		9.51 (5.41)	

Risk factors associated with depression and anxiety

The Chi-square association test revealed that there was a significant relationship between student's depression and family types such that students with joint family (53.8%) reported higher level of depression ($p < 0.05$). Students from urban areas (58.4%) had a significant association with depression ($p < 0.05$) whereas age, gender, education, family head's occupation and family economic condition found no significant association with depression. Gender, on the other hand, had an association with anxiety ($p < 0.01$). The students, from urban area were reported significantly more ($p < 0.01$) anxiety symptoms than the rural students (Table 4).

Degree of risk factors of student's depression and anxiety symptoms

Table 5 shows the risk factors associated with student's depression and anxiety symptoms. Students aged 22–26 years were reported 1.52 times (95% CI: 0.82–2.78) more likely to be depressed and 1.43 times (95% CI: 0.76–2.69) more likely to experience anxiety symptoms than students aged 17–21 years. The female students were reported less likely to be depressed than male students (OR: 0.89; 95% CI: 0.54–2.78). The students who were from joint family (OR: 1.75; 95% CI: 1.08–2.82), lived in urban area (OR: 1.99; 95% CI: 1.71–3.38), and came from lower middle-class families (OR: 1.26; 95% CI: 0.46–3.47) and whose family head was farmer or laborer (OR: 1.30; 95% CI:.56–3.07) were stated more likely to be depressed than their counterparts. Students in the post-panic period were stated 1.10 times (95% CI: 0.74–1.87) more likely to be depressed than those of the panic period. On the other hand, students from a joint family (OR: 1.82; 95% CI: 1.09–3.02) and living in an urban area (OR: 2.18; 95% CI: 1.24–3.83) were reported more likely to be experienced in anxiety symptoms than their counterparts (Table 5).

Discussion

In this study, we aimed to assess the university student's psycho-emotional changes through investigating their level of depression and anxiety effects during panic (April–July, 2020) and post-panic (August–November, 2020) periods of COVID-19 pandemic in Bangladesh. During both periods, we found that university students had a higher percentage of depression and anxiety symptoms. This high percentage of symptoms is comparable to some other studies conducted in Bangladesh [8], [9], [12].

Many studies from various countries also have assessed depression among the university students. For example, Rizvi and the authors reported 40.9% prevalence of depression among the students of Pakistan [24]. The other reported prevalence of depression were 37% in Malaysia, 43.7% in India, 68.5% in Hong Kong; 27.1% in Turkey, nearly fifty percent in Saudi Arabia, more than three quarter in Egypt, more than one fifth present in the USA and Australia [25], [26], [27], [28], [29], [30], [31], [32]. The anxiety rates were reported fifty percent in Turkey and Hong Kong, more than a quarter in USA and Australia, and more or near about three quarter in Pakistan, India, Saudi Arabia, Egypt and Malaysia [25], [26], [27], [28], [29], [30], [31], [32].

However, the students in post-panic period were experiencing comparatively higher depression symptoms than the panic period which is a significance

Table 4: Association between depressions, anxiety with different sociodemographic factors

Variables	Absence of depression	Presence of depression	p-value	Absence of anxiety	Presence of anxiety	p-value
Age						
17–21 years	69 (41.3)	66 (38.2)	p = 0.551	84 (39.8)	51 (39.5)	p = 0.960
22–26 years	98 (58.7)	107 (61.8)		127 (60.2)	78 (60.5)	
Gender						
Male	99 (59.3)	100 (57.8)	p = 0.782	137 (64.9)	62 (48.1)	p = 0.002
Female	68 (40.7)	73 (42.2)		74 (35.1)	67 (51.9)	
Family types						
Nuclear	96 (57.5)	80 (46.2)	p = 0.038	116 (55.0)	60 (46.5)	p = 0.130
Joint/Extended	71 (42.5)	93 (53.8)		95 (45.0)	69 (53.9)	
Place of residence						
Rural	91 (54.5)	72 (41.6)	p = 0.018	118 (55.9)	45 (34.9)	p = 0.001
Urban	76 (45.5)	101 (58.4)		93 (44.1)	84 (65.1)	
Family economic condition						
Lower class	11 (6.4)	11 (6.6)	p = 0.884	13 (6.2)	9 (7.0)	p = 0.949
Lower middle class	48 (28.7)	54 (31.2)		63 (29.9)	39 (30.9)	
Middle and upper class	108 (64.7)	108 (62.4)		135 (64.0)	81 (62.8)	
Time period						
Panic period	86 (51.5)	84 (48.6)	p = 0.588	105 (49.8)	65 (55.4)	p = 0.900
Post-panic period	81 (48.5)	89 (51.4)		106 (50.2)	64 (49.6)	
Family head's occupation						
Unemployed	20 (12.5)	22 (13.6)	p = 0.860	26 (12.9)	16 (13.2)	p = 0.174
Agriculture/Labor works	35 (21.9)	37 (22.8)		52 (25.9)	20 (16.5)	
Business	39 (24.4)	33 (20.4)		46 (22.9)	26 (21.5)	
Service	66 (41.3)	70 (43.2)		77 (38.3)	59 (48.8)	

finding of our study. During the panic period, students were stay with their families and did not feel so much stressed because they believed that this situation was temporary and would be over soon. However, when the situation lasted longer, in post-panic period, many students' families faced financial difficulties due to job loss or lack of income, which had an indirect effect on students' mental health. Furthermore, many students manage their study costs through their own income such as giving tuition in normal situation, but due to the COVID-19 situation, almost all students staying with their family and have no income opportunity. As a result, students became more depressed and anxious during the post-panic period [33], [34].

Our study found that older students were more likely to be depressed and anxious than their counterparts which is very comparable to other studies [8], [9]. A study conducted on Malaysian university students reported that older students were significantly more vulnerable to the risk of both depression and anxiety symptoms [26]. Getting a secure job in developing country is more competitive due to the limited job sectors. Generally, older students have a higher tendency of getting jobs and they prepare himself for competitive job exams from 3rd or 4th years of their university life. The coronavirus pandemic is a big barrier of this issue because competitive job exams were postponed due to rapid spread of the virus. Moreover, many students had not taken part in the competitive job exams due to long time lockdown. In addition, the maximum age allowed for joining government jobs sectors in Bangladesh is 30 years, so the students are depressed and anxious about this issue as the countrywide long-time lockdown hampers them in joining the jobs. At the end of 2020 (post-panic period), the university students strike in several times for continuing incomplete exams as well as all academic activities so that they can apply for competitive job exams. Although the spread of COVID-19 infection is increasing, the students continued protests over deferred exams reported by a famous Bangladeshi newspaper Bangla Tribune [35]. These may be another important factor for increasing the risk of depression and anxiety symptoms during post-panic period.

Moreover, female students found more anxious than the male and the result is comparable to other studies

Table 5: Degree of risk factors associated with student's depression and anxiety symptoms

Variables	Depression		Anxiety	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age				
17–21 years				
22–26 years	1.14 (0.74–1.76)	1.52 (0.82–2.78)	1.01 (0.65–1.58)	1.43 (0.76–2.69)
Gender				
Male				
Female	1.06 (0.69–1.63)	0.89 (0.54–1.47)	2.01 (1.28–3.13)	1.84 (1.09–3.10)
Family types				
Nuclear				
Joint/Extended	1.57 (1.02–2.41)	1.75 (1.08–2.82)	1.40 (0.91–2.18)	1.82 (1.09–3.02)
Place of residence				
Rural				
Urban	1.68 (1.09–2.58)	1.99 (1.17–3.38)	2.37 (1.51–3.73)	2.18 (1.24–3.83)
Family economic condition				
Lower class				
Lower middle class	1.13 (0.45–2.83)	1.26 (0.46–3.47)	0.89 (0.35–2.29)	0.71 (0.24–2.06)
Middle and upper class	1.00 (0.42–2.40)	1.17 (0.42–3.32)	0.87 (0.56–2.12)	0.51 (0.17–1.55)
Time period				
Panic period				
Post–panic period	1.13 (0.74–1.72)	1.10 (0.74–1.87)	0.98 (0.63–1.51)	0.94 (0.57–1.54)

[9], [12], [14]. A study conducted by Shovo, remarked that female university students are more likely to suffer by depression and less prone to anxiety than male students [14]. However, the causes behind this outcome are still unknown. In addition, we also found urban students experiencing more depression and anxiety symptoms than the rural students which are comparable to other studies conducted among university student [8], [9], [14], [36], [37], [38]. This may be the fact that student's self-consciousness about their career life [39]. In general, urban students are more conscious about their academic and job career life which resulted depression [40], [41].

One of the major limitation of this study is that the cross-sectional study was conducted using a Google-based questionnaire which may affect in the representativeness of our findings. A nationally representative longitudinal study would help to overcome the limitations, but it is time expensive, consuming and quite difficult to undertake in Bangladeshi context. The study found post-panic period as the vulnerable to university student's depression symptoms at 7% level of significant. The results could be more significant if there is possible to conduct the study with a sufficiently large sample size. To assess the student's depression and anxiety, we used two famous questionnaire tools (PHQ-9 and GAD-7) that are mostly psychological. However, there have also many other pandemic related factors that are responsible for depression and anxiety of the university students of Bangladesh.

Conclusions

Our study shows that university students experienced a higher degree of depression and anxiety symptoms during both panic and post-panic periods. Although the prevalence in each period was not statistically significant at 5% level, university students in Bangladesh were concerned because it interfered with their academic life. The government of Bangladesh and university authorities should move quickly to open all universities and public service commissions for taking incomplete exams and academic activities while adhering to health regulations. The government, university authorities, and parents should be encouraged to create a friendly academic environment for university students without imposing pressure on their future academic and working careers by providing pandemic response and recovery supports.

Ethical Consent

Formal approval (registration: MBSTU/EC/2020/07) of this study was taken from the Department of Statistics, Mawlana Bhashani Science and Technology University, Santosh, Tangail-1902, Bangladesh. In accordance with the standards of Helsinki Declaration and its corresponding modifications or similar ethical principles, this study was carried out. The data were collected using an online survey where the informed consent was obtained from each of the students before starting the survey. Respondents then expressed their consent, after reading the aforementioned, to take part in the study by clicking either "Yes" or "No." Those who did not consent, by clicking "No" were not included the study.

Availability of Data and Materials

The data used to support the findings in this study are available from the corresponding author on reasonable request to meshbah037@gmail.com.

Author's Contribution

MMR, GKP and SN designed the concept of the study. MMR fixed the study design. MMR, MHC and MJU supervised the study. MMR, GKP tabulated and drafted the manuscript. MMR, MHC, SN and MJU edited and checked the draft for important intellectual context. All authors helped for finalizing the version to be submitted.

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