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Prevalence and associated risk factors for mental health problems among female university students during COVID-19 pandemic: A cross-sectional study findings from Dhaka, Bangladesh

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ABSTRACT

The COVID-19 pandemic has tremendously affected the physical and mental health of people at all levels worldwide. The present study aimed to evaluate the prevalence and contributing factors for mental health problems among female university students in the urban area of Bangladesh. We conducted this online cross-sectional study among 451 female university students. Here we assessed the symptomatic prevalence of common mental health problems among the participants. The prevalence rate of loneliness, anxiety, and depressive symptoms among female university students in Bangladesh was 55.88%, 69.18%, and 45.23%, respectively. Also, we noticed that mild, moderate, and severe symptoms of loneliness, generalized anxiety, and depression were 36.90%, 40.48%, and 22.62%; 48.08%, 22.44%, and 29.48%; and 37.31%, 26.87%, and 35.52%; respectively. According to the present study results, marital status, financial condition, education level, and family structure (nuclear/joint) are potential contributing factors to mental health problems among female university students living in Dhaka, Bangladesh. The COVID-19 pandemic has severely impacted the academic performance and emotional well-being of students in Bangladesh. Also, the closure of university classes for a long time in Bangladesh was responsible for the poor mental health of students. Promoting good mental health has become a vital public health concern during this ongoing COVID-19 pandemic. Female university students residing in urban areas in Bangladesh are more prone to developing mental health problems during any crisis. Therefore, the healthcare authorities of Bangladesh should promote the good mental health of students during and after the ongoing COVID-19 pandemic. Keeping in touch with students to support them psychologically and mentally during the pandemic is crucial for promoting their good mental health.

1. Introduction

The world is in a critical state of disarray as COVID-19 has spread to every corner threatening the health and well-being of people [1, 2, 3]. The initial pandemic crisis had a tremendous impact on the physical and mental health, economy, and social and personal life of people across the world [4, 5, 6, 7, 8]. Disease outbreaks are responsible for causing several mental illnesses among people worldwide. Many earlier studies reported the negative psychological consequences due to the COVID-19 pandemic [9, 10, 11, 12]. The impacts of the COVID-19 pandemic on mental health are enormous, and the possible reasons are social isolation and fear of infection [10, 13]. The unusual lockdown and its consequences due to the COVID-19 pandemic have imposed additional pressure on the mental health of students which influences the risk of developing the mental disorder [14, 15, 16, 17].

Generalized anxiety disorder is a mental illness that refers to excessive fear and worries about the daily staff [18]. In addition, major depressive disorder is another devastating mental illness that significantly reduces a patient's mood, self-esteem, and interest in daily activities [19, 20]. Several factors such as biological, genetic, environmental, stressful life events, and physical conditions are involved in the pathophysiology and development of these mental disorders [21, 22, 23]. The prevalence of anxiety, depression, loneliness, and sleep problems has significantly increased due to the ongoing

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COVID-19 pandemic [9, 11, 24]. Poor mental health significantly reduces the quality of life, hampers daily functioning, and develops other physical complications [15, 25, 26]. Also, the pandemic crisis has tremendously impacted the health and well-being of students due to the altered teaching and learning approaches and discontinuation of classroom teaching [27, 28, 29]. Because students are more vulnerable, and any disturbance throughout the study period has far-reaching long-term implications [30]. Therefore, healthcare authorities and policymakers are concerned about the mental health of people during this ongoing COVID-19 pandemic. The high prevalence of anxiety, fear, stress, and depressive symptoms among the students might be due to the disruption created by the COVID-19 pandemic in their academic life. This sudden disruption has a long-term effect on their future career, health, and personal life. Moreover, female students in Bangladesh might have higher mental stress than male students during this COVID-19 pandemic due to various socio-cultural factors [31, 32, 33].

In Bangladesh, mental health is still a profoundly less important and stigmatized issue among the general population [34]. University students are among the most vulnerable to developing symptoms of mental health disorders due to their academic pressure and uncertainty about their future careers [27, 35]. Even before the COVID-19 pandemic, university students reported mental health problems at significant rates in Bangladesh [15]. The usage of alcohol to cope with mental stress during university life reflects the poor mental health of students. The pandemic has aggravated the psychological problems of students in Bangladesh since they frequently suffer from multiple issues [12, 36, 37]. Therefore, the ongoing public health crisis due to the COVID-19 pandemic has severely impacted academic careers and social and economic lives worldwide [38]. In early 2020the government decided to close all educational institutions to prevent the spreading of coronavirus in Bangladesh [39, 40]. Even though the authority introduced and promoted online education in Bangladesh at the early stage of the COVID-19 pandemic. However, most students faced problems connecting to the class due to weak internet connection, high internet costs, and a lack of proper devices [41]. Therefore, many university students have suffered from session jam phobia, discrimination in e-learning, and subsequent mental problems due to the lockdown and COVID-19 measures [30]. A study reported the prevalence of depression, mental stress, and anxiety among university students was 58.80%, 57.50%, and 30.30%, respectively, at the early stage of the COVID-19 pandemic in Bangladesh [42]. Another survey reported that the depressive and anxiety symptoms were 15% and 18% among university students in Bangladesh during the COVID-19 pandemic [43].

Any disease outbreak has a detrimental impact on mental health and increases self-reported loneliness among the general population. However, females are at a higher risk of developing loneliness, anxiety, and depression during any crisis [44, 45, 46, 47, 48, 49]. In Bangladesh, the psychological health of female university students depends on social, cultural, environmental, and lifestyle-related factors. The thought of 'being female,' 'poor financial condition,' 'insecure future,' and 'tension about career' could negatively affect the mental health of female university students [30]. The impact of COVID-19 has worsened the mental health of female students by aggravating the previous situation. The long-time closure of academic institutions has made students more prone to develop mental illness in Bangladesh [50]. The burden of getting married as early as possible might ignite such pressure as the culture and norms of Bangladesh support the practice of early marriage of females [43, 51]. Many students do part-time jobs or private tutoring to pay their tuition fees and support families. The ongoing COVID-19 pandemic has significantly hampered private tuition resulting in a loss of regular earnings for many students. Long-term unemployment and financial uncertainty would be the most prominent factors leading to the rising prevalence of mental illnesses such as depression and anxiety among Bangladeshi university students [43, 52]. Mental illness and suicidality were more profound among female students than males during the COVID-19 pandemic [53]. In short, the consequences of the COVID-19 pandemic, long-term university closure, and socio-economic factors would be responsible for the poor mental health of female university students in Bangladesh.

As the ongoing pandemic has affected the health and well-being of students in many ways, we aimed to investigate the associated factors causing mental illness of female university students residing in the urban area of Bangladesh. The present findings can help healthcare policymakers and practitioners to identify the reasons for poor mental health and design the policy and guidelines for the good mental well-being of students in Bangladesh.

2. Methods

2.1. Study description and subjects

This online survey was conducted between October 15, 2021, and January 15, 2022. We calculated the sample size for the present study assuming the response rate, confidence interval, and error margin as 50%, 95%, and 5%, respectively. Based on our assumption, the present study needed 384 replies to reach at least 80% statistical power. Initially, we received responses from a total of 481 students; we discarded 30 after going through all due to incomplete or wrong information. Finally, we included 451 complete responses in the statistical analysis. We obtained electronic consent from each participant at the beginning of the study to confirm that all the participants can adhere to the purpose of the study, eligibility requirements, and the study process. We invited only Bangladeshi female university students from Dhaka, Bangladesh, to participate in this study. Subjects with a confirmed mental disorder diagnosed by a physician were advised not to participate in this study. We mentioned all this information in the electronic authorization form. Participation in this study was voluntary, and we did not make any payment for this study.

2.2. Estimations

We aimed to estimate the associations between the sociodemographic variables and the symptoms of mental health problems among the participants. Also, we assessed the severity of loneliness, anxiety, and depressive symptoms using mental health assessment methods. To collect the necessary data, we used structured questionnaires. Questionnaires were initially drafted in English and then translated into Bangla. We deployed two Bangla native speakers having fluency in English (one medical science graduate and one non-medical graduate). They converted the questionnaires from the initial English version into two different Bangla versions. An independent author compiled these Bangla versions to generate a single Bangla forward version. This single Bangla version was again converted into English by two different professional translators who are competent in medical translation. An independent author of this article combined these versions to make a single English version [54]. Then, we performed pilot research among a randomly selected small number of participants to ensure the readability and understandability of the survey questions. We supplied both versions (Bangla and English) of the survey questionnaire for better understanding and clarity by the participants.

2.3. Procedure of data collection

We used Google Forms to collect the responses. We provided a survey link via e-mail, messenger, and other social media means to the potential participants. The link contained a self-administered questionnaire regarding mental health and socio-demographic profile. Also, we provided support to the respondents via video or phone calls to address any issues regarding the understanding and clarity of the survey questions.

2.4. Demographic profile of participants

We collated the relevant demographic information of the study participants. Collected data were regarding marital status, family economic impression, family type, education status, etc.

2.5. Assessment of depressive disorder

We applied the PHQ-9 to evaluate the symptoms of depression among the participants. PHQ-9 is a widely used and renowned questionnaire with nine separate items to assess depressive symptoms [9, 11, 55, 56]. The total score for this self-reported questionnaire is 0–27. A score between zero and three is possible for each question ("zero = not at all; one = several days; two = more than a week; three = nearly every day"). The overall score is divided into four individual portions to represent the severity of depressive symptoms: "mild depressive symptoms" if the score is nine or less; "moderate depressive symptoms" if the score falls between 10 and 14; "moderately severe depressive symptoms" if the score is between 15 and 19; and "severe depressive symptoms" if the score is equal or greater than 20 [57, 58, 59].

2.6. Assessment of anxiety disorder

We used the GAD-7 scale to assess anxiety symptoms among the participants. This scale includes seven questions for the evaluation of anxiety symptoms. Respondents can choose one option from four scores ranging from zero to three to respond to each question, where zero means "Not at all"; one means "Several days"; two means "more than half the days"; and three means "Nearly every day". The overall GAD-7 score runs from 0–27, with each section suggesting a distinct level of anxiety (four or below scores indicate normal, a score of five to nine indicates a mild level of anxiety, 10–14 scores specify the moderate level of anxiety, and 15 or above scores designate severe anxiety level) [60].

2.7. Assessment of loneliness

We applied the UCLA loneliness scale to assess the symptoms of loneliness among respondents. It has 20 questions, and each question has the phrase "How often do you feel" at the beginning. Among them, 11 negatively and nine positively phrased questions. The participants can respond to each question under four options, "Never", "Rarely", "Sometimes", and "Always" with scores one, two, three, and four, respectively. The UCLA scale calculates reverse scores for nine positively phrased questions. The total score of 20 questions indicates loneliness symptoms. The higher scores indicate higher levels of loneliness symptoms and vice versa [61].

2.8. Data processing and analysis

We performed the data processing and analysis with the help of IBM SPSS (v. 25.0). We used descriptive statistical analyses to assess the characteristics and variations among the participants. We also compared the distribution of responses between groups using bar graphs according to the severity of symptoms. We considered a statistically significant p-value of 0.05.

3. Results

3.1. General description of study participants

We presented the demographics of the study participants in Table 1. Among 451 female students, most of them (92.68%) were unmarried.

Table 1. Distribution of socio-demographic variables and their association with mental health problems among the female university students in Dhaka City.

Characteristics	Total (N = 451)		Loneliness (N = 252)					Generalized anxiety disorder (N = 312)					Depressive disorder (N = 204)				
	n	%	n	%	χ2	df	p-value	n	%	χ2	df	p-value	n	%	χ2	df	p-value
Marital status																	
Unmarried	418	92.68	234	55.98	642.036	4	<0.001	290	69.38	642.150	4	<0.001	190	45.45	642.161	4	<0.001
Married	33	7.32	18	54.55				22	66.67				14	42.42			
Studying in																	
Undergraduate level	134	29.71	79	58.95	643.044	4	<0.001	95	70.89	642.375	4	<0.001	65	48.51	643.175	4	<0.001
Graduate level	317	70.29	173	54.57				217	68.45				139	37.47			
Family income (KBDT)																	
Up to 40	190	42.13	107	56.31	643.132	6	<0.001	132	69.47	648.196	6	<0.001	91	47.89	655.768	6	<0.001
41–100	205	45.45	111	54.15				135	65.85				79	38.54			
Above 100	56	12.42	34	60.71				45	80.35				34	60.71			
Economic impression																	
High	56	12.42	34	60.71	643.136	8	<0.001	45	80.36	649.720	8	<0.001	34	60.71	655.960	8	<0.001
Medium	205	45.45	111	54.15				135	65.85				79	38.54			
Low	190	42.13	107	56.31				132	69.47				91	47.89			
Family type																	
Nuclear family	372	82.48	207	55.64	642.065	4	<0.001	253	68.01	643.937	4	<0.001	164	44.09	643.605	4	<0.001
Joint family	79	17.52	45	56.96				59	74.68				40	19.90			
Loneliness																	
Yes	252	55.88	252	100	-	-	-	216	85.71	746.246	4	<0.001	154	61.11	724.740	4	<0.001
No	199	44.12	0	0				96	48.24				50	25.12			
Generalized anxiety disorder																	
Yes	312	69.18	216	69.23	746.246	4	<0.001	312	100	-	-	-	194	62.18	809.059	4	<0.001
No	139	30.82	36	25.89				0	0				10	7.19			
Depressive disorder																	
Yes	204	45.23	154	75.49	724.740	4	<0.001	194	95.01	809.059	4	<0.001	204	100	-	-	-
No	247	54.77	98	39.68				118	47.77				0	0			

p-values are significant at 95% confidence interval ($p < 0.05$). KBDT, kilo Bangladeshi taka; N, number.

The majority of respondents were graduates (70.29%) and living in a nuclear family (82.48%). Only 12.42% of participants had higher economic backgrounds, while 45.45% and 42.13% of respondents were from medium and low economic backgrounds, respectively.

3.2. Psychometric parameters

We noticed the prevalence of self-reported loneliness, anxiety, and depressive symptoms were 55.88%, 69.18%, and 45.23% among the participants (Figure 1 and Table 1). Moreover, 33.48% of respondents reported the symptoms of all three mental health disorders. We observed the symptoms of more than one mental health disorder among most participants. We have noticed that loneliness, anxiety, and depressive symptoms were associated with various socio-demographic variables. The higher prevalence of loneliness symptoms n (i) unmarried vs. married (92.86% vs. 7.14%, $p < 0.001$), (ii) individuals at graduation levels vs. undergraduate levels (68.65% vs. 31.35%, $p < 0.001$), (iii) medium vs. high economic background (44.05% vs. 13.49%, $p < 0.001$), (iv) staying with a nuclear family vs. staying with joint family (82.14% vs. 17.86%, $p < 0.001$). Also, the higher chances of having anxiety symptoms in (i) unmarried vs. married (92.95% vs. 7.05%, $p < 0.001$), (ii) individuals at graduation levels vs. undergraduate levels (69.55% vs. 30.45%, $p < 0.001$), (iii) medium vs. high economic background (43.27% vs. 14.42%, $p < 0.001$), (iv) staying with a nuclear family vs. staying with a joint family (81.09% vs. 18.91%, $p < 0.001$). Similarly, depressive symptoms were higher in (i) unmarried vs. married (94.53% vs. 5.47%, $p < 0.001$), (ii) individuals at graduation levels vs. undergraduate levels (69.15% vs. 32.34%, $p < 0.001$), (iii) low vs. high economic background (45.27% vs. 16.92%, $p < 0.001$), (iv) staying with a nuclear family versus staying with joint family (81.59% vs. 19.90%, $p < 0.001$).

3.3. Binary logistic regression analysis

We measured the correlations among different parameters by applying the binary logistic regression method (Table 2). The likelihood of having loneliness was 4.08 times higher among those who reported anxiety symptoms (OR = 4.08, 95% CI 2.467–6.749, $p < 0.001$) and 2.51 times higher among the participants who reported depressive symptoms (OR = 2.51, 95% CI 1.635–4.167, $p < 0.001$). Similarly, respondents who have loneliness symptoms were 4.13 times more prone to have anxiety symptoms (OR = 4.13, 95% CI 2.492–6.856, $p < 0.001$), and respondents who have depressive symptoms were 15.38 times more likely to have anxiety symptoms (OR = 15.38, 95% CI 7.594–30.929, $p < 0.001$). Also, respondents who have loneliness symptoms were 2.55 times more prone to have depressive symptoms (OR = 2.55, 95% CI 1.596–4.075, $p < 0.001$), and respondents who have anxiety symptoms were 15.15 times more chances to have symptoms of depression (OR = 15.15, 95% CI 7.511–30.639, $p < 0.001$).

4. Discussion

The COVID-19 pandemic is the most catastrophic and complex public-health disaster since the 21st century [62, 63, 64]. Besides the rising incidence of mortality, countries worldwide are experiencing an increased prevalence of severe psychological disorders, such as sleep problems, anxiety, and depression among the general population [55]. Bangladeshi university students are not an exception since government authorities had closed all the educational institutions for a longer period to curb the spread of coronavirus during the ongoing COVID-19 pandemic [65]. This long-term closure has affected their mental health due to insecure academic and professional careers [30, 66]. Also, the COVID-19 pandemic responses have significantly impacted their daily life, health, and well-being. In addition, students are more prone to experience psychological effects from home quarantine, maintaining social distance, and other COVID-19-related limitations [67, 68]. A previous study reported that more than half of the respondents experienced depression and mental stress and one-third reported anxiety symptoms during the early stage of the COVID-19 pandemic in Bangladesh [42]. Moreover, a recent study revealed that female students are at higher risk of experiencing depression, anxiety, and loneliness during the COVID-19 pandemic [38]. Thus, the COVID-19 pandemic and subsequent academic disturbances negatively affected the mental health of female university students.

This study assessed the symptoms of loneliness, anxiety, and depression among female university students in Dhaka city, Bangladesh. According to our findings, marital status, education level, socioeconomic background, and family type may have a role in developing mental health problems among female students. Also, we observed a relationship between the education level and the severity of symptoms of mental illness. The respondents who have completed graduation reported more symptoms of loneliness, anxiety, and depression than others. Among respondents, 68.65% and 69.55% of students in post-graduation levels were struggling with loneliness and anxiety symptoms. About 69.15% of female students reported depressive symptoms. In addition, we have seen an association between the financial condition and mental health

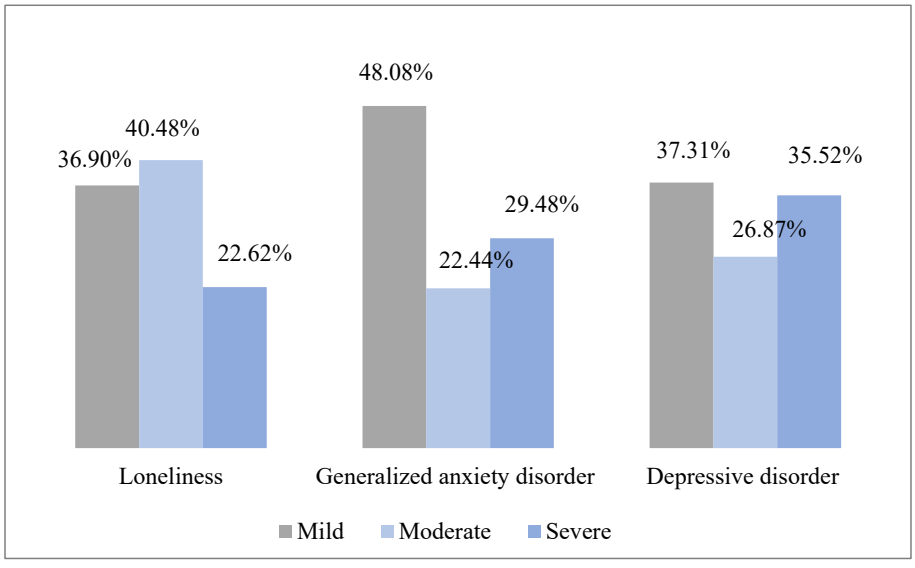

Figure 1. Distribution of the severity of mental health problems among the female university students in Dhaka City.

Table 2. Regression analysis of socio-demographic variables by mental health problems of female university students in Dhaka City.

Characteristics	Loneliness (N = 252)				Generalized anxiety disorder (N = 312)				Depressive disorder (N = 204)			
	OR	Df	95% CI	p-value	OR	df	95% CI	p-value	OR	df	95% CI	p-value
Marital status												
Unmarried	1.047	1	0.425–2.145	0.911	0.865	1	0.447–2.988	0.765	0.895	1	0.461–2.707	0.806
Married	1				1				1			
Studying in												
Undergraduate level	0.870	1	0.725–1.822	0.555	1.035	1	0.554–1.685	0.903	0.835	1	0.729–1.964	0.477
Graduate level	1				1				1			
Economic impression												
High	1.101	1	0.537–1.537	1.537	0.777	1	0.699–2.369		0.814	1	0.699–2.155	0.475
Medium	0.915	1	0.553–2.160	0.798	1.501	1	0.272–1.632	0.374	1.541	1	0.310–1.360	0.252
Low	1				1				1			
Family type												
Nuclear family	0.879	1	0.652–1.983	0.650	1.475	1	0.340–1.351	0.269	1.230	1	0.451–1.464	0.490
Joint family	1				1				1			
Loneliness												
Yes	-	-	-	-	4.13	1	2.492–6.856	<0.001	2.55	1	1.596–4.075	<0.001
No	-				1				1			
Generalized anxiety disorder												
Yes	4.08	1	2.467–6.749	<0.001	-	-	-	-	15.15	1	7.511–30.639	<0.001
No	1				-				1			
Depressive disorder												
Yes	2.51	1	1.635–4.167	<0.001	15.38	1	7.594–30.929	<0.001	-	-	-	-
No	1				1				-			

P-values are significant at 95% confidence interval ($p < 0.05$). CI, confidence interval; df, degree of freedom; N, number; OR, odds ratio.

problems. We found that respondents with medium economic impressions were more prone to have loneliness (44.05%) and anxiety symptoms (43.27%). However, students with low economic backgrounds were more likely to have the symptoms of depression (45.27%). According to our findings, more than 90% of unmarried female university students struggled with such mental problems. Respondents who live in a nuclear family or joint family went through loneliness, anxiety, and depressive symptoms. More than 80% of respondents were from nuclear families who experienced mental health problems.

The chances of having mental health problems were greater for university students during any pandemic crisis. Few studies have assessed the mental health-related issues of female university students. According to published articles, mental health problems were more with female students than males [48, 69, 70]. Moreover, graduate students showed higher levels of mental health problems than others [71]. Another study reported that female undergraduate students are more susceptible to developing mental health problems during the COVID-19 pandemic [72]. At the beginning of the pandemic, researchers observed a high prevalence and severity of mental health problems in female students than in others [73]. These findings might suggest a correlation between mental health problems and the sociodemographic profiles of participants.

It is the first-ever study in Bangladesh to investigate the mental health of female students amid the COVID-19 pandemic. We discovered that various sociodemographic characteristics, such as education level, sex, economic background, marital status, family, etc., play a direct role in mental health problems among female students in Bangladesh.

5. Limitations and strong points

The present study and its design have a few limitations. The self-reported survey using Google forms may induce some biases. Furthermore, we had to exclude students without internet connection from this study. The face-to-face interviews with the students might have different reflections on the present hypothesis. Moreover, we only included university students from Dhaka city, Bangladesh. Also, the present study has some strengths. Firstly, the current study assessed three important psychological estimations (loneliness, anxiety, and depressive symptoms) of female university students in Bangladesh. The Google forms allow to include participants with diverse socioeconomic backgrounds. Furthermore, we used the Bangla version of psychometric scales for better clarification for the participants.

6. Practical implications to the theory and practice

The present findings have several implications for the theory, policy, and practice. We observed a specific association between psychosocial factors and poor mental health among female university students in Bangladesh during the ongoing COVID-19 pandemic. Primarily, sociodemographic profile and gender inequality in Bangladesh might play a vital role in the development of such mental health illnesses that have worsened by the pandemic crisis. Therefore, healthcare authorities, professionals, and allied bodies can design and develop policies, practices, and guidelines to support mentally disturbed university students. They should pay special attention to overcoming such issues created by unwanted pandemics and their consequences [74, 75]. The healthcare authority can develop policies and guidelines for mental healthcare of students, especially in urban areas where support is badly needed. At the same time, clinical psychiatrists, psychologists, and psychotherapists should consider these issues and design specific intervention plans while dealing with this population.

7. Conclusion

The COVID-19 pandemic has tremendously affected the academic career and emotional well-being of many students. In addition to this pandemic crisis, several other psychosocial factors are associated with the increased prevalence of depression, anxiety, and loneliness during the COVID-19 pandemic for female university students in Bangladesh. Therefore, the health and well-being of students are now the top priority for health policymakers. Moreover, female university students residing in

urban areas are more vulnerable during any pandemic or crisis due to Bangladeshi socio-cultural practices and norms. Therefore, the health-care authorities should pay extra attention to protecting the good mental health of students during and after the ongoing COVID-19 pandemic. Keeping in touch with students during a pandemic is crucial to providing emotional support.

Declarations

Author contribution statement

Zabun Nahar; Md. Sohan; Kaniz Farzana Supti: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Md. Jamal Hossain; Mohammad Shahriar; Mohiuddin Ahmed Bhuiyan: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Md. Rabiul Islam: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

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