



Psychological states of Bangladeshi people and associated factors during the outbreak of COVID-19: A cross-sectional survey

Md. Mahfuz Hossain^a, Kamrul Hsan^{a,b}, Md. Saiful Islam^{a,c,*}, Sujan Kanti Nath^d

^a Department of Public Health and Informatics, Jahangirnagar University, Savar, Dhaka-1342, Bangladesh

^b Humanitarian Response Organization, Dhaka, Bangladesh

^c Centre for Advanced Research Excellence in Public Health, Savar, Dhaka-1342, Bangladesh

^d Department of Dental Public Health, Sapporo Dental College and Hospital, Uttara, Dhaka, Bangladesh

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ABSTRACT

COVID-19 is imposing an extremely serious challenge to individuals' physical and mental health. The enforcement of lockdown, restriction on public gathering, social distancing strategy, and unprecedented quarantine measures has affected many aspects of peoples' lives in Bangladesh with potential consequences on their mental and physical health. This study aimed to assess the psychological states and their related factors among general people in Bangladesh during the COVID-19 outbreak. An e-questionnaire-based cross-sectional survey was conducted among 565 Bangladeshi general people between April and May, 2020. Measures included socio-demographics, chronic disease-related variables, the Self-Rating Depression Scale (SDS), and the Self-Rating Anxiety Scale (SAS). Descriptive analysis and bivariate linear regression with "depression" and "anxiety" as the dependent variables were carried out to identify the factors associated with these. Results showed that 30.1% and 32.6% of participants had mild to extremely severe levels of anxiety and depression, respectively. Females were 2.3 (OR = 2.26; 95% CI = 1.58-3.25, $p < 0.001$) and 2.2 (OR = 2.19; 95% CI = 1.51-3.16, $p < 0.001$) times more likely to have depression and anxiety, respectively compared to males. In contrast, the odds of depression and anxiety were 2.9 (OR = 2.85; 95% CI = 1.66-4.90, $p < 0.001$) and 2.0 (OR = 2.00; 95% CI = 1.20-3.36, $p = 0.008$) times higher, respectively among individuals aged above 40 years than those aged between 18-40 years. The health-care authority should take necessary steps considering the psychological problems of the general people during the health emergency.

1. Introduction

The emergence of the novel coronavirus (SARS-CoV-2) that causes coronavirus disease 2019 (COVID-19) in Wuhan, China, has raised great concern all over the world and is imposing an extremely serious challenge to global public health (Zhang et al., 2020). More than 200 countries are currently struggling with the global pandemic of COVID-19 (Yan et al., 2020). As of July 07, 2020, more than 11.3 million cases of COVID-19 have been confirmed with 532,340 deaths around the world (World Health Organization, 2020). The pandemic is not only causing a serious threat to people's physical health and lives but also creating a wide range of psychological problems, such as panic disorder, anxiety, and depression both for persons with COVID-19 and healthy individuals (Kar et al., 2020; Qiu et al., 2020). Because of the unexpected nature of the outbreak and the virus's contagious patterns, the people would undoubtedly experience anxiety, depression, and other stress reactions (Y. Wang et al., 2020).

On March 08, Bangladesh reported its first three confirmed COVID-19 cases (Ferdous et al., 2020; Islam, Emran, Rahman, et al., 2020). Officially, 165,618 confirmed cases, and 2,096 deaths of COVID-19 were recorded up to July 07, 2020 (Institute of Epidemiology Disease Control and Research, 2020). The implementation of lockdown, restriction on public gathering, social distancing strategy, and unprecedented quarantine measures in Bangladesh (Rahman et al., 2020), has affected many aspects of people's lives.

Outbreak related issues such as spatial distancing, lockdown, travel restriction and quarantine, as well as social and economic consequences, have led to depression, anxiety, fear, panic, stress, suicide ideation, post-traumatic stress disorder, etc. due to skyrocketing spread of COVID-19 (Banerjee, 2020; Islam et al., 2020; Islam et al., 2021; Islam et al., 2020; Tasnim, Islam, et al., 2020; Islam et al., 2021). Along with these, addictive behaviors including tobacco use, alcohol consumption, and other substance abuse emerge as one of the major human health threats during

* Corresponding author at: Department of Public Health and Informatics, Jahangirnagar University, Savar, Dhaka-1342, Bangladesh.

E-mail address: islam.msaiful@outlook.com (Md.S. Islam).

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the COVID-19 outbreak (Kar, Arafat, Sharma, et al., 2020; Pirnia et al., 2020). Common psychological problems including depression, anxiety, stress, etc. are linked to tobacco smoking during the COVID-19 pandemic (Islam et al., 2020; Tzu-Hsuan Chen, 2020).

Evidence suggests that a long period of lockdown forcing mass quarantine would undoubtedly have an effect on people's psychological well-being, with underlying causes such as increased media reporting, the escalating number of new cases, and so on (Rubin and Wessely, 2020). In addition, the psychosocial impact of health emergencies seems to be even higher during quarantine measures (Brooks et al., 2020). At the initial stage of the COVID-19 outbreak, a study was conducted among the general population in China which reported that 16.5% and 28.8% respondents had moderate to severe depressive and anxiety symptoms respectively (C. Wang et al., 2020). Furthermore, a study conducted among the general population in Italy also found high prevalence of depression (17.3%), anxiety (20.8%), and insomnia (7.3%) during the COVID-19 pandemic (Rossi et al., 2020).

A previous study demonstrated that a substantial portion of the population is at high risk of psychological consequences during the COVID-19 outbreak in Bangladesh and suggested to pay attention to the mental health of the people who were home-quarantined following lockdown measures for protecting their physical health (Khan et al., 2020).

Although the COVID-19 outbreak has brought a great impact on individuals' psychological health in many different countries, it is poorly studied in Bangladesh. Therefore, we assessed the psychological states in terms of depression and anxiety as well as their associated factors among general people during the COVID-19 outbreak to provide a basis for the promulgation of national and governmental policies.

2. Methods

2.1. Participants and procedure

An online questionnaire-based cross-sectional survey was conducted among the general population in Bangladesh. Data were collected between April and May, 2020 via social media (e.g., Facebook, WhatsApp, Email, etc.). The purposes of the study were well informed to the respondents and they provided their informed consent prior to participating in the survey. We required 565 individuals who met the inclusion criteria including: (i) being 18 years old or above, and (ii) having willingness to take part in the survey. Respondents whose ages were below 18 years old and incomplete responses were excluded.

2.2. Measures

2.2.1. Socio-demographic measures

Socio-demographic data were collected during the survey using a semi-structured questionnaire written in English concerning age, gender, marital status, educational qualification, family type, and living area (urban/rural). Cigarette smoking habits (yes/no) and chronic diseases profile (i.e., blood pressure, diabetes, kidney disease, heart problems, and asthma/ respiratory disease) were also asked during the survey.

2.2.2. Self-Rating Depression Scale (SDS)

The Self-Rating Depression Scale (SDS) is a self-reported screening tool to assess the levels of depression in epidemiological surveys, developed by Zung (1965). This scale consists of 20 questions concerning the past several days (e.g., "I feel down-hearted and blue") with a four-point Likert scale ranging from 0 ("a little of the time") to 3 ("most of the time"). Ten items in the SDS scale (i.e., 2, 5, 6, 11, 12, 14, 16, 17, 18, and 20) are stated using positive feelings, reverse integration in the order of 4 to 1, and the scores are summed up as the total score. The standard score is calculated by the multiplication of total score by 1.25. The present study employed the English version of the SDS scale to screen the participants'

depression levels which has recently been used in China to assess the levels of depression during early in the COVID-19 outbreak (Y. Wang et al., 2020). Depression levels were categorized using the following cutoffs: < 53 = non-depression, 53–62 = mild depression, 63–72 = moderate depression, and > 73 = severe depression (Zung, 1965). In the present study, the Cronbach's alpha of the SDS was 0.8.

2.2.3. Self-Rating Anxiety Scale (SAS)

The Self-Rating Anxiety Scale (SAS) is a self-reported screening tool to assess the level of anxiety in epidemiological surveys, developed by Zung (1971). This scale consists of 20 questions concerning the past several days (e.g., "I feel down-hearted and blue") with a four-point Likert scale ranging from 0 ("a little of the time") to 3 ("most of the time"). Five items (i.e., 5, 9, 13, 17, and 19) in the SAS scale are stated using positive words, reverse integration in the order of 4 to 1, and the scores are summed up as the total score. The standard score is calculated by the multiplication of total score by 1.25. The present study employed the English version of the SAS scale to screen the participants' anxiety levels which has recently been used in China to assess the levels of anxiety during early in the COVID-19 outbreak (Y. Wang et al., 2020). Anxiety levels were categorized using the following cutoffs: < 50 = non-anxiety, 50–59 = mild anxiety, 60–69 = moderate anxiety, and > 70 = severe anxiety (Zung, 1971). In the present study, the Cronbach's alpha of the SAS was 0.8.

2.2.4. Statistical analysis

Data were analyzed using Microsoft Excel 2019 and SPSS software version 25.0. Primarily, data were entered into Microsoft Excel file and after the completion of data input, the file was imported to SPSS software. Descriptive statistics (i.e., frequencies, percentages, means, standard deviations) and first-order analyses (i.e., chi-square tests, Fisher's exact tests, etc.) were performed using SPSS software. Binary logistic regression was performed with a 95% confidence interval to determine significant associations between categorical dependent and independent variables.

2.3. Ethics

The study was approved by the Research Ethics Committee of Sapporo Dental College and Hospital [Ref. No: SDC/C-7/2020/744] and all procedures were performed in accordance with the ethical standards of the Research Ethics Committee of Sapporo Dental College and Hospital, and Helsinki declaration. Confidentiality of data and anonymity to the participants were ensured.

3. Results

3.1. General characteristics of participants

In this study, 63.5% of respondents were males and 36.5% were females. The average age of respondents was 32.2 years (SD = 8.6) ranging from 19 to 66 years. The majority of the respondents were married (65.8%), and had "Bachelor" level of education (53.3%). Most of them were non-smokers (85.0%) and lived in nuclear families (71.7%) as well as urban areas (69.7%) (Table 1).

The respondents also reported that they had the following chronic diseases: blood pressure (12.9%), diabetes (7.4%), kidney disease (1.1%), heart problems (4.1%), and asthma/ respiratory disease (8.0%) (Table 2).

3.2. Depression and anxiety

Based on the SDS, the prevalence estimate of depression was 32.6% with the mean score of 48.3 (SD = 11.3) ranging from 25.0 to 86.25 (Table 3). The prevalence estimates of non, mild, moderate, and severe depression were 67.4%, 21.9%, 8.3%, and 2.3%, respectively (Fig. 1).

Table 1
Distribution of variables among respondents by depression, and anxiety.

Variables	Total N = 565		Depression						Anxiety					
	n	(%)	Yes	(%)	χ^2 p-value	OR	95% CI	p-value	Yes	(%)	χ^2 p-value	OR	95% CI	p-value
Gender														
Female	206	(36.5)	91	(44.2)	19.89	2.26	(1.58-3.25)	<0.001	84	(40.8)	17.61	2.19	(1.51-3.16)	<0.001
Male	359	(63.5)	93	(25.9)	<0.001	Ref.			86	(24.0)	<0.001	Ref.		
Age														
18-40 years	457	(80.9)	166	(36.3)	15.37	2.85	(1.66-4.90)	<0.001	149	(32.6)	7.19	2.00	(1.20-3.36)	0.008
>40 years	108	(19.1)	18	(16.7)	<0.001	Ref.			21	(19.4)	0.007	Ref.		
Marital status														
Unmarried	190	(33.6)	73	(38.4)	4.49	1.25	(0.11-14.01)	0.858	61	(32.1)	2.59	0.24	(0.02-2.66)	0.243
Married	372	(65.8)	110	(29.6)	0.087*	0.84	(0.08-9.36)	0.887	107	(28.8)	0.222*	0.20	(0.02-2.25)	0.193
Divorced	3	(0.5)	1	(33.3)		Ref.			2	(66.7)		Ref.		
Educational qualification														
Intermediate†	12	(2.1)	3	(25.0)	2.71	0.80	(0.21-3.05)	0.746	5	(41.7)	4.38	2.06	(0.63-6.70)	0.232
Bachelor	301	(53.3)	107	(35.5)	0.273*	1.33	(0.93-1.90)	0.123	100	(33.2)	0.112	1.43	(0.99-2.07)	0.058
Above bachelor	252	(44.6)	74	(29.4)		Ref.			65	(25.8)		Ref.		
Family type														
Nuclear	405	(71.7)	139	(34.3)	2.01	1.34	(0.89-1.99)	0.157	126	(31.1)	0.71	1.19	(0.79-1.79)	0.399
Joint	160	(28.3)	45	(28.1)	0.157	Ref.			44	(27.5)	0.399	Ref.		
Residence														
Rural	171	(30.3)	48	(28.1)	2.26	0.74	(0.50-1.10)	0.134	50	(29.2)	0.08	0.94	(0.64-1.40)	0.772
Urban	394	(69.7)	136	(34.5)	0.133	Ref.			120	(30.5)	0.772	Ref.		
Smoking habit														
Yes	85	(15.0)	24	(28.2)	0.86	0.79	(0.47-1.31)	0.356	23	(27.1)	0.44	0.84	(0.50-1.41)	0.509
No	480	(85.0)	160	(33.3)	0.355	Ref.			147	(30.6)	0.509	Ref.		

Note: †Class 11-12; *Fisher's exact test; OR = Odds Ratio; CI = Confidence Interval.

Table 2
Chronic disease profile of participants and their distribution by depression and anxiety.

Characteristics	Total N=565		Positive depression (n=184; 32.6%)					Positive anxiety (n=170; 30.1%)				
	n	(%)	n	(%)	χ^2	df	p-value	n	(%)	χ^2	df	p-value
Blood pressure												
Yes	73	(12.9)	21	(28.8)	0.55	1	0.458	25	(34.2)	0.69	1	0.406
No	492	(87.1)	163	(33.1)				145	(29.5)			
Diabetes												
Yes	42	(7.4)	10	(23.8)	1.58	1	0.208	11	(26.2)	0.33	1	0.567
No	523	(92.6)	174	(33.3)				159	(30.4)			
Kidney disease												
Yes	6	(1.1)	1	(16.7)	0.70	1	0.669*	2	(33.3)	0.03	1	1.000*
No	559	(98.9)	183	(32.7)				168	(30.1)			
Heart problems												
Yes	23	(4.1)	6	(26.1)	0.46	1	0.498	4	(17.4)	1.84	1	0.246*
No	542	(95.9)	178	(32.8)				166	(30.6)			
Asthma/ respiratory disease												
Yes	45	(8.0)	17	(37.8)	0.61	1	0.437	18	(40.0)	2.28	1	0.131
No	520	(92.0)	167	(32.1)				152	(29.2)			

Note: *Fisher's exact test.

Table 3
Correlation analysis of the SAS and SDS standard scores.

Variables	Mean (SD)	R p-value	Categories	Total N=565		Positive depression		Positive anxiety		χ^2 p-value	OR	95% CI	p-value
				n	(%)	n	(%)	n	(%)				
Depression	48.3 (11.3)	0.74 <0.001	Positive	184	(32.6)	184	(100.0)	114	(62.0)	131.74	9.45	(6.27-14.26)	<0.001
			Negative	381	(67.4)	0	(0.0)	56	(14.7)	<0.001	Ref.		
Anxiety	45.2 (10.3)		Positive	170	(30.1)	114	(67.1)	170	(100.0)		9.45	(6.27-14.26)	<0.001
			Negative	395	(69.9)	70	(17.7)	0	(0.0)		Ref.		

Note: SD = Standard deviation; r = Pearson's correlation coefficient; OR = Odds Ratio; CI = Confidence Interval.

Based on the SAS, the prevalence estimate of anxiety was 30.1% with the mean score of 45.2 (SD = 10.3) ranging from 25.0 to 92.5 (Table 3). The prevalence rates of non, mild, moderate, and severe anxiety were 69.9%, 21.1%, 7.1%, and 1.9%, respectively (Fig. 1).

In addition, correlation analysis was conducted for the SAS and SDS standard scores. The findings showed a significant positive correlation between depression and anxiety ($r = 0.74$, $p < 0.001$) and depression (OR = 9.45; 95% CI = 6.27-14.26, $p < 0.001$) and anxiety (OR = 9.45;

95% CI=6.27-14.26, $p < 0.001$) emerged as significant predictor to each other (Table 3).

3.3. Factors associated with anxiety and depression during the COVID-19 outbreak

The proportions of depression were significantly higher in female (female vs. male: 44.2% vs 25.9%, $p < 0.001$) and respondents aged 18-

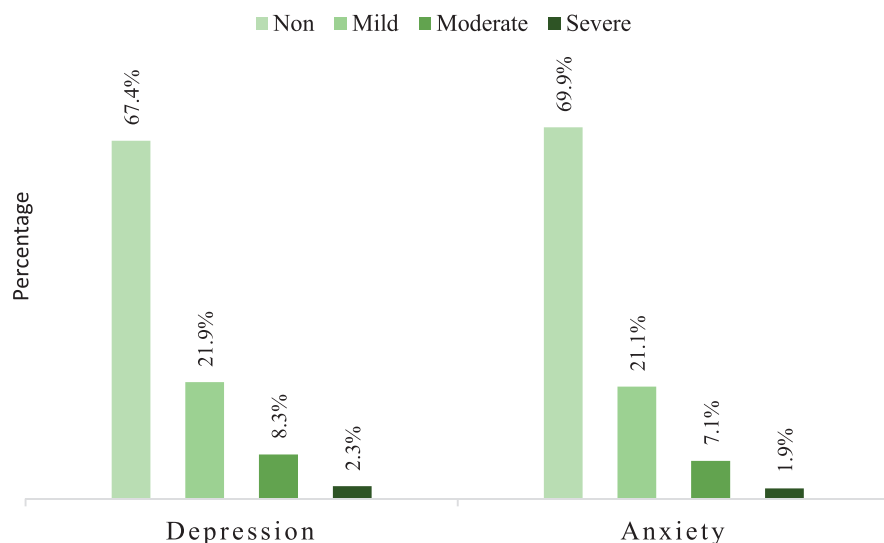


Fig. 1. Distribution of depression and anxiety levels during the COVID-19 outbreak.

40 years (18-40 years vs. above 40 years: 36.3% vs. 16.7%, $p < 0.001$) (Table 1). The proportions of anxiety were also higher in females (female vs male: 40.8% vs. 24.0%, $p < 0.001$) and respondents aged 18-40 years (18-40 years vs. above 40 years: 32.6% vs. 19.4%, $p = 0.007$).

In the binary logistic regression analysis, both gender and age were correlated with depression and anxiety. Females were 2.3 times more likely to have depression (OR = 2.26; 95% CI = 1.58-3.25, $p < 0.001$) and 2.2 times more likely to have anxiety (OR = 2.19; 95% CI = 1.51-3.16, $p < 0.001$) compared to males. In contrast, the respondents aged between 18-40 years were 2.9 times more likely to have depression (OR = 2.85; 95% CI = 1.66-4.90, $p < 0.001$) and 2.0 times more likely to have anxiety (OR = 2.00; 95% CI = 1.20-3.36, $p = 0.008$) than those aged above 40 years old. Findings also showed that depression and anxiety were not significantly associated with chronic disease conditions during the pandemic (Table 2).

4. Discussion

The pandemic COVID-19 has brought an unbearable psychological pressure to people across the world (Duan and Zhu, 2020; Xiao, 2020). Although previous studies in overseas demonstrated the psychological impact of the COVID-19 outbreaks on the general people, patients, medical staff, children, and older adults (Ahmed et al., 2020; Chen et al., 2020; Li et al., 2020; Mazza et al., 2020; Moccia et al., 2020; C. Wang et al., 2020; Yang et al., 2020), there are limited studies in Bangladesh that evaluated people psychological states and potentially related factors during the COVID-19 outbreak. This study evaluated the psychological condition of Bangladeshi people during this pandemic and explored factors influencing their depression and anxiety.

The present study also reported that 32.6% participants had mild to extremely severe levels of depression which is consistent with the study of Sigdel et al. (2020). During the COVID-19 pandemic, comparatively higher prevalence estimates of depression were reported in Bangladeshi students (62.9% among university students, and 46.92% among college and university students) (Islam et al., 2020; Khan et al., 2020) and lower prevalence of depression have also been reported globally, including: 16.5% (C. Wang et al., 2020) and 17.17% (Y. Wang et al., 2020) among the general population in China and 17.3% among the general population in Italy (Rossi et al., 2020).

The present study found that 30.1% participants had mild to extremely severe level of anxiety which is similar to the study of Khan et al. (2020) conducted among home-quarantined Bangladeshi students during COVID-19 pandemic and to the study of Sigdel et al. (2020) conducted among the general population of Nepal

during COVID-19 pandemic. In contrast, differences in the prevalence of anxiety during the pandemic have been reported globally, including: 28.8% (C. Wang et al., 2020) and 6.33% (Y. Wang et al., 2020) among the general population in China and 20.8% among the general population in Italy (Rossi et al., 2020).

Our study found significant gender differences regarding depression and anxiety. The findings revealed that during the pandemic females were more likely to have depression and anxiety than males which is consistent with several previous studies (Moghanibashi-Mansourieh, 2020; Rossi et al., 2020; Sigdel et al., 2020; C. Wang et al., 2020) although the previous studies retained no gender differences regarding depression and anxiety during the pandemic (Ahmed et al., 2020; Islam, Ferdous, & Potenza, 2020). Another similar study also found significant gender differences regarding anxiety but they found no significant gender differences regarding depression (Y. Wang et al., 2020).

The current reports found a significant influence of participants' age on depression and anxiety. Participants whose ages were between 18-40 years were more likely to suffer from depression and anxiety. Our findings are concurrent with the study of Ahmed et al. (2020) who showed that respondents' age was significantly associated with depression and anxiety during the pandemic (Ahmed et al., 2020). Some previous studies also showed a significant association between respondents' age and anxiety during the pandemic but no influence on depression was recorded for age (Mazza et al., 2020; Y. Wang et al., 2020). There is also occasional inconsistent evidence that respondents' age has no significant effect on anxiety and depression (C. Wang et al., 2020).

In the present study, tobacco smoking was not associated with anxiety/ depression which is concurrent with previous reports in Bangladesh (Islam et al., 2021; Islam, et al., 2021). In contrast, many studies conducted in Bangladesh retained a significant association between tobacco smoking and anxiety/ depression during the COVID-19 pandemic (Islam et al., 2020; Tasnim et al., 2020). The participants' chronic disease profile (i.e., blood pressure, diabetes, kidney disease, heart problems, and asthma/ respiratory disease) was not significantly associated with psychological states in terms of depression and anxiety in the present study (Table 2), which is inconsistent with previous reports in Bangladesh (Islam, et al., 2021; Sayeed et al., 2020). However, the findings also resonate with a previous study conducted in Bangladesh that retained no association between chronic diseases and anxiety/ depression (Tasnim et al., 2020).

In addition, findings of the correlation analysis between the SAS and SDS standard scores showed that people with anxiety were likely to be depressed, and individuals with depression were also likely to

be anxious which corroborate with earlier reports (Islam et al., 2020; Islam et al., 2021; Islam et al., 2020; Islam et al., 2020; Kalin, 2020; Tasnim et al., 2021). Similar findings were found among Chinese people during the outbreak of COVID-19 (Y. Wang et al., 2020).

4.1. Strengths and limitations

This study provided baseline data on public psychological states in terms of depression and anxiety as well as their related factors during the COVID-19 outbreak in Bangladesh which will be helpful to plan and adopt appropriate interventions to overcome the negative impacts on peoples' mental health. Moreover, the study will contribute in the promulgation of national and governmental policies.

However, the study has several limitations. First, it is limited by the use of self-reported data which might have influenced the findings through well-known biases including: method biases, memory recall biases, and social desirability biases, etc. Second, the study adopted the online survey due to the COVID-19 outbreak. The survey questionnaire did not reach underdeveloped areas due to limited availability of technology and omitted people who are not comfortable using technology and the Internet; therefore, generalizability to other samples and other types of populations in the country and other countries may be limited. Third, since the current study was cross-sectional, causality cannot be identified. Due to a lack of pre-COVID-19 evidence, the current results cannot be justified as a consequence of COVID-19. Furthermore, the study was also limited by the relatively small sample size, and it was conducted using the online convenience sampling strategy without a random selection of the sample. The present study investigated limited measures which should be warranted a further study using comprehensive measures including participants' or their family members' COVID-19 test positive results and other COVID-19-related factors.

5. Conclusions

The study reported baseline information concerning public psychological states and related factors in Bangladesh. The findings showed that a substantial portion of population especially, females and younger are at high risk of psychological problems during the COVID-19 outbreak. The present study suggested that healthcare authorities should pay attention to individuals' mental health during the health emergency. Government and non-government stakeholders should take necessary steps to provide psychological counseling to the public through electronic devices and social electronic media which are mostly used by the people. The government needs to provide timely and accurate information to the public about the outbreak, especially curative ratio, and mortality. The public should avoid rumors and misleading information about the COVID-19 outbreak that inevitably can lead to depression and anxiety.

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Declaration of Competing Interest

The authors have no conflict of interest to declare.

CRediT authorship contribution statement

Md. Mahfuz Hossain: Conceptualization, Supervision, Methodology, Investigation, Data curation, Writing - original draft, Validation. **Kamrul Hsan:** Conceptualization, Methodology, Investigation, Data curation, Resources, Writing - original draft, Validation. **Md. Saiful Islam:** Conceptualization, Methodology, Investigation, Data curation, Formal

analysis, Resources, Writing - original draft, Writing - review & editing, Validation. **Sujan Kanti Nath:** Writing - review & editing, Validation.

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