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The impact of the COVID-19 pandemic on the mental health of the adult population in Bangladesh: A nationwide cross-sectional study

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Abstract

The recent COVID-19 pandemic has imposed threats on both physical and mental health since its outbreak. This study aims to explore the impact of the COVID-19 pandemic on mental health among a representative sample of home-quarantined Bangladeshi adults. A cross-sectional design was used with an online survey completed by a convenience sample recruited via social media. A total of 1,427 respondents were recruited, and their mental health was assessed by the DASS-21 measure. The prevalence of anxiety symptoms and depressive symptoms were 33.7% and 57.9%, respectively, and 59.7% reported mild to extremely severe levels of stress. Perceptions that the pandemic disrupted life events, affected mental health, jobs, the economy and education, predictions of a worsening situation, and uncertainty of the health care system capacities were significantly associated with poor mental health outcomes. Multivariate logistic regressions showed that sociodemographic factors and perceptions of COVID-19 significantly predict mental health outcomes. These findings warrant the consideration of easily accessible low-intensity mental health interventions during and beyond this pandemic.

Keywords: Home-quarantine, perceptions, DASS-21, mental health, COVID-19, Bangladesh

Introduction

Former infectious disease outbreaks have significantly affected individuals' mental health along with the expected physical health outcomes (Lau et al. 2010). The novel coronavirus disease (COVID-19) is by far the most concerning outbreak of atypical pneumonia since the far less detrimental 2003 outbreak of severe acute respiratory syndrome (SARS) (Hawryluck et al. 2004). The COVID-19 pandemic has been declared an international public health emergency by the World Health Organization (WHO) (WHO 2020a). As of July 1st 2020, the COVID-19 pandemic has infected over ten million people across the world, causing more than 5,00,000 deaths (WHO 2020b). Experts are still uncertain of the trajectory of the COVID-19 pandemic, the projected number of cases and deaths, or to what extent quarantine measures will disrupt daily life (Zandifar & Badrfam 2020). The unpredictable nature of this situation and uncertainty regarding COVID-19 can often trigger psychological distress and mental illness, including depression, anxiety, and traumatic stress (Cheung et al. 2008; Bao et al. 2020; Zandifar & Badrfam 2020). A recent survey by the Indian Psychiatric Society shows a twenty percent increase in mental illnesses since the coronavirus outbreak in India (Loiwal 2020).

The COVID-19 situation in Bangladesh is worsening day by day. The Government of Bangladesh closed all educational institutions and both public and private offices on March 16th 2020 in an effort to contain the outbreak. Public gatherings were also banned (WHO 2020c), and travel from countries with high transmission risk, such as China, Iran, and Italy, was suspended (Anadolu 2020). Despite these efforts, COVID-19 has reached all 64 administrative districts in Bangladesh by July 1st 2020, causing over 145,000 cases and 1,874 deaths thus far (IEDCR 2020). High population density, poor personal hygiene practices, and poor economic conditions make the majority of the Bangladeshi population particularly vulnerable to this virus. Fear of becoming sick,

the isolation of lockdown, the financial necessity to work, and the inability to avoid venturing out in public for essential items such as food may increase psychiatric problems within the general population. Recent publications suggest mental health during the COVID-19 pandemic is associated with gender, socioeconomic status, occupation, having COVID-19-like symptoms, perceptions of COVID-19 impacts, interpersonal conflicts, social media use, and social support (Mowbray 2020; Wang et al. 2020a). Older adults and individuals with low incomes are at increased risk for poor mental health (Holmes et al. 2020).

There is no information yet on mental health associations with or during this COVID-19 pandemic in the general population of Bangladesh. Exploratory studies of mental health conditions and associated factors during this time is essential to mitigate future negative mental health outcomes. We hypothesize that the prevalence of mental health distress is high among Bangladeshi residents during this pandemic. This study estimates the prevalence of and identifies the risk factors for depressive and anxiety symptoms during the COVID-19 pandemic among the adult population in Bangladesh. Symptoms of psychological stress are also explored in a similar manner.

Methods

Setting and participants

A prospective cross-sectional web-based survey was conducted to assess the psychological response of the general population from April 29th to May 7th 2020, about one month after the start of lockdown measures enacted by the government. As a community-based national sampling survey during this time was not feasible, data was collected online. The authors distributed the survey link in all divisions of Bangladesh via social media using snowball sampling. Considering the limited number of studies on the topic, a 50% response rate, 5% significance level, and 2.5% margin of error was used to calculate the needed sample size of 1,315 to achieve 80% power. Data

was ultimately collected from 1,427 participants. All were included in analyses to obtain more precise results. Eligibility criteria included the ability to read Bangla and residence in Bangladesh for the duration of the government mandated lockdown. Participants were predominantly (99.1%) 18 years of age and older, although age was not an exclusion criterion. Each division constituted 10.5-16% of the entire sample, except for the Sylhet division (6.3%), which was lower.

Procedures

An anonymous online questionnaire was developed using WHO materials on COVID-19 pandemic-related mental health to gather data from respondents (WHO 2020d). The research team collaborated on reviewing the literature provided in the WHO materials, decided on the framework of the questionnaire, and drafted individual questions through an iterative process of discussion and editing. The initial survey was written in English and then translated into Bangla by a researcher fluent in both languages. The survey was piloted with a small online user group to test its clarity. The survey included a short overview of the study context, purpose, procedures, confidentiality agreement, and informed consent. Clicking on the survey link directed the participants first to the study overview and informed consent. Demographic information was required in order to begin the survey, after which a series of survey questions appeared.

Survey contents

The survey consisted of 37-close ended queries, which took about 7-8 minutes in total to complete. The survey was split into three sections: participant characteristics (10 items), perceptions regarding COVID-19 (6 items), and mental health (21 items). Sociodemographic data were collected on age, gender, educational status, occupation, location of residence, marital status, monthly income, religion, family size, number of children, and elderly persons residing in the household. Demographic questions were simple and straightforward with options to choose for

answers, such as “Does someone over the age of 50 currently reside in your household?” with answer options “yes” and “no”.

The second section included questions on the pandemic’s disruption to daily life, the level of negative impacts the current lockdown is having on mental health, the perceived capacity of health care facilities, beliefs on the trajectory of the outbreak, job, income, and educational impacts, and the level of perceived impact the pandemic has on the mental health of those with chronic physical health conditions (such as distress stemming from limited access to medications, getting to hospitals for treatment, availability of doctors, etc.). An example of a question from this second section is, “Do you think COVID-19 will have a negative impact on the mental health of those with existing health conditions?” with answer options of “yes,” “no,” and “somewhat”.

A validated Bangla version of the Depression, Anxiety, and Stress Scale (DASS-21) was used to measure the mental health of participants (Le et al. 2019; Alim et al. 2014). The DASS-21 contains three self-report scales with a total of 21-items designed to assess the negative domains of depressive symptoms, anxiety symptoms, and stress levels (Lovibond & Lovibond 1995). Likert scale scores range from 0 (item does not apply at all) to 3 (item applies strongly) for occurrences over the last week. The DASS has proven to be reliable and relevant for assessing mental health in the Bangladeshi population (Alim et al. 2015; Sadiq et al. 2019). The DASS-21 has been used for assessing the psychological impacts of COVID-19 in several studies, and thus was deemed most appropriate for use in the current study (Kazmi et al. 2020; Wang et al. 2020a; Wang et al. 2020b). The Cronbach’s alpha coefficient of the DASS-21 was 0.92, indicating acceptable internal consistency (Taber 2018). Prior to this, the DASS was also used in SARS research (McAlonan et al. 2007).

Statistical analysis

Descriptive statistics were conducted for all covariates and survey responses. Chi-square tests assessed the associations of sociodemographic variables and perceptions of COVID-19 with stress level, anxiety symptom, and depressive symptom scores. Multivariate logistic regression models were applied to determine possible associations between independent variables and mental health outcomes. The final model was selected using a backward selection procedure and lower Akaike information criteria (AIC) value. Coefficients were found significant by Wald tests. The lack of fit of the model was checked by the Hosmer-Lemeshow test. The results are described using odds ratio (OR) and 95% confidence interval (CI). SAS version 9.3 was used for all analyses, with a 5% level of significance for a two-tailed test.

Results

A total of 1,427 participants completed the online survey. The mean age of respondents was 25.75 years (SD: 6.75). The majority were male (71.5%), 24-39 years old (48.6%), unmarried (66.9%), and Muslim (75.4%). Many participants (59%) completed an undergraduate education, 43.7% were students, and 42.2% were employed. Almost half (47.3%) of respondents' monthly income was between 21000 and 40000 BD TK (\$250-470 USD) and over half (55.9 %) lived in rural areas. About half (51.9%) of respondents lived in families with less than four members. The majority (73.7%) did not have children younger than five in their family, but 76.4% of respondents had at least one elderly family member (>50 years old; Table 1).

Among the participants, 59.7% suffered from stress symptoms, however, mild (28.0%) and moderate (22.0%) symptoms were more common. One third (33.7%) of participants reported symptoms of anxiety; among them, 11.6% had moderate anxiety symptoms, and 11.6% had extreme anxiety symptoms. More than half (57.9%) of the respondents experienced depressive symptoms, including mild (14.5%), moderate (21.2%), and severe (13.2%) levels. **[Figure 1]**

The prevalence of mental health symptoms differed among subgroups (Table 1). Higher levels of stress were significantly associated with females (70.9%), monthly income >40,000 BDT (63.8%), and unemployment (71.9 %). The prevalence of anxiety symptoms was significantly higher among females (45.6%), those ≥ 40 years of age (44.0%), those with low education (secondary; 87.5%), and housewives (68.2%). Higher rates of depressive symptoms were associated with females (64.3%), ≤ 23 years of age (62.8%), and the unemployed (77%). Marital status and occupation were also significantly associated with depressive symptoms, anxiety symptoms, and stress levels. Stress levels were found to be further associated with education and monthly income. Anxiety symptoms were further associated with location of residence and living with an elderly family member. Depressive symptoms were also associated with having an elderly family member in the household. [Table 1]

Many respondents (47.7 %) reported that their daily lives were significantly disrupted due to the COVID-19 pandemic and ensuing quarantine measures. Over one third (35.5%) thought this pandemic had a medium effect on mental health. Over half (59.8%) believed that COVID-19 disrupted the health care system. A majority (81%) said “the worst is yet to come” when asked to speculate on the trajectory of the COVID-19 outbreak in Bangladesh. A majority (77.2%) also believed that the pandemic would negatively impact their job, income, or education. Over half (55%) agreed that the pandemic would especially jeopardise the mental health of those with existing physical health conditions. Negative perceptions regarding the COVID-19 pandemic were significantly associated with worse mental health scores. [Table 2]

Multivariate logistic regression models between demographic characteristics and mental health outcomes fulfilled the goodness of fit criteria. A Hosmer and Lemeshow test statistic of stress levels (χ^2 : 15.51, p-value: 0.06), anxiety symptoms (χ^2 : 12.94, p: 0.11) and depressive symptoms

(χ^2 : 5.60, p: 0.69) indicated that the model fit well. Males (vs. female; OR=0.41; CI=0.31-0.54; $p<0.0001$), those with higher secondary and undergraduate education (vs. graduate, 0.58, 0.36-0.94, $p<0.009$; 0.67, 0.48-0.93, $p<0.020$), and those with a family income of ≤ 20000 BDTK (vs. > 40000 BDTK, 0.60; 0.43-0.85; $p<0.001$) had a lower risk of experiencing high stress levels. Unemployed respondents had a greater risk of experiencing high stress levels (3.20; 1.97-5.18; $p<0.0001$) than employed respondents.

Respondents that were aged 24 to 39 years (vs. ≥ 40 , 0.65; 0.42-.83; $p<0.0001$), males (vs. female, 0.37; 0.27-0.51; $p<0.0001$), students (vs. employed, 0.77; 0.45-0.94; $p<0.0001$), had a family income of ≤ 20000 BDTK (vs. > 40000 BDTK, 0.67; 0.45-0.90; $p=0.021$), and lived in a rural residence (vs. urban, 0.45; 0.34-0.59; $p<0.0001$) had lower risks of experiencing anxiety symptoms. Conversely, respondents that were aged ≤ 23 years (vs. ≥ 40 years, 1.56; 1.86-2.85; $p=0.005$), had either secondary or undergraduate education (vs. employed, 12.87, 3.89-42.54, $p<0.0001$; 1.12, 1.04-1.68, $p=0.0003$), owned a business or were unemployed (vs. employed, 4.55, 2.76-7.52, $p<0.0001$; 4.28, 2.47-7.40, $p<0.0001$), and had four or less members in their household (vs. > 4 , 1.40; 1.07-1.84; $p=0.016$) had a higher risk of experiencing anxiety symptoms.

Respondents that were male (vs. female, 0.56; 0.43-0.74; $p<0.0001$) or had no elderly members within their household (vs. yes, 0.73; 0.55-0.97; $p=0.029$) had a lower risk of experiencing depressive symptoms. Those with secondary education (vs graduate, 2.30; 1.94-5.64; $p=0.04$) had a higher risk of experiencing depressive symptoms. **[Table 3].**

Multivariate logistic regression models on perceptions regarding COVID-19 and mental health outcomes were modelled without questions 2 and 6 when analysing stress levels and anxiety symptoms and without questions 2 and 3 when analysing depressive symptoms (Table 4). The

logistic regression models of stress levels (χ^2 : 11.98, p: 0.10), anxiety symptoms (χ^2 : 1.74; p: 0.11) and depressive symptoms (χ^2 : 15.49, p: 0.07) fit the data. Several unadjusted logistic regression models showed significance. Participants who believed that the healthcare system would be overrun (OR=2.64; CI=2.0-3.48; p<0.001), or who were unsure about the fate of the healthcare system (2.82; 1.97-4.03; p<0.001), had higher odds of experiencing high stress levels than those that believed the healthcare system would withstand the pandemic. Respondents who fully agreed that the COVID-19 pandemic would have a negative impact on education and the economy (1.57; 1.15-2.14; p=0.002), or said it would have a “somewhat” negative impact (1.71; 1.03-2.85; p=0.004), had higher odds of experiencing high levels of stress than participants who did not believe the pandemic would have any negative impact.

Respondents who believed that the worst of the crisis has not yet passed (1.95; 1.07-3.56; p<0.001) had higher odds of experiencing anxiety symptoms than those who did not consider the COVID-19 pandemic as a major problem for Bangladesh. Those who agreed that the COVID-19 pandemic would negatively impact the economy and education had higher odds of experiencing depressive symptoms (1.42; 1.11-2.21; p=0.001) than respondents who denied negative impacts. Respondents who agreed that COVID-19 would be detrimental to the mental health of those with chronic physical health conditions had higher odds (1.10; 1.21-1.54; p<.0001) of depressive symptoms than those who believed COVID-19 would only have a “somewhat” negative impact. [Table 4]

Discussion

This study investigated the mental health of the general adult population in Bangladesh during the COVID-19 pandemic. This study provides the first nationwide data on stress levels, anxiety symptoms, and depressive symptoms in Bangladeshi residents during the COVID-19 pandemic. Our findings indicate that COVID-19 pandemic was associated with increased mental health

issues, and these results were similar with previous outbreaks of Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) (Lau et al. 2010; Jeong et al. 2016). Nearly 60% of the respondents suffered from high levels of stress, which is close to the figure (64.3%) reported in India (Kazmi et al. 2020). However, this estimate is much higher than the 32.1% reported in China (Wang et al. 2020b) and the 16.8% reported in the UK (Shevlin et al. 2020). Findings indicate that 26% of respondents reported moderate to severe anxiety symptoms, which is similar to a study done in China (28.8%) during the COVID-19 pandemic (Wang et al. 2020a). The prevalence estimate of depressive symptoms ranging from mild to extremely severe was 57.9% in the current study. Previous studies have reported prevalence rates of depressive symptoms among the general population at 16.5% in China (Wang et al. 2020a; Wang et al. 2020b) and 11.4% in Japan (Ueda et al. 2020). These discrepancies may be attributable to developed socioeconomic and healthcare systems. Pre-COVID-19 era prevalence rates of mental disorders varied from 6.5% to 31.0% among adults in Bangladesh, starkly in contrast to the higher numbers reported in the current study (Ahmed et al. 2014).

Higher levels of stress, anxiety symptoms, and depressive symptoms were observed in females, which is consistent with most previous findings (Limcaoco et al. 2020; Mazza et al. 2020; Wang et al. 2020a), as well as extensive previous epidemiological research placing women at a higher risk for experiencing anxiety symptoms (Wang et al. 2020b). However, Shevlin and Kazmi reported the opposite relationship between stress and gender (Kazmi et al. 2020; Shevlin et al. 2020), while Zhang and Ma observed no relationship between stress and gender (Zhang & Ma 2020). Directives of lockdown may increase domestic violence against women, with social services focused on mitigating risks limited in their capacity to conduct much-needed outreach during quarantine.

Surprisingly, respondents with a graduate level of education experienced high levels of stress more so than those with undergraduate or higher secondary educations, which reflects some earlier research (Othman 2020). Other studies have found no significant differences in the mental health of participants with different educational backgrounds (Jung & Jun 2020; Zhang & Ma 2020). It is possible that those with graduate degrees have more access to information regarding COVID-19 and are therefore more aware of the dire situation, which contributes to higher levels of stress compared to those with less education. Concurrently, those with the lowest level of education have the highest rates of increased stress, anxiety symptoms, and depression symptoms during the pandemic, which is similar to results from a study in China (Wang et al. 2020a). In order to support those with limited education during the pandemic, local agencies should provide information in easily understood diagrammatic or audio formats. Students reported lower anxiety symptoms (27%) than other occupational groups, and this prevalence estimate is lower than that of Chinese students (37.4 %) (Zhou et al. 2020).

Another surprising finding is that high-income respondents experienced high levels of stress at higher rates than low-income respondents. More thorough research and qualitative studies will need to be conducted in order to understand the mechanisms behind this finding. Unsurprisingly, unemployed respondents experienced high levels of stress at higher rates than employed respondents. This finding is different from another study, which found no differences between employment status and stress rates (Kazmi et al. 2020). Unemployed respondents in the current study experienced high levels of stress at even greater rates than healthcare workers. Unemployed individuals face challenges to earning incomes needed to survive during lockdown, likely increasing stress. All public offices in Bangladesh continue to pay workers in order to limit financial stress. The rate of anxiety symptoms among health professionals was 27.7%, which is

similar to a study on health workers in China (Lu et al. 2020). Following the outbreak of COVID-19, studies indicated that hospital staff, particularly doctors and nurses, who had engaged in SARS care more than a decade ago were at high risk of psychological disorders (Verma et al. 2004). Close interactions with COVID-19 patients and lack of protective equipment contribute to experiencing symptoms of anxiety.

Those in the older age group (40 years and older) reported a high rate of anxiety symptoms. This finding may be attributed to anxieties regarding the higher COVID-19 death rate among older individuals (Mahase 2020). Youth (23 years and younger) had a high prevalence of depressive symptoms. Individuals with elderly family members also had a high rate of depressive symptoms. The higher mortality rate for the elderly may also contribute to depressive symptoms, as individuals become aware of the health risks faced by their loved ones. The rate of anxiety symptoms among widows is higher than that of married or single individuals. However, older age typically acts as a confounder for this finding (Mahase 2020; Wang et al. 2020b).

Respondents who agreed that COVID-19 has disrupted life events and feared that “the worst is yet to come” were 47% and 81% respectively, which is similar to American findings (KFF 2020). Of the study sample, 77% believe the pandemic may affect their education, job, or income; this rate was 56% among Americans (KFF 2020). Almost half of respondents believed that COVID-19 would especially be detrimental to the mental health of those with physical health conditions, which is more than the rate among Americans (KFF 2020). Participants who believed that the healthcare system would be disrupted, as well as those who were unsure about the fate of the healthcare system, experienced high stress levels at greater rates than those who were confident in the country’s healthcare system. Recent research has suggested that 86.1% of the population believe Bangladesh does not have the economic or structural capacity to properly address COVID-

19, reflecting public perceptions of the rudimentary healthcare systems of Bangladesh (Islam & Siddika 2020).

This study is the first on mental health impacts of the COVID-19 pandemic in a Bangladesh context. Results establish a baseline of the mental health in Bangladesh during the beginning of the pandemic for other studies to expand on. Respondents from all divisions of Bangladesh were included in this study, which formed a large population-based sample. Piloting of the surveys ensured its suitability for collecting information in the study context and setting. This study identifies groups that may be particularly vulnerable to the deterioration of mental health during the COVID-19 pandemic in Bangladesh, such as those with chronic physical health conditions. These findings warrant consideration of easily accessible low-intensity mental health interventions during and beyond this pandemic that can be targeted for vulnerable subgroups.

However, this study was not free from limitations, including the snowballing of sample recruitment, which may suggest sampling bias by unintentionally excluding those who do not have access to internet. This recruitment strategy may also have contributed to the skewed demographic distribution of gender and occupation, with the current sample comprised of larger proportions of males and students while data from females and older adults is scarce. While this sampling bias limits the generalizability of findings, these demographics are likely to not have access to the survey or internet due to socioeconomic factors or gender- and age-based discrimination. Extensive research has shown these subpopulations to be even more vulnerable to mental health consequences, leading to the conclusion that the results of this study underestimate the true negative impact of the COVID-19 pandemic on mental health in the population. Limited research on this novel topic hinders the robustness of any one study's conclusions, especially given that there have not been any studies on the mental health impact of COVID-19 within the Bangladesh

context. The self-reported survey mode may also introduce response bias, as results likely differ from clinical diagnoses. Additionally, several confounding factors, such as Ramadan of Muslims (fasting months), domestic violence, and exposure to online media were not included in the survey.

Conclusion

This study observed a high prevalence of mental health symptoms in the general population of Bangladesh during the latest COVID-19 pandemic. The prevalence of mental health conditions in the adult population was lower (6.5% -31.0%) in pre-COVID-19 Bangladesh, which suggests that the pandemic may be responsible for increases in impaired mental health. Our findings indicates that this pandemic may strongly impact mental health outcomes such as anxiety symptoms, depressive symptoms, and acute or long-term post-traumatic stress disorders. Similar to other studies, socio-demographic factors and perceptions on COVID-19 were found to be associated with mental health symptoms.

Ethical approval

The research protocol was reviewed and approved by the Research Ethical Committee (REC) of the Department of Food Microbiology, Patuakhali Science and Technology University, Bangladesh (Approval no: FMB:22/04/2020:02). This study complied with the most recent revision of the Helsinki Declaration and followed the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines.

Disclosure statement

The authors declare that there are no conflicts of interest.

Informed consent

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

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Table 1: Prevalence of stress, anxiety and depressive symptoms across sociodemographic variables (n=1427)

Parameters	Category	% in the sample	% Stress (>10)	% Anxiety (>6)	% Depression (>9)
All			59.7	33.7	57.9
Age (years)	≤ 23	38.1	61.3	36.3***	62.8**
	24-39	48.6	58.2	28.9	56.0
	≥ 40	13.4	60.7	44.0	50.8
Gender	Male	71.5	55.2***	29.0***	55.3**
	Female	28.5	70.9	45.6	64.3
Marital status	Married	32.2	58.5*	42.0***	50.7***
	Unmarried	66.9	59.8	29.1	60.8
	Widow	0.8	100	83.3	100
Education level	Secondary	2.2	81.3***	87.5***	75.0
	Higher secondary	10.4	51.0	43.0	59.7
	Undergraduate	59.0	57.5	30.2	58.8
	Graduate	28.3	65.8	33.4	54.0
Occupation	Student	43.7	58.2**	26.9***	61.4***
	Health profession	7.1	63.4	27.7	59.4
	Employed-not health	25.4	56.4	28.2	42.3
	Business	9.7	58.7	55.8	66.7
	Unemployed	9.7	71.9	48.9	77.0
	Housewife	3.1	72.7	68.2	54.5
	Others‡	1.3	42.1	42.1	36.8
Family monthly income	≤ 20000 BDT	25.2	53.2**	29.5	55.2
	21000-40000 BDT	47.3	60.5	33.9	60.0
	>40000 BDT	31.2	63.8	36.9	57.1
Residence	Rural	55.9	58.8	26.6***	58.1
	Urban	44.1	60.8	42.7	57.6
Religion	Muslim	75.4	58.9	33.9	57.1
	Hindu	23.2	62.8	32.6	59.2
	Others†	1.40	50.0	40.0	80.0
Family size	≤ 4	51.9	58.4	35.4	57.6
	> 4	48.1	61.1	31.9	58.2
Child <5 years in family	Yes	26.3	57.3	33.1	54.4
	No	73.7	60.6	33.9	59.1
Elderly >50 years in family	Yes	76.4	60.9	31.7**	59.4*
	No	23.6	55.8	40.1	52.8

*Significant at P <0.05; **Significant at P <0.01; ***Significant at P <0.001

†Others included Buddhists, Christians etc. ‡Others included Farmers, Fisherman etc.

Table 2: Prevalence of stress, anxiety and depressive symptoms based on perceptions of COVID-19

Perceptions	Response	% in the sample	% Stress (>10)	% Anxiety (>6)	% Depression (>9)
1	A lot	47.7	65.0***	39.3***	64.0***
	Medium	27.5	52.4	28.0	53.2
	Some	19.8	59.4	24.0	51.9
	Not at all	5.0	50.7	50.7	49.3
2	A lot	28.0	68.0***	50.5***	67.0***
	Medium	35.5	66.9	35.9	64.1
	Some	28.9	47.3	17.7	44.9
	Not at all	7.6	42.6	22.2	44.4
3	I think so	59.8	65.2***	32.7*	60.9***
	I don't think so	23.3	40.5	30.6	47.7
	Don't know	16.8	66.7	41.7	61.3
4	The worst is behind us	5.6	70.0	62.5***	68.8
	The worst is yet to come	81.0	59.0	29.8	56.9
	Covid-19 is/will not be a major problem for Bangladesh	3.8	61.1	25.9	51.9
	Don't know	9.6	59.1	52.6	62.0
5	Yes	77.2	62.1***	33.1***	61.6***
	No	15.3	47.2	27.5	41.7
	Somewhat	7.5	60.7	52.3	52.3
6	Yes	55.0	64.7***	37.1**	63.2***
	No	10.7	42.5	26.1	37.3
	Somewhat	34.3	57.1	30.7	55.8

*Significant at P <0.05; **Significant at P <0.01; ***Significant at P <0.001

1. How much has your life been disrupted by the COVID-19 pandemic?
2. How much has the COVID-19 pandemic negatively affected your mental health?
3. Do you think the country's healthcare system will be overrun and people will not be able to get medical care?
4. Which of the following do you suspect about the trajectory of COVID-19 in Bangladesh?
5. Do you think COVID-19 will have a negative impact on your job/income/education?
6. Do you think COVID-19 will have a negative impact on the mental health of those with existing health conditions?

Table 3: Effects of sociodemographic variables on mental health (n=1427)

Variables	Stress	Anxiety	Depression
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age group (ref.: ≥ 40 years)			
≤ 23	-	1.56 (1.86-2.85)*	-
24 to 39	-	0.65 (0.42-0.83)***	-
Gender (ref.: female)			
Male	0.41 (0.31-0.54)***	0.37 (0.27-0.51)***	0.56 (0.43-0.74)***
Marital status (ref.: married)			
Unmarried	-	0.60 (0.39-0.93)*	-
Widowed	-	2.47 (0.38-15.94)	-
Education (ref.: graduate)			
Secondary	2.20 (0.79-6.14)	12.87 (3.89-42.54)***	2.30 (1.94-5.64)*
Higher secondary	0.58 (0.36-0.94)*	1.50 (0.87-2.59)	0.95 (0.61-1.50)
undergraduate	0.67 (0.48-0.93)*	1.12 (1.04-1.68)***	0.91 (0.67-1.25)
Occupation (ref.: employed)			
Student	1.47 (0.19-2.10)	0.77 (0.45-0.94)***	-
Health professional	1.82 (0.28-3.07)	1.02 (0.53-1.95)	-
Business	1.59 (0.98-2.57)	4.55 (2.76-7.52)***	-
Unemployed	3.2 (1.97-5.18)***	4.28 (2.47-7.40)***	-
Housewife	1.144 (0.51-2.58)	1.28 (0.56-2.91)	-
Others [‡]	0.844 (0.30-2.34)	1.58 (0.54-4.65)	-
Family income (ref.: >4000 BDT)			
≤ 20000	0.60 (0.43-0.85)**	0.67 (0.45-0.90)*	-
21000-40000	0.93 (0.70-1.24)	1.01 (0.75-1.37)	-
Residence (ref.: urban)			
Rural	-	0.45 (0.34-0.59)***	-
Religion (ref.: Muslim)			
Hindu	-	-	0.85 (0.65-1.12)
Others [†]	-	-	4.11 (1.33-12.67)*
Family size (ref.: > 4)			
≤ 4	-	1.40 (1.07-1.84)*	-
Elderly > 50 in family (ref.: yes)			
No	-	-	0.73 (0.55-0.97)*

*Significant at P <0.05; ** Significant at P <0.01; *** Significant at P <0.001

[†]Others included Buddhists, Christians etc. [‡]Others included Farmers, Fisherman etc.

Table 4: Effects of COVID-19 perceptions on mental health (stress, anxiety and behavior)

Perceptions	Stress	Anxiety	Depression
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Perception 1^a (ref.: not at all)			
A lot	1.59 (0.93-2.71)	0.88 (0.51-1.51)	1.63 (0.96-2.78)
Medium	1.10 (0.64-1.90)	0.55 (0.31-0.96)	1.14 (0.66-1.97)
Some	1.43 (0.81-2.50)	0.44 (0.25-0.79)	1.01 (0.57-1.77)
Perception 3^b (ref.: I don't think so)			
I think so	2.64 (2.0-3.48)***	0.82 (0.59-1.14)	-
Don't know	2.82 (1.97-4.03)**	0.77 (0.53-1.11)	-
Perception 4^c (ref.: COVID-19 is/will not be a major problem for Bangladesh)			
The worst is behind us	1.25 (0.58-2.72)	1.95 (1.07-3.56)***	0.91 (0.48-1.73)
The worst is yet to come	0.68 (0.37-1.25)	0.50 (0.33-0.76)	0.49 (0.32-1.76)
Don't know	0.75 (0.37-1.51)	0.33 (0.16-0.69)	0.47 (0.23-1.93)
Perception 5^d (ref.: no)			
Yes	1.57 (1.15-2.14)**	0.60 (0.39-0.93)	1.42 (1.11-2.21)**
Somewhat	1.71 (1.03-2.85)**	0.41 (0.24-0.69)	0.74 (0.45-1.22)
Perception 6^e (ref.: somewhat)			
Yes	-	-	1.10 (1.21-1.54)***
No	-	-	0.29 (0.44-0.66)***

*Significant at P <0.05; **Significant at P <0.01; ***Significant at P <0.001

^a How much has your life been disrupted by the COVID-19 pandemic?

^b Do you think the country's healthcare system will be overrun and people will not be able to get medical care?

^c Which of the following do you suspect about the trajectory of COVID-19 in Bangladesh?

^d Do you think COVID-19 will have a negative impact on your job/income/education?

^e Do you think COVID-19 will have a negative impact on the mental health of those with existing health conditions?

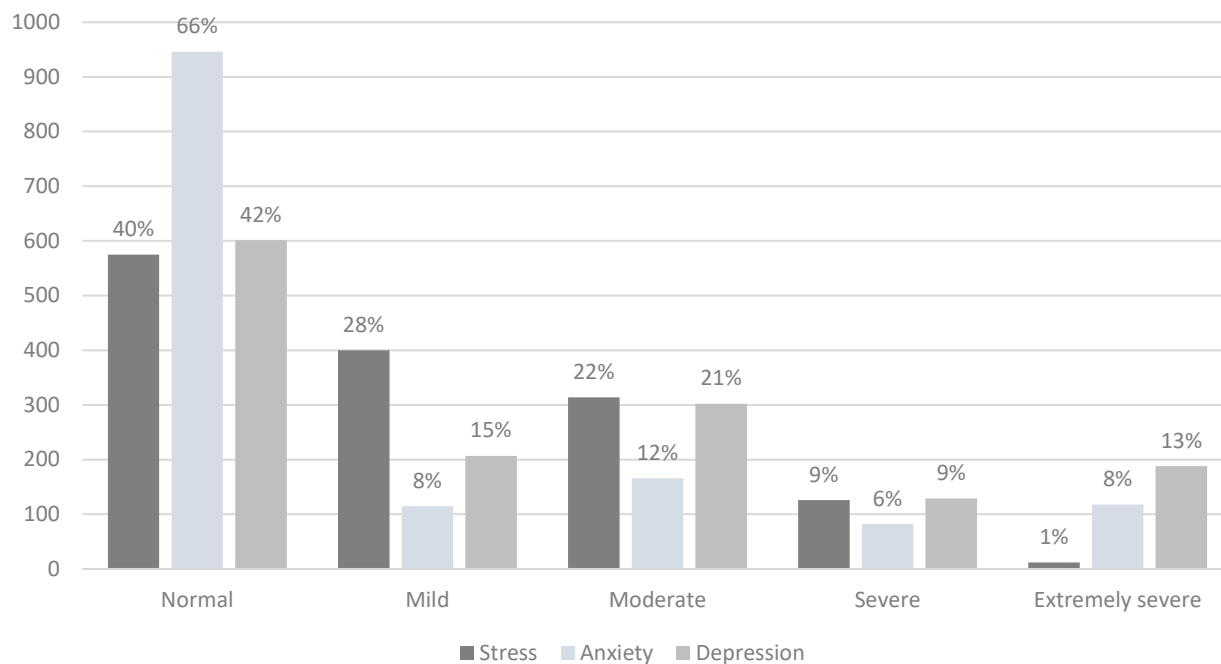


Figure 1: The rate of different severities of stress, anxiety and depression of the participants (n=1427)