

Research Article:

Psychological and Behavioural Effects of the COVID-19 Pandemic on Students: A Study on a Selected Public University in Bangladesh

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ABSTRACT

While the COVID-19 pandemic has far-reaching consequences on public health, little focus has been paid so far in empirical research on the psychological and behavioural effects of the COVID-19 pandemic on the students. As such, this study was intended to examine the psychological and behavioural effects of the COVID-19 pandemic on students. The study was conducted in Noakhali Science and Technology University (NSTU) in Bangladesh, employing a survey research design. Primary data were collected from a total of 150 undergraduate students selected from 17 academic departments of the NSTU based on snowball sampling. The study shows that the COVID-19 pandemic, with several protective measures to reduce the community transmission, has various adverse psychological effects on the students. The complexity of the pandemic is positively associated with the increase of their several psychological conditions such as anxiety, depression, tension, fear or panic, restlessness, boredom, and loneliness. The study reveals that the COVID-19 pandemic is also positively associated with the increase of several behavioural conditions of the students such as their time spent on social media, level of change in daily routine works, level of inattentiveness to study, and level of non participation in daily study. The study indicates that the association between the COVID-19 pandemic and the changes of several psychological and behavioural conditions of the students are statistically significant. Hence, the study opines that the COVID-19 pandemic adversely affects the mental health and well-being of the students. Further, the study suggests that the NSTU should set up an educational guidance and counselling centre in order to address the adverse psychological and behavioural conditions of the students during the pandemic or any other critical situation. Moreover, the families and teachers should play an important role to keep up the mental health and well-being of the students through motivation and individual counselling.

Keywords: COVID-19 pandemic, protective measures, psychological and behavioural conditions, mental health and well-being, educational counselling

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) has become one of the major global agendas these days. The COVID-19 is an infectious disease caused by a newly discovered virus known as SARS-CoV-2 that can spread from person to person. Since its outbreak in December 2019 in Wuhan, China, the COVID-19 has become a key growing public health concern around the world for its devastating multidimensional effects. As of 9 July 2020, a total of 11,874,227 (about 11.87 million) confirmed cases and 545,481 deaths were reported globally (World Health Organization, 2020). About 213 countries and territories in the world have been affected with this deadly virus. People are dying at alarming rates around the world from this virus. Everyone is at risk of getting infected with COVID-19 while older adults and people of any age with serious underlying medical conditions may be at higher risk (Centres for Disease Control and Prevention [CDC], 2020). As such, the outbreak of COVID-19 has been treated as a pandemic for its speedy transmission and deadly consequences across the globe (Suppawittaya et al., 2020; Vos, 2020). The pandemic has resulted in a dramatic increase of fatality rates across the world and caused far-reaching consequences not only on people's physical health but also on their mental health and well-being (Dubey et al., 2020; Li et al., 2020; Rajkumar, 2020; Suppawittaya et al., 2020; Zhang & Ma, 2020). To minimise the community transmission of the COVID-19, the international community has adopted several protective measures or mitigation strategies such as 'social distancing', 'physical distancing', 'self-quarantine', 'self-isolation', 'lockdown' and 'shutdown' which have caused serious impacts not only on people's lives but also on society as a whole (Bhat et al., 2020; Dubey et al., 2020; Khan et al., 2020; Nicola et al., 2020; Suppawittaya et al., 2020; United Nations [UN], 2020).

In view of the present situation, several social scientists, psychologists and psychiatrists have devoted themselves in conducting social research in order to investigate the psychological effects or the state of mental health of the individuals during the COVID-19 pandemic around the world. Banerjee and Rai (2020) propose that the COVID-19 pandemic has increased loneliness among people and thereby resulting in a number of psychosocial and physical problems including increasing social isolation, anxiety and insomnia, and disrupting social integration. Bhat et al. (2020) opine that the COVID-19 lockdown has caused diverse psychological, economic, social and health problems in Kashmir including an increase of anxiety and depression, loss of jobs, decrease of income and an increase of vulnerability to disease and infections, and so on. Dubey et al. (2020) indicate that the COVID-19 pandemic has resulted in multiple psychological effects including anxiety, depression, fear, boredom on the individuals while the nature of effects varies depending on the type of individuals. Hagerty and William (2020) assert that the mitigation strategies used to address the spread of infectious virus have negative consequences on individual and collective mental health. Jakovljevic et al. (2020) suggest that the COVID-19 pandemic has adversely affected public and global mental health by inducing several psychiatric individual and collective problems including panic, anxiety, depression, post-traumatic stress disorder, suspiciousness, and so on. Khan et al. (2020) claim that the COVID-19 pandemic has adverse effects on the physiological or mental health of the individuals by increasing their

anxiety, depression, fear, stress and other mental disorders. Li et al. (2020) show that the COVID-19 outbreak has adverse effects on people's mental health. They indicate that the 'negative emotions' such as anxiety, depression, and indignation have increased while the 'positive emotions' and the 'life satisfaction' have decreased. Liu et al. (2020) opine that the COVID-19 pandemic has resulted in anxiety, depression, phobia, and other psychological abnormalities among the individuals. They indicate that age, gender, knowledge about COVID-19 and the degree of worry about epidemiological infections have significantly influenced psychological status of the individuals.

Ozili (2020) suggests that the COVID-19 pandemic has affected social interaction and economic activities among the people of Africa and created social anxiety among them. Rajkumar (2020) proposes that the COVID-19 pandemic is associated with adverse mental consequences on the individuals including the symptoms of anxiety and depression, and self-reported stress, and so on. Suppawittaya et al. (2020) propound that during the COVID-19 pandemic, three social alteration methods such as social distancing, self-quarantine, and self-isolation have negatively affected people's mental health and well-being by inducing different psychological and psychiatric disorders including feelings of ostracism, stress, anger, depression, insomnia, and so on. Zhang and Ma (2020) assert that the COVID-19 pandemic has caused feelings of horrified and apprehensiveness among the local residents of Liaoning province, China and thereby has affected their mental health. In this regard, this is noteworthy that most of the studies available in the academia are based on the review of secondary sources. The psychological and behavioural effects of the COVID-19 pandemic have not yet received much attention in empirical research with special focus on the students. In other words, in empirical research, little focus has been placed up to now on examining the psychological and behavioural effects of the COVID-19 pandemic on the students.

Moreover, the availability of empirical studies concerning the psychological and behavioural effects of the COVID-19 pandemic on the students in Bangladesh perspective is far from satisfactory. Like most of the countries of the world, Bangladesh has been passing through a critical juncture during the COVID-19 pandemic. Most of the sectors of the country including public health, social, economic and educational areas have been badly affected as a consequence of this pandemic since March 2020 (Bodrud-doza et al., 2020; Emon et al., 2020). As part of preventive measures to reduce the transmission of the COVID-19, school closures have been a widely accepted method across the world which has adversely affected the global learning (Schleicher, 2020; World Bank, 2020). Bangladesh is not an exception. The education sector of Bangladesh has been severely affected since the inception of nationwide school closures in mid-March 2020. All educational activities including conducting class and exams have been shut down or suspended (Emon et al., 2020). The educational sector of Bangladesh is on the threshold of volatility, uncertainty and session-jams. The closures of schools and several protective measures during the COVID-19 pandemic have badly affected students' mental health by causing several psychological and behavioural changes among them (Islam et al., 2020; Khan et al., 2020). Like that of other public universities in Bangladesh, the students of

the Noakhali Science and Technology University (NSTU) are unwilling to participate in the online classes conducted by the faculty members and are reluctant to prepare assignments and perform other educational activities in response to the complexity of the COVID-19 pandemic. However, no comprehensive empirical study has been carried out so far in Bangladesh context in order to investigate the psychological and behavioural effects of the COVID-19 pandemic on the students so that proper policy could be undertaken. As such, the study is intended to examine the psychological and behavioural effects of the COVID-19 pandemic on the students of a public university in Bangladesh. In this regard, the study attempts to investigate the psychological and behavioural conditions among the students during the COVID-19 pandemic. The study also seeks to find out the nature and significance of association between psychological and behavioural changes among the students and the complexity of COVID-19 pandemic in Bangladesh.

METHODOLOGY

Research Design and Participants

The study employed survey research design involving a cross-sectional study where samples were observed at one point in time (Babbie, 2010). Hence, the research is basically quantitative in nature. As Creswell states, a survey design involves a quantitative analysis of trends, attitudes or opinions of a population by studying a sample of that population (Creswell, 2014). The study was deliberately carried out in NSTU – a public university of Bangladesh. About 7000 students have been pursuing higher education in 30 academic departments at the NSTU in a wide range of areas. A total of 17 academic departments were purposively selected for this sample survey. Based on snowball sampling, a total of 150 respondents were chosen from the undergraduate students of the 17 academic departments. Due to the closure of the university arising out of the intensity of the COVID-19 pandemic in Bangladesh, it was very tough to locate the participants for interview. Hence, the snowball sampling was the best option. Snowball sampling is very useful when there is a difficulty to identify the sampling units to be included in the sample or when the samples with the target characteristics may not be easily accessible (Sharma, 2017). As such, the researcher consciously employed snowball sampling where the participants were selected using networks (Dragan & Isaic-Maniu, 2013; Kumar, 2011). The class representatives (CRs) of several batches of the 17 academic departments were first contacted by turns over phone using university diary and then they were asked to provide the names and contact numbers of some of their classmates and finally those classmates were asked to provide the names and contact numbers of their classmates or friends from their networks, who were willing to participate in this research. In this way, 150 samples were selected by using snowball sampling. Table 1 shows the descriptive statistics of the respondents' characteristics in terms of four variables which involve the respondents' department, sex, academic year and age.

Table 1. Descriptive statistics of the respondents' characteristics

Variables		Frequency	%
Department	AGR	8	5.3
	BGE	7	4.7
	BLWS	9	6.0
	CSTE	8	5.3
	ECO	6	4.0
	EDU	10	6.7
	EEE	8	5.3
	ENG	15	10.0
	ESDM	7	4.7
	LW	10	6.7
	MATH	9	6.0
	MICRO	6	4.0
	MIS	10	6.7
	OCEAN	6	4.0
	PHARM	8	5.3
	SOC	14	9.3
	THM	9	6.0
	Total	150	100.0
Sex	Male	58	38.7
	Female	92	61.3
	Total	150	100.0
Academic Year	First year	16	10.7
	Second year	35	23.3
	Third year	56	37.3
	Fourth year	43	28.7
	Total	150	100.0
		Mean	Median & SD
Age		21.51	22.00

Notes: AGR = Agriculture; BGE = Biotechnology and Genetic Engineering; BLWS = Bangladesh and Liberation War Studies; CSTE = Computer Science and Telecommunication Engineering; ECO = Economics; EDU = Education; EEE = Electrical and Electronic Engineering; ENG = English; ESDM = Environmental Science and Disaster Management; LW = Law; MATH = Applied Mathematics; MICRO = Microbiology; MIS = Management Information Systems; OCEAN = Oceanography; PHARM = Pharmacy; SOC = Sociology; THM = Tourism and Hospitality Management.

Source: Fieldwork, July/August, 2020

As illustrated in Table 1, a majority (10.0%) of the respondents were drawn from the English (ENG) Department, followed by the Sociology (SOC) Department (9.3%). It is found that the Education (EDU) Department, the Law (LW) Department and the Management Information Systems (MIS) Department each shares 6.7% of the respondents. However, the Bangladesh and Liberation War Studies (BLWS) Department, the Applied Mathematics (MATH) Department, and the Tourism and Hospitality Management (THM) Department each shares 6% of the respondents. The Agriculture (AGR) Department, the Computer Science and Telecommunication Engineering (CSTE) Department, the Electrical and Electronic Engineering (EEE) Department, the Pharmacy (PHARM) Department each shares 5.3% of the respondents. The Biotechnology and Genetic Engineering (BGE) Department and the Environmental Science and Disaster Management (ESDM) Department each shares 4.7% of the respondents while the Economics (ECO), the Microbiology (MICRO) Department, and the Oceanography (OCEAN) Department each shares 4.0% of the respondents. It is evident that 61.3% of the respondents were males and the rest (38.7%) were females. It is observed that the third year represents the highest proportion (37.3%) of the respondents, followed by the fourth year (28.7%), the second year (23.3%), and the first year (10.7%). As to age, the mean age of the respondents was 21.51 years with a standard deviation of 1.320 years while their median age was 22 years.

Measurement and Data Collection

The 5-point Likert type scale was used to rate the views or perceptions of the respondents pertaining to their psychological and behavioural conditions during the COVID-19 pandemic. On the scale, 1 indicated 'not at all'; 2 indicated 'slightly'; 3 indicated 'moderately'; 4 indicated 'much' and 5 indicated 'very much'. Hence, students' psychological and behavioural conditions were measured on an ordinal scale. Students' psychological conditions were defined as changes in their mental states during the pandemic which were measured on the basis of seven items such as level of anxiety, level of depression, level of tension, level of restlessness, level of fear or panic, level of boredom, and level of loneliness while their behavioural conditions were defined as changes in their daily forms of behaviour during the pandemic which were measured based on four items involving spending time in social media, level of change in daily routine works, level of inattentiveness to study, and level of nonparticipation in daily study. The Cronbach's alpha was used in order to find out the reliability of the items of the measurement. The Cronbach's alpha coefficient for the seven items pertaining to psychological conditions of the students was .922 (greater than .70), and the Cronbach's alpha coefficient for the four items pertaining to behavioral conditions of the students was .890 (greater than .70) which indicated that the items of scales in the measurement were reliable (Taber, 2017).

In order to gain a better understanding of the context, the study employed both types of data – primary and secondary. Given the countrywide school closures during the COVID-19 pandemic in Bangladesh, primary data for this survey were collected from the samples through telephone interview conducted by the researcher himself and his team by

means of a structured questionnaire. In this regard, this is to note that the questionnaire was developed via some steps. First, the researcher went through the relevant literature available in the academia to get familiarity with psychological conditions and mental health of the individuals during the COVID-19 pandemic. Second, the researcher developed an interviewer-administered questionnaire incorporating the closed-ended questions relating to psychological and behavioural conditions of the students during this pandemic. Third, the developed questionnaire was tested among a group of the students of the Department of Sociology, NSTU to ensure its reliability and validity. Then the questionnaire was revised on the basis of pre-test evaluation by the researcher, and after that the final version of the questionnaire was prepared. The sample survey was carried out from 5 July 2020 to 4 August 2020. The researcher maintained honesty and sincerity in the course of his fieldwork. Secondary data were obtained from several journal articles, research reports, bulletins, and so on.

Data Analysis

Primary data were analysed using both descriptive and inferential statistics which involved frequency distribution, percentage, central tendency, and hypothesis test. Since the data were measured on an ordinal scale, median was appropriately used instead of mean to assess the psychological and behavioural conditions among the students during the COVID-19 pandemic. In this study, the complexity of COVID-19 pandemic was viewed as an independent variable and the corresponding psychological and behavioural changes among the students were treated as the dependent variables. Both variables were defined on an ordinal scale. Since the data were measured on an ordinal scale and the samples were not randomly drawn from a normally distributed population, Kendall's *tau-b* test – a type of nonparametric test – was suitably employed to find out the nature and significance of association between psychological and behavioural changes among the students and the complexity of COVID-19 pandemic in place of Pearson's Correlation Coefficient or Spearman's Correlation Coefficient (Corder & Foreman, 2009; Nachmias & Nachmias, 2008). All statistical applications were duly performed by SPSS software.

RESULTS

Table 2 shows the COVID-19 situation in Bangladesh which was measured by three variables such as the complexity of COVID-19 pandemic, the interruption of university education, and keeping social distance.

Table 2. The COVID-19 situation in Bangladesh

Questions	Variables	Frequency	%
To what extent is the COVID-19 pandemic complex in Bangladesh? (the complexity of COVID-19 pandemic)	Not at all	–	–
	Slightly	–	–
	Moderately	6	4.0
	Much	84	56.0
	Very much	60	40.0
	Total	150	100.0
To what extent has your university education been interrupted? (the interruption of university education)	Not at all	–	–
	Slightly	–	–
	Moderately	–	–
	Much	74	49.3
	Very much	76	50.7
	Total	150	100.0
To what extent are you keeping social distance? (social distancing)	Not at all	–	–
	Slightly	–	–
	Moderately	17	11.3
	Much	92	61.3
	Very much	41	27.3
	Total	150	100.0

Source: Fieldwork, July/August, 2020

As shown in Table 2, the majority (56%) of the respondents said that the COVID-19 pandemic was much complex in Bangladesh while 40% of the respondents stated that it was very much complex. This is noteworthy that only 4% of the respondents reported that the COVID-19 pandemic was moderately complex in Bangladesh. As can be seen, the majority (50.7%) of the respondents reported that their university education was very much interrupted during the COVID-19 pandemic while the rest (49.3%) of the respondents reported that their university education had been much interrupted. It is evident that the large majority (61.3%) of the respondents stated that they were keeping social distance much as a protective measure while 27.3% of the respondents reported that they were keeping social distance very much. However, only 11.3% of the respondents reported that they were keeping such distance moderately.

Table 3 shows the students' psychological conditions during the COVID-19 pandemic.

Table 3. Students' psychological conditions during the COVID-19 pandemic

No.	Measurement Items/ Indicators	Mean	Median	SD	Rating
1	The extent to which the students are anxious during the COVID-19 pandemic (level of anxiety)	4.16	4.00	.686	Much
2	The extent to which the students are depressed during the COVID-19 pandemic (level of depression)	3.87	4.00	.762	Much
3	The extent to which the students are tensed during the COVID-19 pandemic (level of tension)	4.01	4.00	.733	Much
4	The extent to which the students are restless during the COVID-19 pandemic (level of restlessness)	3.89	4.00	.761	Much
5	The extent to which the students are frightened during the COVID-19 pandemic (level of fear or panic)	4.16	4.00	.686	Much
6	The extent to which the students are bored during the COVID-19 pandemic (level of boredom)	4.21	4.00	.648	Much
7	The extent to which the students are feeling loneliness during the COVID-19 pandemic (level of loneliness)	3.62	3.00	.711	Moderately

Note: Not at all = 1; Slightly = 2; Moderately = 3; Much = 4; Very much = 5

As shown in Table 3, the students were much anxious during the COVID-19 pandemic since the median is 4.00 on a scale of 5.00. The students were much depressed during this pandemic since the median is 4.00. The students were much tensed during this pandemic (median = 4.00). The students were much restless during this pandemic (median = 4.00). The students were much frightened during this pandemic (median = 4.00). The students were much bored during this pandemic (median = 4.00). However, it is evident that the students were feeling loneliness moderately during this pandemic (median = 3.00). Hence, it may be stated that the COVID-19 pandemic in Bangladesh resulted in much psychological changes among the students excepting their level of loneliness where moderate change was observed.

Table 4 shows the students' behavioural conditions during the COVID-19 pandemic.

As shown in Table 4, the students were spending time much in social media during the COVID-19 pandemic (median = 4.00). The students' daily routine works changed much during this pandemic (median = 4.00). The students were much inattentive to study during this pandemic (median = 4.00). This is also evident that the students were not participating much in their daily study during this pandemic (median = 4.00).

Table 4. Students' behavioural conditions during the COVID-19 pandemic

No.	Measurement Items/ Indicators	Mean	Median	SD	Rating
1	The extent to which the students are spending time in social media during the COVID-19 pandemic (level of spending time in social media)	4.26	4.00	.650	Much
2	The extent to which the students' daily routine works change during the COVID-19 pandemic (level of change in daily routine works)	4.17	4.00	.588	Much
3	The extent to which the students are inattentive to study during the COVID-19 pandemic (level of inattentiveness to study)	4.21	4.00	.651	Much
4	The extent to which the students are not participating in their daily study during the COVID-19 pandemic (level of nonparticipation in daily study)	4.27	4.00	.631	Much

Note: Not at all = 1; Slightly = 2; Moderately = 3; Much = 4; Very much = 5

Table 5 shows the hypotheses testing results summary which reveals the nature and significance of association between students' psychological and behavioural conditions and the complexity of COVID-19 pandemic. As stated earlier, the complexity of COVID-19 pandemic was viewed as an independent variable while the corresponding psychological and behavioural changes among the students during this pandemic were viewed as dependent variables.

Table 5. The hypotheses testing results summary

No.	Research hypotheses (H_a)	Value (τ)	Nature of association	Alpha-value	p -value
1	There is an association between students' anxiety and the complexity of COVID-19 pandemic*	.724	Positive	0.01	.000
2	There is an association between students' depression and the complexity of COVID-19 pandemic*	.597	Positive	0.01	.000
3	There is an association between students' tension and the complexity of COVID-19 pandemic*	.689	Positive	0.01	.000
4	There is an association between students' restlessness and the complexity of COVID-19 pandemic*	.576	Positive	0.01	.000
5	There is an association between students' fear/panic and the complexity of COVID-19 pandemic*	.744	Positive	0.01	.000
6	There is an association between students' boredom and the complexity of COVID-19 pandemic*	.756	Positive	0.01	.000

(Continued on next page)

Table 5. (Continued)

No.	Research hypotheses (H_a)	Value (τ)	Nature of association	Alpha-value	p -value
7	There is an association between students' loneliness and the complexity of COVID-19 pandemic'	.494	Positive	0.01	.000
8	There is an association between students' spending time in social media and the complexity of COVID-19 pandemic'	.650	Positive	0.01	.000
9	There is an association between students' daily routine works change and the complexity of COVID-19 pandemic'	.626	Positive	0.01	.000
10	There is an association between students' inattentiveness to study and the complexity of COVID-19 pandemic'	.791	Positive	0.01	.000
11	There is an association between students' nonparticipation in daily study and the complexity of COVID-19 pandemic'	.823	Positive	0.01	.000

Note: *Statistically significant at 99% level of confidence (p -value < 0.01); Statistical test used = Kendall's τ - b

As shown in Table 5, the complexity of COVID-19 pandemic is positively associated with various psychological and behavioural conditions of the students involving level of anxiety ($\tau = .724$), level of depression ($\tau = .597$), level of tension ($\tau = .689$), level of restlessness ($\tau = .576$), level of fear or panic ($\tau = .744$), level of boredom ($\tau = .756$), level of loneliness ($\tau = .494$), level of spending time in social media ($\tau = .650$), level of change in daily routine works ($\tau = .626$), level of inattentiveness to study ($\tau = .791$), and level of nonparticipation in daily study ($\tau = .823$). All the research hypotheses were accepted at 99% confidence level. It is observed that the associations between the complexity of COVID-19 pandemic and the corresponding psychological and behavioural changes among the students such as level of anxiety (p -value < 0.01), level of depression (p -value < 0.01), level of tension (p -value < 0.01), level of restlessness (p -value < 0.01), level of fear or panic (p -value < 0.01), level of boredom (p -value < 0.01), level of loneliness (p -value < 0.01), level of spending time in social media (p -value < 0.01), level of change in daily routine works (p -value < 0.01), level of inattentiveness to study (p -value < 0.01), and level of nonparticipation in daily study (p -value < 0.01) are statistically significant.

DISCUSSION

The study has identified that the complexity of COVID-19 pandemic in Bangladesh is positively associated with the increase of anxiety among the students and the association is statistically significant. As such, the study opines that the COVID-19 pandemic has a significant effect on the increase of anxiety among the students. Hence, this finding is consistent with the findings presented by a number of studies (Banerjee & Rai, 2020; Bhat et al., 2020; Dubey et al., 2020; Islam et al., 2020; Khan et al., 2020; Li et al.,

2020; Liu et al., 2020; Ozili, 2020; Rajkumar, 2020). The study points out that the complexity of COVID-19 has a significant positive association with the increase of depression among the students. As such, this result is similar with that of other studies (Bhat et al., 2020; Dubey et al., 2020; Islam et al., 2020; Jakovljevic et al., 2020; Khan et al., 2020; Li et al., 2020; Liu et al., 2020; Rajkumar, 2020; Suppawittaya et al., 2020). The study indicates that the complexity of COVID-19 has a significant positive association with the increase of tension among the students. Hence, this finding is similar with the findings put forward by several researchers (Jakovljevic et al., 2020; Khan et al., 2020; Suppawittaya et al., 2020). The study reveals that the complexity of COVID-19 pandemic has a significant positive association with the increase of restlessness among the students. Thus, this finding is similar with the findings presented by some researchers (Wang et al., 2020). The study points out that the complexity of COVID-19 pandemic has a significant positive association with the increase of fear or panic. As such, this finding is identical with the findings presented by several researchers (Dubey et al., 2020; Khan et al., 2020; Liu et al., 2020; Zhang & Ma, 2020). The study opines that the complexity of COVID-19 has a significant positive association with the increase of boredom among the students. Hence, the result of the study is in line with the findings presented by several researchers (Chao et al., 2020; Dubey et al., 2020). The study claims that the complexity of COVID-19 pandemic has a significant positive association with the increase of loneliness among the students. Thus, this finding is similar with the finding presented by Banerjee and Rai (2020).

The study indicates that the complexity of COVID-19 pandemic has a significant positive association with spending time in social media. This finding is consistent with the findings put forward by several researchers (Chao et al., 2020; Donthu & Gustaffson, 2020; Emon et al., 2020). The study reveals that the complexity of COVID-19 pandemic has a significant positive association with the change in daily routine works. This finding is similar with the finding presented by Ojetunde et al. (2020). The study claims that the complexity of COVID-19 pandemic has a significant positive association with the increase of inattentiveness to study and nonparticipation in daily study among the students. However, these findings have not been yet highlighted in the academia. The study argues that the students' increased inattentiveness towards study and nonparticipation in daily study might be due to their adverse psychological conditions arising out of preventive measures, especially lockdown, social distancing, and the interruption of their university education. In view of the aforesaid discussion, the psychological and behavioural effects of the COVID-19 pandemic on the students can be depicted in Figure 1.

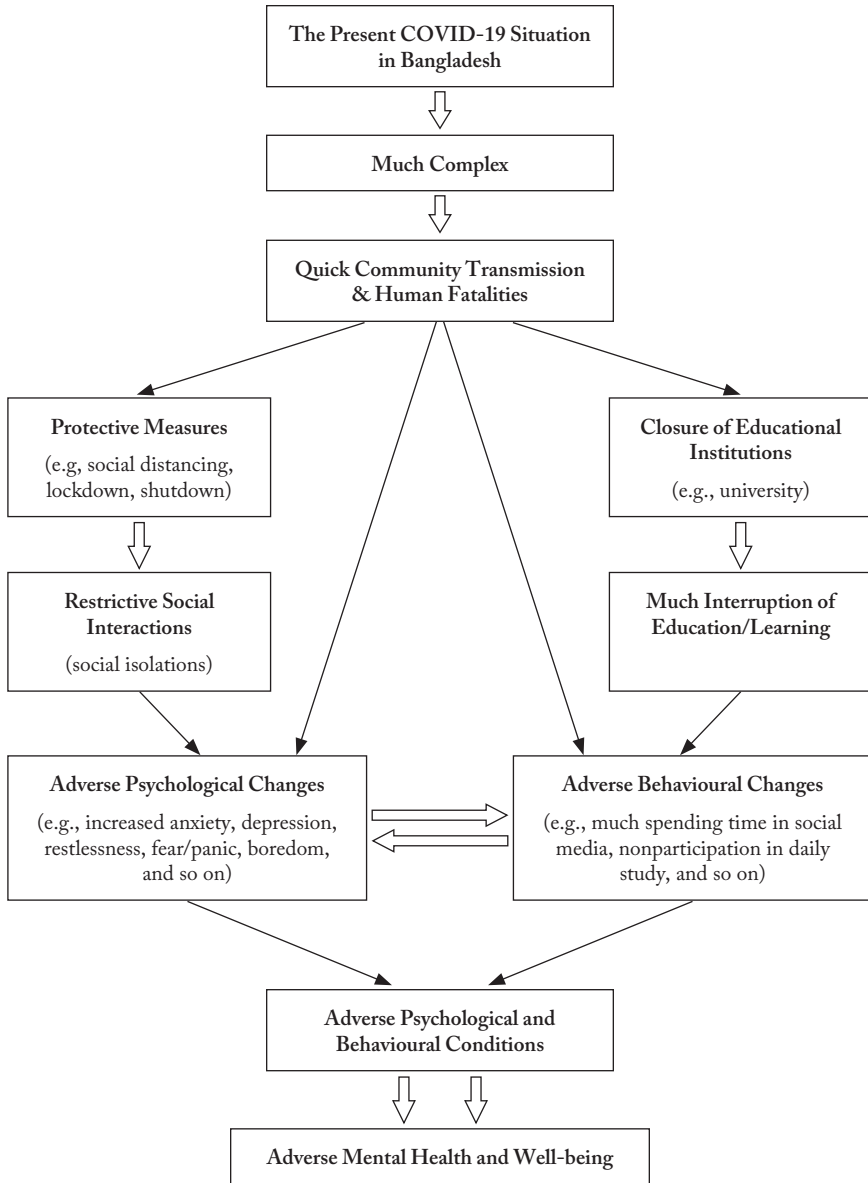


Figure 1. Psychological and behavioural effects of the COVID-19 pandemic

As shown in Figure 1, the present COVID-19 situation in Bangladesh is much complex or critical since it involves quick community transmission of this deadly virus and human fatalities at an alarming speed. Given the present situation, several protective measures have been adopted by the Bangladesh Government to reduce the community transmission and human fatalities. Moreover, all educational institutions have been closed since the mid-March 2020 across the country. The protective measures, in particular social distancing, lockdown and shutdown have restricted social interactions among the students that have caused their social isolations (Artaza, 2020; Banerjee & Rai, 2020; Emon et al., 2020). On the other hand, the closure of educational institutions has much interrupted university education of the students. As such, restrictive social interactions and the risk of community transmission and human fatalities may result in several psychological effects among the students including the increase of anxiety, depression, tension, fear or panic, boredom and loneliness. Similarly, much interruption of academic activities and the risk of community transmission and human fatalities may cause several behavioural changes among the students such as the increase of spending time in social media and nonparticipation in daily study.

The COVID-19 pandemic, therefore, has caused various adverse psychological and behavioural changes among the students including increase of their anxiety, depression, tension, fear or panic, restlessness, loneliness, boredom, and so on and thereby badly affects their mental health and well-being. However, the psychological changes and behavioural changes among the students can influence each other. For example, spending much time in social media may result in an increase of anxiety and fear (Gao et al., 2020; Wang et al., 2020). However, an increase in anxiety and fear may cause students' nonparticipation in daily study much during the COVID-19 pandemic. While the findings of the study are in line with the findings presented by a number of studies (Banerjee & Rai, 2020; Bhat et al., 2020; Dubey et al., 2020; Gao et al., 2020; Islam et al., 2020; Li et al., 2020; Hagerty & William, 2020; Rajkumar, 2020; Suppawittaya et al., 2020; Zhang & Ma, 2020), they have not examined both psychological and behavioural effects of the COVID-19 pandemic. Moreover, unlike the present study, the recent studies have not focused on the interplay of various social, psychological and behavioural factors associated with the adverse psychological and behavioural conditions of the students arising out of the COVID-19 pandemic.

CONCLUSION AND LIMITATIONS

It may be argued that the present COVID-19 pandemic is much complex in Bangladesh. Several psychological and behavioural changes have taken place among the students during this pandemic. The study shows that level of anxiety, level of depression, level of tension, level of fear or panic, level of restlessness, level of boredom, level of loneliness, level of spending time in social media, level of change in daily routine works, level of inattentiveness to study, and level of nonparticipation in daily study have increased during the COVID-19 pandemic. The study indicates that the variables pertaining to

psychological and behavioural changes among the students are all positively associated with the COVID-19 pandemic. Moreover, the associations between the COVID-19 pandemic and the variables corresponding to psychological and behavioural changes among the students are statistically significant. As such, the study argues that psychological and behavioural effects of the COVID-19 pandemic on the students adversely affect their mental health well-being. The COVID-19 pandemic is positively associated with increase of inattentiveness to study and nonparticipation in daily study among the students. While online classes are going on within small scale, the overall academic activities of the students have been greatly hampered due to their inattentiveness to study and nonparticipation in daily study.

As such, this is imperative to address the adverse psychological and behavioural conditions of the students and keep up their mental health and well-being during this pandemic. One of the effective ways to mitigate the adverse psychological and behavioural conditions and promote the mental health of the students could be the establishment of the centre for educational guidance and counselling at the NSTU. In this regard, this is necessary to appoint some educational counsellors or psychologists who could assist the students to cope with any critical situation or the environment alien to them. Moreover, the families and the teachers should play an instrumental role to keep up mental health and well-being of the students by means of motivations and individual counselling. While the study carries much significance from academic and policy perspectives, it has two important limitations. Firstly, the study employed snowball sampling – a type of non-probability sampling – to select samples from the target population. Hence, it might reduce the external validity in the research. However, to address this limitation, nonparametric test was consciously used. Secondly, the study was mainly a quantitative research in which respondents' perceptions and motives of individual behaviour were not studied in-depth. As such, the study proposes the need for conducting an empirical study employing a mixed approach involving both quantitative and qualitative methods to examine psychological and behavioural conditions of the students during this pandemic.

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