



Research article

The impact of COVID-19 on tertiary educational institutions and students in Bangladesh

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ABSTRACT

The COVID-19 forced to transform face-to-face mode of teaching to virtual in educational institutions around the globe that not only impact institutional stakeholders, but also posed as a threat to entire humanity because, all parties related to education had to change their activities. The intentions of this study therefore firstly, to determine the content analysis by interviewing tertiary students and secondly, to determine the frequency distribution by questionnaire developed from results of the content analysis. To better understand the consequences of this outbreak, we took an interview from forty respondents, including undergraduate and postgraduate students across Bangladesh. Results of Content analysis revealed that stakeholders of tertiary education are encountering severe problems in mental health, financial, technical, and study. A questionnaire was designed based on results were obtained through content analysis and distributed using email, WhatsApp, LinkedIn, Telegram, Facebook, and Instagram from May 20 to May 30, 2021. A total number of 505 valid questionnaires were received from respondents. Frequency distribution analysis disclosed that 60% respondents have no separate reading rooms. Laptops and desktops are commonly used for online classes, but unfortunately, 21% respondents have no personal electronic gadgets. Moreover, 55% reported spending less time to study during the coronavirus outbreak. Furthermore, 88% respondents reported experiencing mental health-related stress, anxiety, and depression problems. The proportion that suffered financial crisis, family disruptions, internet and technology related problems were 79%, 83% and 72% respectively. Since coronavirus pandemic is a totally new phenomenon in the world, not much empirical literature exist. So we fill the gap, investigating the issue empirically using content and frequency distribution analysis. Policy implications and recommendations are discussed accordingly.

1. Introduction

The world has witnessed different kinds of pandemics from the Spanish flu to COVID-19, but the consequences of current SARS-CoV-2 has broken all the previous records, providing a red signal to mankind (Ali, 2020; Sahu, 2020). World Health Organization (WHO) denoted coronavirus as deadly virus that can destroy lives. In the first place, the mild cold symptom appears, and that could outstretch as a severe illness later on (Camacho-Zuñiga et al., 2021; Lopes and McKay, 2020). The virus was first discovered in China. Then, scientists were of the view that this virus could be transmitted from animals to humans (Muthuprasad et al., 2021). The word "CORONA" is a Latin word that could be denoted

as halo or crown. As of 12 December 2020, 74 million people were infected with the deadly virus, and Bangladesh is no exemption. The world has seen its bad side by losing 3.87 million people across the globe and 1.3k in Bangladesh¹. The pandemic is not only impacting the health issues but also social, political, economic, and religious (Nicola et al., 2020). In the same vein, the education sector is also experiencing the spillover effect of the pandemic. Since the erudite scientists are yet to discover an effective vaccine for this deadly virus, educational institutions have turned towards the use of online tuition methods for delivering all sorts of services, including teaching and administrative work (Murphy, 2020). It is inevitable that in order to adopt a new online setting, stakeholders of tertiary education are experiencing different

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kinds of challenges that need to be addressed by the respective authorities on a priority basis (Mok et al., 2021).

According to UNESCO report of April 2020, 1.57 billion students have been impacted by COVID-19 across the world because almost every country strictly closed their schools, from primary to tertiary (UNESCO, 2020). The main intention of this closure is to protect higher education institutions as well as students from the deadly coronavirus, which is found to be very contagious. However, the closures have several effects on students and teachers not only directly, but through many other sectors that are indirectly related to educational institutions (Nicola et al., 2020). As nobody knows when this problem could be solved, many institutions around the world started to adopt online teaching instead of face to face. In this case, students, as well as lecturers, began to experience some unique problems that they never encountered before (Al-Amin et al., 2021).

Moreover, the pandemic has drastically impacted on students who are from the middle-class family. In a normal situation, the school authority provides free or subsidised food for students, which is no more possible during the era of coronavirus (Rundle et al., 2020). As a result, parents were under intense pressure during the crisis period due to increased childcare cost even when many had lost their jobs. Similarly, tertiary students also were unable to perform their part-time jobs and other income generating activities due to the lockdown (Owusu-Fordjour et al., 2020). The situation could cause students to drop out from school, which could be a severe threat for any country in the long term (Chen et al., 2011). More importantly, besides the threat of students dropping out of school, income inequality has a significant impact on the online learning setting (Beaunoyer et al., 2020; Blundell et al., 2020). Students who cannot afford to buy high speed internet or electronic devices, are deprived from enjoying the full benefits of E-learning (Murphy, 2020). Besides, Philip Smith reported on 17 April 2020, on how parents have become worried about high school fees in the United Kingdom (Smith, 2020). Many parents were asking school authorities to provide sufficient tuition fee waiver. Similar calls were also made in the United Arab Emirate, where around 14000 guardians had signed to request for a reduction in school fees by 30 percent (Times, 2020).

However, it is indisputable that the consequences of COVID-19 pandemic would not be positive for any country. Chen et al. (2011) investigated the economic and social impact of school closure in Taiwan during influenza epidemic in 2009. They found that due to a short period (one week) of school closure, 27 percent of household could not attend their workplace and 18 percent lost their jobs. In the same vein, Cauchemez et al. (2009) also reported that closing schools during influenza H1N1 pandemic in the United States had a significantly negative impact on the economy as well as students' mindset, but positively reduce the impacted cases. In September 2009, Brookings Institution advocated that if one household in New York City cannot work for one week to take care of children due to school closure, it would have financial cost USD 142 (Lempel et al., 2020). This study also indicated that if New York City remains close for four weeks, the financial cost would be USD 1.1 billion. In this situation, if the entire country closes for 12 weeks, the cost would be 1 percent of total gross domestic product (GDP). On the contrary, during the influenza pandemic in 2009, cost suffered by the UK was 3 percent of GDP (Keogh-Brown et al., 2010).

Likewise, in order to accelerate medical research and support frontline medical personnel, many countries have stopped funding various research activities except for medical. For example, National Institute of Health Research in UK has declared on March 19, 2020, all researchers who were dealing in academia and handling non-COVID-19 associated research should stop for a while their ongoing research and asked them to provide help to initiatives in COVID research (NIHR, 2020). Similarly, National Institute of Health in the United States stopped all non-important or non-medical related research to use resources, researchers, and funds for COVID pandemic (NIH, 2020). In respect to NIH's announcement, the Harvard university closed all their social science and non-pure science related research. Besides, most of the

scheduled conferences before the onset of the COVID-19 pandemic were either shifted to virtual or cancelled (Impey, 2020). Through cancellation of scientific conferences, many research scholars failed to share their scientific contribution towards academia. Thus, this platform is considered the best place for prolific researchers and job seekers to network with scholars from different countries. Therefore, based on the above mentioned problem, this study investigates the impact of COVID-19 pandemic on tertiary educational institution and students in Bangladesh. More specifically, we have two research objectives, which is firstly, to determine the content analysis by interviewing tertiary students that will help to find out real problems they are encountering and secondly, to determine the frequency distribution by questionnaire developed from results of the content analysis.

In addition to the introductory section, the rest of this paper is organised as follows: State of the art dealing with most relevant and vital literature are highlighted in section 2. Section 3 presents the research methodology, data and empirical models. Section 4 reports statistical findings and discussions based on economic intuition, and section 5 outlines the concluding remarks by providing concrete policy implications.

2. Review of related study

This section provides a complete and comprehensive picture of previous empirical studies and findings that emerged with two strands. Firstly, the impact of COVID-19 on educational institutions. The second strand highlights the rapport between COVID-19, socio-economic impact and educational sector sustainability.

The first strand of the literature describes the COVID-19 and tertiary education nexus. Even though novel coronavirus situation suddenly changed all aspects of the economy, including education sectors, scholars tried to examine its impact and in order to provide a fruitful solution to carry on with the new normal way of life. Since data is unavailable, most erudite researchers concentrated their work from review perspectives rather than statistical. Table 1 shows that most scholars scrutinized the impact of COVID-19 on education from the US, Philippines, Nigeria, Ghana, Spain, Zambia, and India. There are very limited scientific articles from Bangladesh even though Bangladeshi universities are producing lot of graduates who are contributing globally. Therefore, this study contributes to the body of knowledge by mitigating research gap through investigating the issue from Bangladesh higher education perspective.

Table 1 further shows that most of the scientists prescribed that COVID-19 has a negative impact on educational system and institutions. For instance, Iyer et al. (2020) highlighted that Dental Colleges in United States should revisit their policies and strategies to accelerate all study-related activities. The authors further suggested that school authorities shall continue their activities through Telecommuting, which could help all stakeholders such as students, patience and school authorities as well. On the other hand, Mukuka et al. (2021) found that Zambia's secondary school students are encountering manifold difficulties while doing online mathematics class. The authors further reported that 56 percent students did not have sufficient access to internet, electricity, information and communication technologies. In the same vein, Yekefallah et al. (2021) discovered that 59 percent students in Iran are not satisfied with currently practicing e-learning system. Apart from unsatisfactory e-learning system, a study of Camacho-Zuñiga et al., 2021 revealed that tiredness, stressed, overwhelmed, depressed, and anxious are the most common survey finding from over 1300 students (high school, undergraduate, postgraduate). The authors suggested to bolster students' mental health, the counselling system should be enhanced and convenient. Hence, students might have much curiosity about health and study that could be addressed by adding a new avenue on the school website to respond to frequently asked questions. In addition, similar suggestions have been prescribed by Sahu (2020); Odriozola-González et al. (2020); and Kapasia et al. (2020). Likewise, Murphy (2020) advocated that American universities should accept E-learning system for

Table 1. Summary of related study's findings.

Contributors	Covered area	Methodology	Key findings
Nexus on COVID-19 and educational impact			
Iyer et al. (2020)	United States	Conceptual article	The findings emphasised more on improving Telecommuting systems with students, patience and school authorities. The counselling system should be convenient, and the school authorities should create a new avenue on their website for responding to frequently asked questions.
Murphy (2020)	American Universities	Conceptual article	The author posits that in order to accelerate E-learning system in American universities, securitization could be taken into consideration.
Toquero (2020)	Philippines	Conceptual article	The author suggested revising the curriculum of study and syllabus.
Jacob et al. (2020)	Nigeria	Conceptual article	The authors recommended increasing research funding by the government.
Owusu-Fordjour et al. (2020)	Ghana	Survey analysis	COVID-19 has a negative effect on higher education institutions and recommended to authorities to provide offline E-learning system.
Sahu (2020)	General perspective	Conceptual article	The author found mental health would be the utmost important to handle the COVID-19 situation. The university should update all the health-related information to students daily and take good care of international students.
Odrizola-González et al. (2020)	Spain	Generalized Linear Models (GLM)	Around 20%–35% students were impacted by mental disorder due to the COVID-19 pandemic.
Kapasia et al. (2020)	West Bengal, India	Percentage distribution analysis	COVID-19 has a significantly negative impact on students' study and mental health in India. In West Bengal, around 70% students continue their education through online.
Blankenberger and Williams (2020)	General perspective	Conceptual article	In order to mitigate the risk of COVID-19 the government should put in place appropriate plans in the short term and long-term basis. Thus, students and academics should cooperate properly to execute government roles.
Ali (2020)	Global perspective	Meta-analysis	The findings indicated that university authorities should provide more staff training and encourage students to participate in online classes.

Table 1 (continued)

Contributors	Covered area	Methodology	Key findings
Nexus on COVID-19 and other socio-economic impacts including education			
Nicola et al. (2020)	Global perspective	Conceptual article	The findings posit that due to the closing down of all educational institutions, heavy socio-economic problems around the globe arose.
Begum et al. (2020)	Bangladesh	Conceptual article	The results reveal that education system negatively impacted the economy compared to other sectors such as banks, and readymade garments.
Beaunoyer et al. (2020)	General perspective	Conceptual article	The findings outlined that COVID-19 increased the digital inequality that drastically impacts on education and the economy.
Blundell et al. (2020)	United Kingdom	Conceptual article	The authors report that COVID-19 has different impacts on different households. The higher and middle-income group have a different effects. Thus, tertiary level and school level students have a different impact from COVID.
Lopes and McKay (2020)	General perspective	Conceptual article	As most countries cannot sustain economic pressure to combat COVID-19, the authors argued that they should adopt the Adult Learning and Education model. This model emphasises that if people are aware of the virus and know what should be done and should not be done, the level of impact would be decreased sharply, and economic activities can be resumed.

long term perspective rather than for COVID-19 period only. The author argues that this online system could be beneficial for both students and lecturers, as well as for cost savings than face-to-face mode of providing tuition. More importantly, the author suggested that the school authority and government must ensure the securitization of E-learning system.

Along with mental health, website development, counselling and e-learning of students and staff, numerous authors addressed some other factors such as funding, training, and curriculum flexibility that could be considered for smoother education system. For instance, a review study of Toquero (2020) suggested that the current curriculum of study and syllabus should be revised because students understanding is not same as in online systems compared with the traditional mode of providing tuition. The author further highlighted that the lecturer should be flexible concerning evaluation of students' performance. On the other hand, after reviewing a number of articles Jacob, Abigeal, and Lydia (2020) prescribed that, government should increase funding for public universities and provide some sort of subsidies for private universities. Blankenberger and Williams (2020) posit that in order to mitigate the risk of COVID-19, government and institutions need to put in place appropriate plans in the short term and long-term basis. Thus, students and academics should cooperate properly to execute government roles. More

importantly, the relationship between students, academics, and administrative staff should be improved because others can give proper assistance if anybody is in trouble. Therefore, the information circulation channel should be enhanced (Ali, 2020). Likewise, Sahu (2020) advised that during this coronavirus pandemic educational institutions should pay extra attention to international students because many of them cannot go back to their country due to the lockdown, and their families might not be able to provide sufficient financial support. The author also suggests that all stakeholders pertaining to education should have proper training and information to adopt this novel coronavirus situation.

The second strand of the literature defines the causality between coronavirus and socio-economic impact. Nicola et al. (2020) investigated the effect of COVID-19 on global socio-economic condition. The authors reported that the coronavirus pandemic severely impacted manufacturing industry, oil and petroleum, agriculture, education, finance, health, hospitality, tourism, and aviation industry. The authors suggested that to run the economy, all sectors shall start their activities by following some rules and regulations that were declared by the World Health Organization (WHO). On the other hand, Begum et al. (2020) explored that coronavirus has badly impacted the education sector compared to readymade garments and banks, in the context of Bangladesh. The authors posit that after having three months lockdown from March to May 2020, readymade garments and banks were partially allowed to operate in order to reactivate the economy. Even though government directed for continuation of online learning, that could not be effective due to lower internet accessibility. Likewise, Beauoyer et al. (2020) prescribed that digital inequality drastically impacts on education and economy. The impact of coronavirus has been different for various households. For instance, high income families could survive long time without having any job, but that might not be possible for lower income people. Since coronavirus suddenly changed people's lives from face-to-face engagements to virtual, and this required the procurement of many electronic devices. In this aspect, the lower income families might have a problem. Thus, to run these electronic devices requires internet connection that could also be different, such as high speed or low speed, that might also impact on students and society as a whole. So, it is inevitable that income inequality causes a severe impact on society, and this impact even worsens during the coronavirus epidemic (Blundell et al., 2020). Likewise, Rahman et al. (2021) advocated that income inequality (high and low) should be reduced by intervening the local government and subsidies should be provided to lower income families that help them to upgrade their daily life.

It is remarkably identified from previous plethora study that, there is timely demand for an investigation in respect to the impact of coronavirus on tertiary education because findings from most of the past studies were based on imagination rather than data analysis. Thus, they focused mainly on either global or Western countries, and very limited attention was paid to Asian single country analysis especially Bangladesh. In order to address policymakers demand and enrich the education literature, we freshly investigate the issue for Bangladesh by employing content analysis and frequency percentile. This is the first study for Bangladesh, to the best of the authors' knowledge, exploring the impact of coronavirus on tertiary education by doing systemic scientific analysis.

3. Research methodology

3.1. Research design

According to suggestions received by Alam (2021); Darch et al. (2020); Hosen et al. (2021); and Ricci et al. (2019), the interview approach is the most appropriate for eliciting participants' behaviour or problems. At the first stage, the interview method would be the best for this study because COVID-19 and education nexus are not well studied in the literature. By accomplishing the interview sessions, the authors would be able to provide a comprehensive and detail insights of respondents (students in our case) that they are confronting in this most

unexpected COVID era. In addition, the authors have followed all the essential steps of qualitative research that included recording the interview session, frequently listening and transcription, developing themes, codes and categories and content analysis. After eliciting the real problems from targeted respondents, in the second phase, these problems could be asked from a large respondent to generalize the results so policymakers can benefit from the study.

3.2. Sample and sampling techniques

In regard to sample size, a qualitative study required small number of dataset in compared to quantitative research that dealt with large dataset to produce numerical and statistical plausible results that can address research objectives (Alam, 2021; Pongutta et al., 2021; Sun et al., 2021). Previous studies ensured that the qualitative data should be around 15-20 which could help to reach the saturation level (Braun and Clarke, 2021; Constantinou et al., 2017; Crouch and McKenzie, 2006). A complete data saturation is considered when no more new information or insights, themes, categories, and codes are generated from collected data. Likewise, Guest et al. (2006) defined data saturation is "the point in data collection and analysis when new information produces little or no change to the codebook". On the other hand, some researchers suggested that the qualitative sample size should be around 50 (Marshall et al., 2013; Sandelowski, 1995).

For the interview session, we targeted undergraduate and postgraduate students from different universities across Bangladesh. Non-probability (quota and snowball) sampling has been applied for this study because not a single university displayed their students particular in the website due to privacy issues. Congruent with Hosen et al. (2020, 2021a), a multi-steps quota sampling has been executed. For example, at the beginning universities were segregated based on their nature of management like private and public. The universities, at the second step, were segregated based on their location. We targeted respondents from both urban and rural area universities to understand the differences between them. In addition to quota sampling, snowball sampling was also executed to select the appropriate respondents because it is difficult to contact with students during strict lockdown imposed by government. The snowball sampling approach is applied in such a way that after completing one interview, the interviewed student was requested to nominate eligible respondent. This approach is subsequently employed until sufficient number of respondents received by interviewers.

3.3. Interview procedure

In order to determine the real conditions (which is first objective of this study) of students during the coronavirus outbreak, we invited a total number of 50 respondents from targeted population for a short semi-structured interview. We received positive consent from 40 respondents and had appointments with them at their favourable times. We arranged semi-structured interview through Zoom and Microsoft team apps. We took one by one interview instead of focus group because during the focus group interview the respondents could be biased with other respondents' answer (Deterding and Waters, 2021). Additionally, personal interview helps to investigate the issue more deeply. Before each interview, a brief idea of research was presented and ensured that the data and information revealed from the interview will be confidential and anonymous. Likewise, the authors took permission from the interviewee to record the conversation that will be used for further analysis. The authors did audio and video recording and taking short notes. More importantly, no ethical approval was involved but this study was conducted according to established ethical guidelines (Edwards et al., 2012; Scott et al., 2020). Each interview session lasted between 5-10 minutes. The authors asked two open ended questions from both undergraduate and postgraduate students such as "what problems are you encountering during the coronavirus outbreak?" and "Do you want to add anything else?". After getting all respondents recording, the authors transcribes and

frequently read to get familiarised the transcription and understanding the conversation. Afterwards, we generate initial codes, categorize themes, capturing codes, revisiting themes, and from there create different groups (see Figure 1).

3.4. Content analysis

According to Roller (2019); Hosen et al. (2021), content analysis is essential to understand the hidden meaning of respondent's real conversation. In order to come up with certain meaningful keywords, we listened to the recorded interviews many times. By employing content analysis, we contextualise the meaning of raw data from recorded conversation. There is a total of 40 respondents which includes 23 from undergraduate and 17 from postgraduate students. After identifying the senses, the authors grouped the core meanings into the relevant themes, codes and categories (see Table 2).

Table 2 shows that undergraduate students reveal 84 problematic descriptors that they are facing during the coronavirus outbreak. The highest descriptors are shown to be study related activities registering 26.19% while technical issues represent appear to be the lowest descriptors composing 10.71% of all descriptors. Besides, respondents reveal also, to be encountering mental anxiety, stress and depression. Additionally, staying home always, and financial crisis are maiden culprits during the pandemic. Likewise, postgraduate students were also having research related problems, and thus 25% of the difficulties usually come from family members during the lockdown. Many universities reduced monthly stipends of postgraduate students because they could not perform their laboratory research activities.

3.5. Data collection and analysis

In order to achieve our second research objective, after determining the real problems through the semi-structured interview, data were collected via online structured questionnaire from 20 May to 30 May 2021. The online survey was distributed through social network sites (WhatsApp, LinkedIn, Telegram, Facebook, Instagram) and email to potential respondents. In aligned with interview data collection, the respondents have been selected based on non-probability (multi-steps quota and snowball) sampling approach. The consent form (under the name of "PERSONAL DATA PROTECTION STATEMENT") has been distributed along with questionnaire survey and ensured that the consent has been provided by the respondent. The questionnaire designed based on the information received from the interview session described in the

previous section, as well as adapting some questions from the study by Kapasia et al. (2020). Before circulating final questionnaire to the respondents, a pre-test and pilot study has been carried out. A total number of 505 useable responses were received from undergraduate and postgraduate students across the Bangladeshi public and private universities. Statistical Package for Social Science (SPSS) was employed to assess collected data from respondents.

4. Discussion of results

Table 3 outlines the characteristics of respondents. The highest proportion of respondents were undergraduate students while postgraduate students represented lowest percentile. The reason could be that, in any university, the number of undergraduate students is more than postgraduate students. In science and engineering departments, most graduates start working after completing their bachelor degrees. More male respondents filled up the questionnaire compared to females. The result further denotes that around 47 percent of respondents are from science background, whereas approximately 18 percent come from arts and humanities departments. Overall, 64 percent respondents have ages above 25 years, and 57 percent live in rural areas.

Table 4 highlights the respondents' knowledge and conditions during lockdown at the time of the coronavirus epidemic. Most respondents (42.97%) got information about coronavirus from social media, whereas very few (14.85%) through newspapers. During the pandemic, 386 out of the 505 respondents moved to their hometowns rather than staying in hostels or rented lodges. More importantly, 59.80 percent of respondents reported that they do not have separate reading rooms in their homes. Besides, laptops or desktop computers are commonly used for online classes and other activities, but still 21 percent respondents could not afford to buy their electronic devices. In that case, they were borrowing from other family members, and sometimes from friends or relatives.

Table 5 shows the online class related information that Bangladeshi universities stakeholders are encountering. Around 79 percent of respondents reported they never attended any online class or E-learning platform before the coronavirus outbreak. This statement indicates they are not comfortable with the new normal online system. Subsequently, around 60 percent of respondents attend less than three days of online classes a week, while only 9 percent indicated they have online classes almost everyday. In addition, Zoom app and Microsoft team are the commonly used platforms for conducting online classes. In the same vein, WhatsApp and Microsoft team denoted as a favourite media to share course related information amongst them. Still, most of the organizations were struggling to accomplish their syllabi. The respondents posit that their productivity becomes less than normal situation because sometimes much more interactions were encountered while working from home.

Table 6 highlights the problems encountered by respondents and their economic consequences. Most of the respondents (87.92 percent) reported that they had mental stress, anxiety, and depression during the coronavirus outbreak, making it difficult for them to deal with the new normal situation. Thus, internet connectivity and internet subscription rate hampered their normal activities. This was due to high internet demand being experienced nowadays. Previously only certain people used internet for their normal activities, but everybody depended on the internet during the outbreak. Most importantly, around 30 percent of respondents reported that they have no sufficient electronic gadgets for performing their online activities. Interestingly, 75 percent of respondents mentioned that they need to work more than normal situation. The possible reason could be, in normal condition if anyone has difficulty in understanding class lectures or anything, they could immediately talk to the lecturer or friends. But such interaction is not possible in an online platform. So, lecturers need to give more time to their students, and same is expected from administrative staff. Besides, stakeholders are also interrupted by family members. During normal conditions, people can work at office, which provides a positive work environment. Since people are not used to working at home, they usually got interruptions from

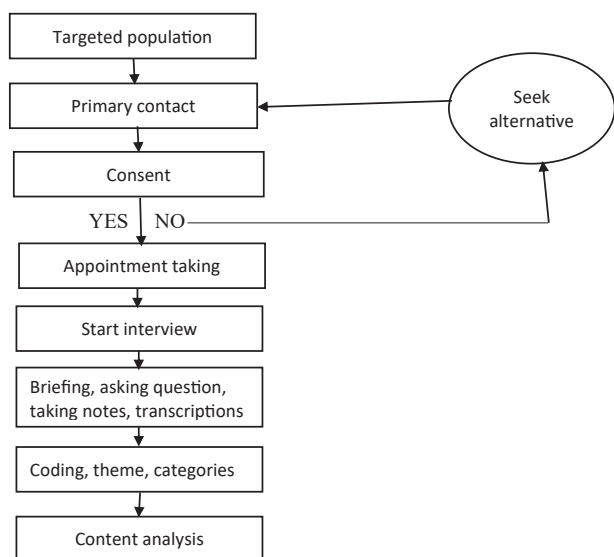


Figure 1. The procedure of data collection to analysis.

Table 2. Content analysis result.

Respondents	Theme	Code	Categories	Frequency	Percentage	
What problems are you encountering during the coronavirus outbreak?						
Undergraduate students	<ul style="list-style-type: none"> • Difficult to understand during online classes (6) • Wasting a lot of time on online gaming rather than studying (3) • We cannot interact with lecturers (5) • My lecturers are not cooperative (3) • I cannot do my final year project (3) • I cannot do my internship (2) 	Study descriptors	Difficult to perform online study	22	26.19	
	<ul style="list-style-type: none"> • I have anxiety all the time when studying online (6) • I have headaches after working a long time on Laptop (7) • I feel depressed when undertaking E-Learning (7) 	Health descriptors	Having mental stress and anxiety	20	23.81	
	<ul style="list-style-type: none"> • Staying home during the lockdown is quite boring (7) • Cannot get help from friends (3) • Cannot mingle with friends (2) • My study environment at home is not favourable (5) 	Personal descriptors	Difficult to stay home	17	20.24	
	<ul style="list-style-type: none"> • Internet connectivity is not stable all the time (7) • Mobile data is not affordable (2) 	Technical descriptors	Internet connection is not stable, and the rate is high	9	10.71	
	<ul style="list-style-type: none"> • I am having financial crisis. (6) • My father has no savings (2) • Sometimes my parents cannot afford internet bill (2) • My family suffers a lot (1) • My family has problem to pay tuition fees (2) • The government and institution should support (3) 	Financial descriptors	Financial condition is not good enough	16	19.05	
	Total			84	100	
	Postgraduate students	<ul style="list-style-type: none"> • Study at home is not convenient (4) • I cannot do my lab activities (5) • I cannot collect my research data (5) • We cannot interact with lecturers (5) 	Study descriptors	Difficult to continue study and research	19	27.94
		<ul style="list-style-type: none"> • Feel disappointed while doing my research (6) • I feel stress on online activities (4) 	Health descriptors	Having mental stress and anxiety	10	14.71
		<ul style="list-style-type: none"> • Wasting time (5) • Need to give more time to family (7) • Usually, get disruption from family members (5) 	Personal descriptors	Difficult to stay home	17	25.00
		<ul style="list-style-type: none"> • Internet connectivity is not stable all the time (5) • Mobile data is not affordable (3) 	Technical descriptors	Internet connection is not stable, and the rate is high	8	11.76
<ul style="list-style-type: none"> • I am having financial crisis (7) • My family has problem to pay tuition fees (5) • The government and institution should support (2) 		Financial descriptors	Financial condition is not well enough	14	20.59	
Total				68	100	

Table 3. Demographic profile of respondents.

Characteristics	Counts	Percentage	
Respondents	Undergraduate	310	61.39
	Postgraduate	195	38.61
Sex	Male	272	53.86
	Female	233	46.14
Program	Science	237	46.93
	Business studies	178	35.25
	Art and humanities	90	17.82
Age	25-above	325	64.36
	25-below	180	35.64
Residential Area	Urban	218	43.17
	Rural	287	56.83

other family members. Alarmingly, 380 respondents (79 percent) reported having suffered some financial crisis, which made them to worry more during the pandemic. This happened due to the economic recession; many people lost their jobs, and many businesses stopped operating.

Based on the findings discovered from respondents, the key challenges of the online activities are discussed below.

4.1. Online activities challenges

Without having a proper plan, many tertiary education institutions were forced to start online activities, more specifically teaching and administrative tasks. This spontaneous decision is causing many unique problems for college and university students, and staff as well. For instance, during the pandemic, many people lost their jobs and struggling to manage their basic needs. As educational institutions turned to online systems within short notice, many students could not afford to buy high-speed internet or electronic devices such as mobile phones, laptops, or desktops even though they are technically sound to operate those gadgets. Similar finding was received by [Mukuka et al. \(2021\)](#) in the context of Zambia secondary school students. In a normal situation, the underprivileged students who typically, have no internet connectivity of their own, would go to the library to accomplish their assignments. Back in 2018, the Bangladesh Telecommunication Regulatory Commission reported that only 80 percent of urban students use internet, which is gives a red signal to the tertiary education management.

Besides, the government forced all students, both local and international, to go back to their hometown during the pandemic. Still, the Bangladesh government is struggling to provide internet facilities across the country. Moreover, the speed of internet varies based on different packages. As a result, if internet facilities are not the same in both rural

Table 4. Respondents knowledge and conditions during lockdown.

Particulars	Frequency	Percentage
<i>How do you receive information about coronavirus pandemic?</i>		
Personal interaction	115	22.77
Newspaper	75	14.85
Television	98	19.41
Social Media	217	42.97
<i>Where do you live during the coronavirus pandemic?</i>		
Near to university area or rented house	119	23.56
Went back to hometown (if applicable)	386	76.44
<i>Do you have a separate reading room?</i>		
Yes	203	40.20
No	302	59.80
<i>What electronic gadgets do you use to attend online class?</i>		
Mobile phone	176	34.85
Laptop or desktop computer	238	47.13
Others	91	18.02
<i>The possession of those devices</i>		
Borrowed from friends or relatives	16	3.17
Borrowed from family members	91	18.02
Personal	398	78.81

Table 5. Online class-related information.

Items	Count	Percentage
<i>Have you attended online class before?</i>		
Yes	78	20.58
No	301	79.42
<i>How many days in a week do you need to attend online classes?</i>		
Everyday	35	8.88
Above three days	126	31.98
Less than three days	233	59.14
<i>What platform do you use for online classes?</i>		
Zoom App	158	43.17
Microsoft Team	139	37.98
YouTube Live	17	4.64
Google classroom	34	9.29
Others	18	4.92
<i>How to share course-related materials?</i>		
University online portal	69	15.58
WhatsApp	126	28.44
Zoom App	91	20.54
Microsoft Team	112	25.28
Others	45	10.16
<i>Syllabus accomplishment</i>		
>50%	158	44.63
<50%	196	55.37
<i>Time spent for study during this coronavirus outbreak</i>		
Same as a normal situation	48	13.04
More than a normal situation	119	32.34
Less than normal situation	201	54.62

and urban areas, students who live in rural areas have a significant risk of missing classes compared to those in metropolitan areas. Even though online teaching can help the lecturer to finish the syllabus, the quality would not be the same as in the traditional face-to-face method. Lecturers and students cannot frequently interact during online lectures, and sometimes are unable to hear one another due to internet connectivity

Table 6. Problems and economic condition.

Particulars	Frequency	Percentage
<i>Do you encounter mental health (stress, anxiety, depression) related problems?</i>		
Yes	422	87.92
No	58	12.08
<i>Do you have any problems related to internet connection or technology activities?</i>		
Yes	331	71.96
No	129	28.04
<i>Do you have sufficient electronic devices for online activities?</i>		
Yes	309	70.87
No	127	29.13
<i>Do you need to work more due to online activities?</i>		
Yes	326	75.12
No	108	24.88
<i>Do you have financial crisis?</i>		
Yes	380	79.00
No	101	21.00
<i>Do family members disrupt you?</i>		
Yes	405	82.99
No	83	17.01

issues. Students' presentations and tutorials are also impacted significantly. In this regard, Begum et al. (2020) suggested to ensure strong internet facilities to both private and public universities students and provide sufficient subsidies.

More importantly, online classes cannot help science stream students, especially those who need to use laboratories. Most laboratories are furnished with all the necessary tools that help students and researchers to experiment physically. Besides science students, other students who are preparing for final year projects also have a difficult time, because data collection cannot be done as students need to move physically in order to collect data.

4.2. Evaluation challenges

As classes are conducted online, examinations should also proceed through online system, but the problem arises about students' honesty. Recently Singapore experimented by conducting all examinations through virtual means. They found that students were very keen to get good grades regardless of morality (Lau, 2020). Alternatively, tertiary institutions could provide many assignments and check their plagiarism reports accordingly. However, only assignments could not be used as a student's performance measurement scale.

Moreover, COVID-19 pandemic significantly impacted the administrative system in Bangladesh higher education. For example, the Bangladesh higher education authority announced that all activities related to tertiary education would proceed online until July 2021, and that the period could be extended. To cope with that announcement, all institutions shall design their academic calendar accordingly. During the early stage of the pandemic, government did not allow for the conduct of online classes, a decision it late changed. That ambiguous decision also hampered college or university schedule. In this situation, tertiary institutions' management was concerned about students' lives because if students could not finish their study at the stipulated times, they might be disappointed. This finding is in line with Kapasia et al. (2020) and Owusu-Fordjour et al. (2020).

4.3. Operational and mental health challenges of students

Many academics, especially those who are aged, face difficulties in order to adopt an online system without having proper training. Even if

they are given training, they still face some difficulties. For instance, when they face any technical disruption, they may experience mental stress which directly or indirectly impact the students. In this aspect, [Ali \(2020\)](#) suggested to arrange more training on technology management and provide more counselling. Additionally, faculty members face more difficulties relating to delivering of lectures, and students' understanding. Conducting a face-to-face class is easier for a lecturer because they can use different methods to make students understand, but that might not be possible in an online platform. Besides, in this system, lecturers cannot interact with students in the classroom.

Tertiary students are not free from the impact of COVID-19 pandemic. In fact, they appear to be affected more than anybody else. Student love to mingle with friends, which is not possible in an epidemic situation. They need to compromise with the quality of lecture because they cannot easily interact with teachers and friends. The online setting is more difficult for those students who love to learn from their friends via informal way. Since all students' financial conditions are not the same, some students might not have computers or laptops, printing machines, or some other necessary stuff. Moreover, some students may face difficulties in finding a comfortable place for study. This could be a source of mental stress, and sometimes they might need to engage in family activities. Science students would encounter serious problems due to inaccessibility of the laboratory, and that situation will cause them delays graduation. Similar kind of findings revealed by [Kapasias et al. \(2020\)](#) in the context of Indian tertiary students. If this online setting continues for a long time, students drop out rate may increase because less privileged students cannot afford to maintain these extra expenditures.

4.4. Financial turmoil

During the COVID-19 epidemic, educational institutions were impacted more than other sectors. Many guardians lost their jobs and could not provide financial supports to their children which is also supported by previous studies ([Blundell et al., 2020](#); [Cauchemez et al., 2009](#); [Chen et al., 2011](#)). When the Bangladesh government announced allowing some flexibility in the movement control order, all other economic activities resumed except educational institutions including schools and universities. It was therefore predicted that this sector would incur a huge financial crisis because students' enrolment will slip downwards, international students will not come from their countries, many students will not be able to pay their tuition fees, etc. Prior to this pandemic, Bangladesh higher education reported that the foreign students' enrolment rate was dramatically reduced in 2019. They recommended for more advertisement and improvement in the quality of teaching and fundamental research.

As of 5 June 2021, 43 public universities were registered and approved by the University Grants Commission (UGC), while private universities registered stood at 103. Most of the private institutions run their operations using tuition fees. Suppose students could not afford to pay their tuition fees, that will affect the institution's activities. In this situation, public institutions will be better off compared to the private ones, because the government supports typically public institutions. However, public institutions may also suffer because the government will cut off their budget as well. To continue their activities with reduced budget, they must sacrifice inviting guest professors, organizing seminars, workshops, and conferences ([Impey, 2020](#)). Therefore, it is obvious that Bangladesh education institutions will experience their worst times ever.

5. Conclusions and recommendations

This study investigated how COVID-19 impacted students of higher educational institutions in Bangladesh. It is expected that educational institutions will be affected more than other sectors in Bangladesh. In order to examine the effects and provide plausible output to respective policymakers, this study used data collected through interview and

questionnaire survey. Analysis of the data was made through content analysis and frequency distribution methods. The findings indicate that the COVID-19 epidemic put pressure on students in manifolds including financial crisis, unable to access their laboratories, higher exposure to mental stress, internet connectivity issues, difficulties in procuring electronic gadgets, unstable academic calendar, etc. If this epidemic continues for a long period, the authorities will have come up with a new sustainable system that could save higher education in Bangladesh. The COVID-19 outbreak had repercussions also for the students' financial conditions. To resolve this serious issue, the government should discuss with stakeholders of both public and private institutions, on finding most efficient ways of effectively managing tertiary education in Bangladesh, especially during onset of pandemics. By taking a good lesson from this unanticipated crisis, they shall make a proper plan for future turmoil.

5.1. Policy implications

The COVID-19 mostly impacted in Bangladesh because most of the higher educational institutions are still closed, and this country provided auto-pass to students without taking any examination. So, Bangladesh government needs to know how to run higher education institutions during this epidemic. Based on the challenges discussed earlier, the following recommendation could help policymakers:

1. Postgraduate and final year project students should be allowed to meet their supervisors or advisors based on appointments, and they also need to follow all safety measures.
2. Meetings of students with their supervisors should be arranged in a bigger place instead of office rooms. Of course, social distancing, wearing masks, using hand sanitizers, and regular checking of temperature should not be compromised.
3. Priority should be given to underprivileged students who cannot afford to buy all necessary equipment.
4. Management should provide financial support to all underprivileged students with zero interest rates.
5. Management should consider arranging high-speed internet for all existing students.
6. The institutions' premises should be marked, indicating all the social distancing signs and safety-related posters.
7. The information board should incorporate all insights on COVID-19, and hotline numbers of hospitals and clinics.
8. University counsellors must organize a new online webinar aimed at minimizing mental stress faced by students and staff.
9. The education institutions' counsellors should be more flexible than before, because students might need their help more than ever.
10. Since Bangladesh higher educational institutions have decided to continue with the online mode of teaching for long, they need to ensure the availability of adequate cybersecurity, and provide subsidy to students for the acquisition of the necessary electronic devices like laptops, computers, printing machines, etc.
11. The government should provide subsidies for students to procure high-speed internet.
12. The institutions should put in place committees for curbing any unexpected crisis. Members of such committees may consist of faculty members, administrative staff, and students.

Declarations

Author contribution statement

Mosharraf Hosen: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Mohammad Nazim Uddin: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

Md Asadul Islam and Shahadat Hossain: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Afzal Ahmad: Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

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