CHAPTER-1
INTRODUCTION

INTRODUCTION

The benevolence of information technology's influence on multiple aspects of our lives today cannot be ignored neither can its growing popularity and use in the education sector be denied (Abbasi *et al.,* 2020). Although learning in virtual environment is nothing new in the 21st century this technology in the academic sector has gained more traction as well as popularity among students and teachers in the ongoing Covid-19 pandemic. Most educational institutions in the country had to close down to limit the infection. This created a huge problem for educators and the students as traditionally they need face to face interaction in all stages and levels of education. Information technology in the form of virtual meeting and web casting provided the instant solution for this problem. The flourishing innovative technologies and learning management systems both for teaching and assessment have taken a headway providing an utilizable solution for educators and giving policy makers an opportunity to implement the use of information technology during the quarantine days for covering the course work. Institutional administrators, support staffs, professors, teachers, lecturers and students, all are making considerable efforts to adapt to this new environment by learning to use this technology. Although it was not easy for many of these group to adapt quickly. However, day by day most people adapted and they can now optimally utilize the available technology for continuing the process of education. This helps to minimize the gap between teachers and students that are going to result as a consequence of not being able to physically attend the educational institution.

In many developed countries distance learning by online classes are provided to the student who cannot attend the class for various reasons. This method of learning is very popular among foreign students who cannot afford to travel overseas. This method of teaching is preferred by many intuitions as this technology allows them to enroll more students without investing into a large physical campus. Many universities across the world are promoting it as a teaching method and it is being widely appreciated by the learners. There are numerous reasons for its overall acceptability; few of them particularly applicable in case of learners are its ease of use, flexibility and better control over the environment. However, in spite of its multiple advantages there are quite a few limitations of e-learning such as social isolation, lack of interaction among students and teachers. This method also heavily depended on internet speed and connectivity.

Although educational institutions in developed countries are using this technology for a long time to their advantage, in developing countries such as ours it's not formally practiced in any of our educational institutes. In fact, majority of the educational institutes never thought it could play a significant role in the education sector. Therefore, it was never considered as a part of educational tools in Bangladesh by the majority of the institutions until the spread of novel corona virus and mandatory quarantine. Lockdown, Quarantine or Social distancing; whatever we may choose to call it, this has forced our educational system to change overnight. The entire educational system in our country moved from a face to face learning environment to a virtual educational system in a few months' time.

Schools, colleges and even undergraduate medical and dental institutes across the country are moving towards a virtual learning system that we call E-learning. Medical Colleges' administrators and teachers are taking appropriate measures to conduct effective e-learning via e-lectures, e-tutorials, e-case based learning, etc. so that continued sufficient education can be provided during this period. Also various e-teaching software are being explored by teachers to bring maximum possible ease for their students.

Relatively recent changes and adaptation of teaching methodology in Bangladesh has not been easy. Going from a face to face learning based environment to a virtual electronic learning environment so quickly was relatively hard for our students and teachers. Both teachers and students are still in the process of getting used to the new environment. This may become our future educational environment. Therefore, it is important to find out both teachers and students' aspects and viewpoint regarding this virtual approach to teaching and learning. How can we improve the total learning experience for both parties? Whether the learners are comfortable to the new environment and methodology. Whether we require any modifications or rather would want to go back to conventional learning altogether or may be a mix of both systems? All these would be interesting questions to answer. Therefore, the purpose of this study was to determine the perceptions of students towards e-learning during the lockdown due to covid-19.

Objective:

1) To find out students' opinion and viewpoint regarding these virtual approach to teaching and learning. Whether the learners are attuned to the new methodology, would prefer any modification or rather would want to go back to conventional learning altogether, would be an interesting point to explore.

2) To assess the factors associated with increased levels of mental health burden among the medical students.

3) This study aims to explore the situation of e-learning among medical students during their clinical years.

4) To identify possible challenges, limitations, satisfactions as well as their perspective for the approach of e-learning.

CHAPTER-2

REVIEW OF LITERATURE

Review of Literature

In late 2019 a novel coronavirus (initially known as Wuhan virus later named SARS-COV2) started spreading in the city of Wuhan, China. At first it was thought to be not so contagious among humans by the world health organization. However, as the virus spread rapidly all over china during Chinese New year in early 2020 world health organization declared worldwide pandemic is imminent. By February 2020, COVID-19 (caused by the SARS-CoV-2 virus) quietly spread worldwide.(Aristovnik *et al*., 2020) This new coronavirus which started to spread in China during December 2019 then moving to Thailand, Japan, the Republic of Korea, and Europe then to the United States, Vietnam, Singapore and at the end of January 2020. Australia, Nepal, Europe (first cases in France on 25 January 2020 and later in Germany, Finland, Italy etc.), Malaysia, Canada, the Middle East, and other countries of the Western Pacific Region and South-East Asia Region, and onwards to Russia, Africa, and Latin America. On 11 March 2020, the World Health Organization (WHO) declared the COVID-19 a pandemic. By 31 July 2020, COVID-19 had spread across more than 217 countries and territories, with almost 17.1 million confirmed cases. By early 2021 over 95 million infected and more than 2 million died of COVID-19. This rapid spread of this virus brought the health system to its knees as hospitals flooded with patients with severe breathing problems. Governments all over the world quickly locked down the borders to limit the spread of the virus, later locked down the cities which brought the whole world to a standstill. The major economies in the world were shut down by this pandemic which consequently affected the citizens as many of them lost their jobs and means of supporting their families. Consequences of this pandemic are already being observed in a historic recession in most developed parts of the world. For example, in the USA where in the second quarter of 2020 GDP plummeted annually by 32.9% while in the euro area GDP plunged by 12.1% and in the European Union (EU) by 11.9% over the previous quarter. As far as health is concerned, the novel corona virus SARS-CoV-2 has affected all age groups. However Senior citizens and people with comorbidities are at higher risk of infection. Therefore, highest death rates being found among older individuals and patients with comorbidities.

Pandemic is not new for humankind. If we look at our history, we can see that every few years we have virus outbreaks all over the world. Over the last few hundred years we had the bubonic plague, the Spanish flu, SARS, Ebola, influenza A (H1N1) etc.

Every outbreak of virus has been responsible for significant changes in geopolitical and demographic situations by altering human behavior, patterns of migration, travel, urbanization, trade, and technology use. Like the past virus outbreaks this pandemic is also forcing the humankind to alter their behaviors and lifestyle thus having a direct impact on their socio economic conditions on a global scale. Besides existing problems and challenges in the area of health, COVID-19 pandemic has created all sorts of unanticipated turbulence in our society and the economy. A few months into the pandemic it is now clear that the consequences of SARS-COV2 will last for many years on all levels of our society even if the virus is eradicated. The humankind will feel the direct as well as indirect impact of SARS-COV2 for many years to come.

COVID-19 has one way or another affected each and every one of us. The wellbeing of all groups in society in every affected country and globally. It has affected our young generation as well. Although the young are generally not in the high risk category, nevertheless they have faced a different kind of challenge during this pandemic, especially the students. As cities were in lockdown and educational institutions were closed indefinitely all students including medical students experienced dramatic effects of the first wave of the COVID-19 pandemic in the first four or five months of 2020. Therefore, many changes to their everyday lives and, perhaps even more alarmingly, to their prospects for their immediate and distant future. Most countries affected by the pandemic were able to slow down the spread of the corona virus with varying degrees of success, including by imposing drastic measures like banning public events and gatherings, workplace closures, stay-at-home restrictions, restrictions on domestic and international transport, testing and contact tracing, and shutting educational institutions down. Physically closing educational institutions (schools, universities) proved to be an efficient way of minimizing the spread of the virus, yet it has led to many challenges for both students and teachers, but also their families, friends, employers, and thus society and the global economy. Moreover, once they reopen after the lockdowns, educational institutions will not encounter the same situation they experienced before the COVID-19 pandemic. The norms that guide many parts of our lives will need to be reformulated in detail in the post-pandemic context and are likely to result in drastic changes to the way in which the future workforce is educated. Following the detection of first COVID-19 case Bangladesh like many other countries put the lockdown strategy into effect on March 26, 2020 to ensure social distancing through home quarantine to curb the spread among its population, since a precise treatment or vaccine

for the infected and people at high risk are yet to achieved by the global health community. However, all education institutions were closed initially from March 18 to march 31, 2020 across the country and later extended. For this students required to stay at home due to the closure of their educational institution on all levels reached a peak of 1.598 billion from 194 countries. The pandemic has had a big impact on medical students' practices regarding academic work and life (e.g., the switch to online lectures/tutorials, closed libraries, changed communication channels for teachers' and administrative support, new assessment methods, different workloads and performance levels etc.) and social life (closed dorms or hostels and therefore moving back home, no meetings with friends, university colleagues or relatives, no parties, no traveling, remaining trapped abroad, etc.), as well as their personal financial situation (loss of student job, worries about their own financial situation, future education and career) and emotional health (fears, frustrations, anxiety, anger, boredom, etc.). On top of the many challenges, the pandemic has led to some more positive changes in habits and mindsets, like paying greater attention to personal hygiene, taking care of one's own health (quitting smoking, eating organic food sourced locally) and of one's relatives, especially of those in risk groups, spending more time to do sports, etc. Several papers have already been published by researchers around the world presenting studies on various aspects of the COVID-19 pandemic crisis, particularly its consequences for physical and mental health, the economy, society, and the environment. This study presents a novel, original, and current contribution to the field of knowledge on medical education in the health crisis caused by COVID-19 by focusing on student life during the first wave of the pandemic. The goal of this paper is to highlight the main results of a survey on impacts of the COVID-19 pandemic on the life of medical students that was carried out on students of Southern Medical College and Hospital(SMCH), University of Science and Technology (USTC), Chattogram International Medical College (CIMC) in Chattogram, Bangladesh. The questionnaire targeted medical students with respect to what student life looked like during the pandemic, including teaching and learning, their social contacts, habits, routines, as well as how they were coping with the situation emotionally, financially and psychologically. Psychological stressors cause changes in a person's life, so they are forced to adapt or cope with stressors that arise. Changes in learning methods become one of the triggers for psychological changes one of which is anxiety, stress. Anxiety affects student learning outcome, because it tends to produce confusion and distortion of perception. Prolonged anxiety that occurs continuously can cause stress that interferes with daily activities. If

not resolved can lead to more serious psychological problems such as depression. Student anxiety, stress and depression are further enhanced by the existence of the Covid-19 pandemic with online learning methods (Hasanah *et al*., 2020). The purpose of the study was to shed light on the ways the COVID-19 crisis has impacted medical student life and to design a set of recommendations for policymakers and medical education institutions concerning how students can be supported during the crisis created by the COVID-19 pandemic (Aristovnik *et al*., 2020). A survey study on polish medical students showed that e-learning is a valuable way of teaching medical students. In the opinion of the respondents in their survey, e-learning is effective in increasing knowledge and is highly accepted. However, it is important not to focus only on increasing knowledge, but also on clinical and social skills (Bączek *et al*., 2020). E-learning should not only be based on the delivery of content, but students should be able to work with the materials and receive feedback. Successfully implementing online learning into the curriculum requires a well thought-out strategy and a more active approach. The main problem in the study they found in respondents, especially those in their 4th to 6th year of study, was lack of interaction with patients. Learning from real patients in a clinical setting is crucial for medical education and it cannot be fully replaced by with distance learning. (Swanwick *et al*., 2020). Surprisingly, over 60% of the respondents in this survey, had never experienced any form of e-learning before the COVID–19 pandemic, which might be the reason why technical issues were the second major disadvantage of e-learning in this study. They also added that E-learning requires a reliable internet connection and the necessary hardware and software (Frith *et al.,*2003). Both students and teachers must be familiar with the equipment and they should receive technical support and guidance from the IT department before and during an online course. Self-learning requires the student to maintain self-discipline, which can be difficult without direct supervision from the teacher. Poor interaction between learners and facilitators, and a lack of clarity of the purpose and goals of the learning can impede the learning process (Docherty *et al.,*2017).Stacey and Gerbic advocated that students' maturity might increase their degree of self-discipline (Stacey *et al*., 2008), which is consistent with findings in their study. The study group assessed that e-learning enabled them to increase their knowledge to the same extent as traditional learning. However, in their opinion, e-learning is definitely less effective in terms of increasing their clinical and social skills. E-learning to teach clinical skills is most effective when combined with traditional classes. Instead of using text-based materials, video instruction seems to be superior in

teaching practical skills (Buch *et al*., 2014) SV and it fits with Peyton's four-step skill acquisition approach (Walker *et al*., 2013). In this model, the teacher conducts a silent demonstration, then he repeats the procedure, this time describing all necessary sub-steps (deconstruction). Following this, the student has to explain each sub-step while the teacher follows the student' sinstructions (comprehension). The last step is performance, where the student performs the complete skill while he or she describes it. An interesting solution for improving social skills is the use of remote standardized patients (RSPs), who communicate with students via the internet. RSPs can not only portray a specific clinical situation, but they also assess the learner and provide real-time feedback. Langenau studied the use of RSPs and Skype and their effects on residents' social skills. In their study, 90% of participants agreed that this format was effective in teaching communication skills (Langenau *et al*., 2014). We found it interesting that respondents assessed that they were less active during e-learning than during traditional classes. One of the reasons could be the lack of an interactive approach when developing e-learning courses. Only 4% of the respondents chose class interactivity as an advantage of e-learning during the COVID–19 pandemics. E-learning methods that are less interactive are viewed less favorably (Cook *et al*., 2013). There are different ways to boost the interactivity of online learning. One new and promising method is gamification, in which "game design elements are used in non-game contexts (Deterding *et al*., 2011). In a systematic review, gamification has been proven to be effective in many fields, especially in education (Hamari *et al*., 2014). A different approach could be social and collaborative learning. This technique allows students to socially interact with each other as well as instructors. They can work together to share ideas and expand their knowledge in an open forum. In a study, the majority of residents assessed that Twitter enhanced their education. Another technique worth mentioning is branching scenarios, in which students get the opportunity to test their skills in a practical setting. This form of learning requires the learner to make a decision and then present the consequences. Each decision produces new challenges and more choices. This technique is associated with higher learning outcomes, mostly regarding increasing knowledge and clinical reasoning. (Cook *et al.,* 2010)

In another study on undergraduate students in New Jersey, reveals that the current COVID-19 pandemic making a significant negative impact on mental health of college students. College students who exhibit greater academic and life difficulties may be

particularly vulnerable to higher mental health distress. The current pandemic may further exacerbate already existing problems. The timeline of the pandemic is uncertain further impacting students' academics, lives, and mental health. With a host of negative consequences associated with poor mental health, further research is needed to address additional risk factors (i.e., substance use, coping mechanisms, social support, family and peer relationships dynamics) that are associated with mental health in this population. They added, previous studies have shown that public health emergencies have a significant impact on mental health of college students (Al Rabiah *et al*.,2020). Since the COVID-19 outbreak, a few studies have emerged describing higher levels of anxiety and increased risk perception among college students during COVID-19 pandemic (De Witt *et al*.,2020). The current study is among the first to examine the impact of the COVID-19 pandemic on mental health among undergraduate college students in the U.S. Northern New Jersey has been one of the most severely affected regions in the U.S. by the current pandemic, creating uncertainty, anxiety and stress among a wider population. The pandemic has also elevated concerns about well-being of the members of the university community, including students. While previous studies have indicated that the current pandemic may have widespread impacts on students' learning experiences (Sahu *et al.,*2020), their results indicate that college students who are experiencing considerable number of academic and everyday difficulties during the COVID-19 pandemic also report increased levels of mental health burden. This is of potential concern as the pandemic is occurring against the backdrop of increasing mental health issues among college students (Hanover *et al*., 2018). Additional stress may lead to further detrimental effects on the learning experiences and mental health of undergraduates.

A study from Thailand, 2016, revealed that undergraduate students' acceptance level of e-learning was slightly higher than neutral (Ngampornchai *et al*., 2016). A study to explore the e-learning perception of 229 participants from the laboratory animal science who were enrolled in 15 courses from Portugal between 2012 and 2015. They used two online training formats; the flipped classroom and full online theoretical training. They reported high acceptance levels of both methods (Costa *et al*., 2019). In another study ,they found that if e-learning can increase knowledge in continuing pharmacy education and if pharmacists can accept the e-courses or not. Their research revealed the effectiveness of e-learning in improving both the knowledge and acceptance of such a

learning way (Wang *et al.*,2012). In a recent study on medical students from Jordan during the Covid-19 closure time, their results revealed that the overall students' satisfaction rate in the e-learning was low (Al-Balas *et al.*, 2020).

Despite the increasing evidence that e-learning is effective as classical on-campus learning, there is very little evidence about what already works. There is a lack of adequate studies about medical students' acceptance and perception of e-learning in Jeddah. So, such research is needed. Half of the students rated e-learning to be lower than on-campus learning. The students had a moderate e-learning acceptance level. Females obtained a significantly better mean score of FC compared to males. Students enrolled in the clinical years obtained a better level on the TQ. Better achievers got significantly higher levels in all EIAM constructs than others. The majority of the students agreed that the educator's e-learning skills, the subject of the course, sound instructional design, interaction, motivation, and good LMS are among the enablers of e-learning. Most medical students agreed that clinical teaching is challenging through e-learning. Besides, the majority of them agreed that exams could be affected by low internet quality.

Limited resources and the lacking student's personal preference for online learning were among the reported barriers. One-third of the participants agreed that lacking adequate computer skills and deficiency of proper training were other barriers (Ibrahim *et al.*, 2020)

Previous study stated that owing to academic stress, medical students had a greater risk of physical and mental health issues than non-medical students. Their study found that the majority of the respondents have stress. Recently (Francis *et al.*, 2019) similar findings were observed and earlier (Saravanan *et al.*, 2014) reported as the majority of medical students (73%) were found to be stressed. The essence of their academic life makes medical students vulnerable to depression and anxiety. A pandemic situation may augment such negative feelings. (Husky *et al.*, 2020) Stress has numerous adverse effects on their mental, emotional, and physical health. (Yusoff *et al.*, 2011) High stress may have detrimental implications for cognitive function and learning abilities. (Abdulghani *et al.*, 2014) Their previous study explored the stress of medical students during the quarantine time found that one-fourth of the participating medical students felt saddened during the quarantine period.(Meo *et al.*, 2020)

The transition from pre-clinical to clinical year (i.e. approaching into 3rd year) is a major turning point, leading to significant changeover in terms of students learning needs and teaching patterns, hence has a significant impact on medical students' well-being. Such changes pose challenges, particularly important to those who are on the verge of transition from student to doctor, a transformation that has long been recognized as challenging. (Teagle *et al*., 2017) This study also found that stress occurrence was at peak amongst the 3rd year students, as they exhibited significantly higher levels of severe stress. According to a study (Saravanan *et al*., 2014), stress was found to be substantially greater in Second and Third MBBS students than in First MBBS students ($p < 0.05$). Students' gender also represents a significant factor in the susceptibility to stress represented by medical and psychological symptoms. They found that female students have shown significantly higher levels of stress as compared to male students. There is a substantial variance of stress levels even when compared between females, from medical and non-medical courses. More female medical students (48.6%) reported being frequently stressed due to studies than non-medical female students. (Al-Dabal *et al*., 2010)

Learning using the internet and related tools for educational purposes, without geographical limitations is known as online learning or E-learning. This study also established the connection between academic measures and the stress rates of medical students as "severe stress" was apparent for the students who considered online learning "during pandemic" as a burden. On the contrary, other studies found that although the level of acceptance towards E-learning is still low, yet, more than 55% of the students found it to be useful and time-saving (Khan *et al*., 2020) useful, and effective (Costa *et al*., 2019). Furthermore, the study recorded that online learning yielded "time management problems" for the majority of the students, whereas, other studies found that "online platforms" provide support for those who have time management problems (Wu *et al*., 2018) as well as technology can be used to shrink the total time students need to be in a class. (Lauren *et al*., 2020) As a current finding, 41.2% of students who responded as "neutral" about "online learning content is difficult to understand" have exhibited stress. Such an inference is likely as the respondents might not have a clear consideration of the emerging and fast-evolving situation. (Khamees *et al*., 2020) Regarding "online learning material not enough for study," neutral respondents showed moderate to severe stress. The provision of sufficient material is very crucial, but this remained a challenge, as the pandemic was

not expected, and the preparedness of the faculty was not achieved by many medical schools. As previously reported (Bediang *et al.*, 2013) that effective online modality requires to engage all relevant faculty members and departments. This shall deal with the problem of inadequate learning material. Learning is difficult in the current pandemic situation, and students had perceived severe stress as they agreed that "regular class lecture is easy to understand". This favoring of regular classes is not a new finding. Studies have reported that online healthcare development skills pose a new challenge for the learning of medical students (Triola *et al.*, 2010). With an available wide range of support from the Saudi government to the academic sector, in general, and medical in particular, they see a huge transformation of academic resources to be based and augmented through E-learning in Saudi universities. This finding is consistent with the future perspective stated in AMEE guide 32, that the E-learning will be an increasingly global activity, providing opportunities to take your courses to the rest of the world and introduce the rest of the world to your courses, and can thus become a classroom anywhere (Ellaway *et al.*, 2008).

In this study, we also have explored the connection between various psychological variables and perceived stress. They found that the students who gained pleasure studying during COVID-19 (which was predominantly through an online platform) were found to be least stressed. Results of another study also found that the students felt it as enjoyable (Costa *et al.*, 2019). One more important finding was about the item exploring for "There is anxiety before online learning session" where a mixed response was received, almost half of the respondents agreed and found not to have stressed. At the same time, another half also agreed with the item and was found to have a varying percentage of mild, moderate, or even severe stress. This is consistent with the results of studies (Husky *et al.*, 2020) reporting high test anxiety among students whereas another study (Teagle *et al.*, 2017) reported medium test anxiety. This variation in the degree of test anxiety may relate to the complexity of certain topics, different items designed by different staff, and also the interest in the topic. Regarding another survey item, the majorities (72%) of their participants were of the opinion that there is anxiety about performance in exams, and among them (60%) had shown mild, moderate, and severe stress. Similarly, a significant percentage (52.30%) of medical students in Ethiopia had troubling test anxiety, and about 65% students had exam anxiety (Khoshhal *et al.*, 2017) Both studies also showed a strong link between test anxiety and the female gender. Studies carried out abroad have shown that the prevalence of

depression and anxiety among medical students varied between 1.4–73.5% (Rotenstein *et al.*, 2016) and 28–85% (Ahmed *et al.*, 2009). Nevertheless, the anxiety dominance data from their study were lower than the global data. Furthermore, anxiety is frequently synonymous with mental illness and or considered as the apprehensive mental state, (Crocq *et al.*, 2017) which is interpreted as a sign of weakness, and students may have underscored their symptoms. The participants were from the nation's leading medical institution; they might have been more resilient and better dealing with stress than other medical students.

Literature suggests that the coping strategies are significant, with their context reflected by social support, particularly within the family, and emotional, with the passions of medical students being the most important factor in the fight against stress. Each person relies, as in any challenging situation, on different coping mechanisms. While unprepared, it is always challenging for medical students to cope. (Murray *et al.*, 2018) The commonly used coping strategies amongst our responded students were "regular exercise," "watching online movies & playing online games," "online fun with family and friends," religious activities,' and "learning to live in COVID-19 situation and accept it." As reported in their study, the most effective coping strategy to deal with severe stress was "religious activities" as practiced by the majority of the "severely stressed" students. Coping with religion includes cognitive, emotional, or behavioral responses to stress. Another study suggested that religious participation in response to life stressors could be particularly important for certain groups (Ahrens *et al.*, 2010).

CHAPTER-3

MATERIALS AND METHODS

Materials and methods

3.1 Study Participants and Procedure

The target population comprised medical students of all 5 years i.e. first year, second year, third year, fourth year, fifth year students. The respondents in the target populations were recruited by Random sampling.

After taking approval from ethical committee of CVASU Approval No: CVASU/Dir (R&E) EC/2020/169/13 Date:21/07/2020, a cross-sectional descriptive study was conducted in 20 October 2020 to 11 November 2020on the students of Southern Medical College and Hospital (SMCH), Institute of Applied Health Sciences, University of Science and Technology (USTC), Chattogram International Medical College (CIMC).

3.2 Measures

Data Collection:

For the collection of primary data, a self-administered questionnaire was developed through literature search and was randomly distributed through online form-Google form.

Social networking sites have been a significant source of reaching out to students enrolled in different medical schools.

Source population- MBBS students of all levels (1st-5th Year). Females were predominant at 186 (59.2%) and males were 128 (40.8%).

Sample size-320

Sampling technique-Non probability type convenience sampling was done.

The questionnaire consists of 5 sections. The scale was based on 4-pointscale: 1-Always, 2-Never, 3-Sometimes, 4-Most of the times. There are 13 questions covered in demographics, 21 items of the questionnaire determined the positive and negative perceptions of students towards e-learning. Fourteen of the 17 items were negatively worded and were reversely scored. The rest of the four items determined what gadgets were used for online class which was mostly Smartphone's, the platform used for the class which was mostly zoom, the type of interaction with the teacher which was mostly voice chat and the type of network used which was mostly Mobile Network. Future learning preference, Is E-teaching better than traditional teaching, Quality of e-teaching is satisfactory, Impact of e-learning is less, Student-Teacher interaction

(isolation has increased), Online teaching is not secure. Before administration of the questionnaire, validation by two medical educationists was done.

For further understanding of the data, 48 items of the questionnaire were grouped into 5 categories. In section 5 questions related to depression regarding E-Learning and study during CoVid-19 is discussed 14 out of the 14 question in section 5 were answered negatively. The questionnaire was shared by Messenger App to all the students for the collection of data. Written informed consent was also taken from the participants. Finally, the respondents were not obliged to complete the questionnaire in full, meaning the number of respondents varied across questions.

3.3 Statistical Analysis

The data were expressed as percentages or frequency of the categories (demography of responder, education style, student's opinion). Collected epidemiological data were entered into a spread sheet program (Microsoft Office Excel 2010) and transferred STATA-13 software for data summary and analysis.

3.4 Ethical Considerations:

All participants were about the details of the study. Study participation was anonymous and voluntary, and students could withdraw from the study without any consequences. Only the researchers had access to research data. Ethical committee of CVASU Approval No: CVASU/Dir (R&E) EC/2020/169/13 Date:21/07/20, the study was conducted on students of Southern Medical College and Hospital, University of Science and Technology, Chattogram International medical college.

CHAPTER-4

RESULTS

RESULTS

Overall findings:

A total of 320 MBBS students participated in the study. They responded to the survey and electrical questionnaire. Females were predominant at 186 (59.2%) and males were 128 (40.8%). The average age was 21 years and ranged between 18-24 years. 110 (34.9%) of students were from the 3rd Year, 84 (26.7%) at 1st year, 48 (15.2%) at 2nd Year, 39 (12.4%) at 4th Year and 34 (10.8%) at 5th Year so most of the respondents were from the 3rd Year. 287 (88.5%) of them live with their family while 36 (11.5%) of them don't. Their main income source is their father at 254 (80.6%) and 248 of them live in urban areas (80.3%).

4.1 Overview of the Questionnaire Results

The results of the medical student survey include findings concerning different aspects of student life, e.g., academic work, infrastructure and the skills needed to study from home, social life, emotional life, and other circumstances, which are described below. In addition, the impact of socio-demographic and geographic characteristics was statistically tested. In general, the empirical results reveal that, students with a better standard of living (i.e., students with scholarships and students who did not lose their jobs, parents who did not lose their job and were able to pay the overall cost of their study and living) those coming from comparatively socioeconomically strong background have more positive attitude to the majority of aspects/elements of student life in the time of the pandemic (Aristovnik *et al*.,2020).
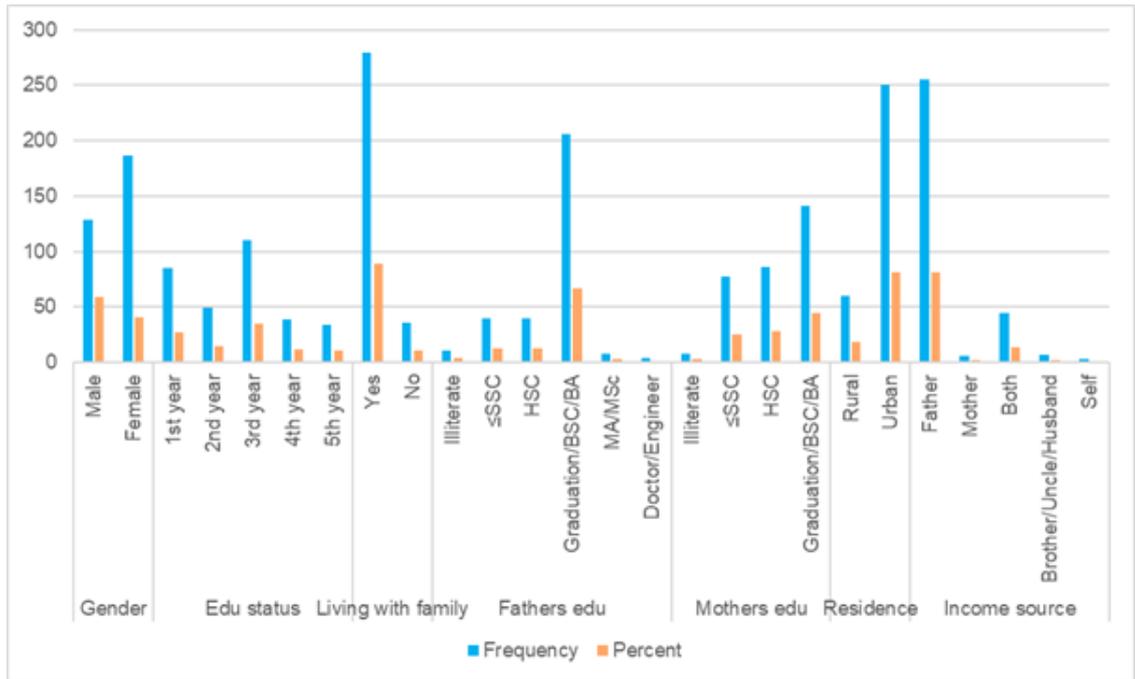
Figure 1: Demography of responder
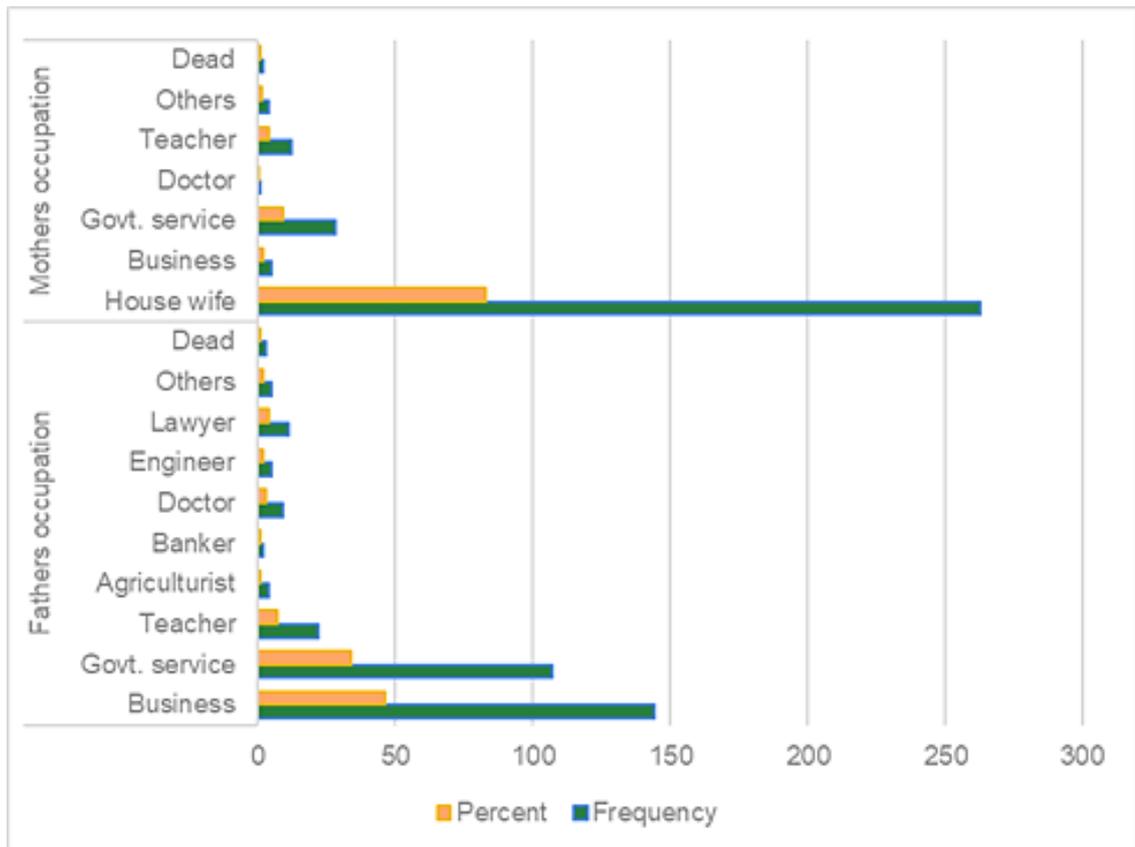
Figure 2: Parents occupation of the responders

Mother's (262) are house wives (83.4%) while 143 of their fathers do business (46%) and 98 of their occupations are service (31.5%).

4.2 From Onsite to Online Lectures

In order to reduce the spread of the novel corona virus, universities around the world moved rapidly to transfer various courses from onsite to online, with online learning (e-learning) thereby becoming a mandatory teaching and learning process of educational institutions. Teaching online is not simply putting learning materials online. Lecturers must organize the content and learning methods according to the new mode of delivery so that students do not feel isolated and alone in the learning process. Therefore, appropriate knowledge and skills of lecturers as well as ICT equipment must be ensured where online learning was still not widespread before the COVID-19 pandemic. In the survey, students were asked about their attitudes to different online forms of teaching and learning, including their satisfaction with the support of their institutions after the cancellation of onsite classes due to the physical closure of their medical education institution. Consequently, several different forms of online lectures were established. The most dominant forms of online lectures were real-time video conferences followed by asynchronous forms: Sending presentations to students, videorecording, and written communication using forums and chats. Video conference system, (e.g. facebook live, Zoom, Google meets etc.) are widespread and have been freely available for quite some time (Aristovnik *et al*.,2020).The students were mostly connected by video chat or voice chats,(Figure:4).

4.3 Academic Work

Universities around the world cancelled their onsite classes and shifted their pedagogical processes to online media. For some universities, the online mode of delivery was not new, unlike others, which were encountering such forms of teaching for the first time. The transition was quick and not much time was available, noting that the quality of teaching and learning in these new circumstances needs proper attention. On the other hand, students from under developed, remote, and rural areas had problems with poor Internet connectivity or even a lack of electricity. We also cannot ignore poverty; with the final result they hold a negative attitude to the online mode. The effectiveness of online learning depends on the designed and prepared learning material, the lecturer's engagement in the online environment, and lecturer–student or

student–student interactions. Further, while studying online from home, students must have an opportunity to ask questions and expect a timely answer (Aristovnik *et al*., 2020). Therefore, in the context of academic work, students were asked about lecturers' topic selection is appropriate or not, are they feeling interested in online classes or are the classes interactive? Are things well mentioned in online classes? Exams in the new circumstances and their performance is questionable, which is related to negative experiences with the rapid transition to online classes. Studying from home commonly requires greater self-discipline and motivation to follow through online lessons, particularly in the earlier period when students are getting used to the new system, which might affect the feeling of an increase in study obligations. On the other hand, lecturers unfamiliar with the new mode of delivery could overload their students with study materials and assignments. The key challenges are problems with an underdeveloped Internet network, lack of and inexperience in using ICT equipment, and the fact that the only available devices for participating in online classes are mobile phones. In this study,53% students always have devices,21%have devices most of the time,20% student have devices sometimes and 6%students never have appropriate device for attending online classes. That means 41% students are not having devices every time and the rest 6%who are not having any devices to attend their online classes, is getting deprived of their lessons, facing problems to continue their study, thus making them stressed and depressed. While studying isolated at home, students may face a lack of self-discipline or an inappropriate learning environment, which evokes a feeling of work overload and thus a higher level of stress. Lecturers should therefore carefully balance online teaching and self-learning of students while planning and designing the teaching and learning process. Students found it difficult to focus during the online teaching in comparison to onsite teaching.
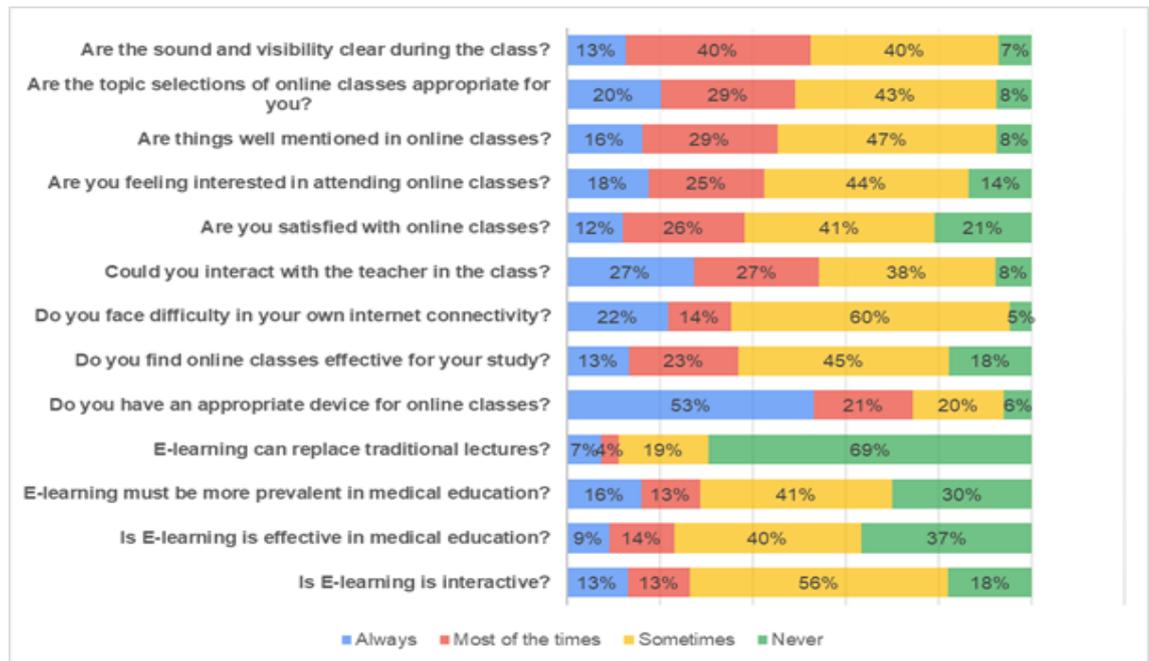
Figure 3: Response to the Likert Scale questions from Medical students

In this study among the respondents, 60% of medical students usually face difficulty in their internet connectivity which is a large population actually, only 13% students mentioned that sound and visibility clear during classes, 40% of students usually face audio visual problems most of the time and another 40% sometimes have audio visual problems, and the rest 7% never gets clear sound and visibility during their online classes. This 7% students are not a negligible. They are always facing problems. If they don't hear and see what lecturers are delivering to them, how can they communicate? They would not have interest in the study, their class performance and result would get detoriated. A large percentage (41%) of people find online classes uninteresting and unsatisfactory (62%). They think that things are not well mentioned in class (53%), they don't think the topic selections in class is appropriate for them (51%), however 54% of people could properly interact with the teacher but 63% of students do not find online classes effective for their study. 88% of students think that e-learning can never replace traditional lectures as 71% of them think that it must be more prevalent, 77% of students think that it is not effective, due to lack of proper devices, poor internet connectivity, audio, visual problem during classes. Only 5% students mention that they never face difficulty in their own internet connectivity, rest of the students are facing the problem.

4.4 Academic Life

As far as the students' academic life is concerned- The availability of different kinds of home infrastructure needed to ensure efficient study; and the students' computer skills, living in a developed country, students do not have necessary study materials (Aristovnik *et al*.,2020). A good Internet connection is essential for online learning yet students complained about connectivity problems Figure:3. Students in remote and rural areas losing their educational opportunities. The skills of browsing online for information, mail, messaging etc. and skills of sharing digital content should be improved. This calls for intense preparation for any future waves in the second half of 2020 and later in the sense of making sure that students are equipped with the skills needed to use those online platforms.
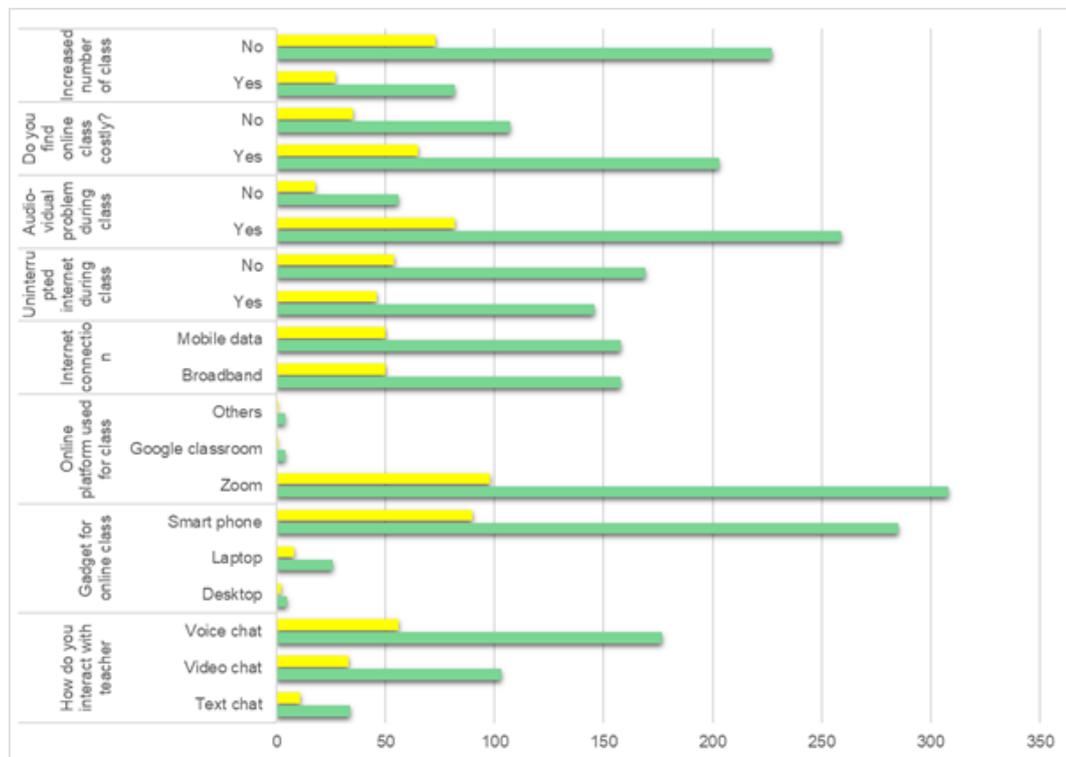
$\blacksquare$ = Percentage $\blacksquare$ =Frequency

Figure-4-Problems faced by the students during e-learning

In this study, 284 (90.2%) respondents have a smart phone with reasonable facility while only 31 (9.9%) had computers. e.g. Laptop 26(8.3%),Desktop5(1.6%). Therefore, e-learning software that is users-friendly and easy to operate with smart phone is needed. Zoom is the highest used online platform for classes standing at a whopping

307 (97.5%), rest uses other online platform like Facebook live, Google room, Google meet etc. The most used type of interaction was voice chat at 177 (56.5%) and 102 (32.6%) and 34 (10.9%) uses text chat. So 55 (17.6%) students feel online classes are never effective for their study, while143 (45.7%) students feel sometimes it is effective,73 (23.3%) students feel it is most of the time effective, only 42 (13.4%) students feel it is always effective. Most students stated that a good internet connection is expensive and the ones that they can afford are not good enough for classes, 167 (53.2%) students do not have an uninterrupted connection during class 147 (46.8%) get quality internet connection in class time and that 156 (49.5%) of them use Broadband Network while 159 (50.5%) of them use mobile network, therefore it is difficult for them to attend live lectures or download files that the teacher gives them. Thus 203 (65.7%) finds online classes costly, only 106 (34.3%) students found it convenient. Moreover, in certain areas due to geographical limitations, the telecommunications signals are quite hampered, they should be provided with technical support for online sessions and flexibility in case of technical problems during online exams. 258 (82.2%) student's faces audio-visual problems during their online sessions, only 56 (17.8%) said they don't face audio visual problems during their classes. So students were concerned about interaction with each other and the instructors during the online session so this causes almost all of the students 227 (73.7%) do not want an increased number of classes, only 81 (26.3%) students said Yes for increased number of online classes per week. So, 66 (21%) students said they are not satisfied with the online classes, 127 (40.4%) is satisfied sometimes,83 (26.4%) said most of the time they are satisfied, 38 (12.1%) said they are satisfied with online classes.

4.5 Social Life

In many studies, the loss of one's usual daily routine as well as reduced social and physical contact with others (including the social-distancing measures) trigger numerous negative emotions like frustration, boredom, anxiety, confusion, anger, etc. The COVID-19 pandemic and subsequent physical closure of medical education institutions has put the majority of students in an unfamiliar situation. During the period of closure, they were living in environments with varying circumstances and had different options to keep their social life as close to 'normal' as possible. Some were at a higher risk of social isolation and the consequent development of mental health disorders, e.g., those who were living by themselves in this period. In this survey, 278

students living with their family and 36 (11.5%) are not living with their family (Figure-1), students who are not living with their family feels isolated, alone, cannot share their feeling, feels more anxious. Students without family complained about stress during the COVID-19 pandemic (Fig:5). Since social support is vital for the mental health of students, it should be efficiently offered and carefully maintained during a time of isolation and/or quarantine (Aristovnik *et al.*,2020).

: Percentage   :Frequency
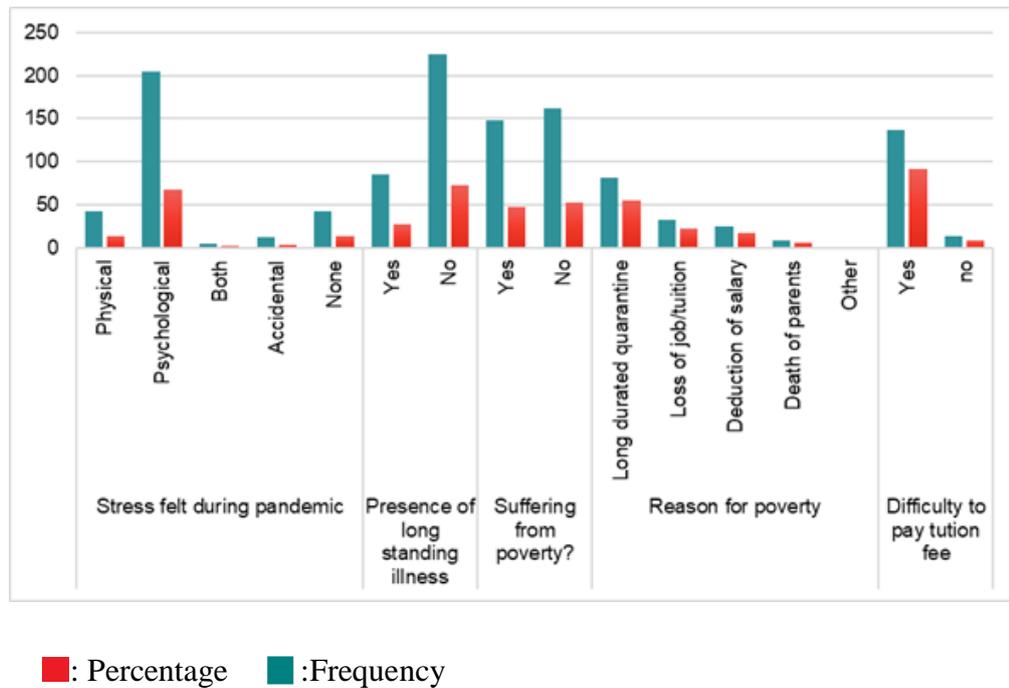
Figure 5: Response to stress and financial problem related questions

4.6 Emotional Life

The COVID-19 pandemic has heavily influenced the emotional wellbeing and thus mental health of people all around the globe—either directly in terms of health issues or indirectly in relation to its economic and social consequences. This is also true for students, although on average they are not the most endangered group of the population as far as the physical health aspects of the pandemic is concerned. However, many of them have experienced unbearable psychological pressure, especially due to the pandemic's impacts on daily life, the economic effects, and the delays in academic activities. In this study, the respondents stated only 14% of them were not stressed and ones that were stressed stated that 203 (65.9%) of them were suffering from psychological stress due to suffering from poverty 147 (47.6%) because of quarantine for long periods of time 102 (59%), loss of job or tuition 33 (19.1%), deduction of salary 26 (15%), death of guardian 09 (5.2%), which leads 198 (80.5%) of them to have

difficulty of paying tuition and university fees, 48 (19.5%) is not facing such problems. 84 (27.2%) of students have longstanding physical illnesses or disabilities that have troubled them (Figure: 5) and students with comorbidities have more chances of being affected by Corona Virus, which can be the another cause of psychological distress. Respondents also reported stated that good quality internet connectivity is very expensive for them and that the affordable bandwidth is limited, which often contributes to slow speeds of download and low quality of videos or visual outputs. In remote, rural areas telecommunication signals are quite hampered. The information on internet infrastructures and availability in our settings may provide base line information regards challenges to e-learning implementations. So, students and their family are struggling financially paying for fees, internet expenses etc. The relatively high level of negative emotions and relatively low level of positive emotions indicates that the pandemic itself and the measures taken by the various governments (e.g., cessation of public life, travel bans, etc.) will have specific short- and long-term impacts on the education and mental health of students. The accompanying effects of COVID-19 will continue to profoundly influence students' emotional wellbeing; meanwhile, emotional wellbeing has a crucial role to play in combating the pandemic. This implies that government, health professionals, medical education institutions, student organizations, and NGOs should all collaborate on the process of designing timely and efficient psychological and financial support services for students (Aristovnik *et al*.,2020).
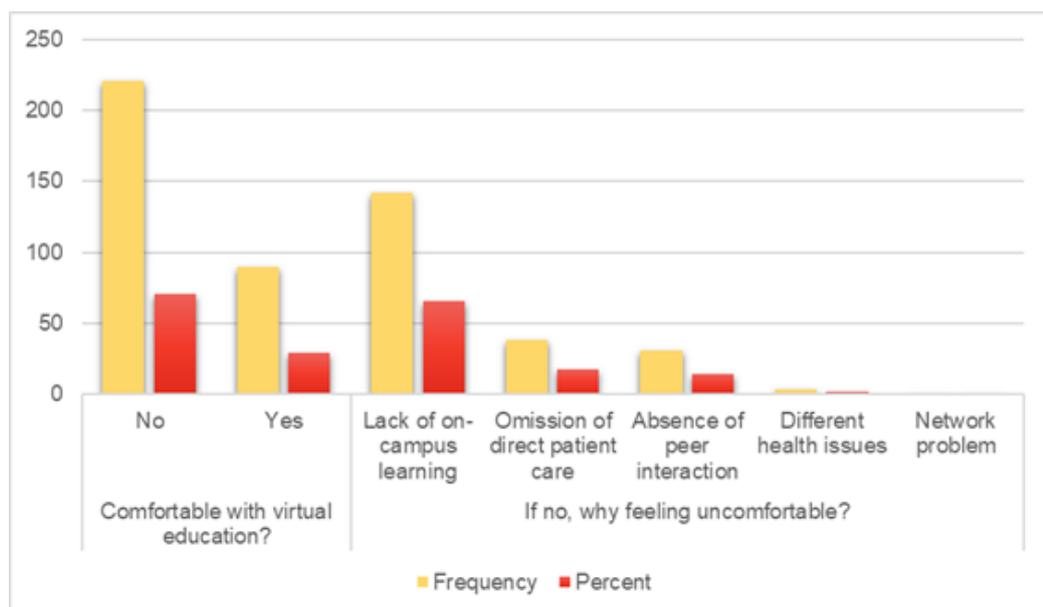
Figure 6: Response to student's comfort in virtual study

Majority 220 (71%) of respondents stated that they are not comfortable with the virtual education system while only 90 (29%) are comfortable with it. The 220 people who aren't comfortable don't like the virtual system because of the lack of on campus learning 148 (63.5%), omission of direct patient care involvement 45 (19.3%) and the absence of peer interaction 35 (15%) etc (Figure:6).
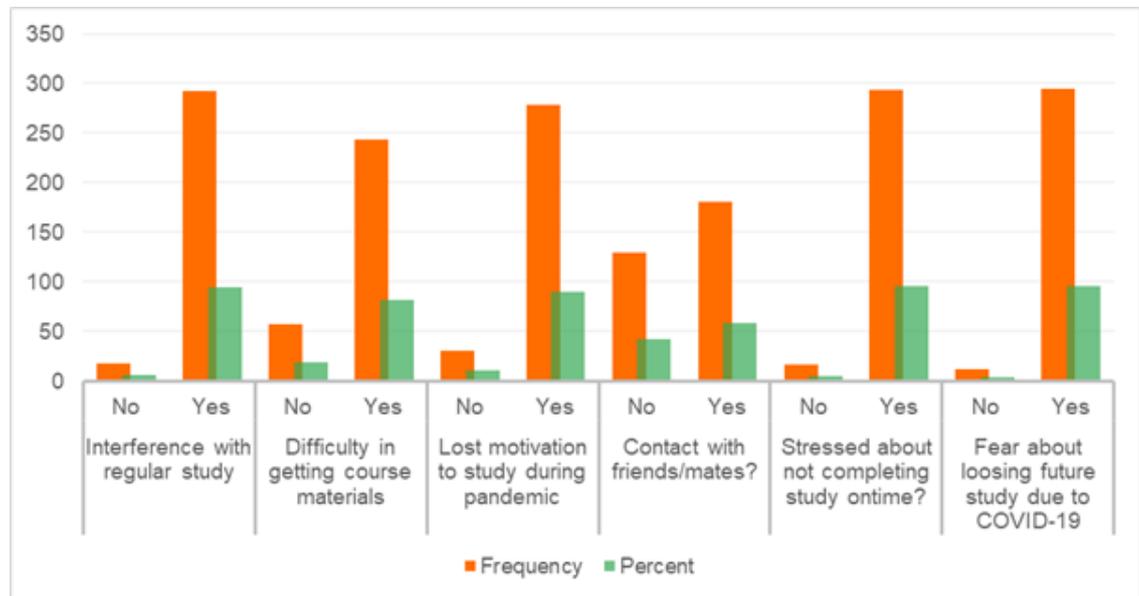
Figure 7: Response to study related questions during pandemic

4.7 Personal Circumstances

The COVID-19 pandemic is responsible for tectonic changes in the lives of many groups in the population, thus also of higher education students. The world is faced with a great crisis due to the pandemic spread of the novel corona virus and as expected based on previous epidemics, students hold specific worries (concerns) about their short- and long-term future too. The results of my study show that, during the lockdown, students were worrying about their professional career in the future and study issues, e.g., lectures, seminars, practical work (Aristovnik *et al*.,2020). During pandemic they were more worried about a professional career in the future, personal finances, and future education.291 (94.2%) fee is current pandemic interferes their regular study, only 18 (5.8%) saying it did not interfere.243 of them (81%) has said that they have difficulties obtaining their course material, 57 (19%) are not facing problem gathering their course material. Thus gradually they losing their motivation during this quarantine period. 278 (90.3%) students' states that they are losing their motivation towards study in this period, only 30 (9.7%) states that they did not lose their

motivation, as 180 (58.3%) had direct or indirect contact with their friends, in this quarantine period they cannot do the group study, as lack of over connection, they feel demotivated. 261 (86.1%) students were stressed as they could not go to class for maintaining social distancing during quarantine, only 42 (13.9%) students were not feeling stress. 292 (94.8%) of student's state that they are stressed about not completing their MBBS on time and 294 (96.1%) of them are worried about not being able to complete their future studies on time. The switch to online classes closed libraries, changed communication channels for teachers and administrative support, new assessment methods, different workloads, and performance levels etc. and social life (e.g.closed dorms and therefore moving back to home, no meeting with friends, university colleagues or relatives, no parties, no travelling, remaining trapped abroad etc., as well as their personal financial situation, like loss of student job, worrying about their own financial situation, future education and career makes them stressed and their emotional health (fears, frustrations, anxiety, anger, boredom etc.) deteriorates so it made 90% of them lose motivation to study during the pandemic; meanwhile, emotional wellbeing has a crucial role to play in combating the pandemic. This implies that government, health professionals, higher education institutions, student organizations, and NGOs should all collaborate on the process of designing timely and efficient psychological and financial support services for students. Majority of the students preferred face to face teaching over e-teaching. The key outcome of the result shows that the students are not yet ready for e-learning.

CHAPTER-5

DISCUSSION

Discussion

During this outbreak of SARS-COV2 pandemic, the students of medical schools in Bangladesh are severely affected. As all the people in the world their life too was turned upside down. For example, on campus classes were moved online, semesters were postponed, examinations adjusted, etc. This unprecedented situation demanded an urgent need for in-depth studies about how this the pandemic had impacted students' lives around the world. In this study which was conducted between October 20, 2020 to November 10, 2020, I attempted to illustrate what student life was like during the COVID-19 pandemic from academic, social, emotional, financial, and other perspectives. The study reveals a number of unique and detailed insights into student life during the lockdown period.

Initially the students' academic work and academic life aspects were studied. As lockdown started in early 2020, all the educational institutes were closed indefinitely. The authorities of the majority of these educational institutes decided that teaching and learning processes shall be online. As a result, the medical students of this study claimed that on campus classes had been cancelled and substituted with online lectures. This process started in the form of real-time video conferences, online classes, online presentations, video recordings, and written communication via email and online forums. Due to this sudden change in study environment less than half of the students felt that the workload before the transition from on campus to online had become larger or significantly larger. The reason for this probably due to the underdeveloped Internet network and a lack of computer skills. Adapting to a new virtual study environment is difficult as most students and teachers had little or no prior experience in this regard. Studying from home isolation via online communication is very challenging for the untrained individual. This requires tremendous motivation, self-discipline and self-initiative to adapt to this new environment. Adapting to new study habits became stressful thus the feeling of work overload. The support of the administrative and teaching staff students quickly familiarized with the new teaching method. All university information about their course could be obtained on websites and social media, which proved to be a very helpful and efficient communication tool from medical education management.

Bangladesh is in the digital phase now. Infrastructures for the Internet and 4G network are being developed all over the country. Smartphones are now cheap and available all over Bangladesh. There fore, it is no surprise that this study finds 90.2% of the students used smartphones for their online classes with reasonable facility while the rest having Laptops 8.3%, Desktop 1.6%. Therefore, E-learning software's that is users –friendly and easy to operate with smart phone is needed. Mobile E-learning applications have been developed to provide support for students in rural areas (Awadallah *et al*., 2020).A study acquitted on University students, shows,66% students uses mobile device for E-learning, which is close to our study that shows 90.2% prefer smartphones. A study in Spain revealed that student prefer smartphones for their online learning as they feel student – teacher interaction is much easier in this platform compared to other devices. In a previous study, the author discussed that through this, learning can take place simply anywhere, anytime. Theresults of this study were a bit different from mine as here smartphones were the second choice for E-learning after Laptop, whereas, in mine Laptops preference came at number two after smartphone.

A good internet connection is the key element in efficient online study. However, as campuses closed for lockdown many students moved to rural areas to visit relatives or parents, in some of these areas internet networks may be poor or being developed. This causes connectivity problems as a result students faced audio-visual problems during classes. Furthermore, many students had difficulties adjusting to the settings of a few software's and programs and as well as a few online teaching platforms. This finding shows the importance of intensive training to both students and teachers before introducing them to new technology at the start of the new academic year. Some students do not have equal opportunities to study online efficiently due to socio economic conditions, domestic duties, and other factors. In the segments of student academic work and life described above, socio-demographic factors appeared as the important predictors of satisfaction with and perception of specific segments. Indeed, the empirical findings confirm that undergraduate students and students with financial problems are finding it harder to cope with the pandemic's consequences for their academic work and lives.

These rapid and radical changes in teaching and learning processes have profound effects on students' mental health. For example, feeling uncertain about the future, experiencing specific emotions and worries about their course work. The analysis of the emotions felt by the students were mixed emotions. Students frequently felt bored,

anxious, and frustrated at the same time also hopeful that everything would work out fine. While studying at home, many not only being under a lockdown but also in isolation or even in quarantine, students were worrying about their professional career in the future and study issues, for example lectures, seminars, practical work. The findings suggest that many challenges lie ahead of the current generations of students. This means the support measures taken by the responsible stakeholders must be implemented as soon as possible and be as systematic, holistic, and sustainable as possible in order to ensure a physically, psychologically, and economically safe future for young generations. Students' mental health during the physical cessation of public life depended heavily on the level of change in their usual daily routine and the social support they were receiving during that challenging period in time. During the months of closure, students lived in very diverse environments and had to run their social life differently to before. By maintaining their social contacts, students were helping others and themselves to maintain their mental health in the unprecedented period of the first wave of the COVID-19 pandemic.

Besides changes in their social life, students had to modify certain other habits and daily routines, especially those connected to the risk of spreading the virus. In our study, they reported having started to wear a mask outside, washing hands, and avoiding crowds and large gatherings. They also had to avoid public transport, cancel their travel plans, work from home, avoid touching the face, and started to stock up on essentials. As digital natives, they did not alter their habits much regarding online shopping. Students also reported not leaving the home unnecessarily not shaking hands, and not visiting family members or friends. Last but not least, apart from the many negative consequences, the pandemic created some opportunities for students with respect to their future work and behaviors, e.g., acquiring digital skills faster, having time to eat healthier, having time to do sports, the opportunity to do something good for people needing help in the family or in neighborhood, and finally shopping and travelling less and therefore saving the planet from pollution.

There is no doubt that the COVID-19 pandemic has tested academic systems around the world and that universities had to rapidly transform traditional forms of education to exclusive online education. But they found it improper due to its limitations in practical learning in wards, direct patient dealing in lab or clinical environment. This is much compatible with the student's behavior in many other countries like Singapore, Malaysia, China etc (Ali *et al.,*2020). Policymakers on all levels should provide investments in digital literacy and infrastructure, while education institutions should

provide flexible delivery methods, digital platforms, and modernized user-friendly curriculum to both students and teachers. In other research, regarding E-learning before Corona Pandemic, there were mixed consequences. Some suggested positive (less bored, more hopeful, greater satisfaction) and others negative inclination towards E-learning. A study on the efficacy of conducting digital lectures on gross anatomy. The study explored student's positive perception towards E-learning and their majority of the students welcomed digital learning (Singh *et al*., 2020). Students were satisfied with E-learning in comparison to face to face learning (Mamattah *et al*., 2016). However, some literature shows students positive perception towards face to face learning over E-learning (Qureshi *et al.,* 2020). Unlike in my study, 90.8% students think E-learning is not effective for medical education.

This study results also highlighted that students are not ready to adopt E-learning which is different from the findings of a study conducted on nurses. They considered E-learning as a better education approach and preferred it for future learning (Ali *et al*.,2020). Another study acquitted in India unveil that E-teaching increased students satisfaction level towards learning (Maheshwari *et al*., 2020).Some studies also reported that students were misusing the user identity during online classes. It was noted that online teaching was not secure incivility was considered as a major issue that was detrimental to students' privacy, as is evident in our findings too (Michael *et al*.,2020). There are several studies on the comparison of E-learning with face to face teaching (Kwary *et al*.,2020).In one of the papers presented in a conference on mobile learning at Singapore, it showed that there is no significant difference between the performance of students having E-learning and face to face learning, whereas in my study it revealed that E-learning is perceived to have little impact compared to face to face learning as indicated by 90.8% of the participants. The same paper highlighted that E-teaching methodology limits student-teacher interaction. This finding was compatible with my study where 92.1% of the students rated that E-teaching has limited student-teacher interaction.

CHAPTER-6
CONCLUSION

Conclusion

In the period of just a few months, the COVID-19 pandemic caused by a novel coronavirus has radically transformed the lives of masses of people around the globe, including medical education student. In this respect, this study provides systematic meaningful insights into students' satisfaction and perception of different aspects of their lives during the pandemic, including their opinions on the immediate and distant future. The lack of computer skills and the perception of a relatively higher workload prevented students from perceiving a higher performance while adapting to the 'new normal'; namely, education from a distance. During the lockdown, students primarily raised concerns about their future professional career and study issues and were mainly bored, anxious, and frustrated. Socio-demographic (and geographic) factors also played an important role in the students' perception of different aspects of academic work/life. The results demonstrate that more hopeful and less bored students, students who were more satisfied with their academic work/life, students with a better living standard (with a scholarship and/or the ability to pay the overall costs of study), showed greater satisfaction with the role and measures of their university during the COVID-19 crisis. These findings importantly call for medical education authorities to closely collaborate (together with other stakeholders) and urgently pay attention to vulnerable student groups while seeking to resolve the diverse, mostly negative, consequences of the prolonged COVID-19 measures around the world. It is concluded that in Bangladesh, despite gaining immense popularity today, digital technology has still not been embraced by the Medical students for use in teaching. Students are still more inclined towards face to face teaching rather than e-teaching. Administration and faculty members should take necessary measures for improving e-teaching quality to help with better learning of students during lock down. In addition, the study finding highlights the need of psychiatric counseling and support services available to vulnerable students.

Limitations of the study

Several limitations of the present study should be noted. One of the limitation of the study is the fact that there was a pandemic going on, so we could not achieve the data in real life, rather we had to do it using social media apps like Messenger. Therefore, results of the study cannot be generalized.

Second, The majority of aspects in the questionnaire were in the form of students' self-report. This kind of process is usually complex and requires both recall and insight, where a recall bias and social desirability bias may be caused by the self-reported property of the research. It is reasonable to assume that some students might under/overestimate their satisfaction with and perception of the selected aspects/elements of their lives during the COVID-19 pandemic. Third, the responses from some institutions were low or quite limited as one or few medical institutions made up most of the sample participants from others. As a result, these findings may be biased to some extent and therefore caution should be taken while generalizing the results to those institutions not included in the sample. Further, as the data collection was mainly conducted in Oct,2020 while the declaration of a pandemic was still in force access to the participants was relatively limited. Another limitation for this study was the inability to measure the educational outcome linked to e-learning and comparing them to traditional learning. Further studies are required to address educational outcomes. Finally, identified socio-demographic differences in students' perceptions are not necessarily just a reflection of the COVID-19 pandemic but also of some other factors (e.g., differences in digital transformation of medical education, economic development, cultural and religious background, political circumstances etc. Therefore, the present study importantly fills this gap and points to avenues for future research, such as: (1) Focusing further empirical analysis on each studied aspect/element of medical student life separately and in more detail from different (comparative) perspectives on regional, national, and/or institutional levels; and (2) extending a similar survey to teaching staff and other employees at medical education institutions by performing a study on the impact of the COVID-19 pandemic on their professional and private lives.

CHAPTER-7

RECCOMENDATIONS

Recommendation

The recommendation of the study is to further explore factors influencing student's perceptions towards e-learning. It is also recommended to explore the perceptions of Faculties regarding their experience towards e-teaching during covid-19 lockdown. Another challenge for the medical education process is examinations. Some schools, such as the Imperial College in London, started to implement an online examination platform during the COVID-19 pandemic for final-year medical students to prevent any further disruption and postponement of student graduations (Tapper *et al.,*2020). This form of online examination and assessment was proposed to meet the requirement for board and fellowship examinations (Munshi *et al*., 2020). However, it poses several technical issues, such as the availability of specific technical requirements including cameras, microphones, and speakers with specific features, so as to prevent any disruption and bias. It also poses ethical challenges, and several difficulties are encountered in terms of its implementation. For example, there might be risks such as leaked questions, which would prevent an accurate in-person assessment.

I recommend adapting interactive online learning lectures by using highly sophisticated technologies along with virtual clinical experience to combine clinical scenarios with similar bedside teaching based on discussions of medical cases. Such measures would help students adapt to this way of medical teaching. Additionally, the situation should be assessed further to examine whether online examinations can help avoid postponing student graduations and medical training. The COVID-19 pandemic is ongoing and will continue to disrupt medical education and training. COVID-19 has overloaded the healthcare system and has affected the ability of healthcare providers to provide adequate healthcare services. As we face a second wave of this outbreak, we must undertake several measures and make changes to minimize the impact on medical education and the progression of training. Valid solutions are needed to reduce this disruption, and such measures may take the form of online training and virtual clinical experience, followed by hands-on experience in a safe environment, although the latter may take time considering the continued spread of COVID-19. Results could be used in future studies to examine medical students' status and the usability of electronic learning as an alternative to the typical medical education process to facilitate the future education of medical students. Empowering medical students by providing them with a comprehensive medical education and sufficient clinical experience for their career can help prevent major disruption and delays in clinical training.

Appendix

Title: Perception of medical students regarding E-learning and related depression during Covid-19 pandemic

- ➤ **Socio demographic Information**

Q: Sex:

Male

Female

Transsexual

- ➤ Q: **How old are you? --------------years**
- ➤ **Q. What's your religion?**

Islam

Hindu

Buddhist

Christian

Others

- ➤ **Q. What is your educational status?**

MBBS

1st year

2nd year

3rd year

4th year

5th year

- ➤ **Q. What is your Father's education?**

Illiterate

SSC

HSC

Graduation/Post-graduation

Others

- ➤ **Q. What is your Mother's education?**

Illiterate

SSC

HSC

Graduation/Post-graduation

Others

- **Q. What is your Father's Occupation?**

Agriculturalist

Day labor

Service

Business

Others

- **Q. What is your Mother's Occupation?**

Daily labour

Service

Business

Housewife

Others

- **Q. Place of residence**

Urban

Rural

- **Q. Living with family?**

Yes

No

- **Q. Income source**

Father

Mother

Both

Self through tuition

QUESTIONS RELATED TO MEDICAL STUDENTS PERCEPTION ON E- LEARNING DURING COVID-19 PANDEMIC

- **Q: Are you feeling interest in attending online classes?**

Always

Never

Sometimes

Most of the times

- **Q: Are the things well mentioned in online classes?**

Always

Never

Sometimes

Most of the times

➢ **Q: Are the topic selections of online classes appropriate for you?**

Always

Never

Sometimes

Most of the time

➢ **Q: Are the sound and visibility clear during the class?**

Always

Never

Sometimes

Most of the times

➢ **Q: Could you interact with the teacher in the class?**

Always

Never

Sometimes

Most of the times

➢ **Q: How did you interact with the teacher in the class most of the time?**

Text chat

Voice chat

Video chat

➢ **Q: Do you have appropriate device for online classes?**

Always

Never

Sometimes

Most of the times

➢ **Q: Which of the following gadget you are using for online class?**

Smart Phone

Laptop

Desktop

➢ **Q: Which online platform you are using for online class?**

Zoom

Google classroom

Virtual classroom

Others

> **Q: Which internet connectivity you are using while taking online class?**

Broadband network

Mobile network

> **Q: Do you face difficulty in your own internet connectivity?**

Always

Never

Sometimes

Most of the times

> **Q: Do you get uninterrupted internet access during class time?**

Yes

No

> **Q: Is there audio-visual problems you face during online class?**

Yes

No

> **Q: Do you find online classes costly?**

Yes

No

> **Q: Do you find online classes effective for your study?**

Always

Never

Sometimes

Most of the times

> **Q: Do you want increased number online classes per week?**

Yes

No

> **Q: Are you satisfied with online classes?**

Always

Never

Sometimes

Most of the times

> **Q: E-learning is effective in medical education?**

Always

Never

Sometimes

Most of the times

- ➤ **Q: E-learning must be more prevalent in medical education?**

Always

Never

Sometimes

Most of the times

- ➤ **Q: E-learning is interactive?**

Always

Never

Sometimes

Most of the times

- ➤ **Q: E-learning can replace the traditional lectures?**

Always

Never

Sometimes

Most of the times

QUESTIONS RELATED TO DEPRESSION REGARDING E-LEARNING AND STUDY DURING COVID 19

- ➤ **Q. Did the current pandemic increase your level of stress? If, yes what is the type**

None=0

Physical=1

Accidental=2

Psychological=3

Others=88

- ➤ **Q. Do you have any longstanding physical illness or disability that has troubled you for at least one year?**

No=0, Yes=1

- ➤ **Q. If yes, how long have you had this?**

From birth on =1, 1 – 5 years =2, & 5 years =3

- ➤ **Q. Do you think that you are suffering from poverty?**

No=0, Yes=1

Q. If yes is it caused by

Quarantine for long periods of time= 1, Deduction of salary =2, Loss of job/tuition =3,

Death of guardian or parent=4

> **Q. If yes are you facing problems paying monthly university fees**

No=0, Yes=1

> **Q. Are you comfortable with the virtual education system during this pandemic**

Yes=0, No=1

> **Q. If no for what reason?**

Absence of peer interaction=1, Omission of direct patient care involvement=2, Lack of on-campus learning=3

> **Q. Did this pandemic interfere with your regular study?**

No=0, Yes=1

> **Q. Did current pandemic stop you from getting course material?**

No=0, Yes=1

> **Q. Did you lose your motivation to study during quarantine?**

No=0, Yes=1

> **Q. Did you have direct or indirect contact with your friends and class mates regarding group study?**

No=0, Yes=1

> **Q. Did you feel stressed about not completing your MBBS on time?**

No=0, Yes=1

> **Q. Did you feel more or less stress during quarantine period as you were not able to go to class?**

No=0, Yes=1

> **Q. Do you fear for your future studies being hampered due to Covid 19?**

No=0, Yes=1

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