# Analyzing the Impact of COVID-19 on the Mental Health of Students

1st Syed Nafiul Shefat, 2nd Nyme Ahmed, 3rd Rifat-Ibn-Alam, 4th Dr. Md Taimur Ahad
1,2,3,4 Dept. of Computer Science, American International University-Bangladesh, Dhaka, Bangladesh
1,2,3,4 408/1, Kuratoli, Khilkhet, Dhaka 1229, Bangladesh.
1 syednafiul0621@gmail.com, 2 nymeahmedhimu@gmail.com, 3 rifatibnalam50@gmail.com, 4 taimur.ahad@aiub.edu

*Abstract*—Mental health is a state of well-being in which a person knows what he or she is good at, can deal with the normal stresses of life, can work well, and can make a positive difference in the world. In COVID-19 pandemic many challenges has been arise to students, educators, and parents. The difficulties and restrictions connected with the epidemic have increased the likelihood that students would suffer mental health problems, which may have a negative impact on their academic performance, social connections, and future career and personal chances. In this study, we analysis the factors which are affected the student's mental health in Covid-19. An online survey that included demographics, lifestyle, and preferences in daily life, Behavioral questions, relevant to COVID-19, and standardized measures of depression, anxiety, resilience, and quality of life was completed by students from different universities of Bangladesh. Decision tree algorithm also applied in WEKA software tools. From the analysis we find that Disruption in education is the most impacting factor than other factors.

*Keywords*— Mental health, Decision tree, Education, COVID-19.

## I. INTRODUCTION

COVID-19 hit the world unexpectedly, quarantining all human existence. It forced the traditional education system to close its doors, which would have remained closed in the absence of online education. COVID19 has a negative impact on all spheres of global education. It has imposed a global curfew, which has had a disastrous effect on the students' life [13] [16] [17]. Mental health is a vital part of overall health and well-being. Mental health is a condition of well-being in which an individual recognizes his or her own skills, can manage with the usual stressors of life, can work productively, and can contribute to his or her community. Numerous social, psychological, and biological elements all contribute to an individual's current state of mental health. As an illustration, it is well-known that both physical violence and long-term economic stress pose mental health hazards. Recently, there has been a growing recognition of the critical role that mental health plays in accomplishing global development goals, as evidenced by the inclusion of mental health in the Sustainable Development Goals. Responses such as fear, anxiety and tension are common and healthy when confronted with perceived dangers, uncertainty or the unknown. This is why people are afraid of the COVID-19 pandemic, and it's normal for them to be scared. COVID-19 is a pandemic that brings with it considerable changes to our everyday routines as our movements are restricted in support of efforts to contain and slow down the spread of the virus. Working from home, unemployment, home-schooling of children and a lack of physical touch with other family members, friends and coworkers necessitates that we care for our mental, as well as our physical health. [14] Globally, mental health problems grew considerably during the coronavirus (COVID-19) epidemic. During the early stages of the outbreak, the government of Bangladesh implemented lockdown and quarantine measures to limit the spread of the virus, which had an impact on people's daily lives and health.

Economic conditions, healthcare facilities, and other aspects of daily life have all been impacted in Bangladesh as a result of the COVID-19 epidemic. Longitudinal studies comparing mental health before and during the pandemic are uncommon, however a study of 254 undergraduates at one UK institution discovered a significant increase in depression and decrease in wellbeing during the first lockdown (April/May 2020) compared to before the pandemic (fall 2019), and that more than a third of the sample might be classified as clinically depressed at lockdown, up from 15% before the pandemic [15].

The purpose of this paper is to analyze the impact of different factors of the COVID-19 epidemic on student mental health. There are five sections in this paper. Each section follows the structure outlined below: Introduction, followed by a brief survey of relevant works regarding the mental health of students in section II. Section III contains the methodology. Section IV contains the findings of this research, as well as a discussion of the findings, and section V includes the conclusion.

## II. LITERATURE REVIEW

The lockdown had a negative effect on mental health, resulting in psychological difficulties such as frustration, stress, and depression. To ascertain the pandemic's impact on students' lives, the authors of [1] surveyed 1182 persons of various ages from various educational institutions in Delhi - National Capital Region (NCR), India. The article highlighted the following as the influence of COVID-19 on students of various ages: time spent on online classes and self-study, mediums of instruction, sleeping patterns, and daily fitness routines, as well as the resultant consequences on weight, social life, and mental health. Additionally, their research discovered that participants used a variety of coping techniques and sought assistance from their close ones in order to cope with stress and anxiety. The goal of this

study [2] was to find out what factors were linked to high levels of mental health burden among first-year college students in Northern New Jersey, United States of America. Cross-sectional surveys were given to 162 college students in an initial core curriculum course. The surveys asked about demographics, COVID-19 knowledge levels and sources, changes in behavior, academic and everyday challenges, and mental health assessments. Researchers performed a multivariate regression analysis to pin down the variables that have the greatest impact on people's mental health. Students reported a wide range of academic and personal difficulties, as well as major mental health issues. High levels of depression were linked to difficulties concentrating on academic work and employee loss, whereas high levels of anxiety were more frequently reported by students other than freshmen and those who spent more than an hour a day searching for COVID-19 content. Academic and personal difficulties were noted by students, as well as significant levels of mental illness. Perceived stressors tended to be female, less able to concentrate on schoolwork, and less able to afford medications and household cleaning supplies, among other things. The authors of [3] intended to see how the coronavirus disease 2019 (COVID) pandemic affected first-year college students' behaviors. The COVID crisis had a detrimental effect on nightly surveys of mood and daily wellness practices, but not on stress. The aggregate amount of these COVID-related changes was minor, but they were consistent throughout the semester, and they differed from previous year's patterns. This study's [4] objective was to measure the effect of the pandemic on the mental health of college students. They evaluated data from 419 first-year students at a big public university in North Carolina before and after the Covid-19 epidemic occurred. After assessing descriptive data on mental health and stressors by students' demographics, the researchers evaluated the relationships between Covid-19 stressors and mental health symptoms and severity while adjusting for students' pre-pandemic mental health, psychosocial resources, and demographics. Moderate-severe anxiety climbed from 18.1% before the pandemic to 25.3% four months later, and moderate-severe depression surged from 21.5 percent to 31.7 percent, according to the study's authors. White, female, and sexual/gender minority (SGM) students were the most likely to have an increase in anxiety symptoms. Non-Hispanic (NH) Black, female, and SGM students were the most likely to have an increase in depression symptoms. During the COVID-19 pandemic, a systematic study was done by [5] to investigate the general population's mental health and its predicting characteristics. The goal of this paper is to compile all of the existing research on the prevalence of depressive, anxious, and post-traumatic stress disorder (PTSD) in the general public during the COVID-19 pandemic. From inception to 17 May 2020, a systematic search was undertaken on PubMed, Embase, Medline, Web of Science, and Scopus. The majority of research reported a high frequency of negative mental symptoms. There were a total of 648 articles. After full-text screening, only 19 articles met the inclusion criteria. Maximum articles were deleted due to duplication, some of them studied specific subgroups of the population, some did not have a standardized/appropriate measure and some were review papers. The general population in China, Spain, Italy, Iran, the United States, Turkey, Nepal, and Denmark reported high levels of anxiety (6.33% to 50.9%), depression (14.6% to 48.3%), post-traumatic stress disorder (7% to 53.8%), psychological distress (34.43% to 38%), and stress (8.1% to 81.9%) during the COVID-19 pandemic. Female gender, younger age group (under 40 years), presence of chronic/psychiatric disorders, unemployment, student status, and regular exposure to social media/news about COVID-19 are all risk factors for distress measures. Bangladesh introduced a lockdown technique, which may have ramifications for daily life, mental and physical health, and this study [6] sought to determine the effect of COVID-19 on the mental health and well-being of Bangladeshi pupils. Between April 9th and 23rd 2020, 505 college and university students were interviewed. Online DASS 21 and IES questionnaires were used to collect data. The variables were analyzed using descriptive statistics and bivariate linear regression. According to DASS 21, 28.5% of respondents felt stress, 33.3% anxiety, 46.92% depression from mild to severe, and 69.31% had event-specific distress from mild to severe. There was also a link between infection concern, financial insecurity, poor food supply, lack of exercise, and restricted or no leisure activity and PTSD symptoms.

The authors of [7] examined the COVID-19 pandemic's impact on domestic US College students aged 18–24 years. Data on the physical, emotional, and social effects of COVID-19, as well as essential background information, were collected from 200 domestic US college students in this age group. The findings suggested that students approaching graduation had an increase in anxiety (60.8%), loneliness (54.1%), and depression (59.8%). A lot of people said that their mental health was affected the most by their worries about the health of their loved ones (20%), and the need to take care of family was the most important factor in their plans for the present and future (31.8%). Almost half of students began exercising and engaging in physical exercise to manage their mental health (46.7%). A third of people did not have strained family

relationships, but almost half of them did (45.7%). The majority (60.9%) found it more difficult to complete the semester at home, particularly those with troubled connections with family (34.1%). Before, during, and after the COVID-19 lockdown in Italy, the goal of this study [8] was to find out how students felt about their mental health. Before COVID-19 was over in Italy, the authors collected data on students' mental health in October and December 2019. Six months later, in April 2020, they did the same thing. People who were 18 to 30 years old in Italy answered socio-demographic questions and took the Beck Depression Inventory – 2 (BDI-2) and other tests. Students on average had more depressive symptoms during lockdown than they did 6 months before they were isolated. About 86.2% of students would not have clinically significant worsening of symptoms, while about 6% of our target population would have more severe depressive symptoms. This study also backs up the idea that depressive symptoms may get worse during lockdown. Students' mental health during the COVID-19 Pandemic was the focus of [9] authors. One method used to find out more about this topic was a survey of 30,725 undergraduates and 15,346 graduate and professional Students' Experience in the Research University (SERU). The author discovered that 35% of undergraduates and 32% of graduate and professional students have major depression, while 39% of undergraduates and 32% of graduate and professional students have generalized anxiety disorder. Graduate and professional students are more likely to have major depressive disorder in 2020 than they were in 2019. They also found that the prevalence of generalized anxiety disorder is 1.5 times higher in 2020 than it was in 2019. The impact of the COVID-19 epidemic on academics, social isolation, and mental health, as well as the extent to which they have been using a range of coping methods, was investigated in this study [10], which performed an online study among undergraduate students 366. 32.5% of the participants said COVID-19 had a significant negative influence on their stress levels, whereas 29.0% said it had a moderate negative impact and 38.5% said it had little to no impact. When compared to male students, the pandemic had a greater detrimental impact on female students' academic performance, social isolation, stress, and mental health. However, both males and females experienced unfavorable mental health impacts when they used social media frequently. Male and female students both said they used substances to deal with stress, but for males, the use of cannabis had a bigger negative impact on their academic results, stress, and mental health than for female students. Students' mental health was examined in [11] as a result of the pandemic. The effects of COVID-19 on daily activities and the methods used to deal with the circumstance

were also explored. 553 Jordanian medical students were recruited for the study from six different Jordanian medical institutions. 40.1% of the population were men, and 59% were women. Physical health (73.1%), academics (68.4%), and social interactions (65.6%) were the most affected by COVID-19, according to students. 66% of the students were concerned about their family members' devotion, while 58% of the students described their fears about not being able to get clinical sessions and laboratories. In order to boost their mental health, most people turned to cooking, baking, and other hobbies. Only 13.2% of the participants were likely to be in good health, and around half had a severe mental condition. Three months into the pandemic, a study [12] examined the impact on the emotional well-being and mental health of South African university students who had been exposed to the COVID-19 virus. First-year students and students with minimal financial resources are particularly at risk of mental distress because of the lack of supports available to them at the university. An online poll of 5074 students yielded the necessary data for this study. 45.6 percent and 35.0 percent of students, respectively, said they had experienced anxiety or depression during the lockdown and were unable to cope. On the mental health continuum, students ranked poorly. During lockdown, students were extremely uncomfortable, had difficulty adjusting academically, and felt socially separated. Female students, those in their first year of college, and those who live in informal settlements were the most likely to suffer from mental distress. The quality of one's relationships, academic performance, spiritual growth and physical health were all linked to one's ability to deal with psychological distress.

## III. RESEARCH METHODOLOGY

This work follows the quantitative-experimental methodology. Because the dataset we are using here from the survey is a combination of numeric data and we are going to identify numeric results also. The quantitative method employs statistical, logical, and mathematical techniques to generate numerical data. The main goal of our study is to analyze the factor which affected the mental health of students' by doing data analysis and Decision tree.

***Data Collection***: For this study, a survey was conducted. First, a list of questions that may be used to gather information was drawn up for use. The next step was to hold a poll. Numerous people took advantage of the opportunity to provide input into the survey. There are various different types of questions in the survey that are designed to better understand the mental health situation of the students. In the survey, participants were asked for demographic information such as age and

gender. Questions about their preferences in daily life leisure activities, and smoking habit, drug addiction were also raised throughout this discussion. Behavioral questions were also asked regarding approximate how much time they spend on social media, their relationship status and they are affected with any chronical disease or not. People were also asked about where they live, and a lot of other things in the survey. Covid-19 related question like they ever affected in Covid-19 or not, did they lose any of their closed ones in Covid-19, did they have any family/ lifestyle-related concerns, did Covid-19 disrupt the continuity of their study or not. People also asked for giving the rating about their anxiety level depression level and mental health situation on scale 5. Respondents to this poll represented a variety of demographics. In total we received 516 responses from different universities students. All of this information was gathered from Bangladeshi student. A study of this data was also performed.
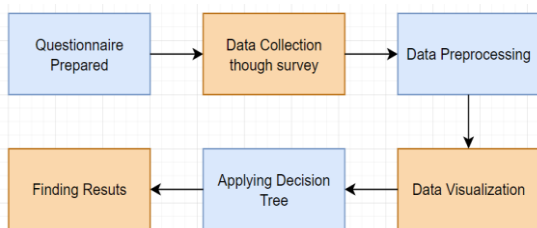


Figure 1. Flowchart of proposed work

*Process:* Following data collecting, data preparation was carried out. Here, a number of null values and outliers were found, and they were then processed and cleaned up. After the data has been cleaned, we are now ready to perform the analysis. Data preparation is the term for this process. Once the data has been cleaned and prepared, the next step is to analyze and explore it. Microsoft Excel was used on this dataset to look for important information. We also applied Decision Tree algorithm in Weka. After analyzing, it is easier to identify factors which affected student's mental health. It was then possible to see how the data should be represented graphically. It is based on the outcomes that we may determine which factors affected the mental health of the students the most during COVID-19.

## IV. RESULT AND DISCUSSION

This section contains a brief analysis on the dataset of the survey. 516 student from different university of Bangladesh completed this survey. An analysis on different factors impact on student mental health is conducted from that dataset. Later on, decision tree is also generated by using WEKA to identify the prominent factors that have significant impacts on students' mental health. From these findings, we identify the most impact factor on student mental
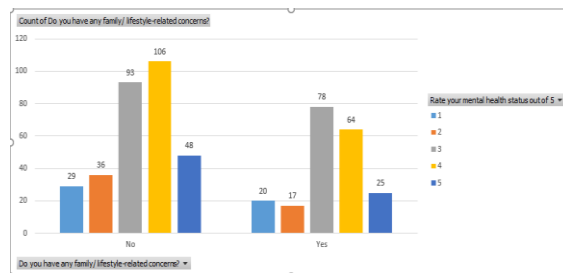
health.



Figure 2. Rate mental health based on any family/lifestyle- related concerns

According to figure 2, out of 516 individuals, 204 (39.534 %) reported having family/lifestyle concerns, whereas 312 (60.465 %) denied this assertion. 9.80 % and 8.33 % of those who replied yes, respectively, ranked their mental health state as 1 or 2 on a 5-point scale. However, 38.24 % and 31.37 % of students, respectively, ranked their mental health as 3 and 4 on a 5-point scale. Finally, 12.25 % of them gave a 5-star rating to their mental health. Among those who said no, 9.30 % and 11.54 %, respectively, assessed their mental health state as 1 and 2 out of 5. However, 29.81 % and 33.97 % of students, respectively, ranked their mental health as 3 and 4 on a 5-point scale. Finally, 15.38 % of them gave a 5-star rating to their mental health.
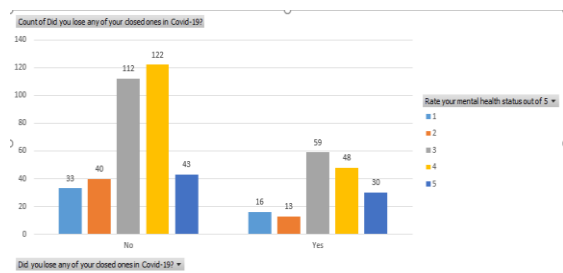


Figure 3. Rate mental health based on lose any of closed ones in Covid-19

Figure 3 depicts that most of the attendees of this survey did not lose anyone in Covid'19. However still there is a significant amount ones who did. Furthermore, in this case the number of attendees who rated their mental health status 3 or 4 on a scale of 5 is high compared to others.
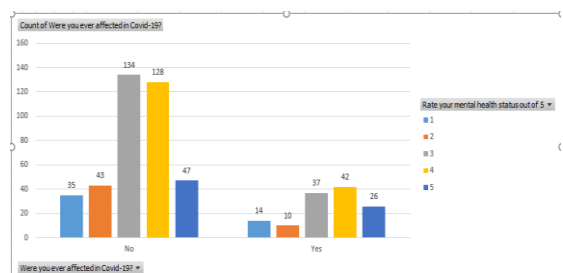


Figure 4. Rate mental health based on ever affected in Covid-19

As seen in figure 4, the majority of respondents to the poll was not affected in Covid'19. However, there are still some of those who did. Additionally, here, the proportion of participants who assessed their mental health state as 3 or 4 on a 5-point scale is higher than in others.
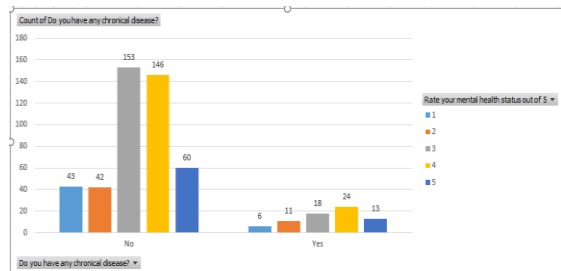


Figure 5. Rate mental health based on any chronical disease

Figure 5 shows that the majority of survey participants do not have any chronical diseases. Furthermore, when compared to others, the number of attendees who rated their mental health status as 3 or 4 on a scale of 5 is high in this case.
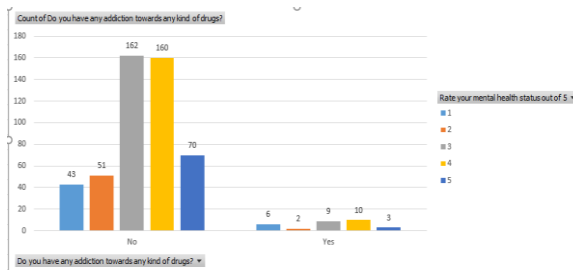


Figure 6. Rate mental health based on any addiction towards any kind of drugs

Figure 6 shows that most of the attendees do not have any addiction towards any kind of drugs. In this case, the number of people who said their mental health was 3 or 4 on a scale of 5 is higher than in other cases.
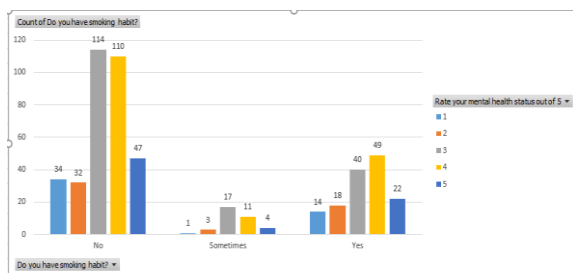


Figure 7. Rate mental health based on any smoking habit

Figure 7 shows that the majority of those who took part in this survey do not have smoking habit. However there is a significant amount ones who has smoking habit. Moreover, some of them smoke sometimes. The number of people who gave themselves a mental health status of 3 or 4 on a scale of 5 is also higher in this situation than in others.
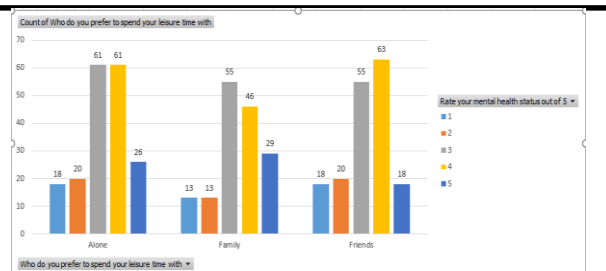


Figure 8. Rate mental health based on prefer to spend leisure time with

Figure 8 illustrates that the number of the survey participants who prefer to spend their leisure time with their friends, family and alone are almost identical. Furthermore, as compared to comparable cases, the number of participants who ranked their mental health state as 3 or 4 on a scale of 5 is high.
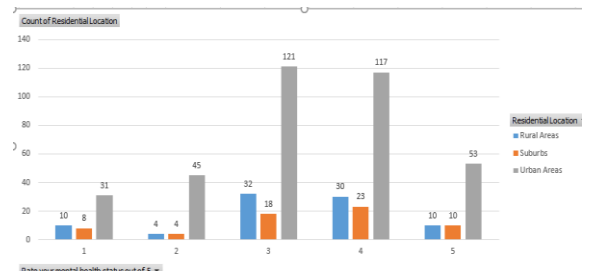


Figure 9. Rate mental health based on residential location

As seen in figure 9, the majority of respondents dwell in urban areas. Additionally, here, the proportion of participants who assessed their mental health state as 3 or 4 on a 5-point scale is higher than in others.
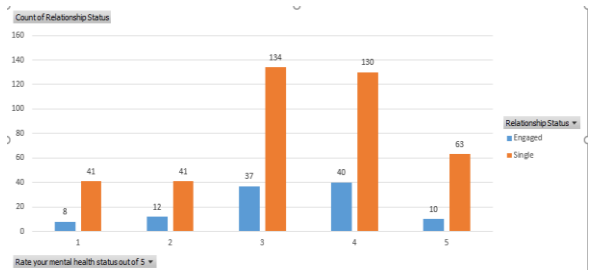


Figure 10. Rate mental health based on relationship status

As seen in figure 10, the vast majority of respondents' relational status is they are single. Moreover, the number of individuals who rate their mental health as 3 or 4 on a 5-point scale is greater in this survey than in others.
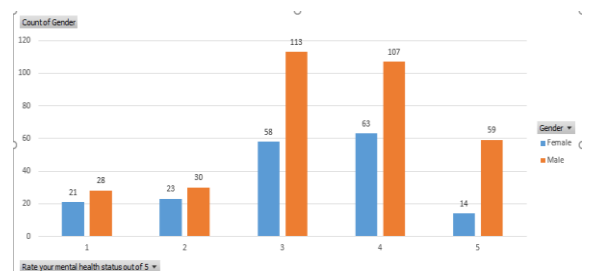
Figure 11. Rate mental health based on gender

As seen in figure 11, the majority of respondents are male. Furthermore, the proportion of participants who assessed their mental health state as 3 or 4 on a 5-point scale is higher than in others.
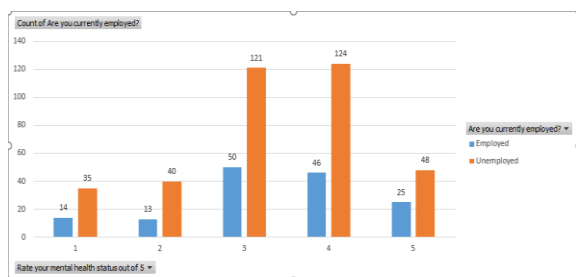


Figure 12. Rate mental health based on employed status

Currently employed respondents outnumber unemployed respondents by a wide margin, as seen in figure 12. Furthermore, as compared to comparable cases, the number of participants who ranked their mental health state as 3 or 4 on a scale of 5 is high.
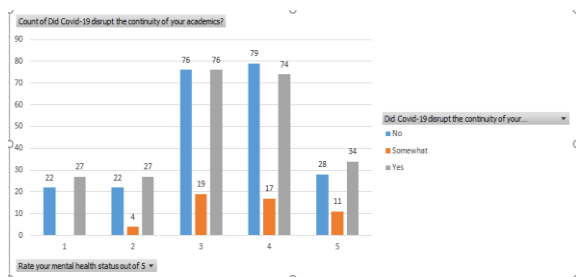


Figure 13. Rate mental health based on disrupt the continuity of academics

As seen in figure 13, for the majority of respondents, Covid'19 did not disrupt their continuity of academics. However, there are still some, for those it did. Moreover, the proportion of participants who assessed their mental health state as 3 or 4 on a 5-point scale is higher than in others. And whoever have disrupted in their academic their condition of mental health is not in good condition.
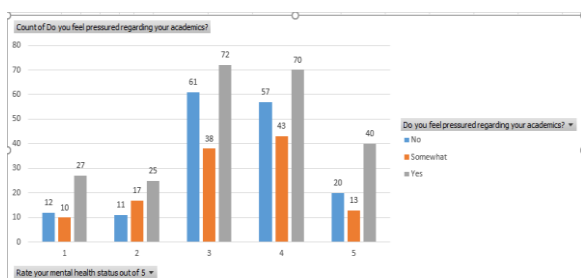


Figure 14. Rate mental health based on pressured regarding academics

As seen in figure 14, the majority of respondents feel pressurized regarding their academics. However, a mixed pattern is observed here as some of the respondents do not feel pressurized and for some, it is occasional. Here,

the proportion of participants who assessed their mental health state as 3 or 4 on a 5-point scale is higher than in others.

So, after analysis we can see disruption in academic is the most influential factors when it comes to the mental health of students. All subsequent graphs from figure 2 through figure 13 could well be illustrated similarly. A significant pattern can be seen in all these graphs that for all the cases, the highest number of students rated their mental health status in between 3 and 4.

Then, we import our dataset to WEKA for implementing Decision Tree classifier algorithm. A decision tree is probably the best place to start if to classify any dataset. It'll give a good overview, and it'll make the classification understandable. Decision trees have simple features to define the most critical dimensions, manage missing values, and deal with outliers.
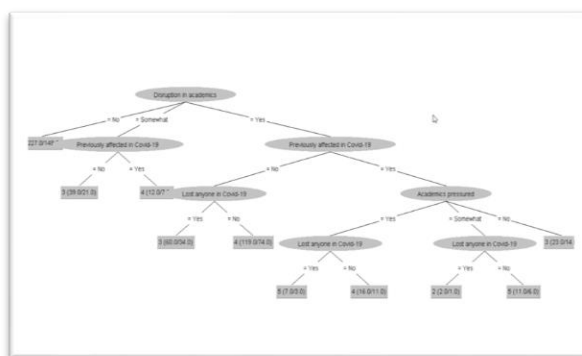


Figure 15. Decision Tree

According to the decision tree from figure 15, "Disruption in academics" is the most impacting among all the factors. The students who did not go through any discontinuity in their academics due to the pandemic, most of them rated their mental health 4 on a scale of 5. "Previously affected in Covid-19" also has a significant impact on their mental health. "Academic Pressure" and "Lost anyone in COVID- 19" are also influential factors to the students' mental health. The students who were not affected in Covid-19 and lost someone close in the pandemic, their mental health seem to be moderate. On the contrary, those who did not lose anyone in Covid-19 has somewhat better mental health. Therefore, these are the most influential factors when it comes to the mental health of students. If proper care can be taken to uplift these factors, the quality of the students' mental health will be improved significantly. According to analysis and decision tree "Disruption in academics" is the most impacting factor which affected the mental health of the students during Covid'19. So, from this we identify that a student can come over from other situation but when their academic education disrupts then their mental health will also disturb. If a pandemic will occur in future then their mental health can be improved by ensuring the continuity

of their education.

## V. CONCLUSION

Mental health includes being able to think, act, and feel well. It all comes down to what people think, feel, and do. People sometimes use the term "mental health" to mean that they don't have a mental disorder. The global lockdown and school closures caused by the COVID-19 outbreak have imposed a severe mental health burden on students. Because of the seriousness of the virus's threat, governments implemented a number of social segregation measures, including widespread lockdowns, travel restrictions, and school closings. Although these regulations may have been necessary to manage the outbreak, they have caused enormous disruptions to people's daily lives and imposed a substantial mental health burden.

The aim of this study is to find the impact of different factors of Covid-19 on student's mental health. For this study a survey set out to investigate the impact of Covid-19 on the mental health and wellbeing of students. In that survey demographics question, lifestyle related question, preferences in daily life, Behavioral questions, COVID-19 related question, and standardized measures of depression, anxiety and mental health were asked. 516 students from different universities of Bangladesh completed the survey. On the dataset an analysis conducted in Microsoft excel and a data mining algorithm which is decision tree also applied.

According to analysis "Disruption in academic" is the most dominant factors when it comes to the mental health of students. According to decision tree "Previously affected in Covid-19", "Academic Pressure" and "Lost anyone in COVID- 19" are also influential factors to the students' mental health. But, "Disruption in academics" has the most impact on the mental health of the students during Covid'19. So, from this study we find that, by ensuring continuity of education students mental health can be improved if pandemics will occur in future.

## REFERENCES

[1] Chaturvedi, K., Vishwakarma, D.K. and Singh, N., 2021. COVID-19 and its impact on education, social life and mental health of students: A survey. Children and youth services review, 121, p.105866.

[2] Kecojevic, A., Basch, C.H., Sullivan, M. and Davi, N.K., 2020. The impact of the COVID-19 epidemic on mental health of undergraduate students in New Jersey, cross-sectional study. PloS one, 15(9), p.e0239696.

[3] Copeland, W.E., McGinnis, E., Bai, Y., Adams, Z., Nardone, H., Devadanam, V., Rettew, J. and Hudziak, J.J., 2021. Impact of COVID-19 pandemic on college student mental health and wellness. Journal of the American Academy of Child & Adolescent Psychiatry, 60(1), pp.134-141.

[4] Fruehwirth, J.C., Biswas, S. and Perreira, K.M., 2021. The Covid-19 pandemic and mental health of first-year college students: Examining the effect of Covid-19 stressors using longitudinal data. PloS one, 16(3), p.e0247999.

[5] Xiong, J., Lipsitz, O., Nasri, F., Lui, L.M., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A. and McIntyre, R.S., 2020. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. Journal of affective disorders, 277, pp.55-64.

[6] Khan, A.H., Sultana, M.S., Hossain, S., Hasan, M.T., Ahmed, H.U. and Sikder, M.T., 2020. The impact of COVID-19 pandemic on mental health & wellbeing among home-quarantined Bangladeshi students: A cross-sectional pilot study. Journal of affective disorders, 277, pp.121-128.

[7] Lee, J., Solomon, M., Stead, T., Kwon, B. and Ganti, L., 2021. Impact of COVID-19 on the mental health of US college students. BMC psychology, 9(1), pp.1-10.

[8] Meda, N., Pardini, S., Slongo, I., Bodini, L., Zordan, M.A., Rigobello, P., Visioli, F. and Novara, C., 2021. Students' mental health problems before, during, and after COVID-19 lockdown in Italy. Journal of psychiatric research, 134, pp.69-77.

[9] Chirikov, I., Soria, K.M., Horgos, B. and Jones-White, D., 2020. Undergraduate and graduate students' mental health during the COVID-19 pandemic.

[10] Prowse, R., Sherratt, F., Abizaid, A., Gabrys, R.L., Hellemans, K.G., Patterson, Z.R. and McQuaid, R.J., 2021. Coping with the COVID-19 pandemic: examining gender differences in stress and mental health among university students. Frontiers in psychiatry, 12, p.439.

[11] Seetan, K., Al-Zubi, M., Rubbai, Y., Athamneh, M., Khamees, A.A. and Radaideh, T., 2021. Impact of COVID-19 on medical students' mental wellbeing in Jordan. PLoS One, 16(6), p.e0253295.

[12] Visser, M. and Law-van Wyk, E., 2021. University students' mental health and emotional wellbeing during the COVID-19 pandemic and ensuing lockdown. South African Journal of Psychology, 51(2), pp.229-243.

[13] Ahmed, N., Rifat-Ibn-Alam, M., Akib, G.A., Shefat, S.N. and Nandi, D., 2022. An Extensive Analysis on Computing Students' Academic Performance in Online Environment using Decision Tree. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 13(1), pp.149-163.

[14] Das, R., Hasan, M.R., Daria, S. and Islam, M.R.,

2021. Impact of COVID-19 pandemic on mental health among general Bangladeshi population: a cross-sectional study. BMJ open, 11(4), p.e045727.

[15] Evans, S., Alkan, E., Bhangoo, J.K., Tenenbaum, H. and Ng-Knight, T., 2021. Effects of the COVID-19 lockdown on mental health, wellbeing, sleep, and alcohol use in a UK student sample. Psychiatry research, 298, p.113819.

[16] Akib, M.G.A., Ahmed, N., Shefat, S.N. and Nandi, D., 2022. A Comparative Analysis among Online and On-Campus Students Using Decision Tree.

[17] Shefat, S.N., Akib, M.G.A., Ahmed, N. and Nandi, D., 2022. Investigation of Computing Students' Performances in a Fully Online Environment During COVID-19 Pandemic. Malaysian Journal of Science and Advanced Technology, pp.23-30.