



Research Paper

Psychological disorders among college going students: A post Covid-19 insight from Bangladesh

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ABSTRACT

The COVID-19 pandemic has been found to result in adverse effects on both the physical and mental well-being of individuals. The adolescent population emerged as one of the most susceptible cohorts affected by the ongoing pandemic. They experienced significant adversity due to various mental health conditions. The objective of this study was to evaluate the present prevalence rates of depression, anxiety, and internet addiction among college-going students in Bangladesh following the post-COVID period. The study involved a cohort of 7667 students. A cross-sectional study was conducted to evaluate the levels of depression, anxiety, and internet addiction among college-going adolescents. The assessment utilized the Patient Health Questionnaire (PHQ-9), Generalised Anxiety Disorder (GAD-7), and Young's Internet Addiction Test (IAT) scales. The data was analyzed using the Pearson chi-square test and binary logistic regression. Participants averaged 15.3 years old and 64.3 % female. 63 % of students fulfilled the criterion for internet addiction, 37 % did not, 75 % met depression criteria, 25 % did not, and 60 % met anxiety requirements. Girls were more depressed and anxious than boys. Boys were more internet-addicted than girls. Social media usage from COVID-19, daily exercise, online courses, and financial concerns throughout the pandemic affected participants' mental health. Still, the students were suffering from internet addiction, depression, and anxiety after COVID-19. Early identification and intervention may lessen these difficulties' influence on adolescents' academic and personal lives. Colleges may provide mental health services, encourage healthy lives, and educate on mental health.

1. Introduction

Researchers in Wuhan, China, discovered a new virus in December of 2019, and they dubbed it the Coronavirus. It didn't take long for it to become widespread everywhere (WHO, 2020). As a consequence, it led to the proliferation of an epidemic known as Covid-19, which eventually turned into a threat to the general population's health and a state of international emergency all over the world (Wang et al., 2020; Zhu et al., 2020). According to the information provided by the appropriate authorities, there have been a total of 6.5 million fatalities and 615 million confirmed cases of the illness around the world (WHO, 2020).

International communities have deployed strict anti-epidemic

preventive measures in the absence of effective immunizations or anti-viral treatments. Among these measures were the implementation of distance schooling and work-from-home policies for employees, as well as the closure of administrative and educational institutions, the metro system, and public places (Ahmed et al., 2020; Anwar et al., 2020; Chen and Yuan, 2020). Daily media updates were also being provided by governments to increase public awareness and encourage social distancing and housekeeping. To avoid the spread of COVID-19, all schools have been closed. Institutions have started using virtual classrooms instead of traditional ones (Ahmed et al., 2020; Chen and Yuan, 2020; Kovacs et al., 2022; Singh and Balhara, 2021a).

The epidemic caused pupils to experience increased dread and stress,

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which in turn contributed to a decline in their mental stability. Students all around the globe are showing signs of mental health issues such as post-traumatic stress disorder (PTSD), internet addiction (IA), sadness, stress, anxiety, and even suicidal thoughts (Bera et al., 2022; Hoekstra, 2020; Lin et al., 2020; Murata et al., 2021; Sniadach et al., 2021; Zhang et al., 2020).

The first case of an infection caused by a coronavirus was discovered in Bangladesh on March 8, 2020 (Shammi et al., 2021). In reaction to the massive COVID-19 outbreak, the government of Bangladesh has declared a state of lockdown across the country. To stop the epidemic, all public appearances were severely restricted. Moreover, educational establishments were made unavailable to students. A mechanism for online instruction was included in the curriculum (Shammi et al., 2021).

A several number of research had been carried out to investigate the effects that the COVID-19 epidemic has had on peoples in Bangladesh. Throughout the time covered by the covid-19 study, they discovered that there was a considerable prevalence of IA as well as depression, anxiety, stress, and PTSD among students (Abir et al., 2021; Afrin et al., 2022; Al Mamun et al., 2021; Biswas et al., 2022b; Faisal et al., 2022; Hosen et al., 2021; Khan et al., 2021; Shovo et al., 2021). According to the findings of the studies, the prevalence of IA among students ranged from 35 to 80 %, depression from 40 to 85 %, and anxiety from 26.6 to 96.82 % (Abir et al., 2021; Al Mamun et al., 2021; Ali et al., 2022; Biswas et al., 2022b; Faisal et al., 2022; Hosen et al., 2021a, 2021b; Khan et al., 2021; Shovo et al., 2021; Tasneem Chowdhury et al., 2022).

To prevent the pandemic in Bangladesh, a nationwide lockdown was implemented and it finished in August 2021. At that time, all public activities and institutions were permitted to resume normal operations (The Daily Star, 2022). During the lockdown period, to measure the psychological impacts of COVID-19, researchers across the nation had conducted numerous research in this regard. While the measures implemented by authorities effectively halted the pandemic, we hardly found any studies that confirmed the current prevalence rate of IA, depression, and anxiety among students. The primary goal of this research was to address this research gap and to assess the prevalence of IA, depression, anxiety after and COVID-19 is finished. The study also aimed to determine the significant factors behind IA, depression, and anxiety among the college-going students of Bangladesh.

2. Methodology

2.1. Study design, study settings, and data collection procedure

From July 2022 to February 2023, 7667 students aged 13 to 19 from selected Bangladeshi institutions were sampled. The sample was convenience-sampled from the indicated institutions. First, 104 pupils self-reported in a preliminary study. The comprehensive survey was conducted following the pilot study analysis to determine research feasibility and effectiveness. Google Forms, a brief online survey tool, gathered data.

2.2. Measures

2.2.1. Socio-demographic measures

Questions regarding socio-demographics were asked including age, division (Dhaka, Chittagong, Rajshahi, Khulna, Rangpur, Sylhet, Barisal, Mymensingh) gender (Male, Female), academic class (Nine, Ten), marital status (Married, Unmarried), religion (Islam, Hinduism, Others), use of social media (Yes, No), daily exercise (Yes, No), had online classes during the covid-19 period (Yes, No), and any financial crisis due to Covid-19 (Yes, No).

2.2.2. Measurement for depression, anxiety disorders, Internet Addiction Test (IAT) scale

S. Young's Internet Addiction Test (IAT) scale was utilized to quantify internet dependency for this research, the cut-off score of the IAT

scale is 50 (Young, 2015). The Patient Health Questionnaire (PHQ-9) has been used to assess depression in several studies (Spitzer et al., 1999). This study was also used to assess depression among the participants. Participants who scored more than 10 were considered as having depression. For anxiety disorders, Generalized Anxiety Disorder (GAD-7) questionnaire was used to measure the respondents' degree of anxiety disorder which also has been used in some contemporary research in Bangladesh (Khan et al., 2021). We considered 10 as the cut-off score, like in the previous research.

2.2.3. Statistical analysis

Descriptive analysis summarized socio-demographic IA, depression, and anxiety variables. Respondents were grouped by IA, depression, and anxiety levels using the Likert scales IAT-20, PHQ-9, and GAD-7. We examined relationships between variables, IA, depression, and anxiety using the Pearson Chi-square test. A binary logistic regression analysis was performed using IA, depression, and anxiety as the dependent variables and the other covariates as independent variables. Multivariate normality was established using the Shapiro-Wilk test, and then chi-square and logistic regression analyses were performed. The correlation matrix was used to analyze the multicollinearity of the dataset. Data dependency, multivariate normality, independence, and the lack of multicollinearity were all verified using the Kolmogorov-Smirnov test. Each categorical variable has an odds ratio (OR) and a 95 % confidence range.

3. Results

3.1. Demographical variables

The study's demographic data is shown in Table S1. In all, 7667 college students participated. There were 63.3 % females and 36.7 % males, 7.1 % Hindus, 92.5 % Muslims, and 0.4 % adherents to other faiths among the participants. 98 % were unmarried and the remaining 2 % were married. There was a wide variation in responder ages (13–19), although on average they were 15.27.

3.2. Prevalence of internet addiction, depression, and anxiety

The percentage of study participants who reported having IA, depression, or anxiety is shown in Fig. S1. What we discovered of the students surveyed, 63 % met the criteria for internet addiction, 37 % did not, 75 % met the criteria for depression, 25 % did not, and 60 % met the criteria for having anxiety.

Fig. S1 showed that 40.2 % of female students and 20.67 % of male students were addicted to the internet; 43.3 % of these students were in grade 12; 19.65 % were in grade 11. Fig. S2 showed that among the depressed students being surveyed, 50.52 percent were female, and 24.16 percent were male; 51.01 percent were in the twelfth grade; In Fig. S3, we saw that 41.02 % of female students and 19.05 % of male students were anxious, that 41.64 % of students in Grade 12 are anxious, and that 13.59 % of students in the Dhaka region are anxious.

We found that gender ($p < 0.000$), use of social media ($p < 0.000$), exercise ($p < 0.027$), online class ($p < 0.000$) had significant effects on increasing internet addiction, depression and anxiety, and financial issue during covid-19 wasn't significant for IA among the college students of Bangladesh (Table S1).

3.3. Factors associated with internet addiction, depression, and anxiety

The causes of IA, depression, and anxiety among the college students in the research were shown in Table S2 using binary logistic regression. Male college students exhibited a 1.37 (CI: 0.78–3.13) times higher prevalence of internet addiction compared to their female counterparts. The study found that individuals who engaged in the use of social media were 3.72 times more likely to exhibit symptoms of internet addiction

compared to those who did not use social media (CI: 1.89–8.17). Participants who did not engage in daily exercise exhibited 2 times increase in internet addiction compared to those who exercised daily (CI: 1.93–7.56). Once again, individuals who participated in online classes were found to have a 2.24 (CI: 1.65–6.46) times higher likelihood of developing internet addiction compared to those who did not partake in online classes.

In comparison to male students, females had a 1.066 % (CI: 0.27–1.5) higher risk of depression. Compared to participants who did not use social media, those who did were 1.7 times more likely to experience depression (CI: 0.67–4.83). Students who did not exercise regularly were 1.4 % (CI: 0.87–2.64) more likely to suffer from major depressive disorder than those who did. Students who experienced any form of financial difficulty during the covid-19 pandemic were 2.6 (CI: 0.61–21.69) times as likely to experience depression than those who did not.

There was a 1\0.5 means 2.0 (CI: 0.9–1.27)–fold increase in the prevalence of anxiety disorders among female students compared to male students. Students who did not engage in regular physical activity were 1.1 % (CI: 0.63–1.62) more likely to suffer from anxiety than those who did.

4. Discussion

COVID-19 has brought significant changes to the world, and Bangladesh is no exception. Students have been forced to stay at home since educational institutions have been closed for a long time. During the pandemic, Bangladeshi college students have faced tough times that impacted their mental health considerably. Due to this sudden shift to online learning, students have become more prone to mental health problems due to increased screen time. Students are uncertain about their academic and professional prospects due to the closure of colleges and universities (Lee, 2020; Lee et al., 2021; Radwan et al., 2020). In this context, understanding the extent to which mental health disorders have become prevalent among college students in Bangladesh following the COVID-19 pandemic is essential.

This study assessed college-going students in Bangladesh for their internet addictions, depression, and anxiety after the COVID-19 outbreak. The study found that a significant number of students were affected by IA, depression, and anxiety. In previous studies conducted during the pandemic period, the prevalence rates of these disorders were similar. The prevalence of these issues persists even after the severe phase of the pandemic has passed. Female students were more likely to suffer from depression and anxiety than male students. The use of social media and lack of physical activity were both associated with increased rates of IA, depression, and anxiety. According to previous studies conducted during COVID in Bangladesh and other countries, this study's findings align with previous findings.

The present study found that 63 % of students suffered from IA, 75 % of students experienced depression, and 60 % of students had anxiety disorders. These rates are alarming and indicate that students in Bangladesh are still experiencing significant mental health challenges even after the pandemic period. There is a similar prevalence of IA among students in different countries, including Bangladesh, India, and Lebanon, which matches previous studies that have been conducted. According to several studies, the percentage of people diagnosed with IA is consistent worldwide. Choosing Lebanon as an example, a study found that 56.5 % of the population is affected by the disease (Samaha et al., 2018). These kinds of problems are much more prevalent in countries located in South Asia. For instance, a study in India found the rate to be around 70.29 percent, whereas two other studies in Bangladesh found the rate to be 80 % and 81.7 %, respectively. Additionally, our study found that the incidence of IA was like those reported in other studies. However, our study reveals that the prevalence of IA remains alarming, even after the COVID-19 pandemic.

Similarly, as with previous studies worldwide, students experiencing

the COVID-19 pandemic reported high levels of depression and anxiety. In some previous studies, Greece stated that university students had 74.3 % (Kaparounaki et al., 2020) and 80.7 % (Najjuka et al., 2021) depression among students during COVID-19. In Uganda, the rate was 51.2 % (Sazakli et al., 2021). 58 % of Indian medical students had depression during the pandemic. Bangladeshi researchers evaluated that 80.2 % of medical students faced depression (Biswas et al., 2022a), whereas 76.1 % (Islam et al., 2020b), 72 % (Faisal et al., 2022), and 80.2 % (Chowdhury et al., 2022) university students had depression during the covid-19 period according to the researchers. A study conducted in 2020 by Islam et al. (2020c) found that 86 % of college students in Bangladesh were in COVID-related stress (Islam et al., 2020c). Among adolescent students, the rate was 67 % (Afrin et al., 2022). Although there was no singular reason behind the higher rates of depression and anxiety, scholars have identified some contributing factors. For example, Afrin et al. (2022) discovered a significant positive relationship between school homework and reduced depression. Faisal et al. (2022) indicated that the rates are higher due to the tension related to the disease, with college students more likely to fear their uncertain future. Biswas et al. (2022a) found that tension related to potential COVID-19 infection among family members and discrimination against frontline physicians could be some of the reasons for higher depression among medical students.

In the present study, it has been found that 67 % of college students suffer from depression, a rate like what was observed in other studies conducted during the pandemic.

During COVID-19, students have been experiencing various mental health disorders, including anxiety, as reported by several Bangladeshi researchers. The prevalence of anxiety among university students has been assessed to be 71.5 %, and 87.7 %, while a study on medical students showed that 65.9 % of them experienced anxiety disorders during the pandemic (Islam et al., 2020a, 2020b; Safa et al., 2021). The reasons behind the higher rates of anxiety among university students are primarily attributed to unemployment, financial insecurity, and the absence of family support during periods of unemployment (Islam et al., 2020a). Our survey also found a high prevalence rate of 60 % for anxiety among the participants, which is consistent with the findings of previous studies. This indicates that students are still experiencing anxiety disorders at a significant rate. The high prevalence of depression among students is a significant concern, as depression can have a lasting impact on students' lives, affecting their academic performance and professional prospects.

Moreover, a critical finding of the study is that female students were more likely to experience depression and anxiety than their male counterparts (Hawes et al., 2021; Kibbey et al., 2021). This result is consistent with previous studies conducted in Bangladesh and other countries, highlighting the gender differences in mental health disorders' prevalence (Chowdhury et al., 2022; Islam et al., 2020b; Safa et al., 2021; Sayeed et al., 2020). The COVID-19 pandemic has disproportionately affected women, and female students have faced additional challenges in terms of academic and personal life. There may be a reason why female students are more likely to suffer from depression and anxiety. The reasons for this disparity are not fully understood, but women may be more susceptible to mental health disorders due to various social and cultural factors, such as gender inequality, discrimination, and social stigma. On the other hand, researchers found that during the COVID-19 pandemic, among adolescents males were more addicted to internet than the girls (Ozturk and Ayaz-Alkaya, 2021). Our study also had the same result, after the covid-19, the boys were still more addicted to the internet than the girls.

Especially during the COVID-19 pandemic, young people are using social media more and more (Pennington, 2021). In the study, it was determined that the use of social media was significantly related to a lack of physical activity. Regular physical exercise has been found to be beneficial for both physical and mental health. Students who used social media and did not engage in physical exercise were more likely to

experience IA, depression, and anxiety. This result is consistent with previous studies that have linked sedentary lifestyles to mental health disorders. The closure of educational institutions during the pandemic has limited students' physical activity, leading to a more sedentary lifestyle, and worsening mental health disorders. A meta-analysis of studies conducted on medical students found that the use of social media increased IA (Chaudhari et al., 2015). Additionally, two comprehensive meta-analyses found that there was a strongly significant connection between using social media and the prevalence of depression and anxiety (Best et al., 2014; Hoare et al., 2016). The findings of our study provide further evidence to support this correlation. The increased use of social media during the pandemic has further exacerbated these issues, highlighting the need for interventions to address excessive social media use among students. Furthermore, this study demonstrates the importance of physical exercise as a preventative measure against mental illness.

As a result of the COVID-19 pandemic, educational institutions have implemented the provision of online classes (Marengo et al., 2022). In order to engage in the instructional sessions, students utilized electronic devices. The study conducted by researchers revealed that the utilization of the internet for online classes has been associated with an increased susceptibility to internet addiction (Singh and Balhara, 2021b; Siste et al., 2020, 2021). This study concluded that students those attended online classes during the pandemic had internet addiction than the students who did not attend online classes, which matched with the previous research findings. Moreover, as covid-19 caused serious crisis in the economical systems, many families suffered badly from this occurrence (Michie, 2020). Adolescents from the crisis family had faced psychological instabilities (Joseph, 2020). They were suffering from depression, anxiety, even suicide (Banerjee et al., 2021; Prime et al., 2020). Hence, our study also indicated that students who experienced financial challenges due to the COVID-19 pandemic, in addition to familial responsibilities, exhibited higher levels of depression compared to their counterparts.

5. Conclusion

One of the limitations of this study is the timeframe, as there is no specific time called post-COVID. On the other hand, there has been the possibility of Self-Report measures. This study uses the scales of PHQ-9, GAD-7, and IAT, which rely on self-report questionnaires. On the other hand, as this is a cross-sectional study, it may overlook causation or determine that changes over time. For future research, longitudinal studies can fill the gap to understand how these mental health issues evolve. Additionally, the in-depth comparison of pre-COVID mental health, during-COVID mental health, and post-COVID mental health can be studied, which may help to identify specific pandemic-related impacts. Lastly, qualitative thematic analysis that includes interviewing college-going students can also bring some areas that other researchers overlook.

The study revealed a lot of students are still suffering from several mental health disorders. Healthcare practitioners should recognize the prevalence of these diseases among college students and test for them during regular checkups. Early diagnosis and intervention may reduce these issues' impact on kids' academic and personal lives. Policymakers, educators, and mental health specialists must work together to solve this issue. Educational institutions may provide mental health services, promote healthy lifestyles, and teach mental health. Targeted interventions that reduce social media use and promote regular physical activity have shown efficacy in reducing the prevalence of these disorders among students, particularly female students who are more vulnerable to mental health disorders.

Implications

By utilizing the results of our research, policymakers, educators, and

mental health experts could work together immediately to confront this crisis. Institutions of higher learning could provide mental health services, encourage the development of healthful living habits, and include instruction on mental health in existing curricula.

Ethical approval

The study received approval from the Institutional Review Board (IRB) (BRKCNC-IRB-2022-5) of Begum Khatun Chowdhury Nursing College, Sylhet, Bangladesh. Prior to commencing the online data collection, explicit written consent was obtained from every participant. Participants who provided their consent were ultimately included in the study.

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CRediT authorship contribution statement

Md Abu Bakkar Siddik: Conceptualization, Formal analysis, Writing – original draft, Supervision, Writing – review & editing. **Akher Ali:** Data curation, Formal analysis, Writing – review & editing. **Sumon Miah:** Data curation, Writing – original draft, Writing – review & editing. **Mahedi Hasan:** Data curation, Writing – original draft, Writing – review & editing. **Minhaz Ahmed:** Data curation, Writing – original draft, Writing – review & editing. **Tachlima Chowdhury Sunna:** Formal analysis, Writing – review & editing.

Declaration of Competing Interest

The authors declared no conflict of interest.

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No.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jadr.2023.100686](https://doi.org/10.1016/j.jadr.2023.100686).

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