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# Impact of COVID-19 Pandemic on Health and Academic Condition of College and University Students of Bangladesh: A Cross-Sectional Study

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***Abstract***

*The COVID-19 pandemic, a global public health emergency, resulted in the prolonged closure of educational institutions worldwide, substantially affecting students' physical health, mental well-being, and academic conditions. This cross-sectional study examined the impacts of the pandemic on college and university students in Bangladesh using data collected from 220 participants in Savar Upazila between June and August 2021. The findings indicated that 32.3% of the students had been infected with COVID-19, with fever, cough, and loss of smell or taste reported as the most common symptoms. Academic disruption was highly prevalent, as 81.4% of the participants experienced a decline in academic performance due to institutional closures, challenges related to online learning, poor internet connectivity, and inadequate educational resources. Mental health conditions were also adversely affected, with elevated levels of depression, anxiety, and sadness reported among the students. Statistical analysis demonstrated significant associations between COVID-19 infection and mental health status ($\chi 2 = 11.001$, $p = 0.001$), as well as between mental health status and academic performance ($\chi 2 = 14.51$, $p < 0.001$). These findings underscore the critical need for targeted policy and institutional interventions to strengthen students' psychological well-being and academic resilience during pandemics and comparable public health crises.*

***Keywords:*** *COVID-19; Mental Health; Academic Performance; Online Learning; Bangladesh*

## Introduction

COVID-19 emerged as one of the most disruptive public health crises of the twenty-first century. First identified in late 2019, the disease rapidly spread across countries and placed intense pressure on health systems, economies, families, and educational institutions. Beyond its direct effects on morbidity and mortality, the pandemic reshaped everyday life through lockdowns, social distancing, travel restrictions, quarantine measures, and the prolonged closure of schools, colleges, and universities (Kumar et al., 2021; Singh et al., 2024).

These measures were necessary to reduce transmission, but they also produced broad consequences for young people whose social, academic, and personal development depends strongly on regular institutional engagement, peer interaction, and structured learning environments.

The education sector was among the most affected areas of social life during the pandemic. Across the world, campus closures interrupted teaching, examinations, laboratory activities, fieldwork, internships, and graduation schedules. Students were required to adjust suddenly to online or remote learning, often without adequate preparation, resources, or psychological readiness (Day et al., 2020). For college and university students, this transition was especially challenging because higher education is closely linked with career preparation, professional identity formation, social independence, and future employment planning. As a result, the pandemic became not only a health emergency but also an academic and psychosocial crisis for students.

Bangladesh experienced similar disruptions after the first confirmed COVID-19 case was reported in March 2020 (Piya et al., 2022). Following the spread of infection, the government introduced restrictions on movement, public gatherings, and institutional activities. Educational institutions remained closed for a prolonged period, and students had to continue their studies through online classes, recorded lectures, mobile communication, and informal academic support. However, the transition to remote learning exposed unequal access to digital devices, stable internet, electricity, private study space,

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and supportive home environments (Koh & Daniel, 2022). These inequalities were more visible among students from rural areas, low-income households, and families affected by financial insecurity during the pandemic.

College and university students in Bangladesh faced multiple overlapping pressures during the COVID-19 pandemic. The closure of educational institutions disrupted their academic routine, reduced direct contact with teachers and classmates, delayed examinations, created uncertainty about graduation, and weakened motivation for study. Many students also experienced difficulty concentrating due to family stress, fear of infection, financial hardship, and uncertainty about future employment. The academic interruption was therefore not limited to the loss of classroom instruction. It affected students' confidence, learning continuity, institutional attachment, and perceived control over their future.

At the same time, the pandemic affected students' physical and mental health conditions. Reduced mobility, long screen time, irregular sleep, limited outdoor activity, and changes in eating habits contributed to physical discomfort and lifestyle imbalance. Mental health concerns also increased due to isolation, fear, loneliness, anxiety, sadness, frustration, and uncertainty (Giuntella et al., 2021). Students who were already vulnerable because of economic pressure, poor family support, or weak academic standing were likely to face deeper distress. In Bangladesh, where access to counselling and student mental health services remains limited, these problems may have remained underreported or untreated.

The combined effects of health stress and academic disruption require careful empirical attention. Students' academic performance cannot be understood separately from their mental health, social environment, family conditions, and access to learning resources. Similarly, mental health outcomes during the pandemic were closely connected with academic uncertainty, financial stress, reduced social contact, and fear of delayed career entry (Roberts et al., 2023). This makes the issue multidimensional and calls for a cross-sectional assessment that examines the health and academic conditions of students together.

Existing literature shows that the COVID-19 pandemic had wide-ranging effects on students' mental health, academic engagement, and social behavior. Studies conducted in different countries reported increased anxiety, depression, stress, loneliness, emotional instability, and reduced motivation among students during lockdowns and institutional closures. The sudden loss of campus life, peer networks, and daily routine intensified psychological pressure among young people. Fear of infection, concern for family members, and exposure to alarming news further increased emotional distress (Elharake et al., 2022; Khawaja et al., 2023; Marciano et al., 2022; Panchal et al., 2021; Stock et al., 2022; Werner et al., 2021; Xiao-qiao et al., 2020).

Research also shows that the pandemic affected students' physical health and lifestyle patterns. Many students reported reduced physical activity, sleep disturbance, increased screen exposure, headaches, fatigue, and changes in diet (Ihm et al., 2021). Online learning required long hours of device use, which created discomfort for students who lacked proper study arrangements at home. In many cases, home confinement reduced opportunities for recreation, exercise, and social interaction. These lifestyle changes contributed to a decline in overall well-being and made students more vulnerable to academic fatigue (Pandey et al., 2020).

Academic disruption has been one of the most frequently reported consequences of the pandemic. Although online education helped maintain some continuity, it did not fully replace face-to-face learning. Students often faced unstable internet connections, high data costs, a lack of laptops or smartphones, poor audio and video quality, and limited interaction with teachers (Govindaraju et al., 2023). Practical courses, laboratory work, field-based learning, and group activities were especially difficult to conduct online. As a result, many students experienced reduced learning satisfaction, lower academic engagement, and uncertainty about assessment quality.

In developing countries such as Bangladesh, the shift to online learning revealed deeper structural inequalities. Students from urban and higher-income families were generally better positioned to attend online classes, access digital resources, and communicate with teachers (Kamrujjaman et al., 2024). In contrast, students from rural or economically disadvantaged backgrounds often struggled with poor connectivity, shared devices, household responsibilities, and limited privacy for study (Islam et al., 2023; Learning Loss among Adolescent Girls during the COVID-19 Pandemic in Rural Bangladesh, 2021). This digital divide created unequal academic experiences and may have widened existing educational disparities.

The literature also indicates that social and behavioral changes during the pandemic shaped student experiences. Students became more aware of preventive practices such as mask use, hand hygiene, social distancing, and health-related information (Boonroungrut et al., 2021). However, the same period also produced fear, misinformation, excessive social media use, and confusion about the disease. For some students, family support and self-care practices helped reduce distress. For others, family conflict, financial pressure, and prolonged isolation increased emotional burden (Sharma & Tyszka, 2023). These mixed experiences suggest that the pandemic affected students in different ways depending on their social, economic, and educational circumstances.

Although a growing body of research has examined the effects of COVID-19 on students, much of the evidence focuses either on mental health or on online learning separately. Fewer studies have assessed the combined effects of the pandemic on physical health,

mental health, academic performance, and social behavior among college and university students in Bangladesh. The cross-sectional study addresses this gap by examining how the COVID-19 pandemic affected the health and academic condition of college and university students in Bangladesh. Specifically, the study aims to identify the major health-related problems experienced by students, assess the effects of the pandemic on academic performance and learning continuity, and explore the social and behavioral changes associated with students' health and education during the pandemic period. By focusing on both health and academic dimensions, the study provides a broader understanding of students' pandemic experiences and offers evidence that may support future educational planning, student support services, and crisis-responsive academic policies.

## Methodology

This study employed a cross-sectional descriptive survey design to examine the social, behavioral, health, and academic impacts of the COVID-19 pandemic among college and university students in Bangladesh. A cross-sectional approach was considered appropriate because it allows the assessment of population characteristics and associated conditions at a specific point in time, particularly during a rapidly evolving public health crisis. The study was conducted among students residing in the Savar area of Dhaka, Bangladesh, including participants enrolled at college, undergraduate, graduate, and postgraduate levels.

The sample size was determined using the standard formula:

$$n = \frac{N}{1 + N(e^2)}$$

where n represents the required sample size, N denotes the population size, and *e* refers to the margin of error set at 0.05 for a 95% confidence level. Considering that the estimated student population in the study area exceeded 10,000, the calculated minimum sample size was approximately 200 respondents. To enhance reliability and address potential non-response bias, the final sample size was increased to 220 participants.

A convenience sampling technique was employed due to movement restrictions during the pandemic. Participants were recruited voluntarily through Google Forms, institutional email, and social media platforms, while a limited number of printed questionnaires were distributed to students with restricted internet access. Data were collected using a structured closed-ended questionnaire covering socio-demographic characteristics, COVID-19 knowledge and information sources, behavioral changes, health-related experiences, academic impacts, and mental health conditions. The instrument also included items related to online learning, internet accessibility, eating patterns, depression, anxiety, stress, and academic performance. A pilot test was conducted to ensure clarity and validity, and necessary modifications were incorporated prior to final data collection.

The study included independent variables such as age, gender, educational level, family income, COVID-19 infection status, and information sources, while dependent variables included behavioral changes, mental health conditions, health-related challenges, internet use, awareness, and academic performance. Data collection was conducted between 1 July and 1 August 2021. Informed consent was obtained from all participants, and confidentiality, anonymity, and voluntary participation were strictly maintained throughout the study.

Collected data were coded, cleaned, and analyzed using SPSS. Both descriptive and inferential statistical techniques were employed. Descriptive statistics, including frequency distributions and percentages, were used to summarize socio-demographic and categorical variables. Inferential statistical analysis was performed using the chi-square test to examine associations between categorical variables, including the relationship between COVID-19 infection status and mental health condition, as well as the relationship between mental health condition and academic performance. The Chi-square statistic was computed using the following formula:

$$\boldsymbol{x^2} = \sum \frac{(\boldsymbol{O} - \boldsymbol{E})^2}{\boldsymbol{E}}$$

where O indicates observed frequency and E indicates expected frequency. Statistical significance was determined at a threshold of $p < 0.05$. The findings were presented using tables, charts, and graphical illustrations to improve clarity and interpretability.

The study adhered to established ethical standards for human participant research. Participation was entirely voluntary, and respondents retained the right to withdraw at any stage without consequence. Informed consent was obtained before data collection, and all personal information was kept confidential. Only aggregated findings were reported to ensure anonymity and protect participant privacy.

## Results

### Respondent Characteristics

Table 1 presents the socio-demographic characteristics and COVID-19 knowledge levels of the respondents. A total of 220 college and university students participated in the study. The majority of the respondents belonged to the 21–23 years age group (38.2%), followed by 24–26 years (35.9%) and 18–20 years (25.9%). Female students constituted a slightly higher proportion of the sample (54.1%) compared to male students (45.9%).

**Table 1.** Socio-Demographic Characteristics and Knowledge Level of Respondents (N = 220)

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| **Age Group (Years)** | 18–20 | 57 | 25.9 |
| | 21–23 | 84 | 38.2 |
| | 24–26 | 79 | 35.9 |
| **Sex** | Male | 101 | 45.9 |
| | Female | 119 | 54.1 |
| **Education Level** | College | 55 | 25.0 |
| | Undergraduate | 74 | 33.6 |
| | Graduate | 57 | 25.9 |
| | Postgraduate | 34 | 15.5 |
| **Monthly Family Income (BDT)** | <10,000 | 33 | 15.0 |
| | 10,000–30,000 | 78 | 35.5 |
| | >30,000 | 109 | 49.5 |
| **Knowledge Level about COVID-19** | Low | 13 | 5.9 |
| | Medium | 132 | 60.0 |
| | High | 75 | 34.1 |
| | **Total** | **220** | **100.0** |

Regarding educational status, undergraduate students represented the largest proportion of respondents (33.6%), followed by graduate students (25.9%), college students (25.0%), and postgraduate students (15.5%). In terms of monthly family income, nearly half of the respondents (49.5%) reported a family income above BDT 30,000, while 35.5% belonged to families earning between BDT 10,000 and 30,000 per month, and 15.0% reported a monthly family income below BDT 10,000.

The findings further indicate that the majority of students possessed a moderate level of knowledge regarding COVID-19 (60.0%), whereas 34.1% demonstrated a high level of knowledge and only 5.9% reported a low level of awareness. These findings suggest that most students were reasonably informed about the pandemic and its related preventive measures.

### Social and Behavioral Changes

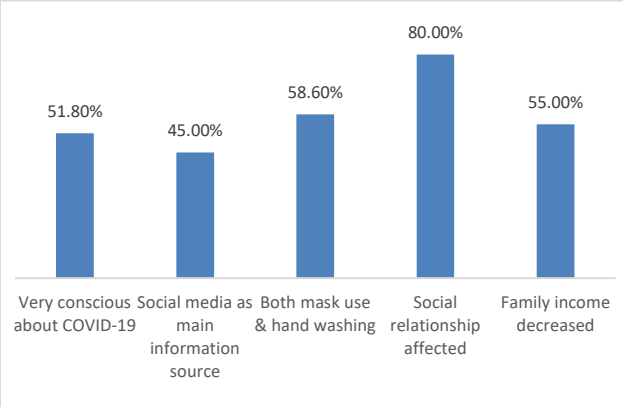


**Figure 1.** Social and Behavioral Changes among Students during the COVID-19 Pandemic

Students demonstrated a relatively high level of awareness and preventive behavior regarding COVID-19 (Figure 1). More than half of the respondents (51.8%) reported being highly conscious about the pandemic, while social media emerged as the primary source of COVID-19-related information (45.0%). Preventive practices were widely adopted, with 58.6% of students reporting both regular mask use and frequent hand washing. The pandemic also substantially affected students' social and economic conditions, as 80.0% reported disruptions in social relationships and 55.0% experienced a decline in family income during the pandemic period.

### Health Impacts of COVID-19 among Students

The study findings revealed that 32.3% of the respondents had been infected with COVID-19, while 67.7% reported no infection history. Among infected students, fever and cough were identified as the most common symptoms (16.8%), followed by loss of smell or taste (8.2%), shortness of breath (4.6%), and other health-related complications (2.7%). Despite the relatively high infection rate, only 5.5% of respondents reported experiencing long-term health effects following COVID-19 infection, whereas the majority (94.5%) reported no persistent complications.

Changes in eating behavior were also observed during the pandemic period. Approximately 35% of students reported reduced food intake, while 18.2% experienced increased eating patterns and 14.2% reported inconsistent eating behavior. However, 32% indicated no noticeable changes in eating habits. These findings suggest that the pandemic substantially influenced students' lifestyle and dietary behaviors.

**Table 3.** Health Impacts of COVID-19 among Students (n = 220)

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| **Infected with COVID-19** | Yes | 71 | 32.3 |
| | No | 149 | 67.7 |

| | | | |
|---|---|---|---|
| **Health Problems during COVID-19 Infection** | Fever and cough | 37 | 16.8 |
| | Shortness of breath | 10 | 4.6 |
| | Loss of smell and taste | 18 | 8.2 |
| | Others | 6 | 2.7 |
| **Long-term Health Effects** | Yes | 12 | 5.5 |
| | No | 208 | 94.5 |
| **Changes in Eating Patterns** | Eating decreased | 77 | 35.0 |
| | Eating increased | 40 | 18.2 |
| | Inconsistent eating | 31 | 14.2 |
| | No change | 70 | 32.0 |

**Mental Health Impacts of COVID-19**

The findings revealed substantial psychological impacts of the COVID-19 pandemic among students (Table 4). Overall, 80.0% of respondents reported that the pandemic negatively affected their mental health. Depression (29.1%) and anxiety (24.1%) were the most commonly reported psychological conditions, while 15.0% experienced both depression and anxiety simultaneously. Academic delays and concerns regarding future careers (34.5%) emerged as the leading contributors to psychological distress, followed by prolonged educational institution closures (33.6%).

**Table 4.** Mental Health Impacts of COVID-19 among Students (N = 220)

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| **Mental Health Affected by COVID-19** | Yes | 176 | 80.0 |
| | No | 44 | 20.0 |
| **Mental Health Conditions** | Depression | 64 | 29.1 |
| | Anxiety | 53 | 24.1 |
| | Sadness | 26 | 11.8 |
| | Both depression and anxiety | 34 | 15.0 |
| | None | 43 | 20.0 |
| **Health Problems Related to Depression and Anxiety** | Insomnia | 39 | 17.7 |
| | Panic attack | 27 | 12.3 |
| | Eating disorder | 30 | 13.6 |
| | Chest pain | 12 | 5.5 |
| | None | 112 | 50.9 |
| **Reasons for Depression and Anxiety** | Long-term educational closure | 74 | 33.6 |
| | Academic delays and future career concerns | 76 | 34.5 |
| | Family-related problems | 15 | 6.8 |
| | Fear of infection | 24 | 10.9 |
| | None | 31 | 14.1 |
| **Seeking Mental Health Counseling** | Yes | 19 | 8.6 |

**Table 5.** Association between COVID-19 Infection and Mental Health Condition

| COVID-19 Infection Status | Mental Health Affected (Yes) | Mental Health Affected (No) | Total |
|---|---|---|---|
| **Yes** | 66 | 5 | 71 |
| **No** | 110 | 39 | 149 |
| **Total** | **176** | **44** | **220** |
| **Statistical Test** | $\chi^2$ Value | df | p-value |
| **Pearson Chi-square** | 11.001 | 1 | 0.001 |

Despite widespread psychological challenges, only 8.6% of students reported seeking mental health counseling during the pandemic period. Inferential analysis further demonstrated a statistically significant association between COVID-19 infection status and mental health condition ($\chi^2 = 11.001$, $p = 0.001$), indicating that students infected with COVID-19 were more likely to experience mental health problems than non-infected students (Table 5).

**Academic Impacts of COVID-19**

The study findings revealed that the COVID-19 pandemic substantially disrupted students' academic performance.

A large majority of respondents (81.4%) reported that their academic performance had been negatively affected during the pandemic, whereas only 18.6% reported no academic disruption. The most commonly reported academic challenge was the creation of a long-term study gap (38.2%), followed by difficulties related to online classes (21.8%) and lack of concentration in study (18.2%).

Students also encountered several barriers in attending online classes. Internet connectivity problems were the most common challenge (28.2%), followed by difficulties in managing internet costs (12.7%) and lack of smartphones (8.2%). Nevertheless, 50.9% of respondents reported no major difficulties in attending online classes. Regarding online examination performance, approximately 57% of students reported a decline in performance during the pandemic, while 35.9% experienced improvement and 6.8% reported no change.

**Table 6.** Academic Impacts of COVID-19 among Students (n = 220)

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| **Academic Performance Affected** | Yes | 179 | 81.4 |
| | No | 41 | 18.6 |
| **Major Academic Problems during the Pandemic** | Challenges in online classes | 48 | 21.8 |
| | Lack of concentration | 40 | 18.2 |
| | Long-term study gap | 84 | 38.2 |
| | Others | 5 | 2.3 |
| | None | 43 | 19.5 |
| **Problems in Attending Online Classes** | Internet connectivity problem | 62 | 28.2 |
| | Lack of smartphone | 18 | 8.2 |
| | Managing internet cost | 28 | 12.7 |
| | No problem | 112 | 50.9 |
| **Online Examination Performance** | Decreased | 125 | 57.0 |
| | Improved | 79 | 35.9 |
| | Same as before | 15 | 6.8 |

**Table 7.** Association between Mental Health Condition and Academic Performance

| Mental Health Affected | Academic Performance Affected (Yes) | Academic Performance Affected (No) | Total |
|---|---|---|---|
| **Yes** | 152 | 24 | 176 |
| **No** | 27 | 17 | 44 |
| **Total** | **179** | **41** | **220** |
| **Statistical Test** | $\chi^2$ Value | df | p-value |
| **Pearson Chi-square** | 14.509 | 1 | <0.001 |

Chi-square analysis further demonstrated a significant association between students' mental health conditions and academic performance ($\chi^2 = 14.509$, $p < 0.001$). Students experiencing mental health problems were significantly more likely to report deteriorating academic performance during the pandemic period.

**Internet Use and Related Health Problems**

The findings indicate substantial internet and smartphone usage among students during the pandemic. The majority of respondents (43.6%) reported spending 5–7 hours daily using smartphones or the internet, while 27.7% spent 2–3 hours, 16.4% spent 8–10 hours, and 12.3% spent more than 10 hours daily.

Extended internet use was associated with several health-related problems among students. Approximately 20% reported insomnia due to excessive internet use, 15% experienced vision-related problems, 14% reported headaches, and 11% experienced weight gain associated with prolonged online activity. These findings suggest that increased dependence on digital technologies during the pandemic may have contributed to adverse physical and psychological health outcomes among students.

**Table 8.** Internet Use and Associated Health Problems among Students (n = 220)

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| **Time Spent Using Smartphone/Internet** | 2–3 hours | 61 | 27.7 |
| | 5–7 hours | 96 | 43.6 |
| | 8–10 hours | 36 | 16.4 |
| | Above 10 hours | 27 | 12.3 |
| **Health Problems due to Internet Addiction** | Insomnia | 44 | 20.0 |
| | Headache | 31 | 14.0 |
| | Vision problems | 33 | 15.0 |
| | Weight gain | 24 | 11.0 |

**Discussion**

The findings of this study indicate that the COVID-19 pandemic affected college and university students in Bangladesh through interrelated health, psychological, academic, social, and behavioral pathways. The results show that the pandemic was not only a public health event but also a broader disruption to students' educational continuity, emotional well-being, lifestyle patterns, and social environment. This multidimensional impact is particularly relevant in the context of Bangladesh, where prolonged institutional closure, unequal access to online learning, and limited formal mental health support created additional challenges for students (Hosen et al., 2022).

A notable finding of the study is that nearly one-third of the respondents reported being infected with COVID-19. Fever and cough were the most frequently reported symptoms, followed by loss of smell or taste and shortness of breath. Although only a small proportion of students reported long-term health effects, changes in eating patterns were common. Reduced food intake, increased eating, and inconsistent eating behavior suggest that the pandemic affected students' lifestyle regulation and daily routines. These patterns may reflect psychological stress, restricted mobility, altered household conditions, and prolonged home confinement during the pandemic period (Larsson et al., 2022).

The mental health findings are among the most important results of the study. A large majority of students reported that their mental health had been affected by the pandemic, with depression and anxiety being the most common conditions. Academic delays and concerns about future careers were the leading reasons for psychological distress, closely followed by prolonged closure of educational institutions. This indicates that students' mental health problems were not caused only by fear of infection. Instead, they were strongly connected with uncertainty about academic progress, delayed examinations, interrupted learning, and anxiety about future employment. The low rate of mental health counselling further suggests that psychological distress may have remained largely unmanaged among students (Hawley et al., 2021).

The meaningful association between COVID-19 infection status and mental health condition adds further weight to this finding. Students who had been infected were more likely to report mental health problems than those who had not been infected. This association may be explained by fear, isolation, physical discomfort, stigma, concern about family transmission, and uncertainty about recovery. It also shows that infection experience can affect students beyond physical symptoms, influencing emotional well-being and perceived vulnerability.

Academic disruption was also highly evident. More than four-fifths of the respondents reported that their academic performance had been affected during the pandemic. The most common academic problem was a long-term study gap, followed by challenges in online classes and a lack of concentration. These findings show that institutional closure created a major interruption in learning continuity. Although online education was introduced as an alternative, it did not fully compensate for face-to-face academic engagement. Internet connectivity problems, the cost of internet use, and the lack of smartphones created barriers for a section of students. Even among those who could attend online classes, learning quality may have been affected by reduced interaction, limited feedback, and difficulty maintaining attention in a home-based learning environment (Dawadi et al., 2024; Saleem et al., 2022).

The association between mental health conditions and academic performance is particularly important. Students with mental health problems were more likely to report affected academic performance. This finding supports the view that psychological wellbeing and academic outcomes are closely linked. Depression, anxiety, sadness, sleep disturbance, and panic symptoms can reduce concentration, motivation, memory, class participation, and confidence (Bladek, 2021; Marrone et al., 2024). Therefore, academic recovery after a crisis cannot be addressed only through syllabus completion or examination rescheduling. Student support systems must also address mental health, counselling access, learning confidence, and emotional adjustment.

The study also found changes in social and behavioral conditions. Most students reported awareness of COVID-19 and adopted preventive practices such as mask use and hand washing. Social media was the major source of pandemic-related information, showing its central role in shaping awareness among young people. At the same time, a high proportion of students experienced disruption in social relationships, and more than half reported a decline in family income. These findings suggest that students were exposed to both health-related and socioeconomic stressors. Family income decline may have affected internet affordability, study resources, nutrition, and emotional security (Wang et al., 2020).

Internet and smartphone use increased considerably during the pandemic, with many students spending five to seven hours online each day. Extended digital exposure was associated with insomnia, vision problems, headache, and weight gain. This reflects the dual role of digital technology during the pandemic. It enabled academic continuity and communication, but also contributed to physical and psychological strain when used for long periods without adequate ergonomic, recreational, or institutional support. The findings point to the need for integrated institutional responses during future crises. Colleges and universities should strengthen counselling services, develop inclusive digital learning systems, support students with limited internet access, monitor academic recovery, and promote healthy digital habits. Such measures would help protect students' well-being and maintain learning continuity during public health emergencies or comparable disruptions.

## Conclusion

This study demonstrates that the COVID-19 pandemic exerted a multidimensional impact on the health, mental well-being, behavioral patterns, and academic conditions of college and university students in Bangladesh. The findings reveal that students experienced physical health problems, altered eating habits, psychological distress, social disruption, and substantial academic setbacks during the period of institutional closure. Depression, anxiety, and sadness were prominent mental health concerns, with academic delay and uncertainty about future careers emerging as major sources of distress.

The study further shows that mental health problems were closely associated with deteriorating academic performance, indicating that educational disruption cannot be separated from students' psychological well-being. Barriers to online learning, including poor internet connectivity, internet costs, and limited access to devices, also constrained academic continuity for many students. Increased dependence on digital platforms created additional health concerns such as insomnia, headache, vision problems, and weight gain. The evidence highlights the need for integrated student support systems, inclusive digital education infrastructure, accessible counselling services, and crisis-responsive academic planning to protect student wellbeing and learning continuity during future public health emergencies.

## Declarations

### Ethical Approval

The study was conducted in accordance with ethical principles for research involving human participants. Participation was voluntary, and respondents were informed about the purpose of the study before data collection. Confidentiality and anonymity were strictly maintained throughout the research process.

### Consent to Participate

Informed consent was obtained from all participants before their inclusion in the study. Participants had the right to withdraw from the study at any stage without any consequence.

### Consent for Publication

Not applicable.

### Availability of Data

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

### Competing Interests

The author declares no competing interests.

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### Author Contributions

Dr. Farhana Kaniz Mouri conceptualized the study, designed the methodology, developed the questionnaire, supervised data collection, analyzed and interpreted the data, and prepared the manuscript.

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