



# **Psychological Impact of the Post-COVID-19 Period on College Students in the Paschim Midnapore District, West Bengal: A Cross-Sectional Study of Anxiety, Depression, and PTSD**

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## **Abstract**

The COVID-19 pandemic has significantly disrupted social, academic, and economic life, leaving lasting psychological effects on vulnerable populations, including college students. This study aimed to evaluate the prevalence of anxiety, depression, and post-traumatic stress disorder (PTSD) among college students in the post-COVID-19 period and to identify the associated risk factors. A cross-sectional study was conducted among 202 college students from the Paschim Midnapore district, West Bengal. Standardized questionnaires including GAD-7, PHQ-9, and IES-R were administered along with a socio-demographic and COVID-19-related questionnaire. Anthropometric and blood pressure data were also recorded. Chi-square and logistic regression analyses were performed using SPSS 25.0.

Among participants, 52.0% experienced some level of anxiety, 48.0% experienced depression, and 23.8% experienced PTSD. Female students were more likely to experience severe anxiety and PTSD. Significant associations were observed between mental health symptoms and socioeconomic status, changes in family income, degraded family relationships, fear of reinfection, and inadequate sleep. Mental health issues remain prevalent in the post-pandemic era among college students, especially in economically and socially vulnerable groups. Intervention strategies focusing on psychosocial support, academic counseling, and financial aid are recommended.

**Keywords:** COVID-19, college students, anxiety, depression, PTSD, mental health, West Bengal, cross-sectional study.

## **1. Introduction**

Although the COVID-19 pandemic is largely under control, its psychological and social impacts persist globally. The outbreak disrupted everyday life, particularly affecting educational systems, employment, and mental health. College students were identified as a high-risk group during and after the pandemic, showing a substantial increase in mental health issues such as anxiety, depression, and post-traumatic stress disorder (PTSD) (Yuan et al., 2021; Shi et al., 2021). Studies conducted during the pandemic found that university students were especially vulnerable due to isolation, uncertainty, and academic disruption (Alfakeh et al., 2021).

The first year of college is a critical period in students' lives, marked by emotional fluctuations, social transitions, and academic stress (Wyatt et al., 2017). The added burden of a pandemic has further intensified these challenges, leading to an increased risk of poor psychological outcomes. Multiple studies have emphasized that the mental health status of students is influenced by factors such as poor sleep, lack of exercise, academic overload, and socioeconomic instability (Howard et al., 2022; Bruffaerts et al., 2018). Students with elevated symptoms of depression during the first semester were more likely to drop out by the end of their second year (Howard et al., 2022).

Moreover, the psychological toll of the pandemic may be long-lasting. Emotional exhaustion, stress from time pressure, and disrupted family relationships were found to contribute significantly to the mental health burden among students (Gusy et al., 2021; Wright et al., 1998). Gender-based differences have also been noted, with female students more likely to experience higher levels of anxiety and PTSD (Wyatt et al., 2017; Xing et al., 2022). Additionally, socioeconomic hardships, including declining household income and health burdens in the family, were found to worsen psychological outcomes (Liu et al., 2021; Marley et al., 2021).

Despite the growing literature on mental health during the early stages of the pandemic, there is limited research on the post-pandemic phase. Studies from China, Saudi Arabia, and Europe have indicated that even as physical health indicators improve, mental health symptoms persist or worsen in the post-COVID-19 period (Bao et al., 2020; Oh et al., 2021; Alsolais et al., 2021). Lifestyle disruptions such as altered sleep patterns, reduced physical activity, and family conflicts continue to pose risks (Di Renzo et al., 2020; Natalia et al., 2022).

Given these findings, it is critical to assess the long-term psychological effects of COVID-19 on Indian college students. This study aims to investigate the prevalence of anxiety, depression, and PTSD symptoms in the post-COVID-19 era among college students in the Paschim Midnapore district of West Bengal, and to identify key contributing factors including socioeconomic conditions, family relationships, gender, and perceived pandemic-related stress.

## **2. Materials and Methods**

### **2.1 Study Design and Participants**

This cross-sectional study was conducted among college students across various institutions in the Paschim Midnapore district of West Bengal, India, during the post-COVID-19 recovery period—when regular in-person academic activities had resumed. A total of 202 students (128 males and 74 females) voluntarily participated. Participants were selected using a non-probability sampling method. Inclusion criteria involved college enrollment and consent to participate.

### **2.2 Ethical Considerations**

Prior to data collection, all participants were fully informed about the study's objectives and procedures. Written informed consent was obtained, ensuring voluntary participation.

Anonymity and confidentiality were strictly maintained throughout. The study design adhered to ethical principles outlined in the Declaration of Helsinki.

### 2.3 Anthropometric and Physiological Assessment

Anthropometric measurements, including height and weight, were taken using standard calibrated instruments. BMI (body mass index) was calculated using the Quetelet index: weight in kilograms divided by the square of height in meters. Blood pressure (systolic and diastolic) and pulse rate were measured in a resting state using digital sphygmomanometers. The classification of BMI followed WHO guidelines (WHO, 2010).

### 2.4 Socioeconomic Status Assessment

Socioeconomic status (SES) was assessed using the Modified Kuppuswamy Socioeconomic Scale, which incorporates the educational level, occupation of the head of the household, and monthly family income. Income subscales were revised based on the All India Average Consumer Price Index for Industrial Workers.

### 2.5 Psychological Assessment Tools

#### *Generalized Anxiety Disorder 7-item Scale (GAD-7):*

Developed by Spitzer et al. (2006), the GAD-7 is a brief self-report tool used to identify generalized anxiety symptoms and severity. Scores range from 0–21, with higher scores indicating greater symptom severity.

#### *Patient Health Questionnaire-9 (PHQ-9):*

PHQ-9 is a 9-item self-administered questionnaire designed to screen and assess the severity of depression (Kroenke et al., 2001). Scores classify depression as minimal (<5), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27).

#### *Impact of Event Scale – Revised (IES-R):*

The IES-R is a validated tool used to assess post-traumatic stress disorder (PTSD) symptoms based on three subscales—intrusion, avoidance, and hyperarousal (Weiss & Marmar, 1997). Total scores are classified as: 0–23 (normal), 24–32 (mild psychological impact), 33–36 (moderate), and >37 (severe psychological impact).

### 2.6 COVID-19-Related Behavioral and Lifestyle Variables

Participants completed a self-reported questionnaire covering a range of post-COVID-19 behaviors and experiences, including:

- Use of masks and hand sanitizers
- Occurrence of respiratory symptoms within one week of survey
- Concerns about pandemic recurrence, public transportation, and infection risk
- Changes in household income and family relationships due to COVID-19
- Sleep patterns and family health burden
- Time spent outside during lockdown
- Access to government assistance

Responses to lifestyle and perception variables were dichotomized (0 = Never/Sometimes; 1 = Often/Always) for analytical clarity, consistent with prior methodologies (Xing et al., 2022; Natalia et al., 2022).

### 2.7 Statistical Analysis

Statistical analysis was performed using SPSS version 25.0. Descriptive statistics summarized the demographic and clinical characteristics of participants. Associations between independent variables and mental health outcomes (anxiety, depression, and PTSD) were assessed using the chi-square test. Ordered logistic regression was conducted to identify independent predictors and calculate odds ratios (ORs) with 95% confidence intervals (CIs). A p-value <0.05 was considered statistically significant.

### 3. Results

#### 3.1 Health Characteristics of Participants

A total of 202 participants were enrolled in the study, comprising 128 males and 74 females. The mean height and weight of male participants were  $162.32 \pm 7.09$  cm and  $60.16 \pm 8.26$  kg, respectively, while those of female participants

were  $154.59 \pm 6.81$  cm and  $56.39 \pm 9.51$  kg. The mean body mass index (BMI) was  $22.95 \pm 3.61$  kg/m<sup>2</sup> in males and  $23.64 \pm 4.05$  kg/m<sup>2</sup> in females. The average systolic blood pressure was  $120.12 \pm 12.65$  mmHg in males and  $119.68 \pm 10.89$  mmHg in females. The mean diastolic blood pressure was  $75.88 \pm 6.87$  mmHg among males and  $77.61 \pm 8.40$  mmHg among females.

**Table 1: Health Characteristics of the study participants**

| Male (n=128)             | Female (n=74)      |                    |
|--------------------------|--------------------|--------------------|
| Height (cm)              | $162.32 \pm 7.09$  | $154.59 \pm 6.81$  |
| Weight (kg)              | $60.16 \pm 8.26$   | $56.39 \pm 9.51$   |
| BMI (kg/m <sup>2</sup> ) | $22.95 \pm 3.61$   | $23.64 \pm 4.05$   |
| SBP (mmHg)               | $120.12 \pm 12.65$ | $119.68 \pm 10.89$ |
| DBP (mmHg)               | $75.88 \pm 6.87$   | $77.61 \pm 8.40$   |

#### 3.2 Characteristics of the study Participants

Based on BMI classification, 11.9% of students were underweight ( $<18.5$  kg/m<sup>2</sup>), 36.1% had a normal BMI ( $18.5$ – $22.99$  kg/m<sup>2</sup>), and 52.0% were classified as overweight or obese ( $>23$  kg/m<sup>2</sup>). Regarding annual income, 43.6% of students belonged to the income group of  $\leq$ Rs. 60,000, while 56.4% reported an income  $>$ Rs. 60,000.

Self-reported responses to general health and pandemic-related questions revealed the following: 75.2% of students reported using masks and hand sanitizers, while 24.8% did not. When asked whether they had experienced cold symptoms within one week of the survey, 22.9% answered 'yes', and 70.8% answered 'no'. Regarding concern about a potential resurgence of the pandemic, 63.4% reported being worried, while 36.6% were not. When asked about fear of using public transport, 17.3% expressed concern, whereas 82.7% did not. Similarly, 17.3% of students were worried about themselves or their

family becoming infected with COVID-19, while 82.7% were not.

When asked about the pandemic's impact on household income, 1.5% reported an increase, 70.8% reported no effect, and 27.7% reported a decrease. Regarding family relationships, 93.1% of students reported no effect, 3.5% reported an improvement, and 3.5% reported deterioration. In response to a question on unplanned childbirth in the family, 5.9% responded 'yes', while 94.1% responded 'no'. On continued health burden in the family, 28.2% responded 'yes', and 71.8% responded 'no'.

Additionally, 31.2% of students reported spending time outside during lockdown, while 68.8% did not. When asked about receiving government support during lockdown, 53.5% responded affirmatively, while 46.5% did not. Regarding sleep patterns, 88.1% of students reported adequate sleep, whereas 11.9% reported inadequate sleep.

**Table 2: Descriptive characteristics of the study participants**

| Variable  | Group                        | n (%)       |
|---|------------------------------|-------------|
| Gender  | Male                         | 128 (63.4%) |
|   | Female                       | 74 (36.6%)  |
| BMI   | <18.5kg/m <sup>2</sup>       | 24 (11.9%)  |
|   | 18.5-22.99 kg/m <sup>2</sup> | 73 (36.1%)  |
|   | >23kg/m <sup>2</sup>         | 105 (52.0%) |
| Annual income   | ≤Rs. 60000                   | 88 (43.6%)  |
|   | >Rs. 60000                   | 114 (56.4%) |
| Mask, sanitizer used  | No                           | 152 (75.2%) |
|   | Yes                          | 50 (24.8%)  |
| Whether catching cold 1 week of survey                          | No                           | 143 (70.8%) |
|   | Yes                          | 59 (29.2%)  |
| Worried about spread pandemic again                             | No                           | 128 (63.4%) |
|   | Yes                          | 74 (36.6%)  |
| worried about taking public transport                           | No                           | 167 (82.7%) |
|   | Yes                          | 35 (17.3%)  |
| Worried about being infected by Covid19 for yourself and family | No                           | 167 (82.7%) |
|   | Yes                          | 35 (17.3%)  |
| pandemic impact on household income                             | No effect                    | 143 (70.8%) |
|   | Increase                     | 3 (1.5%)    |
|   | Decrease                     | 56 (27.7%)  |
| Pandemic impact on family relationship                          | No effect                    | 188 (93.1%) |
|   | Increase                     | 7 (3.5%)    |
|   | Decrease                     | 7 (3.5%)    |
| Unplanned Child in the family                                   | No                           | 190 (94.1%) |
|   | Yes                          | 12 (5.9%)   |
| Health burden still continue in family                          | No                           | 145 (71.8%) |
|   | Yes                          | 57 (28.2%)  |
| Spend time outside in lockdown                                  | No                           | 139 (68.8%) |
|   | Yes                          | 63 (31.2%)  |
| Government's help on lockdown                                   | No                           | 94 (46.5%)  |
|   | Yes                          | 108 (53.5%) |
| Sleep pattern   | Adequate                     | 178 (88.1%) |
|   | Inadequate                   | 24 (11.9%)  |

### 3.3 Distribution of Anxiety, Depression, PTSD symptoms among college students

A total of 202 participants (n = 202) took part in the survey, comprising 128 male and 74 female college students. Table 3 presents the prevalence rates of three psychological conditions—anxiety, depression, and post-traumatic stress disorder (PTSD)—among the participants.

Among male students, 48.02% reported experiencing normal levels of anxiety, 29.07% mild anxiety, 18.81% moderate anxiety, and 3.47% severe anxiety. In comparison, among female students, 41.89% reported normal anxiety levels, 29.73% mild anxiety, 21.62% moderate anxiety, and 6.76% severe anxiety.



Regarding depression, 51.56% of male participants reported normal levels, 29.69% reported mild depression, 17.19% reported moderate depression, and 1.56% reported severe depression. Among female participants, 70.27% experienced normal levels of depression, while 5.41%, 9.46%, and 14.86% reported mild, moderate, and severe depression, respectively.

In terms of PTSD, 76.24% of male students reported normal levels, 6.93% mild PTSD, 6.44% moderate PTSD, and 10.40% severe PTSD. Among female students, 70.27% experienced normal levels of PTSD, 5.41% mild, 9.46% moderate, and 14.86% severe PTSD.

**Table 3: Prevalence of anxiety, depression, and PTSD symptoms among college students**

| Psychological Symptoms | All (n=202) |       | Male (n=128) |       | Female (n=74) |       |
|------------------------|-------------|-------|--------------|-------|---------------|-------|
|                        | f           | %     | f            | %     | f             | %     |
| Anxiety                |             |       |              |       |               |       |
| Normal                 | 97          | 48.02 | 66           | 51.56 | 31            | 41.89 |
| Mild                   | 60          | 29.70 | 38           | 29.69 | 22            | 29.73 |
| Moderate               | 38          | 18.81 | 22           | 17.19 | 16            | 21.62 |
| Severe                 | 7           | 3.47  | 2            | 1.56  | 5             | 6.76  |

## 4. Discussion

The present study investigated the psychological impact of the post-COVID-19 period among college students in Paschim Midnapore, West Bengal, focusing on the prevalence and associated factors of anxiety, depression, and PTSD. Our findings reveal alarmingly high rates of mental health symptoms even after the peak of the pandemic, with 51.5% reporting anxiety, 48.0% reporting depression, and 23.8% experiencing PTSD symptoms. These results highlight the lingering psychological consequences of the pandemic and reinforce the need for long-term mental health monitoring and interventions in academic settings.

The prevalence rates observed in this study align with previous global findings. For instance, similar patterns of psychological distress were reported among Chinese college students, where over 40% experienced anxiety and depressive symptoms (Xing et al., 2022). The persistent stress related to academic uncertainty, fear of reinfection, and disruptions in routine appear to contribute significantly to the continuation of mental health issues even after the lifting of lockdowns (Liu et al., 2021; Bao et al., 2020).

Notably, female participants in our study showed a higher prevalence of moderate to severe anxiety and PTSD symptoms compared to males, which is consistent with several other studies (Wyatt et al., 2017; Oh et al., 2021). Gender differences in stress reactivity, emotional processing, and social expectations may contribute to this disparity. Furthermore, the pandemic may have exacerbated existing gender-based inequalities in household responsibilities and emotional labor, further straining female students' mental health (Howard et al., 2022).

Socioeconomic status emerged as a key determinant of psychological outcomes. Students from families earning less than ₹60,000 annually showed significantly higher odds of experiencing anxiety and depression. This finding is consistent with prior research indicating that financial instability is a major predictor of psychological distress during and after pandemics (Marley et al., 2021; Alsolais et al., 2021). Economic strain likely contributes to chronic stress, food insecurity, and feelings of helplessness—all of which adversely affect mental well-being.

In addition, participants who reported deteriorated family relationships and ongoing health burdens within their families had significantly higher PTSD scores. This supports the assertion that family conflict and caregiver stress are potent predictors of trauma-related symptoms (Gusy et al., 2021; Weiss & Marmar, 1997). Moreover, students worried about a resurgence of the pandemic or who experienced disrupted sleep patterns were also at higher risk, reinforcing the idea that both cognitive (worry, rumination) and behavioral (sleep hygiene) factors play roles in sustaining psychological distress (Natalia et al., 2022).

These findings emphasize that the impact of the pandemic on young adults extends beyond immediate health concerns to long-term psychological consequences influenced by social, economic, and familial conditions. Importantly, our results suggest that even after normal academic operations resumed, the psychological recovery of students lagged behind.

This study highlights the urgent need for universities and public health authorities to design student-centered mental health programs. These should include proactive screening, counseling services, financial aid for economically weaker students, and psycho-education for families to foster supportive environments.

## 5. Conclusion

This study highlights the continued psychological impact of COVID-19 on college students in the post-pandemic period, with high rates of anxiety, depression, and PTSD. Key risk factors included female gender, low socioeconomic status, family stress, and fear of reinfection. These findings underscore the need for sustained mental health support in academic settings, particularly for vulnerable groups. Early intervention, counseling, and targeted policies are essential to promote long-term emotional well-being among students.

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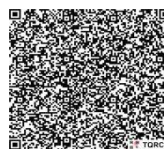
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