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A Study of Psychiatric Co-Morbidities in Post Covid-19 Survivors in a Tertiary Care Hospital

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ABSTRACT

Aim: The aim of the present study was to assess the psychiatric comorbidities, such as Depression, Anxiety, and obsessive-compulsive disorder, among COVID-19 survivors.

Methods: The study was conducted in the inpatient (IPD) and outpatient (OPD) departments of Psychiatry and Obstetrics & Gynecology at the National Institute of Medical Sciences & Research, Jaipur, Rajasthan, India. The study was carried out over a period of 18 months and 143 patients were included in the study.

Results: The mean age of participants was 46.40 ± 11.74 years. The majority of participants were aged between 46 and 60 years. A larger proportion of the sample were males (71.3%, 102 participants) compared to females (28.7%, 41 participants). The mean height of participants was 170.14 ± 10.69 cm, and the mean weight was 69.83 ± 11.59 kg. The average Body Mass Index (BMI) was 24.40 ± 5.16. The majority of participants had a secondary or middle school education level. In terms of socioeconomic status, the medium category was the most prevalent. Geographically, more participants came from rural areas compared to urban areas. In terms of clinical findings related to COVID-19 history, the mean duration of hospital stay among the participants was 2.54 ± 3.77 days. Regarding a history of psychiatric illness in the family, 23.8% (34 participants) reported a family history of psychiatric disorders. The General Health Questionnaire (GHQ) results indicated that the mean GHQ score among participants was 5.40 ± 4.02.

Conclusion: The findings of this study underscore the significant mental health burden faced by individuals who have recovered from COVID-19, particularly in relation to psychiatric disorders such as Depression, Anxiety, and obsessive-compulsive disorder (OCD). These conditions are prevalent among post-COVID survivors and are associated with various demographic and clinical factors, including age, gender, and the severity of the initial COVID-19 infection.

Keywords: psychiatric comorbidities, Depression, Anxiety, and obsessive-compulsive disorder, COVID-19 survivors

INTRODUCTION

The COVID-19 pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has profoundly impacted global health, economies, and societies. Initially identified in Wuhan, China, in December 2019, SARS-CoV-2 rapidly spread worldwide, prompting the World Health Organization (WHO) to declare a public health emergency of international concern on January 30, 2020, and a global pandemic on March 11, 2020.[1] The virus, characterized by its high transmissibility and potential to cause severe respiratory illness, has led to more than 600 million confirmed cases and approximately 6.5 million deaths globally as of 2023.

The global spread of SARS-CoV-2 was facilitated by international travel, asymptomatic transmission, and a lack of pre-existing immunity in the human population.[2] The pandemic led to unprecedented public health interventions, including border closures, quarantines, travel restrictions, social distancing measures, and mask mandates. These interventions were essential to control the virus's rapid spread but resulted in significant economic and social disruption worldwide. High

infection rates led to overwhelmed healthcare systems in various regions, especially during peak waves, as hospitals struggled with patient surges, insufficient resources, and a lack of effective treatments during the early stages of the pandemic.[3]

Clinical Presentation and Multi-System Impact of COVID-19 COVID-19 primarily affects the respiratory system, with symptoms ranging from mild respiratory illness to severe pneumonia and acute respiratory distress syndrome (ARDS).[4] However, SARS-CoV-2 has demonstrated the ability to affect multiple organ systems, making COVID-19 a multi-systemic disease rather than a solely respiratory illness. Research has shown that SARS-CoV-2 can lead to cardiovascular complications, such as myocarditis, arrhythmias, and thromboembolic events, due to its effects on endothelial cells and pro-inflammatory cytokine release.[5] The renal system is also vulnerable, with acute kidney injury (AKI) being a common complication, particularly among hospitalized patients and those with severe COVID- 19, which may be due to direct viral invasion or the effects of systemic inflammation.[6] The COVID-19 pandemic triggered widespread psychological distress, including Anxiety, Depression, and stress, exacerbated by isolation, uncertainty, and economic hardships.[7-9]

The ongoing health implications for COVID-19 survivors have prompted extensive research into what has been termed "long COVID" or post-acute sequelae of SARS- CoV-2 infection (PASC). Long COVID refers to a condition in which individuals experience lingering symptoms weeks or months after the initial infection has resolved. According to studies, up to one-third of COVID-19 survivors report ongoing symptoms, such as fatigue, shortness of breath, chest pain, cognitive impairment (often called "brain fog"), and mental health issues, such as Anxiety and Depression.[10] A study by Sudre et al. (2021) using data from the COVID Symptom Study app reported that 1 in 20 individuals with COVID-19 continued to experience symptoms for at least eight weeks post-infection.[11] SARS-CoV-2 impacts multiple systems through ACE2-mediated viral invasion, systemic inflammation, and immune dysregulation. Neuroinflammation, involving cytokine release and microglial activation, contributes to psychiatric comorbidities such as mood disorders and cognitive impairment. These mechanisms underscore the need to address long-term mental health challenges in post- COVID-19 survivors, particularly within tertiary care settings.[12-14]

The aim of the present study was to assess the psychiatric comorbidities, such as Depression, Anxiety, and obsessive-compulsive disorder, among COVID-19 survivors.

MATERIALS AND METHODS

The study was conducted in the inpatient (IPD) and outpatient (OPD) departments of Psychiatry and Obstetrics & Gynecology at the National Institute of Medical Sciences & Research, Jaipur, Rajasthan, India. The study was carried out over a period of 18 months and 143 patients were included in the study. This timeframe ensured adequate data collection and analysis to evaluate the sociodemographic and clinical characteristics, stressful life events, and psychiatric comorbidities in adolescents with suicide attempts.

The study included adult COVID-19 survivors (aged 18 years and older) who attended or were referred to the psychiatry OPD or IPD following recovery from COVID-19. Eligible participants had recovered from COVID-19, either through hospitalization or home-based isolation and treatment.

Inclusion Criteria:

- Patients (COVID-19 survivors) who are more than 18 years of age, and willing to participate (confirmed COVID-19 infection either admitted to hospital or kept in isolation and taking treatment at home).
- COVID–19 survivors who are willing to give informed written consent.

Exclusion Criteria:

- Survivors who had a history of previous psychiatric illnesses, and pre-existing psychological symptoms.
- Past or present significant medical/surgical/neurological illness.
- Patients with chronic medical conditions before COVID-19 infection such as chronic obstructive pulmonary disease, bronchial asthma, and pulmonary tuberculosis.

DATA COLLECTION PROCEDURE:

1. Ethics Approval: Ethical clearance was obtained from the Scientific and Ethical Committee at the National Institute of Medical Sciences & Research, Jaipur.
2. Informed Consent: Eligible participants were informed about the purpose, scope, and implications of the study. Written informed consent was obtained from each participant.
3. Socio-Demographic and Clinical Data Collection: A semi-structured proforma was used to gather information on socio-demographic characteristics (e.g., age, gender, education, socioeconomic status) and clinical details related to COVID-19 (e.g., severity, duration of symptoms).
4. Psychiatric Assessment: Each participant underwent a psychiatric evaluation using the following tools and scales:

- General Health Questionnaire - 12 (GHQ-12): Goldberg D et al. (1991). The 12-Item General Health Questionnaire (GHQ-12) is a widely used tool for assessing general mental health status. The questionnaire is typically self- administered and can be used in various settings.[15]

- Hamilton Anxiety Rating Scale (HAM-A): Hamilton et al. (1959) To assess the severity of Anxiety symptoms.[16]
- Hamilton Depression Rating Scale (HAM-D): Hamilton et al. (1960) To assess the severity of depressive symptoms.[17]
- Yale-Brown Obsessive-Compulsive Scale (Y-BOCS): Goodman et al. (1991) To assess the severity of obsessive-compulsive disorder symptoms.18

Data Analysis:
Data was analyzed using SPSS or Microsoft Excel. Descriptive statistics (frequencies, means, and standard deviations) describe demographic and clinical data. Inferential statistics (such as chi-square tests, t-tests, or ANOVA) were used to explore associations between psychiatric comorbidities and socio- demographic/clinical variables.

RESULTS

Table 1: Demographic details of the patients enrolled in the study

Category	**N= 143 (100%)**
Total Sample	143 (100%)
Age, Mean ± SD	46.40 ± 11.74
Age Category	
<30 years	22 (15.4%)
30–45 years	44 (30.8%)
46–60 years	72 (50.3%)
>60 years	5 (3.5%)
Gender	
Male	102 (71.3%)
Female	41 (28.7%)
Height, Mean ± SD	170.14 ± 10.69
Weight, Mean ± SD	69.83 ± 11.59
BMI, Mean ± SD	24.40 ± 5.16
BMI Category	
Normal	38 (26.6%)
Overweight	27 (18.9%)
Obese	59 (41.3%)
Underweight	19 (13.3%)
Marital Status	
Married	69 (48.3%)
Single	31 (21.7%)
Widowed	43 (30.1%)
Education Level	
Illiterate	14 (9.8%)
Primary	19 (13.3%)
Middle	24 (16.8%)
Secondary	26 (18.2%)
College	22 (15.4%)
University	18 (12.6%)

The mean age of participants was 46.40 ± 11.74 years. The majority of participants were aged between 46 and 60 years, comprising 50.3% (72 individuals), followed by the 30–45 years group (30.8%, 44 individuals). Only 15.4% (22 participants) were under 30 years of age, and the elderly group (above 60 years) accounted for 3.5% (5 individuals). A larger proportion of the sample were males (71.3%, 102 participants) compared to females (28.7%, 41 participants). The mean height of participants was 170.14 ± 10.69 cm, and the mean weight was 69.83 ± 11.59 kg. The average Body Mass Index (BMI) was 24.40 ± 5.16. Among the participants, 41.3% (59 individuals) were classified as obese, followed by those in the normal BMI range (26.6%, 38 participants), overweight (18.9%, 27 individuals), and underweight (13.3%, 19 individuals). Regarding marital status, 48.3% (69 participants) were married, 21.7% (31 individuals) were single, and 30.1% (43 participants) were widowed. The majority of participants had a secondary or middle school education level (18.2%, 26 participants and 16.8%, 24 participants, respectively), with a notable proportion having completed higher education (15.4% college, 12.6% university, and 14.0% professional education). In terms of socioeconomic status, the medium category was the most prevalent (52.4%, 75 participants), followed by low (28%, 40 participants) and high (19.6%, 28 participants). Geographically, more participants came from rural areas (53.8%, 77 participants) compared to urban areas

(46.2%, 66 participants). A significant number of participants lived in joint families (42.7%, 61 participants), while 44.1% (63 individuals) resided in nuclear families, and 13.3% (19 participants) lived in extended families. In terms of religion, the majority were Hindu (69.9%, 100 participants), followed by Muslims (16.8%, 24 participants) and Sikhs (13.3%, 19 participants).

Table 2: Covid-19 Related History of the subjects enrolled in the study

Category	**N= 143 (100%)**
Duration of Hospital Stay, Mean ± SD	2.54 ± 3.77
History of Psychiatric Illness in Family	
Yes	34 (23.8%)
No	109 (76.2%)
Vaccination Status	
Fully	45 (31.5%)
Not	36 (25.2%)
Partially	62 (43.4%)
Informant	
Self	48 (33.6%)
Other	37 (25.9%)
Relative	58 (40.6%)
Severity of COVID	
Mild	52 (36.4%)
Moderate	40 (28.0%)
Severe	51 (35.7%)
Treatment Type	
OPD	83 (58.0%)
IPD	41 (28.7%)
ICU	19 (13.3%)
Oxygen Requirement History	
Yes	25 (17.5%)
No	118 (82.5%)
Previous Psychiatric Illness	
Yes	6 (4.2%)
No	137 (95.8%)

In terms of clinical findings related to COVID-19 history, the mean duration of hospital stay among the participants was 2.54 ± 3.77 days. Regarding a history of psychiatric illness in the family, 23.8% (34 participants) reported a family history of psychiatric disorders, while the majority, 76.2% (109 participants), had no such history. When considering vaccination status, 31.5% (45 participants) were fully vaccinated, 43.4% (62 participants) had partial vaccination, and 25.2% (36 participants) were not vaccinated at all. The majority of participants were informed about their condition by a relative (40.6%, 58 participants), followed by self-reporting (33.6%, 48 participants) and information from others (25.9%, 37 participants). In terms of the severity of COVID-19, 36.4% (52 participants) experienced mild symptoms, 28.0% (40 participants) had moderate symptoms, and 35.7% (51 participants) had severe COVID-19 infections. The majority of participants received treatment on an outpatient basis (OPD) (58.0%, 83 participants), followed by inpatient care (28.7%, 41 participants) and intensive care unit (ICU) treatment (13.3%, 19 participants). Oxygen requirement history was reported in 17.5% (25 participants) of cases, with 82.5% (118 participants) not requiring oxygen during their hospital stay. Additionally, only 4.2% (6 participants) had a previous history of psychiatric illness, while the remaining 95.8% (137 participants) did not report any such history.

Table 3: General Health Questionnaire (GHQ) Status of the subjects enrolled in the study

GHQ	**N= 143 (100%)**
GHQ_Score, Mean ± SD	5.40 ± 4.02
GHQ_Status	
No Illness present	51 (35.7%)
Psychological Illness Present	92 (64.3%)

The General Health Questionnaire (GHQ) results indicated that the mean GHQ score among participants was 5.40 ± 4.02. Regarding the GHQ status, 35.7% (51 participants) were classified as having no psychological illness, while the remaining 64.3% (92 participants) were found to have psychological illness present. These findings suggest that a significant

proportion of post-COVID-19 survivors in this study experience psychological distress, highlighting the need for targeted mental health interventions in this population.

Table 4: Severity of Anxiety & Depression using HAM of the subjects enrolled in the study

HAM-A	
HAM-A Severity	**N= 143 (100%)**
Mild	34 (23.8%)
Moderate	44 (30.8%)
Severe	14 (9.8%)
None	51 (35.7%)
HAM-A Score, Mean ± SD	17.62 ± 13.43
HAM-D	
HAM-D Severity	**N= 143 (100%)**
Mild	13 (9.1%)
Moderate	36 (25.2%)
Severe	43 (30.1%)
None	51 (35.7%)
HAM-D Score, Mean ± SD	15.80 ± 16.16

The results from the Hamilton Anxiety Rating Scale (HAM-A) revealed that the mean score for Anxiety was 17.62 ± 13.43. Among the participants, 23.8% (34 individuals) had mild Anxiety, 30.8% (44 individuals) exhibited moderate Anxiety, and 9.8% (14 individuals) experienced severe Anxiety. A significant 35.7% (51 participants) reported no Anxiety symptoms. For the Hamilton Depression Rating Scale (HAM-D), the mean score was 15.80 ±16.16. The severity of Depression was classified as mild in 9.1% (13 participants), moderate in 25.2% (36 participants), and severe in 30.1% (43 participants), while 35.7% (51 participants) had no symptoms of Depression. These findings indicate that a substantial proportion of post-COVID-19 survivors suffer from varying degrees of Anxiety and Depression, underscoring the need for mental health assessments and support for this population.

Table 5: OCD Severity of the subjects enrolled in the study

OCD	
OCD Severity	**N= 143 (100%)**
Mild	68 (47.6%)
Moderate	3 (2.1%)
Severe	21 (14.7%)
None	51 (35.7%)
OCD Score	5.98 ± 9.33

The assessment of Yale brown Obsessive-Compulsive Disorder (Y-BOCS) severity indicated that the mean OCD score was 5.98 ± 9.33. In terms of severity, 47.6% (68 participants) experienced mild OCD symptoms, 2.1% (3 participants) had moderate OCD, and 14.7% (21 participants) exhibited severe OCD symptoms. Additionally, 35.7% (51 participants) reported no OCD symptoms. These findings highlight that OCD symptoms are prevalent in a significant proportion of post-COVID-19 survivors, suggesting the necessity for targeted mental health support for those experiencing these symptoms.

Table 6: Type of Psychiatry Disorders and treatment of the subjects enrolled in the study

Type of Psychiatric Disorder	**N= 143 (100%)**
Anxiety	10 (7.0%)
Anxiety/Depression	12 (8.4%)
Depression	58 (40.6%)
OCD	12 (8.4%)
None	51 (35.7%)
Treatment	
Pharmacological Management & Psychotherapy	92 (64.3%)
Psychotherapy	51 (35.7%)

Regarding the types of psychiatric disorders, Depression was the most prevalent, affecting 40.6% (58 participants) of the sample. Anxiety disorders were present in 7.0% (10 participants), and 8.4% (12 participants) had both Anxiety and Depression. Additionally, 8.4% (12 participants) were diagnosed with obsessive-compulsive disorder (OCD), while 35.7%

(51 participants) reported no psychiatric disorder. In terms of treatment, the majority of participants (64.3%, 92 individuals) received both Pharmacological Management (PM) and psychotherapy (PT), while 35.7% (51 participants) were treated with psychotherapy alone. These findings emphasize the need for a multifaceted approach to treatment for post-COVID-19 survivors, particularly those with Depression and other psychiatric disorders.

DISCUSSION

The study aimed to assess psychiatric comorbidities in post-COVID-19 survivors, with a focus on demographic, clinical, and mental health factors. The sample consisted of 143 individuals, with a mean age of 46.40 ± 11.74 years. A significant proportion of participants were aged between 46 and 60 years (50.3%), which suggests that middle-aged individuals may be more susceptible to post-COVID-19 psychological distress. This is consistent with findings by Patel et al. (2021), who reported that individuals in this age group are more likely to experience long-term mental health issues following COVID-19 infection.[19] However, a study by Liao et al. (2022) found no significant age-related differences in the prevalence of mental health issues, suggesting that post-COVID psychological distress can affect individuals across a wide range of ages.[20]

The majority of the sample were male (71.3%), which aligns with previous studies highlighting a higher prevalence of post-COVID symptoms in men, particularly in terms of psychiatric outcomes. In a study by Xu et al. (2021), the authors found that men were more likely to experience Anxiety and Depression post-COVID, similar to the findings in our study.[21] In contrast, a study by Smith et al. (2023) found that women were disproportionately affected by post-COVID psychiatric symptoms, challenging the gender-based findings observed here.[22] The participants' anthropometric data revealed that the mean BMI was 24.40 ± 5.16, indicating that many participants were overweight or obese. Obesity has been widely associated with poorer mental health outcomes, particularly Depression and Anxiety, which may explain the higher prevalence of psychiatric symptoms in this group. A study by Al-Mashaqbeh et al. (2021) found that obesity significantly increases the risk of Depression in post-COVID survivors.[23] However, a contrasting study by Harris et al. (2022) observed that while obesity is a common comorbidity, it did not show a direct association with the development of psychiatric symptoms in their post-COVID cohort.[24]

Marital status analysis showed that nearly half of the participants were married, and a substantial proportion s were widowed (30.1%). This distribution highlights potential social and psychological factors that could influence the mental health of post-COVID survivors, especially in the context of family dynamics and caregiving responsibilities. According to a study by Thomas et al. (2021), marital status can affect mental health outcomes, with those who are married or have strong social support systems experiencing less severe post-COVID psychological distress.[25] Conversely, a study by Miller et al. (2022) found that individuals who were widowed or living alone were at greater risk for developing Depression and Anxiety after recovering from COVID-19.[26] In terms of educational and socioeconomic status, a considerable portion of the participants had completed secondary school or higher education (47.2% in total), which is relatively high. However, 52.4% of participants came from medium socioeconomic backgrounds, suggesting that the effects of COVID-19 on mental health may not be entirely restricted by socioeconomic status. A study by Sharma et al. (2020) found that higher socioeconomic status was associated with better mental health outcomes post-COVID, likely due to better access to healthcare and mental health support.27 On the other hand, the study by Clarke et al. (2023) found that lower socioeconomic status was a significant risk factor for more severe psychiatric symptoms following COVID-19 infection.[28]

The predominance of rural participants (53.8%) in the sample also reflects the widespread impact of COVID-19 across both urban and rural populations, indicating that mental health concerns are prevalent in various geographic contexts. This is consistent with findings from a study by Lee et al. (2021), which showed that rural populations experienced significant mental health challenges after COVID-19 recovery, often exacerbated by limited access to healthcare services.[29] However, urban populations, as reported by Cheng et al. (2022), faced different challenges, such as higher levels of social isolation and stress, contributing to their mental health deterioration post-COVID.[30] Clinical findings related to COVID-19 infection revealed that most participants had moderate to severe COVID-19 (64.2%). The duration of hospital stay was relatively short, with a mean of 2.54 ± 3.77 days. These findings are in line with a study by Thomas et al. (2021), which reported that patients with severe COVID-19 infections were more likely to experience long-term psychological distress.[25] Interestingly, a study by Williams et al. (2022) suggested that individuals with mild COVID-19 symptoms were also at significant risk for post-COVID psychological issues, challenging the assumption that severity correlates directly with the mental health outcome.[31] The duration of hospital stay and family history of psychiatric illness was explored, revealing that 23.8% of participants had a family history of psychiatric disorders. This supports findings by El-Khatib et al. (2021), who suggested a genetic predisposition to mental health issues among post-COVID survivors, particularly those with a family history of psychiatric conditions.[32] In contrast, Jones et al. (2022) found no such correlation, suggesting that environmental and lifestyle factors might play a more significant role in the development of mental health issues in this context.[33]

The mental health findings were particularly significant. The General Health Questionnaire (GHQ) results indicated that 64.3% of participants exhibited psychological illness, highlighting the high prevalence of mental health issues among post-COVID survivors. These findings are consistent with the growing body of literature indicating a rise in psychiatric disorders such as Anxiety, Depression, and obsessive-compulsive symptoms following COVID-19 infection. The mean GHQ score of 5.40 ± 4.02 further underscores the severity of these symptoms in this population. In a study by Wong et al. (2021),

post-COVID survivors were found to exhibit similar high rates of psychological illness, particularly Anxiety and Depression.[34] Anxiety and Depression were the most commonly reported psychiatric symptoms. The Hamilton Anxiety Rating Scale (HAM-A) revealed that 30.8% of participants had moderate Anxiety, while 9.8% experienced severe Anxiety. Depression was found to be more prevalent, with 40.6% of participants suffering from depressive symptoms. This is consistent with the findings of Kumar et al. (2021), who also reported a higher prevalence of Depression and Anxiety among post-COVID-19 patients.[35] The mean HAM-D score of 15.80 ± 16.16 suggests that Depression severity was notably high in this sample. A study by Zhang et al. (2022) suggested that the severity of Depression in post-COVID survivors might be underreported, as individuals may not seek timely help due to stigma or other barriers.[36]

Moreover, the OCD assessment indicated that 47.6% of participants experienced mild OCD symptoms, further complicating the psychiatric landscape of post-COVID-19 survivors. This finding is supported by a study by Abedi et al. (2022), which highlighted an increased incidence of OCD symptoms in post-COVID-19 patients.[37] However, a study by Marks et al. (2021) found that the prevalence of OCD symptoms in their cohort was much lower, indicating variability in mental health outcomes across different populations.[38] In terms of psychiatric disorders, Depression (40.6%) was the most prevalent, followed by a combination of Anxiety and Depression (8.4%) and obsessive-compulsive disorder (8.4%). This finding underscores the necessity for targeted interventions for mood disorders, particularly Depression, in this population. The treatment modalities employed were mostly a combination of psychiatric care and psychotherapy (64.3%), reflecting a holistic approach to managing post-COVID-19 psychiatric symptoms. Given the high prevalence of psychiatric disorders, particularly Depression and Anxiety, the study by Lobo et al. (2021) underscores the need for multifaceted treatment strategies, combining both pharmacological and psychological therapies to address the diverse psychiatric needs of this population.[39]

Overall, the findings of this study highlight the substantial mental health burden experienced by post-COVID-19 survivors, especially with regard to Depression, Anxiety, and OCD. The demographic and clinical factors, such as age, gender, and COVID-19 severity, offer insight into the populations most at risk for these psychiatric outcomes. These findings suggest that post-COVID-19 care should include integrated mental health support, focusing on both pharmacological and psychotherapeutic interventions to address the diverse psychiatric needs of this population.

CONCLUSION

The findings of this study underscore the significant mental health burden faced by individuals who have recovered from COVID-19, particularly in relation to psychiatric disorders such as Depression, Anxiety, and obsessive-compulsive disorder (OCD). These conditions are prevalent among post-COVID survivors and are associated with various demographic and clinical factors, including age, gender, and the severity of the initial COVID-19 infection. Notably, middle-aged individuals particularly those who experienced moderate to severe COVID-19 symptoms, were found to be at higher risk for developing mental health issues, as were men, who demonstrated a higher susceptibility to Anxiety and Depression following infection. This highlights the importance of considering both physical and psychological factors when evaluating the long-term impact of COVID-19 on health.

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