

# A Cross-sectional Questionnaire-based Survey of Difficulties Faced Post-COVID-19 among Patients Treated at a COVID Jumbo Facility in Mumbai Region

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## Abstract

**Background and Objectives:** Persistent symptoms after COVID-19 infections are emerging as a new challenge to healthcare workers of which there is sparse documentation in the literature. The objective of this study is to evaluate the persistent symptoms and the attitude of the individuals who have recovered from COVID-19 infection.

**Methodology:** 474 fully recovered individuals who were hospitalized with mild or moderate COVID infection were included in the study. A questionnaire-based analysis to determine the persistent symptoms and their attitude was conducted during the follow-up evaluation at a jumbo COVID facility of Mumbai metropolitan region. The participant response was electronically recorded and qualitatively analyzed.

**Results and Discussion:** Among the study participants, it was found that around 41% presented with at least one persistent symptom during the follow-up. The predominant symptoms that persisted are fatigue (41.6%), cough (16.9%), burning in retrosternal area (11%), and body ache (9.9%). Burning sensation in the retrosternal area is a new symptom which was not observed in the participants at the time of hospitalization.

**Conclusion:** Based on the study finding of the persistent symptoms in post-COVID recovered patients, a multi-disciplinary clinical approach is needed to manage the physical symptoms as well as the psychological aspect of the individuals.

**Key words:** COVID-19, Long COVID, Persistent symptoms

## INTRODUCTION

Severe acute respiratory syndrome coronavirus-2 (SARS-COV-2) is a novel coronavirus infection mainly affecting the respiratory system, which was considered as the primary cause for the outbreak of COVID-19 over the world.<sup>[1]</sup> Since its initial isolation in December 2019 from Wuhan, China the infection has spread to majority of the countries and infected millions worldwide. The term “coronavirus” is derived from the Latin word CORONA

meaning “crown” as its structure resembles a crown with multiple spikes under an electron microscope.<sup>[2]</sup> SARS-COV-2 is an enveloped positive sense single-stranded RNA virus with multiple spikes on the surface having a genome size of approximately 26–32 kilobases and belonging to the genera beta coronavirus.<sup>[3]</sup>

As per the latest statistics of the World Health Organization (WHO), the number of infected people in the world is close to 186 million with over 30 million infected in India.<sup>[4]</sup> The death count of individuals affected by COVID-19 has crossed 4 million.<sup>[4]</sup> The mortality rate of SARS-COV-2 is lesser compared to the previous infections of SARS and Middle East respiratory syndrome but a high human to human transmission rate.<sup>[5]</sup> The incubation period for COVID-19 infection is typically 1–14 days which may extend up to 24 days.<sup>[6]</sup> Most human cases of COVID-19 are mild with 5% of the infected patients developing

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severe symptoms that requires mechanical ventilation and intensive care hospitalization. The most common symptoms are fever, dry cough, shortness of breath, dysosmia, and dysgeusia.<sup>[7]</sup> In addition, the gastrointestinal system has been found to be affected in many patients.<sup>[8]</sup> The clinical symptoms of COVID-19 are broadly classified into three classes. The most common are fever, dry cough, and tiredness. Less common symptoms are body aches, sore throat, diarrhea, loss of taste or smell and severe symptoms are difficulty in breathing or shortness of breath, chest pain or pressure, and loss of speech or movement.<sup>[9]</sup>

While most of the patients recover from the COVID-19 infection, there are few who continue to experience post-COVID conditions. Post-COVID conditions are a wide range of new, returning or on-going health problems people can experience four or more weeks after being first infected with COVID-19. These post-COVID conditions may also be known as long COVID, long-haul COVID, post-acute COVID (symptoms beyond 3–4 weeks), long-term effects of COVID or chronic COVID (symptoms beyond 12 weeks).<sup>[10]</sup> The symptoms of long COVID can be encountered not only in patients with severe COVID-19 infection, but also in patients who showed mild symptoms and did not required hospitalization. These patients may experience an array of persistent symptoms that may include cough, breathlessness, fever, sore throat, chest pain, palpitations, and multi-organ involvement among others.<sup>[11]</sup>

At present, there is minimal data concerning the occurrence of post-COVID symptoms and hence it is difficult to understand the long-term health consequences of COVID-19 infection. Obtaining and reporting data related to the occurrence of post-COVID symptoms from hospitalized as well as non-hospitalized patients is the need of the hour that may help us to understand the full spectrum of COVID-19 infection and also aid in framing appropriate treatment and preventive strategies. Thus, the aim of the present study is to evaluate the persistent post-COVID symptoms in fully recovered hospitalized patients; the mental status of patients post-COVID recovery; and the probable application of some social policies for the betterment of their post-COVID lifestyle.

## METHODOLOGY

A cross-sectional questionnaire-based survey was conducted at a COVID-19 care facility in Mumbai district to identify the post-COVID complications of COVID-19 infected individuals. The center was established at the time of emergence of first wave of COVID-19 during May 2020 with the objective of treating COVID-19 infected patients of all severity. In addition, the center also had a

dedicated service available for follow-up evaluation of treated patients. For the study, a structured questionnaire was administered on the eligible participants and their responses was recorded in electronic format. Questions were focused on collecting demographic data, symptoms with which the patient presented at the time of diagnosis of COVID-19, the persistent symptoms and others during the follow-up examination of recovered patients. Inclusion criteria included those patients who were initially diagnosed with COVID-19 infection based on the symptoms as per the WHO criteria and positive reverse transcription polymerase chain reaction test for SARS-COV-2 infection and were categorized as mild and/or moderate infection that required hospitalization. On admission, the clinical symptoms were recorded along with the lab investigations, as necessary. The patients were discharged on completion of their quarantine period as well as other criteria as per the WHO guidelines for discharge of patients on completion of treatment. After discharge, these patients were then recalled for a follow-up evaluation after 8 weeks. At the time of follow-up evaluation, the study participants were selected by random sampling irrespective of age, gender, and socio-economic status. A total of 474 eligible participants were enrolled in the study. The study participants were provided with all information regarding the study and informed consent was obtained from them before providing the questionnaire. The study participants were then asked to respond to the questions as provided in the questionnaire that were stored anonymously in an electronic mode. Exclusion criteria included those patients who were admitted with severe symptoms during first visit that required intensive care, as well as the participants who provided incomplete questionnaire. The obtained data were then tabulated and qualitatively analysed for the responses obtained from the participants.

## RESULTS

The study was performed during the time frame of 4 months (December 2020 to March 2021). A total of 474 participants responded to the questionnaire to evaluate the symptoms and the attitude of individuals post-recovery from COVID-19 infection. The median age of the participants was 51 years (Range: Min- 7 years; Max- 80 years) and included 66.9% males ( $n = 317$ ) and 33.1% ( $n = 157$ ) were females. Majority of the participants required hospitalization for treatment and the common symptoms encountered at the time of admission included fever ( $n = 457$ ), sore throat ( $n = 372$ ), cough ( $n = 344$ ), breathlessness ( $n = 345$ ), and fatigue ( $n = 130$ ) [Table 1]. Less common symptoms included nausea, vomiting, loss of taste, and abdominal pain among others.

Data analysis of the respondents at the time of follow-up revealed that around 41% of the participants had one

**Table 1: Demographic and clinical characteristics of the study participants (n=474)**

Characteristics	Value
Age	
Median	51
Range	7 to 80
Sex (%)	
Male	66.9 (n=317)
Female	33.1 (n=157)
Symptoms at the time of diagnosis (%)	
Cough	344 (72.6)
Sore throat	372 (78.5)
Fever	457 (96.4)
Dyspnea/Breathlessness	345 (72.8)
Fatigue	130 (27.45)
Nausea	37 (7.8)
Vomiting	32 (6.8)
Abdominal pain	25 (5.3)
Loss of taste	17 (3.6)
Headache	17 (3.6)
Chest Pain	0
Lack of appetite	0
Loose motions	10 (2.1)
Joint Pain	4 (0.8)
Bodyache	13 (2.7)
Any other (cold)	3 (0.6)
Hospitalization required (%)	
Yes	98.7
No	1.3
Home quarantine (%)	
Yes	1.3
No	98.7
Persistent symptoms at the time of follow up (%)	
Cough	80 (16.9)
Sore throat	19 (4)
Fever	10 (2.1)
Dyspnea/Breathlessness	12 (2.5)
Fatigue	197 (41.6)
Nausea	2 (0.4)
Vomiting	0
Abdominal pain	3 (0.6)
Loss of taste	2 (0.4)
Headache	5 (1.1)
Chest Pain	3 (0.6)
Lack of appetite	2 (0.4)
Loose motions	4 (0.8)
Burning in retrosternal area	53 (11.2)
Joint Pain	17 (3.6)
Bodyache	47 (9.9)
Any other	Remaining
Pain/discomfort preventing from daily work (%)	
Not at all	18.8
A little	81.3
Moderate	-----
Very much	-----
Extreme amount	-----
Quality of life post-COVID-19 recovery (%)	
Very poor	-----
Poor	-----
Good	52.1
Very good	-----
Neither poor nor good	46.8

or more symptoms that persisted even after 8 weeks of discharge. The predominant symptoms that persisted are fatigue (41.6%), cough (16.9%), burning in retrosternal area (11%), and body ache (9.9%) [Table 2]. Burning sensation in the retrosternal area is a new symptom which was not observed in the participants at the time of hospitalization.

The data obtained from the study suggested the long-term persistence of COVID-19 symptoms. In addition, the discomfort associated with the persistent symptoms was hindering the quality of life and work output to some extent although it did not have any severe consequences.

## DISCUSSION

This qualitative cross-sectional study was conducted among participants to evaluate the persistent symptoms and the general attitude of 474 study participants recovered from COVID-19 infection which revealed certain important findings. Most of the participants included in the study required hospitalization but not intensive care and were diagnosed with mild to moderate infection. The predominant symptoms at the time of hospitalization included fever, sore throat, cough, breathlessness, and fatigue. The patients were discharged a per the WHO criteria for patient discharge and were advised follow-up evaluation. During the follow-up examination and questionnaire survey, it was observed that around 41% of the study participants had at least one persistent symptom. The primary persistent symptoms were fatigue, cough, body ache, and burning in retrosternal area. This finding was in accordance with the literature data available till date. It is also noteworthy that symptoms such as burning

**Table 2: COVID-19 related symptoms at hospitalization and follow-up period**

Symptoms	Baseline, Hospitalization (%)	Symptoms reported at the follow-up period after recovery (%)
Cough	344 (72.6)	80 (16.9)
Sore throat	372 (78.5)	19 (4)
Fever	457 (96.4)	10 (2.1)
Dyspnoea/Breathlessness	345 (72.8)	12 (2.5)
Fatigue	130 (27.45)	197 (41.6)
Nausea	37 (7.8)	2 (0.4)
Vomiting	32 (6.8)	0
Abdominal pain	25 (5.3)	3 (0.6)
Loss of taste	17 (3.6)	2 (0.4)
Headache	17 (3.6)	5 (1.1)
Chest Pain	0	3 (0.6)
Lack of appetite	0	2 (0.4)
Loose motions	10 (2.1)	4 (0.8)
Burning in retrosternal area	0	53 (11.2)
Joint Pain	4 (0.8)	17 (3.6)
Body ache	13 (2.7)	47 (9.9)
Any other (cold)	3 (0.6)	Remaining

sensation in retro-sternal area were present at follow-up evaluation but were not observed in any of the participants at the time of hospitalization during the initial diagnosis.

A study performed by Leth *et al.* (2021) has found persistent symptoms such as fatigue, dyspnea, cough, chemosensory dysfunction, and headache in 96% of the participants even after 12-week follow-up.<sup>[12]</sup> Another study by Carfi *et al.* (2020) found that only 13% of the study population were free of any symptoms after 60 days follow-up and the symptoms were similar to the findings of our study.<sup>[11]</sup> Based on the presence of the persistent symptoms; in our study, it was noted that these symptoms originated from multiple organ systems. The involvement of multiple organ system could possibly reflect the wide distribution of the angiotensin-converting enzyme 2 in different tissues such as the epithelium of the intestine, kidney, and blood vessels among others.<sup>[13]</sup> Further it is possible that the inflammatory response which is accentuated secondary to damage of the epithelial-endothelial barrier due to acceleration of the viral replication could contribute to the wide range of persistent symptoms in patients recovering from COVID-19.<sup>[12]</sup>

Based on the findings of the present study as well as the literature data, it is evident that symptoms related to COVID-19 are known to persist even after the patient recovery from the infection which may have huge health and socio-economic consequences. However, there is lack of adequate knowledge regarding the pathogenesis or the organs involved in persistent COVID-19 symptoms. To provide adequate care for these individuals requires a dedicated, multi-disciplinary clinical approach to reduce the long-term consequences of the illness and also to improve the post recovery quality of life. The need of the hour is to perform more such studies involving large study population which should involve both hospitalized and non-hospitalized individuals, the data obtained from which can be used to frame appropriate guidelines for managing post-COVID symptoms. Further, specialized centers should be set up for investigation and management by adequately trained health care workers.<sup>[14]</sup>

In addition to the assessment of the persistent symptoms, this study also evaluated the attitude of the recovered COVID-19 individuals. It was observed that while many of the recovered patients graded that the quality of life was good, around 47% of the study participants were not sure about the same. On further insistence regarding the question on quality of life, many of them mentioned that they were simply happy to be alive. During the personal interaction with the participants, majority of them showed anxiety related to the recovery and quality of life as well as fear of recurrence of infection. Furthermore, stress related to losing out on jobs or family was also evident in some of the participants.

Cumulatively, it has been observed that the individuals who have recovered from COVID-19 not only encounter persistent physical symptoms, but also show varying levels of psychological trauma. Instances of post-traumatic stress disorders, depression and anxiety have been reported to occur especially in patients with severe infection. However, not much studies have focused on the psychological aspect of COVID-19 recovered individuals.

## CONCLUSION

The present study is one of the few documentations of a large sample size from a single center dedicated for COVID-19 management. From the study, it has been observed that the most common post-COVID symptom was fatigue (41.6%) which they encountered during routine work followed by persistent cough, burning in retrosternal area and body ache. Anxiety pertaining to quality of life and family was observed in many participants. Overall, there is an urgent need for longitudinal, multi-national and multi-site studies focusing on both the physical symptoms and mental status. Further, exclusive centers should be set up which caters to the management of persistent symptoms and also provide psychological counseling to those needful of the same. A holistic management approach that includes healthy diet, intake of nutritional supplements and having a right balance between the physical and mental activities could be helpful.

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