

## Observational Telephonic Survey-Based Research to Assess Six-Month Morbidity and Mortality in Patients after Recovery from COVID-19

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Conflict of interest: Nil

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### Abstract

**Aim:** The aim of this study was to identify the proportion of COVID-19 patients who died due to any cause within 6 months of discharge from our tertiary COVID-19-care hospital.

**Methods:** All the adult patients (age  $\geq 18$  years) who had been discharged from Banaras Hindu University in Varanasi, Uttar Pradesh, India. after initial hospitalization for COVID-19 was included. After obtaining ethical committee approval, we embarked upon this observational telephonic survey-based study. Clinical and laboratory data of hospitalization for COVID-19 were retrieved from the medical records department of our hospital.

**Results:** 30 patients (15%) were still symptomatic with complaints of either cough dyspnea, or fatigue. Dyspnea or breathing difficulties were noted to be the most common symptoms seen in 7% of total responders, followed by fatigue in 6%, and cough was noted in 5%. Some patients reported sleep disturbances (4%), and headaches (3%). Of all the patients who responded, 16 patients (8%) required expert medical consultation for these symptoms. 18 patients out of the 200 (9%) required re-hospitalization for post-COVID-19 complications within 6 months of discharge. A total of 4 patients (2%) succumbed within 6 months of their discharge from our hospital. Most of the patients who had recovered after a mild infection, remained symptom-free (asymptomatic) (70% vs 40%,  $p < 0.00001$ ). Patients with moderate COVID-19 illness were more symptomatic (50% vs 26.48%,  $p < 0.00001$ ) in the 6 months after discharge. Analyzing the comorbidities present in patients who had been discharged, we found that no particular comorbidity specifically influences whether a patient would remain symptomatic or asymptomatic. However, patients who had received oxygen therapy during their stay were more symptomatic post-discharge than those that did not need any oxygen ( $p < 0.005$ ).

**Conclusion:** A significant proportion of patients had persistent post-COVID-19 symptoms after discharge from the hospital in our study. Breathing difficulty was the most common symptom noted, closely followed by fatigue. We did not find any significant correlation between any specific comorbidity or laboratory value that could predict the persistence of the COVID-19 symptoms after discharge.

**Keywords:** Hospitalization, Mortality, Post-COVID-19, Symptom

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## Introduction

Coronavirus disease 2019 (COVID-19) has had devastating consequences on the global population. In terms of directly measured outcomes, by August 2021, COVID-19 has resulted in more than 4.2 million direct deaths worldwide, and more than 600,000 direct deaths in the United States alone. [1] Millions of people globally have recovered from the illness, and there has been significant interest into the impacts of a COVID-19 infection on patients after the patient has recovered. Post-acute sequelae of COVID-19 are not well understood. For some patients, the post-acute complications can affect multiple organ systems and persist for many months affecting quality of life. [2-5] Severe complications like post-acute thrombosis, respiratory failure, and cardiac and vascular damage may increase the likelihood of future morbidity and mortality in recovered COVID-19 patients. [6-8] The data from cohort studies investigating these long-term complications post COVID-19 infection is quite limited, and studies mainly focus on complications leading to re-admission rather than post-acute complications. [9,10] One study suggested that COVID-19 infection carries an increased 6-month mortality risk. [11]

The concept of long COVID-19 is quickly gaining cognizance because not only do patients tend to have prolonged or persistent symptoms even after testing negative for COVID-19 but also because rehospitalizations and deaths due to post-COVID complications continue to occur. Even though the COVID-19 pandemic continues to rage on, the death rates due to this disease have decreased significantly in most parts of the world. Not many studies, however, have investigated the fate of patients who have been discharged, including the pattern of hospital readmissions after initial COVID-19 hospitalization. [12,13]

A recent study focusing on hospitalizations for post-acute sequelae of COVID-19 suggested that severe COVID-19 (defined as a COVID-19 hospitalization) confers a greater risk of downstream hospitalization than either COVID-19 negative patients or even mild COVID-19. [14] It is unclear, however, whether a severe COVID-19 infection places patients at a greater 12-month mortality risk beyond the initial episode of infection. Moreover, little research has focused on post-acute COVID-19 sequelae for younger vs. older patients.

The aim of this study was to identify the proportion of COVID-19 patients who died due to any cause within 6 months of discharge from our tertiary COVID-19-care hospital.

## Materials and Methods

All the adult patients (age  $\geq 18$  years) who had been discharged from Banaras Hindu University in Varanasi, Uttar Pradesh, India after initial hospitalization for COVID-19 was included. After obtaining ethical committee approval, we embarked upon this observational telephonic survey-based study. Clinical and laboratory data of hospitalization for COVID-19 were retrieved from the medical records department of our hospital. Patients less than 18 years, pregnant women, and individuals with missing phone numbers or clinical details were excluded. An interview was scheduled at a time convenient to the patient and or relative and all questions were then asked as per the protocol of this study. Patients or their attendants were telephonically called for those discharged.

Oral consent was obtained for a telephonic survey after explaining the aims and objectives of the call. The data collected during telephonic interviews and clinical details of COVID-19 hospitalization retrieved from medical record department

(MRD) were used for analysis. A questionnaire was designed to have only closed-ended answers that include post-COVID-19 symptoms, history of post-COVID-19 hospitalizations, and any mortality. Pretesting of the questionnaire was done, and supervised calls were made before the beginning of actual data collection.

### Operational Definitions

- Symptomatic: Patients who continued to have at least one post-COVID-19 symptom persisting from the time of discharge till the time of interview.
- Asymptomatic: Patients who did not have any post-COVID-19 symptoms for at least the last 4 weeks.
- Post-COVID-19 symptoms: Dyspnea, cough, and fatigue.

### Questionnaire

Q1. Do you have any of the following symptoms: Cough, dyspnea, and fatigue?

– Yes/No (Which of the following?)

Q2. Do you have a symptom not mentioned above?

– Yes/No (Which symptom? Headache, Insomnia, etc.?)

Q3. Did you require expert medical consultation for post-COVID-19 symptoms?

– Yes/No

Q4. Did you require re-hospitalization at any hospital, after recovery from COVID-19?

– Yes/No

Q5. Is the patient discharged from hospital still surviving?

– Yes/No

Q6. If he has succumbed, then what time (in months) after discharge did he succumb?

– A number

### Statistical Analysis

Statistical analysis was done using OpenEpi or statistical procedures for social service (SPSS) software, version 20. Most of the data were dichotomous categorical variables which were expressed as percentages. Non-parametric tests were applied to them. The continuous data were expressed in mean and standard deviation. Chi-squared test analysis was also used for categorical variables and t-tests were used for the comparison of continuous variables. The variables after suitable statistical analysis with  $p < 0.05$  have been considered as statistically significant for the study.

### Results

A total of 756 patients were admitted to our hospital during the study period. Out of these, 520 patients were discharged and included in our study. The remaining 236 patients succumbed during hospitalization itself. Out of 520 patients, we were able to connect with only 200 patients. In the remaining 320 patients, either an incorrect phone number had been provided or their phones were unreachable despite more than three attempts. Some patients also refused consent to participate in the survey.

**Table 1: Baseline characteristics of study patients**

Variables	N=200	%
Male:Female	160:40	80:20
Asymptomatic	156	78
Symptomatic	30	15
Dyspnea	14	7
Cough	10	5
Fatigue	12	6
Sleep disturbances	8	4

Headache	6	3
Required medical consultation	16	8
Required hospitalization	18	9
Post-COVID-19 deaths	4	2

30 patients (15%) were still symptomatic with complaints of either cough dyspnea, or fatigue. Dyspnea or breathing difficulties were noted to be the most common symptoms seen in 7% of total responders, followed by fatigue in 6%, and cough was noted in 5%. Some patients reported sleep disturbances (4%), and headaches (3%). Of all the patients who

responded, 16 patients (8%) required expert medical consultation for these symptoms. 18 patients out of the 200 (9%) required re-hospitalization for post-COVID-19 complications within 6 months of discharge. A total of 4 patients (2%) succumbed within 6 months of their discharge from our hospital.

**Table 2: Comparison of post-COVID-19 symptomatic and asymptomatic patients**

	Symptomatic (n = 30)	Asymptomatic (n = 170)	p-value
Age	48.24 ± 14.6	47.93 ± 15.5	0.765
Male %	24 (80)	130 (76.48)	0.890
COVID severity			
Mild	12 (40)	119 (70)	<0.00001
Moderate	15 (50)	45 (26.48)	<0.00001
Severe	3 (10)	6 (3.52)	0.997
Comorbidity			
DM	8 (26.66)	50 (29.41)	0.678
HT	9 (30)	42 (24.70)	0.556
CAD	1 (3.34)	10 (5.88)	0.876
CKD	–	4 (2.35)	
COAD	1 (3.34)	4 (2.35)	0.987
Treatment related			
Oxygen supplementatin	17 (56.66)	60 (35.30)	<0.0001
Ward	27 (90)	150 (88.23)	0.654
ICU requirement	2 (6.66)	20 (11.76)	0.980
Duration of hospitalization (days)	11.39 ± 5.75	11.55 ± 5.70	0.567

Most of the patients who had recovered after a mild infection, remained symptom-free (asymptomatic) (70% vs 40%,  $p < 0.00001$ ). Patients with moderate COVID-19 illness were more symptomatic (50% vs 26.48%,  $p < 0.00001$ ) in the 6 months after discharge. Analyzing the comorbidities present in patients who had been discharged, we found that no particular comorbidity specifically influences whether a patient would remain

symptomatic or asymptomatic. However, patients who had received oxygen therapy during their stay were more symptomatic post-discharge than those that did not need any oxygen ( $p < 0.005$ ).

### Discussion

With the world still battling coronavirus attacks, the number of patients who have survived severe COVID-19 is also increasing. These patients, however,

continue to battle with many symptoms of the illness, long after they have clinically tested negative for the disease. They are called as long-haulers. In the days to come, it will be an important challenge to manage these cases simply because of the huge numbers. coronavirus disease-2019 sequelae may vary from mild symptoms such as nonspecific fatigue and body aches to severe forms requiring long-term oxygen therapy and even lung transplantation due to lung fibrosis. A significant number of patients are reporting cardiac abnormalities and strokes leading to marked impairment in the quality of life (QoL). Studies have reported that around 70–80% of patients declared COVID-19 free and recovered from the acute crisis, still present with the persistence of at least one symptom. [12,13]

30 patients (15%) were still symptomatic with complaints of either cough dyspnea, or fatigue. Dyspnea or breathing difficulties were noted to be the most common symptoms seen in 7% of total responders, followed by fatigue in 6%, and cough was noted in 5%. Some patients reported sleep disturbances (4%), and headaches (3%). [14] Of all the patients who responded, 16 patients (8%) required expert medical consultation for these symptoms. 18 patients out of the 200 (9%) required re-hospitalization for post-COVID-19 complications within 6 months of discharge. A total of 4 patients (2%) succumbed within 6 months of their discharge from our hospital. Huang et al. [15] have described the clinical follow-up for 6 months of 1,733 adult patients discharged from their hospital after COVID-19. They have reported a much higher proportion of patients 76% (1,265 of 1,655) who complained of at least one persistent symptom, as compared to our study figures of 17.21%. They noted that fatigue or muscle weakness was the most frequently reported symptom (63%). In our subset, fatigue was reported in smaller

numbers as compared to dyspnea. Another North Indian study including more than 1000 patients with a follow-up period of at least 3 months showed myalgia (10.9%), fatigue (5.5%), shortness of breath (6.1%), and cough (2.1%) as the common symptoms. [16] The higher prevalence of dyspnea in our study could be due to a higher prevalence of underlying comorbidities such as chronic respiratory disorder, physical deconditioning, and more sedentary life. Post-COVID-19 symptoms are not only limited to severe COVID-19 but also limited to mild disease. We have found a persistence of symptoms such as fatigue and cough in almost one-third of patients who recovered from mild COVID-19 a month back. [17]

The fact that the proportion of people who died ( $n = 4$ ) is very close to the proportion of people who were re-hospitalized ( $n = 18$ ), as noted in our study, bears testimony to this unfortunate fact. The number of hospitalized patients should have been much higher than those that succumbed. In Bihar, the eastern state of India, it was exceedingly difficult to get beds for post-COVID-19 care once declared COVID-19 negative. This is because most private nursing homes and small hospitals had been closed due to the nationwide shutdown as well as the fear and paranoia of the owners. Even the hospitals catering to COVID-19 patients had shut doors to non-COVID-19 patients for fear of the spread of the disease to a vulnerable population due to mixing. We believe that patients who needed hospitalization might be finding it very difficult because the very few hospitals which were taking care of non-COVID-19 patients were either full or exorbitantly costly. Indeed, the plight of even palliative care patients due to the lockdown has been staggering. [18] We could not communicate with almost a fifth of the patients who had been discharged from the hospital. These could be the least accessible and least resourceful patients. This group could be more symptomatic.

More may have succumbed to disease and thus the true mortality and mortality figures could be higher. [19]

### Conclusion

A significant proportion of patients had persistent post-COVID-19 symptoms after discharge from the hospital in our study. Breathing difficulty was the most common symptom noted, closely followed by fatigue. We did not find any significant correlation between any specific comorbidity or laboratory value that could predict the persistence of the COVID-19 symptoms after discharge. The proportion of patients who died after recovery from COVID-19 was lower in our study compared to that reported in the literature.

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