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Clinical Long-Term Complications of Post Covid Time in Patients Reporting at PAF Hospital Within 3 Months After Discharge

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ABSTRACT

Objectives: To determine the long term complications of post COVID time in patients reporting within 3 months after discharge. **Study design:** Cross-sectional study. **Place and duration of study:** Department of Medicine, PAF Hospital, Islamabad. From July 2021 to June 2022. **Methods:** A total of 100 patients, ≥ 18 years of age, with a confirmed diagnosis of COVID-19 infection and admission to the hospital, presenting to the outpatient department within 3 months of hospital discharge were enrolled in this study. All the related demographics were noted and details of medical history was taken from patient's medical record. Clinical symptoms were recorded using a standard questionnaire and grouped as respiratory, musculoskeletal, cardiovascular, neurological, gastrointestinal and psychological functions to determine the full spectrum of post-COVID sequelae. **Results:** Mean age of patients in this study was 53.88±8.03 years with an age range of 39 to 67 years. Males were 57% of total study population while females were 43%. The details of clinical symptoms reported by these patients showed that fatigue (59%), dyspnea (47%) and loss of taste/smell (41%) were the most frequent symptoms reflecting COVID-19 complications associated with musculoskeletal, respiratory and neurological functions. **Conclusion:** COVID-19 patients reporting within 3 months of discharge from hospitalization still experience fatigue, dyspnea, and loss of taste/smell, indicating respiratory, musculoskeletal and neurological complications even after recovery from this infection.

INTRODUCTION

The COVID-19 is an infectious disease caused by the corona virus SARS-COV-2 which has affected the world health system in the form of pandemic. According to a report by WHO, more than 760 million COVID cases are reported since 2019 with the mortality in over 6 million people.[1]

Although most of the patients recovered from COVID-19 with the out-patient consultation, patients with severe symptoms needed hospitalization. It has been observed that patients who survived after the hospitalization experienced persistent complication in the long term. WHO has recognized the condition and defined it as long COVID, or post-acute sequel of SARS-CoV-2 infection (PASC). PASC is observed in patients with a probable or confirmed history of SARS-CoV-2 infection, which typically arises within 3 months following the onset of COVID-19 and is characterized by persistent symptoms that cannot be explained with any other diagnosis.[2,3] This long term organ damage in SARS-CoV-2 is similar to earlier coronavirus outbreaks of SARS and MERS. Commonly observed ongoing symptoms by the patients reported in different studies are tiredness, dyspnea, breathing difficulties, pain in the chest, and persistent coughing.[4,5]

Less commonly, patients have reported issues with their joints and bones, as well as changes in their sensory functions.[6,7] Long-term breathing problems are observed with severe COVID-19 which can lead to widespread damage to alveoli and blood vessels in the lungs, formation of hyaline membrane, scarring of lung tissue, and solidification of lung areas.[8] Hence, after suffering from severe COVID-19, the most common problem related to respiration is the decreased ability to transfer carbon monoxide and is observed in nearly 50% of the survivors. This issue typically begins during the initial infection and may continue for six months.[9,10]

The complexity of PASC is further described by its neurological symptoms. Studies have shown patients experiencing cognitive difficulties alongside mental health issues like anxiety and depression in more than half of the patients (55.4%).[11] PASC also affect the cardiovascular system in shape of persistent palpitation and the trace level of cytokines which indicate the

potential cardiovascular risk in these survived patients.[12] In short, the complication of COVID in the long term are diverse, and presented as complex sequel from respiratory system to other important body systems with an impact on overall health status. It is also important to mention that most of the research work was focused on immediate, 6-month or even longer post-COVID outcomes and the three-month period mostly remained understudied. This timeframe may be vital for identifying and treating patients before the complications become chronic. These complications related to PASC significantly impact healthcare costs, work productivity, and patients' mental and social well-being, making early identification crucial for effective treatment planning.

Most of the data discussed above is based on international studies and data associated to our local population is limited. This research work was therefore aimed to find the clinical long term complications of post COVID-19 time in patients reporting at our hospital within 3 months after discharge. The results of our work will help to understand this critical healthcare challenge and to improve the long term outcomes for COVID-19 survivors.

METHODOLOGY

This prospective cross-sectional study was conducted at the Department of Medicine, PAF Hospital, Islamabad from July 2021 to June 2022, over a period of 1 year.

Prior approval of conducting the study was taken from the ethical committee of the hospital.

The sample size was calculated as per following details: Precision = 5.00 %, Population size = infinite.

Prevalence (Incidence of dyspnea at the post COVID-19 follow up visit) = 5.50 %.[10]

With 95% Confidence Interval, the estimated sample size (n) = 80.

A total of 100 patients, ≥ 18 years of age, with a previous confirmed diagnosis of COVID-19 infection and admission to the hospital, presenting to the outpatient department (OPD) within 3 months of discharge were enrolled in this study using consecutive sampling technique. Informed written consent was obtained from all participants prior to their enrollment in the study.

Patients with pre-existing chronic conditions which can overlap with the PASC complications, incomplete medical records, severe psychiatric issues, pregnancy, new unrelated complications during post-discharge period, or unwillingness to consent were excluded from the study.

All the related demographic were noted and details of medical history was taken from patient's medical record. Clinical symptoms were evaluated using a standard questionnaire and grouped as respiratory, musculoskeletal, cardiovascular, neurological, gastrointestinal and psychological functions to capture the full spectrum of post-COVID sequelae.

Data was analyzed using SPSS version 25. Quantitative variables were expressed in form of mean and standard deviation while qualitative analysis were expressed in shape of frequency and percentage. Descriptive analysis was used to present the long term clinical complications of post COVID time in patients presenting to the OPD within 3 months of hospital discharge.

RESULTS

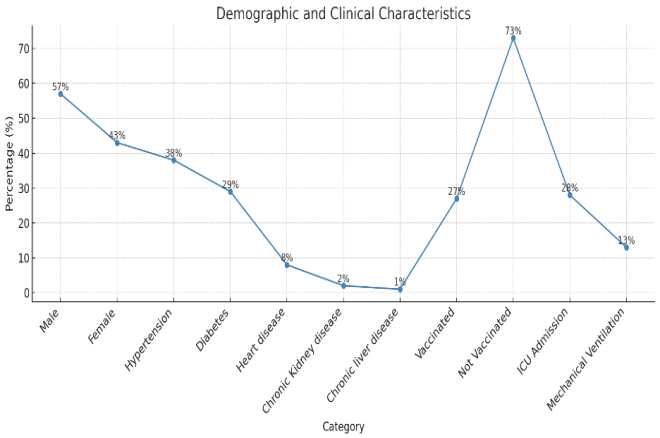
The Mean age in this study was 53.88±8.03 years with an age range of 39 to 67 years. Males were 57% of total study population while females were 43%. The demographics and clinical history of patients are given in Table 1.

Table 1

Demographics and clinical history (n=100)

Demographics		
Age (Mean±SD)		53.88±8.03
Gender	Male n (%)	57 (57)
	Female n (%)	43 (43)
Medical history		
Length of stay (Mean±SD) days		12.95±4.35
Time since discharge (Mean±SD) days		48.34±15.44
Co-morbidities	Hypertension n (%)	38 (38)
	Diabetes n (%)	29 (29)
	Heart disease n (%)	8 (8)
	Chronic Kidney disease n (%)	2 (2)
	Chronic liver disease n (%)	1 (1)
Vaccination status	Yes n (%)	27 (27)
	No n (%)	73 (73)
ICU admission n (%)		28 (28)
Invasive mechanical ventilation during stay n(%)		13 (13)

Figure 1

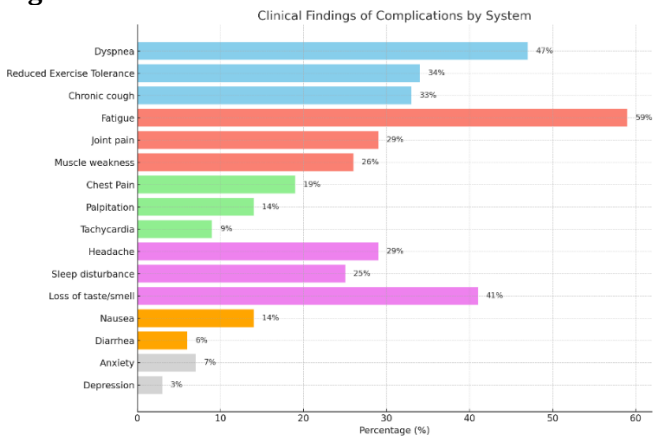


The details of clinical symptoms reported by these patients showed that fatigue (59%), dyspnea (47%) and loss of taste/smell (41%) were the most frequent symptoms reflecting impact of COVID-19 complications on musculoskeletal, respiratory and neurological functions of these patients. The detailed Clinical complications related to PASC over the long term, in patients reporting within 3 months after discharge explaining the full spectrum of post-COVID sequelae, are given in Table 2.

Table 2
Clinical finding of complications (n =100)

Clinical Finding of Complications		
Respiratory	Dyspnea n (%)	47 (47)
	Reduced Exercise Tolerance n (%)	34 (34)
	Chronic cough n (%)	33 (33)
Musculoskeletal	Fatigue n (%)	59 (59)
	Joint pain n (%)	29 (29)
	Muscle weakness n (%)	26 (26)
Cardiovascular	Chest Pain n (%)	19 (19)
	Palpitation n (%)	14 (14)
	Tachycardia n (%)	9 (9)
Neurological	Headache n (%)	29 (29)
	Sleep disturbance n (%)	25 (25)
	Loss of taste/smell n (%)	41 (41)
Gastrointestinal	Nausea n (%)	14 (14)
	Diarrhea n (%)	6 (6)
Psychological	Anxiety n (%)	7 (7)
	Depression n (%)	3 (3)

Figure 1



DISCUSSION

This study was among the few research works conducted to find the clinical complications presented by the COVID-19 patients within first 3 months after being discharged from the hospital. The mean age of patients in this study was 53.88±8.03 years with an age range of 39 to 67 years. Males were 57% of total study population while females were 43%. Most frequently present comorbidity was hypertension (38%) and ICU admission was needed in 28% of patients. The details of clinical symptoms reported by these patients showed that fatigue (59%), dyspnea (47%), loss of taste/smell (41%), reduced exercise tolerance (34%) and chronic cough (33%) were the most frequent symptoms reflecting major impact of COVID-19 infections on respiratory, musculoskeletal, and neurological functions of patients. The other symptoms reported in these patients indicate that cardiovascular and psychological functions are also involved in these complications. A prospective study by Dryden M et al to evaluate the post COVID-19 symptoms at 3 months follow up after hospitalization in South Africa found fatigue (50.3%), dyspnea (23.4%), lack of concentration (17.5%) and headache (13.8%) as the major symptoms reported in these patients. The study mentioned a heavy impact of these symptoms on functional and occupational responsibilities on the patients.[13]

Dyspnea was the major symptoms present in 49% of post COVID-19 patients at the 3 months follow up time in a study conducted by Grewal JS et al. Cardiorespiratory abnormalities and depression were the other majorly reported clinical symptoms in these patients.[14]

A study of 238 COVID-19 patients conducted in Italy found significant health issues persisting even at four months after hospital discharge. Physical limitations due to reduced lung functions were found in 50% of the patients, while approximately 20% experienced symptoms of post-traumatic stress. The other symptoms reported at the follow up visit were dyspnea (5.5%), loss of taste (5%), loss of smell (4.6%), joints pain (5.9%), cough (2.5%), and diarrhea (1.3%). These findings suggested that even after recovery, many COVID-19 patients continue to face breathing problems, physical constraints, and mental health challenges months after discharge from hospital.[10]

A post COVID-19 follow up of hospital discharged patients was made by Huang C in prospective cohort study in Wuhan China. The most common symptoms reported at 6 months follow up were fatigue (52%) and sleep disorders (26%). Anxiety/depression affected 23% of patients and reduced walking capacity was recorded in 17% of these patients.[15]

Chopra V et al made a follow up of 488 COVID-19 survivors after 2 months of being discharged from the hospital. Complications relating to respiratory system was experienced in 32.6 % of these patients while 13.3% had loss of taste or smell. Emotional impact of the disease was seen in 50% of the patients, out of which 5.6% needed support and treatment for mental health.[16]

Zhao YM et al focused on physiological characteristics and pulmonary functions in their 3 month follow up study with COVID-19 survivors' discharged from the hospital. The results showed that 63.4% of patients still had ongoing symptoms linked to their pulmonary functions. The study therefore suggested the need for long-term monitoring of COVID-19 patients.[17]

A study conducted in Pakistan by Qamar MA made a follow up of 331 COVID-19 survivors after recovery (42% within next 1-3 months and the rest in latter months). The most common persisting symptoms were body aches (39.9%), depression (32.6%), and cough (30.2%). Nausea/vomiting and mood changes were the major factors for poor quality of life in the post COVID-19 time.[18]

An important finding of our study showed that 65% of these patients had ≥2 systems involved in PASC complications. A systemic review by Wu L et al also mentioned that more than one symptom were present in patients discharged due to COVID-19 infection and fatigue, breathing problems, chest discomfort, body

pains, taste/smell loss, hair loss, sleep issues, and mental health concerns were the commonest among these. These symptoms reflect the involvement of lung, heart, and nervous systems and arises the need for continues consultation rehabilitations.[19]

The results of our study are in line with the studies discussed above and confirm the clinical complications in post COVID-19 time within 3 months period of hospital discharge. These results provide an insight and will help the health care professional to design appropriate strategies to save these patients from developing serious PASC complications.

A primary limitation of our study is the small sample size. Moreover this was a single center study. Further research with larger cohorts is recommended to better understand the long-term effects and refine therapeutic strategies.

CONCLUSION

COVID-19 patients often experience persistent symptoms, within three months of post-discharge, impacting multiple organ systems. Major symptoms include fatigue, dyspnea, and sensory loss, showing effect on musculoskeletal, respiratory, and neurological functions. These findings highlight the need for systematic follow-up and rehabilitation for COVID-19 survivors and emphasize on a vigilant post-discharge care.

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