Evaluation of Signs and Symptoms Post Recovery in COVID Patients: A Questionnaire Survey

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ABSTRACT

Aim: Purpose of the present study was to understand as well as assess the signs as well as symptoms in patients after recovery from coronavirus infection.

Methodology: About 287 survivors from COVID-19 were included in the study, each received a questionnaire divided into three main parts starting from subjects' demographic data, data about the COVID-19 status and other comorbidities of the subject, and finally data about post-COVID-19 manifestations.

Results: Only 10.8% of all subjects have no manifestation after recovery from the disease while a large percentage of subjects suffered from several symptoms and diseases. The most common symptom reported was fatigue (72.8%), more critical manifestations like stroke, renal failure, myocarditis and pulmonary fibrosis were reported by a few percent of the subjects. There was a relationship between the presence of other comorbidities and severity of the disease. Also, the severity of COVID-19 was related to the severity of post-COVID-19 manifestations.

Conclusion: The post-COVID-19 manifestation is largely similar to the post-SARS syndrome. All subjects recovered from COVID-19 should undergo long-term monitoring for evaluation and treatment of symptoms and conditions that might be precipitated with the new coronavirus infection.

Keywords COVID-19, recovery, SARS, co-morbidities.

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the pathogen responsible for coronavirus disease 2019 (COVID-19), has caused morbidity and mortality at an unprecedented scale globally.[1] Scientific and clinical evidence is evolving on the subacute and long-term effects of COVID-19, which can affect multiple organ systems.[2] Early reports suggest residual effects of SARS-CoV-2 infection, such as fatigue, dyspnea, chest pain, cognitive disturbances, arthralgia and decline in quality of life.[3-5] Cellular damage, a robust innate immune response with inflammatory cytokine production, and a pro-coagulant state induced by SARS-CoV-2 infection may contribute to these sequelae. Survivors of previous coronavirus infections, including the SARS epidemic of 2003 and the Middle East respiratory syndrome (MERS) outbreak of 2012, have demonstrated a similar constellation of persistent symptoms, reinforcing concern for clinically significant sequelae of COVID-19.[6-8]Although the mortality rate is considerable, the vast majority of SARS-CoV-2–infected patients recover from the acute phase. Long-term health consequences of this coronavirus disease (COVID-19) are yet largely unknown, but many patients are likely to experience long-lasting morbidity.[9] Indeed, based on observations from diseases that share COVID-19 characteristics such as acute respiratory distress syndrome (ARDS), SARS-CoV, and Coxiellaburnetiiinfection (Q fever), it is hypothesized that, in the long-term, a significant number of patients with COVID-19 will suffer from lung function impairment, residual pulmonary parenchymal abnormalities, decreased physical capacity, loss of muscle mass, anxiety, depression, cognitive deficits, post-traumatic stress disorder, fatigue, and poor health status.[10-12]Nutritional status is a major health determinant for the recovery of COVID-19 patients, especially in people at risk for adverse outcomes, such as the elderly and those with underlying medical conditions. Previous literature has shown that prolonged intensive care unit stays lead to a decline in muscle mass and strength and anorexia. Moreover, following the COVID-19 infection, malnutrition was aggravated, which was responsible for poor recovery and poor quality of life of discharged ICU patients. Previous reports have associated worse outcomes of COVID-19 patients with low levels of circulating markers of nutritional status. Nutrition deficiencies have been acknowledged across all the stages of COVID-19, especially in populations who are at higher risk of negative outcomes.[13-15]The severity of the disease is related to age and comorbidities of the infected subjects; the elderly are severely affected with the need for ICU. The severity of symptoms is also related to its duration, for mild cases, symptoms may last for 2 weeks while for the severe cases it ranges from 3 to 6 weeks. Direct contact to confirmed cases is the main way by which the disease transfer among people because the SARS-CoV-2 is transmitted through exhaled air and aerosol.[16-18]Hence, the current study aims to investigate the post-COVID-19 manifestation to demonstrate the different symptoms or signs that appeared on subjects after recovery from the disease, alsoto link these symptoms with several factors (age, weight, disease severity or other comorbidities).

AIM OF THE STUDY

Purpose of the present study was to understand as well as assess the signs as well as symptoms in patients after recovery from coronavirus infection.

METHODOLOGY

287 subjects who had recovered from COVID-19, received an open-ended questionnaire aimed to collect data related to their post-COVID-19 manifestations through emails. This questionnaire was divided into several parts starting from subjects' demographic data (age, gender, height, smoking and weight), then, data about the COVID-19 status and other comorbidities of the subject. Finally, data about post-COVID-19 manifestations (Symptoms, extra investigations of the symptoms, need for using medications for post-COVID-19 symptoms and recovery of post-COVID-19 symptoms). Each item's responses were analysed first to indicate the rate of its occurrence, then, to be linked with the occurrence of post-COVID-19 manifestations. Descriptive statistical analysis was carried out – percentages, frequency, mean, standard deviation, to analyse the data acquired. SPSS 25.0 is used for carrying out the analysis.

RESULTS

The study involved 287 recovered COVID-19 subjects, 103 of them were males and 184 females. Age of involved subjects expressed as Mean ± SD was 32.3 ± 8.5 and ages ranged from 20 to 60 years old. Mean ± SD weight, height and body mass index (BMI) were 77 ± 16.4, 162.9 ± 15.3 and 28.5 ± 5.2, respectively. Percent of smokers among male subjects was 27.2%, while all females were non-smokers. Regarding other diseases, 70.7% of all subjects have no known history of other illnesses, while 7.7% have hypertension and 5.2% were diabetic. The severity of COVID-19 symptoms was divided into three categories, first is the mild cases. that were isolated at home and they expressed 80.2%, the second category was the moderate cases that received oxygen therapy and they represent 14.9%, the third category was the severe cases that required ICU admission and this category represent a small percent (4.9%). Analysis of post-COVID manifestations revealed that only 10.8% of all subjects have no manifestation after recovery from the disease while a large percentage of subjects suffered from several symptoms. (Table 1)

Table 1-Demographic data of COVID-19 subjects

Variable	Percentage
Age	20-30 y- 33.8% 31-40 y- 49.1% >40 y- 17.1%
Gender	Male- 35.9% Female- 64.1%
Smoking	Smoker- 9.8% Non-smoker- 90.2%
Severity of disease	Severe (ICU)- 4.9% Moderate (Oxygen therapy)- 14.9% Mild- 80.2%
Other diseases	No other conditions- 70.7% Hypertension- 7.7%

	Diabetes- 5.2% Other conditions- 10.2%

Table 2- Characterisation of post-COVID-19 manifestations

Variable	
Clinical symptoms	Fatigue- 72.8% Anxiety- 38% Joints pain- 31.4% Continuous headache- 28.9% Chest pain- 28.9% Intermittent fever- 11.1% Pulmonary fibrosis- 4.9% Myocarditis- 1.4%
Extra investigations for post-COVID-19 manifestations	Yes- 13.2% No-86.8%
Condition improved on treatment	Yes -67.2% No -32.8%
Received medications for post-COVID-19 manifestations	Yes- 85% No- 15%

Most subjects suffered from fatigue (72.8%), anxiety (38%), joints pain (31.4%), continuous headache (28.9%), chest pain (28.9%), dementia (28.6%), depression (28.6%) and dyspnoea (28.2%). A few percent of recovered subjects have newly diagnosed with diabetes (2.4%) (Table 2). A large percent of the subjects was recovered from post-COVID-19 manifestations(67.6%), while 32.4% of subjects have persistent manifestations. Regarding nutritional support, 90.6% of all subjects were receiving multivitamins (natural or pharmaceutical products) during the disease. Most (83.3%) of the moderate-severe cases were related to those with comorbidities. (Table 2)

DISCUSSION
Post-COVID-19 manifestations were recorded for about 90% of the recovered subjects, with a wide range of symptoms and conditions that varied from a low-critical symptom like a headache to more critical conditions such as stroke, renal failure and pulmonary fibrosis. Post-viral infection syndrome was previously reported after SARS.[20,21] Follow-up for 4 years showed that chronic fatigue and psychiatric conditions continued to be clinically significant among subjects survived from SARS infection.[22] Hence, mental health morbidities management should be optimised through a multidisciplinary approach combined with long-term rehabilitation.Regarding COVID-19 survivors, each subject reported one or more manifestations, those manifestations persisted with all subjects for more than 20 days from the last negative PCR. The severity of COVID-19 was classified into three categories as follow; mild cases that had controllable symptoms and have been treated at home without the need for oxygen therapy, moderate cases which suffered from difficult breathing and needed oxygen therapy at home and severe cases that had been hospitalised and needed ICU. The relation between age, comorbidities and severity of COVID-19 showed a strong link between the presence of other comorbidities and the severity of COVID-19.[23]Also increasing age was

related to increased severity of the disease course.16 Most of the reported manifestations were mild reversible symptoms that could be relieved without medical interventions such as fatigue and headache which could be related to COVID-19 symptoms. Other mild symptoms like joint and muscle pain were also reported by many subjects and it could be classified as mild manifestations.The most reported manifestation for this study was fatigue which also reported by Tansey et al after SARS in 2003. Fatigue persisted with recovered subjects from SARS for several months, as subjects were monitored every 3 months, more than 50% of subjects were suffering from fatigue each time. Another study followed up SARS subjects for 4 years to evaluate the percent of chronic fatigue in those subjects and they found that about 40.3% suffered from chronic fatigue.[24]Regarding cardiac involvement, it was reported that some COVID- 19 subjects suffered from myocarditis as a complication of COVID- 19 which was consistent with the finding of this study.[25] Some of the mild manifestations might be related to the administration of hydroxychloroquine like the blurred vision which was reported from subjects receiving the drug as a part of the treatment course especially the hydroxychloroquine was a part of the treatment protocol for COVID-19 subjects.[26]

CONCLUSION

For subjects recovered from COVID-19, negative PCR is not the end of patient monitoring, continuous and long-term monitoring of the subjects is recommended for evaluation of post-COVID-19 manifestation, and early intervention with the critical signs. Also, the need for continuous counselling with the subjects is very important not only for maintaining good adherence to the medications, but also for detection of early warning signs of developing serious manifestations.

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