

The Frequency of Persistent Symptoms after Acute COVID-19 among Iraqi Patients

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Abstract

Background: Post-coronavirus disease 2019 (COVID-19) symptoms tend to persist in many survivors of COVID-19. **Objectives:** To find out the prevalence of persistent symptoms that continue to appear after the eradication of the COVID-19 infection among Iraqi survivors. We hypothesized that wearing a mask during the COVID-19 pandemic may lead to a lesser viral load in an individual who gets infected, thereby leading to milder symptoms and manifestations. **Materials and Methods:** Overall, 70 consecutive Iraqi patients diagnosed with COVID-19 during the period from early August to late September 2020 were enrolled in the study, and on a mean of 31 days after recovery, they were assessed for persistent symptoms after the acute COVID-19 infection. **Results:** The mean age $\pm$ SD was 40.5 ± 16.1 years old. On a mean of 31 days post-COVID-19 recovery, 91.4% of all the patients had at least one persistent symptom. The most common persistent symptoms recorded were fatigue (42.9%), dyspnea (32.8%), and chest pain (25.7%). There was a statistically significant difference ($P = 0.002$) among patients with hypertension, among whom 45.5% had persistent palpitation. Among patients with ischemic heart disease, 25% had constant chest pain, and 37.5% complained of palpitation post-recovery. Patients who had used masks before infection (85.4%) were managed at home, and they did not require hospitalization. Overall, 45.7% of those dyspneic during the infection period were still complaining of exertional dyspnea post-recovery ($P = 0.041$). **Conclusion:** A large proportion of the Iraqi patients with COVID-19 infection had persistent symptoms after recovery. The use of a mask before infection showed mild symptoms during the acute phase, and hospitalization or oxygen therapy was not indicated for them.

Keywords: Long-term COVID-19, persistent COVID-19 symptom, SARS-COV-2

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a severe respiratory disease that results from infection with a new generation of coronavirus (SARS-COV-2). One critical point regarding COVID-19 is that it can be transmitted very easily and has a high spread rate. All over the world, millions of people and hundreds of thousands of deaths have been reported. Infected people are suffering from different symptoms with different presentations such as fever, dry cough, fatigue, myalgia, and many others; of these, 80% of cases are mild. The severity of the disease varies and may progress to respiratory distress and respiratory failure; hence, the need for intensive care units (ICUs) and respiratory care units (RCUs).^[1] On January 30, 2020, the World Health Organization (WHO) declared

COVID-19 as an outbreak, and on March 11, 2020, it was announced as a global pandemic.^[2,3]

The severity of the disease is related to the age, presented comorbidities, and immune status of the infected person. Older people are much prone to more severe forms of the disease, and hence the need for ICUs and RCUs is increasing among older people.^[4] Direct contact with confirmed cases is the main transmission route among

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people since SARS-COV-2 is transmitted through respiratory droplets, exhaled air, and aerosol.^[5] Clinical presentations of COVID-19 vary from asymptomatic, mild symptoms to severe illness and deaths. For mild cases, supportive treatment and antipyretics were the only choices, with the need for antibiotics according to the clinical condition of the patients. Patients who had severe symptoms and presented with respiratory distress were under oxygen therapy regardless of the use of mechanical ventilation, which has its own and special criteria for each patient specifically.^[6] A lot of medications that act as antivirals have been included in the clinical trials. Still, there is no clear, evidence-based result to indicate and clarify the confirmed effect of each investigated medication.^[7-9] In addition to symptomatic and supportive therapy, corticosteroids as an anti-inflammatory medication could play a vital role in severe cases.^[10] Post-recovery manifestations were also studied after the severe acute respiratory syndrome (SARS) attack in 2003, with the reflection of many persistent symptoms experienced by the patient during their post-recovery period, such as fatigue, myalgia, weakness, and depression; some of the manifestations were chronic and required long-term monitoring and observations.^[11] In addition to the mentioned mild symptoms, a mild hypoactivation of the hypothalamic-pituitary-adrenal axis was reported in a study by Leow *et al.*^[12]

Hence, this current study aims at evaluating and investigating the post-COVID-19 manifestations among the Iraqi population to demonstrate the different symptoms and presentations that tend to appear in patients who have recovered from the disease; it also aims at linking the association of the persistent symptoms with the severity of the disease and other factors such as age and comorbidities.

MATERIALS AND METHODS

In this cross-sectional study, 70 participants were enrolled, from early August to late September 2020. All participants who were between 18 and 80 years old were included. The participants who were confirmed cases of COVID-19 based on combined clinical presentations, imaging modalities, and laboratory tests were enrolled. They went through a recovery period, ranging from a minimum of two weeks up to three months from recovery. All of them had been diagnosed with COVID-19 by either PCR or imaging modalities, with clinical and basic blood investigations for further evaluation. All the consecutive patients attending the clinic for post-recovery symptoms were included. Permission was obtained from all the participants before their enrollment in this study, and data were collected from them at clinical interview at least two weeks from the appearance of their symptoms. In particular, data on specific symptoms potentially related to COVID-19 were gathered using a comprehensive questionnaire. Patients

were asked to recall the presence or absence of symptoms during the acute phase of COVID-19, and then they were asked whether they still had the signs at the time of the visit or whether any other different symptoms developed apart from the persistence of the symptoms during the acute phase. The symptom was regarded as a persistent one when the patient was still experiencing/complaining from a specific ongoing/new sign even after recovery from the acute COVID-19 phase (either negative PCR and/or clinical/biochemical improvements).

Past medical history (including chronic diseases such as: hypertension, diabetes mellitus [DM], ischemic heart disease [IHD], and chronic lung disease), social and travel history of each patient were asked and were taken into consideration. We also obtained information about using masks, antibiotics, or any other medications by the patients and the place which they manages medically at, like staying at hospital, nursing care at home or outpatient follow-up by a physician. The severity of the disease was assessed based on the patient's clinical appearance at the time of acute infection, hospitalization, and need for oxygen therapy, in addition to admission into ICUs/RCUs.

Statistical analysis of data

The statistical analysis was done using IBM SPSS Statistics, Version 23.0; IBM Corp, Armonk, NY. Baseline patient characteristics were summarized. All data are presented as mean $\pm$ SD for continuous variables and n (%) for categorical variables. Comparisons between groups were made using chi-square test for categorical variables. A *P* value of <0.05 was considered statistically significant.

Ethical consideration

The study was conducted following the ethical principles that have their origin in the Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee. The Ethics Committee approved this study of Hawler Medical University.

RESULTS

A total number of 70 participants (47.1% females and 52.9% males) who had been diagnosed with COVID-19 during the period from early August to late September 2020 were included in this current study. Then, on a mean of 31 days after recovery, they were assessed for persistent symptoms after acute COVID-19 infection.

The mean age $\pm$ SD was 40.5 ± 16.1 , with an age range of 18–80 years. The prevalence of persistence of symptoms was 91.4%; in other words, 91.4% of all the included patients complained of at least one sign after recovery, and 8.6% were free from any symptom after a mean of 31 days post-recovery. The age distribution of persistent

symptoms varied. The presence of persistent symptoms was highest (32.9%) among the generations younger than 29 years of age, 18.6% among the 40–49 age group, 17.1% among the 30–39 age group, 14.3% among the 60–69 age group, 12.9% among the 50–59 age group, and only 4.3% among those who were older than 70 years of age. Table 1 shows the age distribution of the included patients with persistent symptoms after acute COVID-19 infection. Careful recording of acute-phase symptoms by the enrolled patients of this study showed that the most familiar symptoms during acute-phase COVID-19 were fatigue (92.9%), fever (91.4%), myalgia (88.6%), cough (77.1%), headache (72.9%), shortness of breath (SOB) (50%), loss of smell and taste (50%), chest pain (25.7%), palpitation (24.3%), and gastro-intestinal (GIT) problems (22.9%).

Patients were also asked to record their persistent symptoms during post-acute COVID-19 infection, and the results showed that around half of them had fatigue (42.9%) and difficulty in breathing (32.9%), myalgia (38.6%), chest pain (25.7%), cough (24.3%), palpitation (22.9%), headache (20%), fever (8.1%), and GIT symptoms, including change in bowel motion (5.7%).

Table 2 shows the acute and persistent symptoms of COVID-19 infection.

Among the included patients, 15.7% were hypertensive, 12.9% had DM, 11.4% had IHD, and the remaining 60.3% did not have any chronic illness. Table 3 shows the

frequency of chronic disease among Iraqi patients with COVID-19. Focusing on the persistent cardiovascular symptoms among patients with chronic cardiovascular diseases (CVS), 25% of patients with IHD had constant chest pain, and 37.5% complained of palpitation during post-recovery as a long-term COVID-19 effect ($P = 0.200$). Table 4 shows the cardiovascular manifestations among different genders.

Participants with a known case of hypertension (45.5%) tended to have palpitation during the post-recovery period ($P = 0.05$), and 27.3% tended to have persistent attacks of exertional chest pain during the post-recovery period.

Moreover, the study showed that out of the 70 participants, 68.6% (48) of the participating patients had been using facial masks before acquiring the infection. The remaining 31.4% (22) had not been using facial masks prior to the infection. Among those 48 patients who had been using facial masks before the illness, 55.3% had a saturation of $O_2 \geq 96\%$ on follow-up, indicating that they were not dyspneic. However, this was statistically not significant ($P = 0.08$).

Moreover, 45.8% of those who had been using facial masks before the infection did not require antibiotics and were only having mild symptoms; 85.4% of them were managed at home, and they did not need hospitalization (mild cases with controllable symptoms who had been treated at home without the need for oxygen therapy). On the other hand, 9.1% of the survivors who had not been using masks prior to the infection had severe symptoms and were hospitalized.

Another interesting point was that 63.3% of those who had not been using masks prior to the infection were dyspneic during their acute phase of the disease; thus, the wearing of masks matters.

We hypothesized that wearing masks during the COVID-19 pandemic may lead to a lesser viral load in an individual who gets infected, thereby leading to milder symptoms and manifestations. All the symptoms are summarized in Table 5, which shows the frequency of the acute-phase COVID-19 symptoms, among those who had been using

Table 1: The age distribution of patients with persistent symptoms of COVID-19 infection

Age groups (years)	Frequency (%)
Younger than 29	23 (32.9)
30–39	12 (17)
40–49	13 (18.6)
50–59	9 (12.9)
60–69	10 (14.3)
≥ 70	3 (4.3)
Total	70 (100)

Table 2: The prevalence of acute-phase symptoms and persistent symptoms post-COVID-19 infection among participants

Symptoms	The frequency of symptoms during the acute phase (%)	The frequency of persistent symptoms (%)
Fatigue	65 (92.9)	30 (42.9)
Myalgia	62 (88.6)	27 (38.6)
SOB on exertion	35 (50)	23 (32.9)
Chest pain	18 (25.7)	18 (25.7)
Cough	54 (77.1)	17 (24.3)
Palpitation	17 (24.3)	16 (22.9)
Headache	50 (72.9)	14 (20)
GI symptoms	16 (22.9)	4 (5.7)
Fever	64 (91.4)	6 (8.1)

SOB: shortness of breath

a facial mask before acquiring the infection compared with those who had not been using a facial mask. About the source of the disease, 46% reported that they had possibly been exposed to the virus through their contact with one of their affected family members, 13% in the workplace, and 40% of an unknown source.

DISCUSSION

Post-COVID-19 manifestations were recorded for about 90% of the patients who had recovered, with a wide range of symptoms. Post-viral infection syndrome was previously reported after SARS.^[12,13] Follow-up for four years showed that chronic fatigue and psychiatric conditions continued to be clinically significant among patients who had recovered from SARS infection.^[14] Hence, the management of mental health morbidities should be optimized through a multidisciplinary approach combined with long-term rehabilitation. Until this moment of conducting this study, globally, COVID-19 cases are rising and these are accompanied by increasing morbidity and mortality rates. And because this disease is new, very little is known about it or studied, particularly about its long-term outcomes and sequelae. Moreover, some recent data describe and

report the persistent symptoms of COVID-19, apart from its acute-phase symptoms. Beginning on April 21, 2020, the Fondazione Policlinico Universitario Agostino Gemelli in Italy established a post-acute outpatient service for individuals after recovery from COVID-19 and found that in patients who had recovered from COVID-19, 87.4% reported the persistence of at least one symptom. Fatigue and dyspnea were found to be the most typical symptoms: 53.1% and 43.4%, respectively.^[15]

In our current study, we also found that 91.4% reported persistence of at least one symptom; most of the reported manifestations were mild reversible symptoms that could be relieved without medical interventions, such as fatigue (42.9%), dyspnea on exertion (32.8%), headache (20%), and myalgia (38.6%). It was noted that many manifestations are related to the central nervous system. An observational study indicated that the most common symptoms were headache (70.3%), loss of smell (70.2%), nasal obstruction (67.8%), cough (63.2%), asthenia (63.3%), myalgia (62.5%), rhinorrhea (60.1%), gustatory dysfunction (54.2%), sore throat (52.9%), and fever (45.4%).^[16]

Another study in Wuhan, China reported similar results regarding acute-phase clinical presentation and symptoms.^[17] The prevalence of hypertension and DM among the participants of that study in China was 30% and 12.1%, respectively, which was apparently similar to the results of our study, showing the prevalence of hypertension and DM as 15.7% and 12.9%, respectively. The difference might be due to the population (sample size) of the study. The most reported manifestation for this study was fatigue, which was also reported by Tansey *et al.* after SARS in 2003.^[18] Fatigue persisted with the patients who had recovered from SARS for several months, as the patients were monitored every three months; more than 50% of the patients were suffering from fatigue each time.^[13] Another study followed up the victims of SARS for four years to evaluate the percent of chronic fatigue among them (40.3%).^[13] Since SARS and COVID-19 post-recovery findings are almost similar, therefore continuous follow-up of the patients with persistent symptoms is needed to find further information about its mechanism

Table 3: The frequency of chronic illnesses among Iraqi survivors of COVID-19 (%)

Chronic illnesses	Frequency (%)
IHD	8 (11.4%)
HTN	11 (15.7%)
DM	9 (12.9%)
COPD	0 (0%)
No chronic illness	42 (60.3%)

COPD: chronic obstructive pulmonary diseases, DM: diabetes mellitus, HTN: hypertension, IHD: ischemic heart diseases

Table 4: The frequency of persistent cardiovascular symptoms in different genders

Symptom	Male, n (%)	Female, n (%)	P value
Chest pain	13 (35.1)	5 (15.2)	0.090
Palpitation	8 (21.6)	8 (24.2)	0.700

Table 5: Frequency of the acute-phase COVID-19 symptoms, among those who used a facial mask before acquiring infection compared with those who did not use a facial mask

Symptoms	Used facial mask, n (%)	Did not use facial mask, n (%)	P value
Fever	43 (89.6)	21 (95.5)	0.657
Dyspnea	21 (43.8)	14 (63.6)	0.197
Cough	37 (77.1)	17 (73.7)	0.621
Myalgia	43 (89.6)	19 (86.4)	1.000
Headache	35 (72.9)	16 (72.7)	0.239
Chest pain	10 (20.8)	8 (36.4)	0.160
Palpitation	11 (22.9)	6 (27.3)	0.062
Fatigue	47 (97.9)	18 (81.8)	0.031

on the body systems and the pathophysiology of the manifestation.

Garrigues *et al.* also reported that fatigue and dyspnea were the most common long-term symptoms in 120 patients; among them, 55% reported the persistent fatigue symptom post-discharge, 42% dyspnea, 34% loss of memory, and 30.8% sleep disorders.^[19] In another study, among 292 respondents, 43% reported that they continued to experience cough during their recovery time. Also, fatigue (35%) and dyspnea (29%) were the second and third most common post-acute symptoms, respectively.^[20] The initial clinical signs of patients with COVID-19 who had enrolled in this study were mainly fatigue (92.9%), fever (91.4%), and myalgia (88.6%), which was different from those observed in some other studies. Regarding cardiac involvement, it was reported that some patients with COVID-19 suffered from myocarditis as a complication of COVID-19.^[21]

Patients with myocarditis may present with palpitation and chest pain as well; in our study, a great portion of the post-COVID-19 survivors had palpitation (24.3%) and chest pain (25.7%). This may need cardiological workup to exclude myocarditis as one of the COVID-19 complications.

On April 3, 2020, the Centers for Disease Control and Prevention issued recommendations on wearing cloth face coverings by the public to reduce community spread.^[22] The WHO did not recommend population-level face masking in April,^[23] but it changed its guidance on June 5, 2020,^[24] when the extent of transmission from presymptomatic or even asymptomatic individuals was clear.^[25]

One recent model showed that population-level masking is one of the most efficacious interventions to reduce further spread of SARS-COV-2, allowing for less stringent lockdown requirements in countries adopting this strategy.^[26] There are two likely reasons for the effectiveness of facial masks: The first—to prevent the spread of viral particles from asymptomatic individuals to others—has received a great deal of attention.^[27,28] However, the second theory—that reducing the inoculum of the virus to which a mask-wearer is exposed will result in milder disease^[29-33]—has received less attention and is the focus of our perspective compiling virological, epidemiologic, and ecologic evidence. In this current study, 45.8% of those who had been using masks prior to the infection were not in need of antibiotics and were only having mild symptoms, and 85.4% of them were managed at home. On the other hand, 9.1% of the survivors who had not been using masks before the infection had severe symptoms and were hospitalized.

Another interesting point was that 63.3% of those who had not been using masks prior to the infection were dyspneic during their acute phase of the disease; thus, wearing masks matters. Increasing rates of asymptomatic and mild infection with COVID-19 have been seen over

time during the pandemic in settings adopting population-level masking. A systematic review of earlier studies before facial masking was widely practiced, placing the proportion of asymptomatic infection with SARS-COV-2 at 15%.^[34] A more recent narrative review of 16 different studies estimated the rate of asymptomatic infection at 40%–45%.^[35,36] The Centers for Disease Control and Prevention (CDC) has now (since article submission) also placed the rate of asymptomatic infection at 40%.

Our study findings showed that 68.6% of the participating patients had been using facial masks before acquiring the infection, and 55.3% of those who had been using facial masks before the disease had a saturation of $O_2 \geq 96\%$ on follow-up, indicating that they were not dyspneic. Moreover, 45.8% of those who had been using masks before the infection did not need antibiotics and were only having mild symptoms; 85.4% of them were managed at home, and they did not need hospitalization.

CONCLUSION

In summary, the study showed that most of the patients with COVID-19 experienced several manifestations after the recovery period, which could be mild symptoms. It concludes that fatigue and shortness of breath were among the most common persistent symptoms of COVID-19 in Iraqi patients. The post-COVID-19 manifestation is mainly similar to the post-SARS syndrome and community-acquired pneumonia. All patients who have recovered from COVID-19 should undergo long-term monitoring for the evaluation and treatment of symptoms and conditions that might be precipitated after recovery from the new COVID-19. We recommend planning rehabilitation services to manage these symptoms appropriately, which will improve the quality of life of survivors of COVID-19. Those who wore masks experienced milder symptoms compared with those who did not use masks before COVID-19 infection.

Study strength and weakness

One of the weaknesses of the study that needs to be mentioned is its small sample size, due to the exclusion of some patients from the data, as they did not fit within the criteria of the study; and some follow-up data were missing. Due to this, the results of this study may not be utterly generalizable because of a relatively small number of patients.

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Conflicts of interest

There are no conflicts of interest.

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