

Research Article

Persistent Symptoms in Patients Post-Acute COVID 19 Infection

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ABSTRACT

Introduction: Post-acute sequelae of COVID-19 (PASC) are symptoms that persist following acute COVID-19 infection and can include respiratory, neurological, psychological and systemic symptoms that last for several months after recovery.

Objective: To identify the frequency, pattern, and severity of symptoms that persist after acute COVID-19 infection and the clinical features of the post-acute recovery phase.

Methods: This descriptive cross-sectional study was carried out at Department of Medicine, Akhter Saeed Medical College, Rawalpindi, during the period of May, 2025 to October, 2025. Patients were evaluated using a structured questionnaire and clinical examination, including adult patients with a history of COVID-19 infection who had been suffering from symptoms for more than four weeks.

Results: The most common symptom was fatigue (65.6%), followed by dyspnea (46.1%), sleep disturbance (38.3%), difficulty concentrating (33.9%), and headache (31.7%) among 180 participants. In 27.8% of patients, symptoms continued for more than 24 weeks. Patients who had severe acute COVID-19 were more likely to have multiple persistent symptoms.

Conclusion: Post-COVID symptoms can be long-term and can significantly extend recovery, highlighting the need for follow-up and a multidisciplinary approach.

Keywords: Covid-19, Long Covid, Persistent Symptoms, Post-Acute Sequelae, Fatigue, Dyspnea.

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, known as coronavirus disease 2019 (COVID-19), started as an acute respiratory infection but has been shown to have significant long-term impacts in a significant proportion of those infected. While most patients get better from the acute illness, some suffer symptoms for weeks, months, or even years afterwards. The lasting symptoms are frequently referred to as post-acute sequelae of COVID-19 (PASC), post-COVID-19 condition, or long COVID. Persistent symptoms have been shown to be clinically significant even in the second year after acute infection, with fatigue, exertional dyspnea, cognitive problems, and sleep disturbances being among the common complaints (1). Long-term follow-up studies have also demonstrated that symptoms can persist 12 months post-infection (2), meaning that recovery from COVID-19 is

not necessarily complete at the end of the acute infectious phase.

A significant aspect of post-acute COVID-19 is that it affects patients with and without severe disease or hospitalization. A systematic review of the literature on patients with mild COVID-19 showed that persistent symptoms can occur in patients treated in outpatient settings, including fatigue, dyspnea, cough, chest pain, headache, cognitive problems, and olfactory dysfunction (3). Symptoms that last for a long time can have a major impact on patients' health and physical functioning. Survivors have reported impaired health status, ongoing symptoms, and limited ability to engage in routine physical activities such as walking, climbing stairs, carrying objects, etc., at about 1 year after acute infection, highlighting the possibility of functional outcomes of long-term illness (4). Long COVID clinical presentation is very diverse and can affect multiple organ

systems. Systematic examination of post-acute somatic complaints has revealed complaints of the respiratory, cardiovascular, musculoskeletal, neurological, gastrointestinal, and general constitutional systems, and fatigue and respiratory complaints are among the most frequently observed (5).

Moreover, the issue of persistent symptoms has not been solved with the emergence of new SARS-CoV-2 variants. In the Omicron era, post-acute manifestations were still reported, such as fatigue, impaired attention, depression, sleep-related complaints, cardiological symptoms, altered smell or taste, and other multisystem manifestations, pointing to the ongoing clinical significance of post-COVID conditions, despite the changes in the circulating viral variants (6). Some symptoms last longer than others and are more intense in some people than in others. Population-based cohort studies have shown that symptoms tend to slowly improve in many patients, but a certain percentage remain with complaints after one year of infection. Some populations have reported that older age, female sex, obesity, smoking history, some comorbidities, and a higher number of symptoms in the acute phase are associated with slower symptom resolution (7).

Staggering population burden of post-acute symptoms has been shown in large, multinational analyses of health-record data, indicating that the burden of persistent complaints may change over time and by infection history, as reinfected individuals may experience a substantial burden of post-acute complaints (8). Sustained symptoms of COVID-19 also have a significant occupational and socio-economic impact. Healthcare workers who had been directly impacted by COVID-19 have reported persistent fatigue, anxiety, sleep problems, chest pain, muscle pain, and cognitive complaints following the acute illness, which may have a negative impact on wellbeing and work functioning (9). While the underlying mechanisms are not fully understood, some patients may have symptoms due to ongoing immune dysfunction. Persistent inflammation and elevated activation and proliferation of CD8+ T cells have been identified in longitudinal immunological investigation in individuals with some post-acute symptoms, suggesting that there may be a role for prolonged immune activation in PASC (10).

Population-based studies six to twelve months after SARS-CoV-2 infection have shown that fatigue and neurocognitive symptoms are

especially salient symptom clusters and could be linked to poorer overall health recovery and working ability (11). The presence of PASC in both inpatient and outpatient settings reinforces the notion that persistent illness is not solely the result of the severity of acute illness. Several demographic and clinical factors have been studied in different populations and with varying results and have been associated with post-acute symptoms (12). The results highlight the difficulty in identifying patients with a prolonged recovery. Long COVID is now recognised as a multisystem disorder with physical, cognitive and psychological effects rather than a single organ complication. Patients may have multiple comorbidities, including respiratory impairment, cardiovascular abnormalities, neurological symptoms, musculoskeletal complaints, mental health disturbances, and reduced functional capacity, all of which can impose significant burdens on patients, the health care system, families and society (13).

Importantly, symptoms can persist long after the first year, with prospective follow-up demonstrating that symptoms can still be detected in some survivors ~2 years after COVID-19 infection (14). However, these may vary according to disease severity, as some symptoms have been found to be more prevalent in previously hospitalized survivors than in non-hospitalized survivors, and some symptoms are still significant in the latter group (15). Persistent symptoms are likely to have a complex and variable pathophysiology. Recent cohort evidence among non-hospitalized individuals has identified associations between specific PASC symptoms and biomarkers of viral activation, inflammation, previous disease severity, and vascular activation, but some of these biological associations have varied over time since infection (16). Possible mechanisms are viral reservoirs, viral antigen, immune activation, autoimmunity, endothelial or vascular dysfunction, tissue injury, and abnormal immune responses. Research into severe and persistent long COVID could also help to shed light on other post-infectious syndromes with similar symptoms, including fatigue and cognitive impairment, and exercise intolerance (17). Given the broad range, long duration, and possibly the effects of chronic COVID symptoms, further clinical research is required to understand how often, when, and how these symptoms develop and relate to other factors in the patient and the effects of the symptoms in various patient groups.

Objective

To determine the frequency, pattern, and severity of persistent symptoms among patients following acute COVID-19 infection and to assess their clinical characteristics during the post-acute recovery period.

MATERIALS AND METHODS

Study Design

This was a descriptive cross-sectional study to see how many patients experienced symptoms after recovery from acute COVID-19 infection.

Study Setting: The study was conducted in the Department of Medicine, Akhter Saeed Medical College, Rawalpindi, Pakistan, which serves patients from a wide range of socio-economic backgrounds.

Duration of the Study

The study was carried out for a period of six months, from May, 2025 to October, 2025.

Inclusion Criteria

Patients were included who were 18 years of age or older and had previously been diagnosed with COVID-19 using a reverse transcription polymerase chain reaction (RT-PCR) test or other documented diagnostic testing. Participants were eligible to be enrolled if they had recovered from the acute phase and had been experiencing one or more symptoms for at least four weeks after infection.

Exclusion Criteria

There were no patients under 18 years of age, patients who had an active COVID-19 infection, or patients who could not reliably provide clinical information. Additionally, patients with chronic medical, neurological, psychiatric, or respiratory diseases that could account for the chronic symptoms were excluded.

METHODS

The patients who were eligible to participate in the study were recruited at the start of the study period with informed consent. A structured data collection form was used to record demographic data such as age, sex, occupation, smoking history, and relevant medical history. Medical records and patient interviews were used to obtain information on the previous acute episode of COVID-19, which included date of diagnosis, presenting symptoms, hospitalization, oxygen requirement, and treatment history. Persistent post-COVID-19 symptoms were evaluated, including fatigue, dyspnea, cough, chest pain, headache, sleep disturbance, loss of smell or taste, myalgia, palpitations, and difficulty in concentration. Each symptom was recorded for length of time and intensity. Clinical examination was carried out if necessary. The data were entered and analyzed with SPSS version 26. Data for continuous variables were reported as mean and standard deviation, and for categorical variables, as frequency and percentage. Appropriate statistical tests were used to determine associations between persistent symptoms and relevant clinical characteristics.

RESULTS

A total of 180 patients with persistent symptoms following acute COVID-19 infection were included in the study. The mean age of the participants was 42.6 ± 13.4 years, with the highest proportion being 31-45 years (62, 34.4%). Of the total participants, 104 (57.8%) were females, and 76 (42.2%) were males. As to the severity of the first episode of COVID-19 infection, 96 (53.3%) had mild, 58 (32.2%) had moderate, and 26 (14.4%) had severe disease. Of the 49 participants, 27.2% required hospitalization during their acute infection and 72.8% were managed without hospital admission.

Table 1. Demographic and clinical characteristics of study participants (n=180)

Characteristics	Frequency (n)	Percentage (%)
Age 18–30 years	38	21.1
Age 31–45 years	62	34.4
Age 46–60 years	51	28.3
Age >60 years	29	16.1
Male	76	42.2
Female	104	57.8
Mild acute COVID-19	96	53.3
Moderate acute COVID-19	58	32.2
Severe acute COVID-19	26	14.4
Hospitalized during acute illness	49	27.2

Non-hospitalized	131	72.8
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Persistent symptoms most commonly included fatigue (118, 65.6%), dyspnea (83, 46.1%), and sleep disturbances (69, 38.3%). 61 (33.9%) patients complained of difficulty concentrating, and 57 (31.7%) complained of headaches. Persistent cough occurred in 49

(27.2%), myalgia in 46 (25.6%), and chest pain in 39 (21.7%) patients. Thirty-four (18.9%) reported loss or change of smell or taste, and 29 (16.1%) reported palpitations. Many individual patients had more than one lasting symptom.

Figure 1. Distribution of the most commonly reported persistent post-COVID-19 symptoms

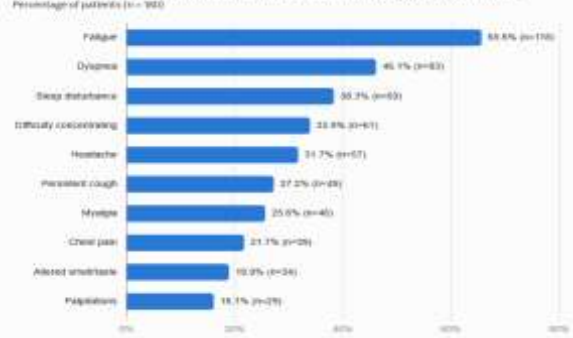


Table 2. Frequency of persistent symptoms among participants (n=180)

Persistent symptom	Frequency (n)	Percentage (%)
Fatigue	118	65.6
Dyspnea	83	46.1
Sleep disturbance	69	38.3
Difficulty concentrating	61	33.9
Headache	57	31.7
Persistent cough	49	27.2
Myalgia	46	25.6
Chest pain	39	21.7
Altered smell/taste	34	18.9
Palpitations	29	16.1

As for the duration of persistent manifestations, 72 (40.0%) participants reported that they had symptoms lasting from 4 to 12 weeks after acute infection. Fifty-eight (32.2%) had symptoms lasting 13–24 weeks and 31 (17.2%)

had symptoms lasting 25–36 weeks. 19 (10.6%) reported persistent manifestations after 36 weeks. Therefore, over 25% of the study population had symptoms present after 24 weeks of the acute illness.

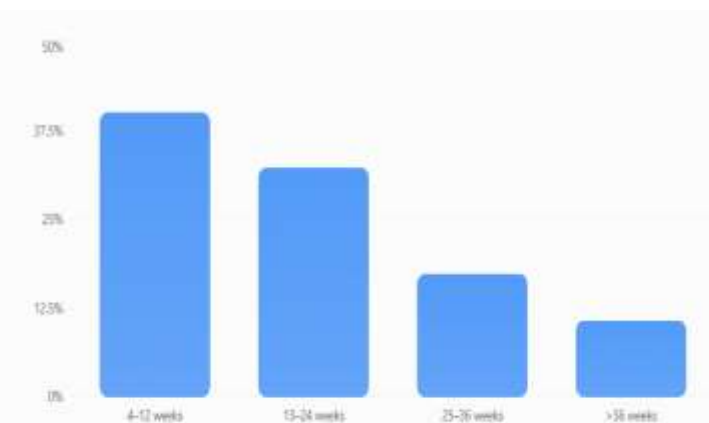


Figure 2. Duration of persistent symptoms following acute COVID-19 infection

The occurrence of persistent symptoms also differed according to the severity of the initial COVID-19 episode. In individuals who had previously suffered from the mild disease, 36 (37.5%) had three or more symptoms that

persisted. This rate rose to 29 (50.0%) in moderate cases and 18 (69.2%) in severe cases of COVID-19. Fatigue and dyspnea were especially prevalent in patients who had suffered moderate or severe acute illness.

Table 3. Burden of persistent symptoms according to severity of acute COVID-19

Acute disease severity	Total patients	1–2 symptoms, n (%)	≥3 symptoms, n (%)
Mild	96	60 (62.5)	36 (37.5)
Moderate	58	29 (50.0)	29 (50.0)
Severe	26	8 (30.8)	18 (69.2)
Total	180	97 (53.9)	83 (46.1)

In conclusion, the study revealed a significant symptom burden of long-term effects of acute COVID-19 infection. Respiratory, sleep-related, and neurocognitive complaints were the second most common, with fatigue the most common complaint. While symptoms were found in patients of all disease severity groups, more symptoms were seen in patients who had developed severe acute COVID-19. Many of the participants also experienced symptoms lasting for over six months, a testament to the long-term effects of post-acute symptoms in some individuals.

DISCUSSION

The present study showed that there were a significant proportion of patients who continued to have symptoms after acute COVID-19 infection. The most common symptom was fatigue (65.6%), followed by dyspnea, sleep disturbance, difficulty concentrating, headache, persistent cough, myalgia, chest pain, altered smell or taste, and palpitations. These results support the concept that recovery from the acute phase of COVID-19 is not synonymous with clinical recovery. Many patients may have physical, respiratory, neurological, and psychological symptoms for several weeks or months. These findings are similar to those in population studies, which found fatigue, exertional intolerance, neurocognitive problems, and sleep-related symptoms were present in the second year after infection (1). The most common continuing symptom in this study was fatigue, present in about two-thirds of the sample. This is in line with other studies that have previously found fatigue as one of the most prevalent symptoms of post-acute COVID-19 syndrome. Kim et al. noted that symptoms persisted in patients about 12 months following infection and fatigue was an important ongoing symptom (2). Fatigue was also commonly reported in patients with initially mild COVID-19 (3), as was the case in a

systematic review of patients with mild COVID-19 (4). Chronic fatigue can disrupt daily functioning, work, physical activity, and quality of life. It can also occur in conjunction with post-exertional worsening, which can make it more challenging for some people to reach full function.

The second most frequent symptom in the present study was dyspnea, experienced by 46.1% of the participants. Ongoing dyspnea following COVID-19 can be due to residual lung injury, decreased physical fitness, weakness of respiratory muscles, vascular changes, or other factors. Long after resolution of the acute COVID-19, Kingery et al. reported persistent symptoms and effort intolerance (4), which lends support to the observation that functional respiratory complaints may persist long after the acute illness has resolved. Respiratory symptoms, such as dyspnea and cough, were also among the most frequently reported somatic symptoms of long COVID reported by Nguyen et al. (5). The difficulty in breathing highlights the need to clinically assess the patient to differentiate between persistent functional symptoms after COVID and any underlying pulmonary or cardiovascular abnormalities.

Another frequent symptom was sleeping disturbance (38.3%), and difficulty concentrating (33.9%) was also significant in this study. All these symptoms suggest that post-COVID disease is more than just ongoing breathing issues and often has a neurocognitive and psychological element. Fatigue, decreased concentration, sleep disturbances, and other neurological symptoms have been reported in studies conducted during the Omicron period, indicating that these effects have remained despite the shift in currently circulating SARS-CoV-2 variants (6). Robineau et al. also showed that symptoms of post-COVID can last very differently for different patients and can be long-term in certain patient populations (7).

Learning, work productivity, social functioning, and emotional health can be impacted by cognitive problems and sleep disturbances.

40.0% of patients had persistent symptoms for 4–12 weeks, while 32.2% had persistent symptoms for 13–24 weeks. Importantly, 27.8% had symptoms that lasted more than 24 weeks (10.6% more than 36 weeks). This long-term course is in line with the international evidence that post-acute symptoms can last for many months. In a large multinational cohort study, post-acute manifestations were found to be a significant and ongoing health care burden in various populations (8). There have also been reports of persistent symptoms among frontline health care workers, including fatigue, sleep problems, musculoskeletal symptoms, chest pain, and cognitive symptoms that have had a negative impact on well-being and may have affected their job duties (9). The longer period seen in the present study emphasizes the importance of long-term follow-up instead of restricting clinical evaluation to the acute stage following infection.

The mechanisms that underlie the chronic symptoms are not fully understood and are probably multifactorial. One pathway has been suggested as persistent immune activation. LaVergne et al. showed that some COVID-19 survivors with PASC have CD8+ T cells that remain activated and proliferating for months after the acute illness, indicating that persisting immunological abnormalities may be responsible for persisting symptoms (10). Other suggested mechanisms involve autoimmune processes, endothelial dysfunction, autonomic dysfunction, tissue injury, microvascular abnormalities, and abnormal inflammatory processes. Population-based studies have also shown clinically significant fatigue and neurocognitive problems 6–12 months following infection, which affect overall health and work capacity (11).

Persistent symptoms were also observed in all severity levels of the initial COVID-19 presentation. Long-term effects were not limited to those who were hospitalized or critically ill: 37.5% of patients with mild acute disease had three or more persistent symptoms. However, the percentage having 3 or more symptoms rose to 50.0% for moderate disease and 69.2% for severe disease. Previous studies have also demonstrated that P.A.S. can occur in both inpatient and outpatient settings, but specific types of P.A.S. may be related to the severity of the initial infection (12). The multisystem nature of PASC described by

Parotto et al. also corroborates the fact that patients can have respiratory, cardiovascular, neurological, psychological, and musculoskeletal abnormalities simultaneously (13).

The persistent symptoms observed in the present study are further corroborated by prospective evidence showing that some patients are symptomatic some 2 years after infection (14). Meta-analytic results suggest that some persistent symptoms, such as dyspnea and myalgia, are more likely to occur in hospitalized survivors, but also in non-hospitalized patients with a significant post-acute disease (15). Recent studies also indicated that the biological mechanisms involved in the individual symptoms might differ depending on the interval since infection, the severity of the disease, inflammatory activity, viral factors, and vascular activation (16). This diversity can be the reason why patients experience various symptom patterns and recovery courses.

In summary, the results highlight the significance of long-term symptoms after acute COVID-19, which should be identified, monitored, and treated by multiple specialists. The existence of long-term symptoms in both mild and severe patients at the onset of the disease implies that follow-up actions should not be limited to those who were previously hospitalized. The importance of fatigue, respiratory symptoms, cognitive symptoms, sleep problems, and functional problems should be given more attention to identify those who need rehabilitation or further evaluation. The study of severe and prolonged long COVID may also help to better understand post-infectious illnesses in general, as suggested by Brodin et al. (17). Longitudinal studies are needed in Pakistani populations to better understand the natural history, risk factors, underlying mechanisms, and long-term outcomes of ongoing post-COVID symptoms and to inform effective health care planning

CONCLUSION

Long-term symptoms after an acute COVID-19 infection are a significant current clinical issue. The top symptoms reported in this study were fatigue, followed by dyspnea, sleep disturbance, trouble concentrating, headache, cough, myalgia, chest pain, altered smell/taste, and palpitations. Many patients had symptoms for months following the acute infection, indicating that full recovery can be delayed. Patients who had mild, moderate, and severe

initial COVID-19 disease all had persistent manifestations, but the burden of multiple symptoms was found to be higher in patients with severe COVID-19. The results underscore the need for structured post-COVID-19 surveillance and early detection of ongoing symptoms, as well as the importance of a multidisciplinary approach to managing these patients. Future prospective studies with a larger Pakistani population are needed to assess long-term outcomes, risk factors associated with the sequelae of post-COVID-19, and effective strategies for prevention, rehabilitation, and management of post-acute COVID-19 sequelae.

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