Postacute Sequelae of COVID-19 Infection and Development of a Physiatry-Led Recovery Clinic

To the Editor:

The coronavirus 2019 disease (COVID-19) pandemic has caused immeasurable loss and suffering for people worldwide. Medical advances have helped save the lives of many COVID-19 patients; however, countless survivors of this disease are now struggling with its after effects. This letter will describe the current state of knowledge regarding persistent symptoms after the initial COVID-19 infection and discuss the central role of physiatry in the care of patients with prolonged symptoms.

Medical literature and mass media have increasingly reported long-term effects in a subset of the COVID-19 survivors after acute resolution of the illness, a syndrome now termed postacute sequelae of COVID-19 infection (PASC). Other commonly used terms for this syndrome include post-COVID-19 syndrome and long COVID-19. The affected population has adopted the term long haulers to describe their battles with ongoing symptoms.

Postacute sequelae of COVID-19 infection represents ongoing symptoms after the acute infection, generally accepted to be 4 wks or longer after the initial SARS-CoV-2 diagnosis or symptom onset. Early studies are helping improve our understanding of the frequency and impact of symptoms. A study in Italy demonstrated a high proportion of individuals reporting fatigue (53%), dyspnea (43%), joint pain (27%), and chest pain (22%) approximately 2 mos after hospitalization for acute illness.[1] A cohort from Wuhan, China, demonstrated that 76% of previously hospitalized patients continued to experience at least one persistent symptom at 6-mo follow-up, with 63% experiencing fatigue or muscle weakness.[2] The cohort with the longest follow-up in the United States revealed that approximately 30% of those previously diagnosed with COVID report persistent symptoms.[3] In addition, a recent meta-analysis demonstrates that the most common symptoms include persistent severe fatigue, headaches, and attention and memory impairments often termed brain fog.[4] Other frequent symptoms include shortness of breath, cough, sleep disturbance, anxiety, and depression (Table 1).

The available literature shows that increased severity of the acute COVID-19 infection is associated with an increased incidence of persistent symptoms. Development of PASC seems to be more common among those who had symptomatic COVID-19 infection, required hospitalization, and were critically ill.[5] Interestingly, some data also suggest that women have a higher incidence of development of PASC.[2,5,6] The cause of PASC in a particular patient may be singular or multifactorial. Possible etiologies include organ dysfunction resulting from the acute illness, manifestations of a persistent hyperinflammatory state, cerebrovascular disease, cerebral hypoxia, medication adverse effects, physical deconditioning, pre–COVID-19 comorbidities, and psychological sequelae.

Increasing recognition of PASC has fueled the development of outpatient PASC programs at dozens of medical centers throughout the United States. The structure of these programs varies substantially and can include a strictly therapy-based program, single-specialty evaluation, or multidisciplinary collaboration. Our review reveals that clinics are led by a variety of specialists, including those in physical medicine and rehabilitation,[7] internal medicine, pulmonology, and infectious disease.

Where possible, we believe that physiatrists serve as the most logical and appropriate choice to lead outpatient PASC programs. Physical Medicine & Rehabilitation (PM&R) providers have experience with managing rehabilitative plans of care for patients with complex medical illnesses that include multisystem manifestations that mirror the symptoms most predominant in PASC. Many of the most debilitated post-COVID patients pass through an inpatient rehabilitation or skilled nursing facility during their recovery, providing an opportunity for developing a robust longitudinal rehabilitative plan and ensuring continuity of care. In addition, the physiatric approach is multidisciplinary and collaborative, thereby providing the most comprehensive and efficient treatment for patients. Given the large breadth of organ systems affected by COVID-19, PM&R can coordinate with other specialists to provide the most appropriate care.

At our tertiary care academic medical center in the southeast, we have implemented a physiatry-led COVID recovery clinic. Initial evaluations are primarily done via telemedicine and include structured questions related to the COVID-19 case history, postacute symptoms and complications, and functional status. Tools administered include anxiety, depression, and cognitive screens. Referral pathways have been established with key specialists, such as pulmonology, cardiology, and neurology, to provide efficient scheduling. More complex patients will subsequently be scheduled for an in-person, multidisciplinary clinic evaluation with PM&R, general internal medicine, psychiatry, neuropsychology, physical therapy, and occupational therapy. The multifaceted nature of PASC patients has necessitated the involvement of a nurse coordinator and a social worker to facilitate a holistic approach to care.

TABLE 1. Frequent PASC symptoms

General	**Fatigue**, sleep disturbance
Respiratory	**Dyspnea**, cough
Cardiovascular	Chest pain, palpitations
Neurological	**Cognitive impairment**, headache, peripheral neuropathy, dizziness
Gastrointestinal	Abdominal pain, nausea, diarrhea
Musculoskeletal	**Joint and muscle pain**
Psychological	**Anxiety**, depression, stress disorder

Common PASC symptoms are listed by organ system. The top 5 complaints in our COVID recovery clinic are bolded.

Looking toward the future, development of research programs will be critical to improving our understanding of PASC. Further characterization of the affected population, risk factors for development, and treatment options will be a central focus of future research and in large part funded through US $1.15 billion approved by Congress in December 2020. Engagement of physiatrists as key clinician-scientists to inform research and implementation priorities will be crucial to ensure the most efficient and effective deployment of resources to improve outcomes for COVID-19 survivors.

ACKNOWLEDGMENTS

The authors greatly appreciate the efforts of collaborators throughout UNC Health in providing care for patients with persistent symptoms after COVID-19 infection.

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Funding for the UNC COVID Recovery Clinic was provided from UNC Hospitals, UNC Faculty Physicians, and the UNC Health Foundation.

DOI: 10.1097/PHM.0000000000001778

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