



# The “Long COVID” Respiratory Symptoms—Concerns with Frailty and Respiratory Diseases

Ricardo Aparecido Baptista Nucci<sup>1,2</sup> Wilson Jacob-Filho<sup>1,2</sup>

<sup>1</sup>Laboratory of Medical Research in Aging (LIM-66), Division of Geriatrics, Clinical Hospital of the Faculty of Medicine of the University of São Paulo, São Paulo, Brazil

<sup>2</sup>Department of Pathology, Faculty of Medicine of the University of São Paulo, São Paulo, Brazil

Address for correspondence Ricardo Aparecido Baptista Nucci, PhD, Department of Pathology, Av. Dr. Arnaldo, 455 - Cerqueira César, São Paulo 01246-903, Brazil (e-mail: nucci.ricardo.ab@gmail.com).

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Respiratory complications are more common in elderly patients, especially in those with a history of respiratory disorders. Additionally, before the coronavirus disease 2019 (COVID-19) outbreak, respiratory diseases (e.g., chronic obstructive pulmonary disease) and pulmonary complications due to lower respiratory infections were some of the leading causes of death in the elderly population.<sup>1</sup> Thus, there is a rising concern in long-term symptoms due to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, mainly in frail elderly people with respiratory pathologies and comorbidities.<sup>2–4</sup>

Recently, the term “Long COVID” had being introduced to describe the long-term symptoms of the SARS-CoV-2 infection in patients recovered and discharged from hospital.<sup>5</sup> The SARS-CoV-2 virus interact with angiotensin-converting enzyme 2 negatively affecting the vascular endothelium and leading to systemic injury.<sup>6</sup> Amidst, the respiratory system is directly lesioned by COVID-19, which may require health strategies for elderly patients with preexisting respiratory diseases, mainly in low-income and middle-income countries due to limited resources. Additionally, SARS-CoV-2 infection severity and mortality has been clearly related to vulnerability due to age-related accumulation of deficits, rather than chronological age itself.<sup>3,4</sup> In this scenario, the need of research support is a necessary step to understand, in an international and interdisciplinary perspective, the long-term symptoms of COVID-19 in this population to manage and preserve their health lifelong. Thus, we performed a literature review on PUBMED database until December 16, 2021 using keywords and Medical Subject Headings terms related to “postacute COVID-19 syndrome” and “respiratory

system,” of which the main findings were summarized in the paragraph below.

Emergent data suggested that 1 to 3 months after discharge, patients still had radiologic abnormalities consistent with pulmonary dysfunction (e.g., interstitial thickening and fibrosis), decreased diffusion capacity for carbon monoxide, and diminished respiratory muscle strength.<sup>7–10</sup> In addition, it was observed airflow obstruction, as well as reduced lung volume measurements (total lung capacity, forced vital capacity, and forced expiratory volume in one second) after more than 1 month postdischarge or more than 2 months postadmission.<sup>11</sup>

With the abovementioned symptoms, this leads to concerns about the elderly population with vulnerability due to a history of preexisting respiratory diseases. Frailty is a complex condition characterized by declining function across several homeostatic systems leading to increased vulnerability to stressors and risk of adverse health outcomes with age.<sup>12–14</sup> At the beginning of COVID-19 pandemic era, initial reports from Wuhan revealed that most cases of COVID-19 have occurred in people aged 60 or above.<sup>15</sup> Additional reports from Italy and the United Kingdom, which are among the most hit countries in Europe, have confirmed the high risk of death in older adults, particularly in those with preexisting diseases (e.g., cardiovascular and respiratory diseases).<sup>16–18</sup> SARS-CoV-2 is a novel virus, which means there is still much that the medical and wider research community do not know. Thus, well-conducted long-term research is needed to follow-up discharged patients with symptoms from “long COVID” to treat sequelae in the vulnerable population, taking into account frailty assessment and the history of comorbidities.<sup>5,14,19</sup>

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We hope this Letter encourage future researches to identify and manage long-term complications due to COVID-19 infection and support elderly patients with vulnerability due to preexisting comorbidities, mainly in the respiratory system.

**Authors' Contributions following the CRediT (Contributor Roles Taxonomy)**

R.A.B.N.: Conceptualization, writing - original draft.

W.J.F.: Supervision, writing - review and editing.

**Conflict of Interest**

None declared.

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None.

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