

# Long COVID and its Manifestations

**Hiba Naveed Ilahi**

1st Year MBBS, Islamabad Medical and Dental College, Islamabad Pakistan

## Key points

- Long COVID in the eyes of International Organizations.
- What are symptoms of long COVID.
- Population affected by this long COVID.
- Need to understand economic and medical impact of long COVID on a patient's wellbeing.

Majority who suffer from the Coronavirus disease (COVID-19) fully recover, but some remain with long term effects on their body systems, including pulmonary, cardiovascular and nervous systems, as well as psychological effects. Post COVID-19 conditions known as long COVID, can affect anyone susceptible to the SARS-CoV-2 irrespective of the age or severity of the original symptoms.

Long COVID as per World Health Organization is the continuation or emergence of new symptoms three months after the initial SARS-Cov-2 infection, with symptoms lasting for at least two months.<sup>1</sup> It is a multi-organ condition which warrants a multidisciplinary clinical approach. According to National Institute for Health Research (NIHC) long COVID may be an amalgamation of four different syndromes such as post-intensive care syndrome, post-viral fatigue syndrome and long term COVID Syndrome.<sup>2</sup>

## Symptoms

Long COVID often manifests in the form of noticeable disability, functional limitation, and loss of productivity, efficiency and resources. Moreover, it has had a profound impact on mental health. While lethargy is the most common symptom of long COVID, cognitive dysfunction including lapse of memory and concentration, chest pain, breathlessness, headaches, dizziness, and palpitation are also common.<sup>3</sup>

In a study undertaken on long COVID and its repercussions, the responses of 3762 participants from 56 countries were analyzed.<sup>4</sup> The most common symptoms after 6 months of the onset of COVID-19 were fatigue, post exertional malaise and cognitive dysfunction. Results from the aforementioned study indicate that long COVID comprises heterogeneous symptoms which affect multiple organ systems having a critical effect on functioning and ability to work. A wide range of neurologic symptoms were also experienced by patients with long COVID with the most common being memory and cognitive dysfunction experienced by 88% of the respondents. Such symptoms translate into reduced work capacity and relapses which

were triggered by mental exertion and stress of work.

Research on the effects of long COVID on children is scarce, however, in a study on 129 children diagnosed with COVID-19 between March and November 2022 the most persistent symptoms were identified as insomnia (18.6%), respiratory symptoms (14.7%), nasal congestion (12.4%), fatigue (10.8%), muscle (10.1%), joint pain (6.9%) and concentration difficulties (10.1%).<sup>5</sup> It was concluded in the aforementioned that measures aimed at controlling the spread of COVID-19 have had a significant impact of children's mental health and wellbeing, therefore, pediatricians, mental health experts and policymakers need to determine and identify means to mitigate the impact of such COVID -19 protocols on the long term mental wellbeing of children.

In another study efforts were made to appraise the range of symptoms in children and adolescents suffering from long COVID.<sup>6</sup> Most common manifestation in children and adolescents upon admission in hospital were fever (67%), cough (38%), respiratory distress (31%), muscle pain (16%) and diarrhea (10%). Moreover, 44.8% of the children /adolescents reported symptoms of long COVID including fatigue (21%), shortness of breath (12%), exercise intolerance (12%), weakness (10%) and walking intolerance (9%).<sup>7</sup>

Efforts have also been made to ascertain whether COVID-19 vaccine administration can impact the prevalence of long COVID and existing long COVID symptoms. A systematic review based on 2584 studies, 11 peer-reviewed studies and six preprints was concluded on the basis of which it was concluded that vaccines reduced the risk of developing long - COVID in people with mild to moderate COVID-19 lending credence to the hypothesis that vaccination could be used as a preventive measure for alleviating long term symptoms of COVID-19.<sup>7</sup> Preliminary findings in this respect also advocated that two doses could be more effective than a single dose. It was concluded that 63% of the studies found that vaccinations improved ongoing symptoms of long COVID, whereas 36% reported

worsening in some cases. Although the findings remained inconclusive there was consensus as regards to the fact that COVID-19 vaccines are beneficial for further immunological protection against re-infections.

Another review on the pathophysiology and mechanism of long COVID has identified certain mechanisms which are potentially involved in long COVID.<sup>8</sup> It was observed that virus driven cellular alterations may impart to the pathophysiology of long COVID giving rise to olfactory disorders and autonomous nervous system dysfunction. Secondly, a dysregulated immune reaction in response to the initial infection may give rise to deleterious disorders including autoimmune manifestations, metabolic disturbances etc.

Additionally, a narrative review conducted by YONG pointed towards six distinct phenotypes including multi-organ sequelae, chronic fatigue, pulmonary fibrosis sequelae, orthostatic syndromes, post-intensive care syndrome, and medical/clinical sequelae pertaining to chronic health conditions.<sup>9</sup>

Older age, female gender, hospital admission at onset, chest pain, abnormal auscultation findings and comorbidities such as asthma were associated with an increased risk of developing long COVID.<sup>10</sup> Furthermore, pre-existing hypertension, chronic lung conditions and the requirement for oxygen therapy were also accentuated as the main determinants of long-term symptoms.<sup>11</sup>

Efforts have also been made to probe the likelihood of long – COVID based on gender. A study found that being a female posed a higher risk for developing long term post - COVID symptoms including depression, anxiety and a poor quality of sleep. It has therefore been proposed that differences in gender be accounted for whilst managing long-haulers.<sup>12</sup>

### Numbers affected

Studies show that around 10-20% of people infected by the SARS-Cov-2 may go on to develop symptoms that can be diagnosed as long COVID. The exact number of those living with long COVID is undetermined, it is believed that more than 17 million people across the WHO European region may have experienced it during the first two years of the pandemic (2020/21).<sup>13</sup>

### Future outlook

There is a need for consensus on a specific categorization of post COVID-19 symptoms including precise etiology as this will impact treatment and rehabilitation decisions.<sup>14</sup>

The World Health Organization is endeavoring to develop three goals – the 3 R's, collectively calling upon governments and health administrations to pivot attention upon post COVID -19 condition and those affected by it through greater (1) recognition and knowledge sharing ,

where all services are sufficiently equipped , and no patient is left alone or has to struggle to navigate a system which is not prepared, or not capable of addressing this debilitating condition (2) research and reporting through data gathering and reporting of cases, and well-coordinated research, with full participation of patients needed to advance understanding of the prevalence, causes and costs of long COVID and (3) rehabilitation that is based on evidence and effectiveness, and is safe for both patients and carers.<sup>15</sup>

To conclude it is imperative to realize the need to attend to the consequences of long COVID by recognizing its impact not only on a patients physical and mental wellbeing but also on their ability to earn sustainable livelihoods. A multidisciplinary research methodology may be applied encompassing community-based population studies, clinical and health care studies and qualitative analysis of lived experiences.<sup>16</sup>

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