

# Neurodegenerative Changes in Long COVID: Implications for Pakistan

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## Abstract

The long term impact of COVID-19, particularly its association with neurodegenerative changes, has become a significant concern in the post-pandemic era. This letter to the editor highlights the increasing incidence of cognitive impairments, dementia and other neurodegenerative conditions observed in patients with long COVID, or post-acute sequelae of SARS-CoV-2 infection. Recent studies highlight the role of chronic inflammation, cerebrovascular alterations and immune dysregulation in contributing to these conditions. In countries like Pakistan, where neurodegenerative diseases are prevalent and awareness of long COVID is limited, there is an urgent need for public health education to address these issues. Educational initiatives should focus on debunking myths about vaccination, promoting early detection of neurodegenerative changes and enhancing the management of long COVID through advanced diagnostic technologies. By prioritizing these efforts, Pakistan can reduce the long term impact of COVID-19 on neurodegenerative health and thus, improve overall public health outcomes.

**Keywords:** Long COVID; Infectious diseases; Health care services; Public health; Epidemiology

## Letter to Editor

### Dear Editor,

SARS-CoV-2 is the virus that primarily spreads through respiratory droplets when an infected person coughs, sneezes, or talks, though it can also be transmitted through close contact with infected individuals or by touching contaminated surfaces and then touching the face. COVID-19 presents with a wide range of symptoms, from mild flu like symptoms to severe respiratory distress and organ failure, with older adults and those with underlying health conditions at higher risk of severe illness. Long COVID-19, alternatively referred to as Post-Acute Sequelae of SARS-CoV-2 infection (PASC), manifests as enduring symptoms following the onset of COVID-19 [1].

In the aftermath of the COVID-19 pandemic, PASC has been emerging as a serious medical condition. A growing body of evidence has illuminated the multifaceted nature of post-COVID conditions among the innumerable symptoms afflicting individuals in the post-acute phase, cognitive impairment stands out as a significant contributor to morbidity [2-5]. We believe that most of the articles are missing the discussion on neurodegenerative changes seen in long COVID patients.

Recent data have suggested an increased incidence of neurodegenerative changes seen in patients with previous COVID-19 [3]. Most patients were reported with dementia, confusion and parkinsonian symptoms. There was also an increased number of alzheimer's cases reported, especially among hospitalized patients [3]. Studies have shown the detrimental effects of long-term COVID on Central Nervous System (CNS) causing inflammatory changes, encephalitis and cerebrovascular changes [4]. Increased incidence rates of anxiety, depression, sleep disorders and cognitive dysfunction further compound the burden faced by individuals struggling with long COVID [5]. Various inflammatory markers and cytokines like total Tau (t-tau), Neurofilament Light Chain (NFL), Glial

Fibrillary Acidic Protein (GFAP) and Phosphorylated-tau-181 (pTau-181) were found elevated in patients and dysregulated immune response to the COVID-19 virus by brain cells play a major role. With recent advancements in medical technology, including Positron Emission Tomography (PET) scans coupled with Artificial Intelligence (AI) can offer insights into subtle metabolic alterations within the brain with algorithms enhancing diagnostic accuracy thus enhancing patient care pathways [6].

Addressing neurodegenerative diseases and reducing the impact of long covid requires a comprehensive approach that includes public health education as an important component. In the context of third world countries especially, Pakistan, where neurodegenerative diseases are prevalent and awareness about long COVID is lacking, prioritizing public health education becomes necessary. This education should aim to debunk myths surrounding vaccination side effects and emphasize evidence-based information on the benefits of vaccination in preventing severe illness, including long COVID. It is the need of an hour to organize seminars and hold conferences to discuss the impact of neurodegenerative diseases on society and the role COVID-19 plays in their prevalence. Furthermore, tailored educational campaigns can empower individuals to make informed decisions about their health, promote early detection and management of neurodegenerative diseases and encourage adherence to preventive measures against COVID-19. By investing in public health education initiatives, Pakistan can effectively combat misinformation, reduce the burden of neurodegenerative diseases and minimize the impact of long COVID on its population.

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## References

1. Ahmad E, Ahmed S, Ahmad B, Arif MH, Ilyas HM, et al. Long COVID-19 and primary care: Challenges, management and recommendations. *Semergen*. 2024; 50(3):102188.
2. Natarajan A, Shetty A, Delanerolle G, Zeng Y, Zhang Y, et al. A systematic review and meta-analysis of long COVID symptoms. *Syst Rev*. 2023; 12(1):88.
3. Bowe B, Xie Y, Al-Aly Z. Postacute sequelae of COVID-19 at 2 years. *Nat Med*. 2023; 29(9):2347-2357.
4. Baazaoui N, Iqbal K. COVID-19 and neurodegenerative diseases: Prion-like spread and long-term consequences. *J Alzheimers Dis*. 2022; 88(2):399-416.
5. Venkataramani V, Winkler F. Cognitive deficits in long Covid-19. *N Engl J Med*. 2022; 387(19):1813-1815.
6. Rudroff T. Artificial intelligence's transformative role in illuminating brain function in long COVID patients using PET/ FDG. *Brain Sci*. 2024; 14(1):73.