

Study explores COVID-19 effects on cognition

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Pavel Danilyuk. Credit: Pexels

A new long-term study led by neuroscientists at Western University shows short-term symptoms from COVID-19, like labored breathing, fever, and dry cough, may just be the proverbial tip of the iceberg.

The findings, published by *Cell Reports Medicine*, reveal short and possible long-term cognitive impairments among people who had COVID-19.

With a robust data set collected by participants using the Cambridge Brain Sciences online scientific investigation tool, principal investigators Adrian Owen and Conor Wild discovered significant impairments in reasoning, speed of thinking and verbal abilities in patients with confirmed cases of COVID-19, but no losses in memory functioning.

"The pattern of [cognitive impairment](#) in these COVID-19 patients resembles that of healthy study participants who are sleep-deprived," said Owen, professor of cognitive neuroscience and imaging at Western's Schulich School of Medicine & Dentistry.

In 2017, [Owen and Wild conducted the world's largest sleep study](#), with more than 40,000 people participating, using the same online scientific investigation tool.

For the COVID-19 brain study, Owen, Wild and their collaborators at Western, University of Cambridge, Sunnybrook Health Sciences Center, and University of Ottawa assessed nearly 500 people approximately three months after a confirmed diagnosis of COVID-19. The participants' COVID-19 experiences ranged from "very mild" to "ICU on ventilation." The researchers found the severity of the cognitive impairments was directly related to the severity of the original infection.

"The worse the COVID-19 symptoms were for the patient, the worse the cognitive impairments were, as well," said Wild, a Schulich School of Medicine & Dentistry research associate, noting significant impairments were also seen in those with mild infection.

The researchers recruited thousands of participants for the study; however, since COVID-19 testing was so sparse in the early days of the pandemic (the study launched in June 2020), they were unable to confirm who had contracted COVID-19 versus those who just thought they might have it. As a result, Owen and Wild chose to focus on 478

individuals, who reported having had a medically confirmed case of COVID-19.

The study also found that the degree of cognitive impairment was not related to the amount of time that had elapsed between COVID-19 infection and the assessment, suggesting that they might be long-lasting.

"The impairments were not smaller for individuals who were up to three months post-infection, which suggests that these effects may not subside in the short term," said Wild.

Mental health impact

The COVID-19 brain study participants presented significantly elevated levels of depression and anxiety, with 30 percent meeting the clinical criteria for one or the other, or both.

"These effects on mental health were not related to the severity of the original infection, or cognitive impairments, suggesting that they may be the result of living through the pandemic itself, rather than the result of COVID-19 infection," said Dr. Richard Swartz from Sunnybrook Health Sciences Center.

The findings of this study are an important first step in a much larger research program emerging at Western, which includes researchers from Western Institute for Neuroscience (WIN), BrainsCAN, the Imaging Pathogens for Knowledge Translation (ImPaKT) Facility, and partners across campus studying the cognitive impairment, [disease progression](#) and mitigation, and social inequalities of long COVID.

More information: Conor J. Wild et al, Disentangling the cognitive, physical, and mental health sequelae of COVID-19, *Cell Reports Medicine* (2022). [DOI: 10.1016/j.xcrm.2022.100750](https://doi.org/10.1016/j.xcrm.2022.100750)

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