

Long Covid May Lead to Measurable Cognitive Decline, Study Finds

People with long Covid symptoms scored slightly lower on a cognitive test than people who had recovered. But long Covid patients who eventually got better scored as well as those whose symptoms did not last long.

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A long Covid patient with cognitive challenges prepared for a neurofeedback therapy session in Massachusetts in June. Brian Snyder/Reuters



By **Pam Belluck**

Pam Belluck has been covering long Covid since the condition first emerged.

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Long Covid may lead to measurable cognitive decline, especially in the ability to remember, reason and plan, a large [new study](#) suggests.

Cognitive testing of nearly 113,000 people in England found that those with persistent post-Covid symptoms scored the equivalent of 6 I.Q. points lower than people who had never been infected with the coronavirus, according to the study, published Wednesday in The New England Journal of Medicine.

People who had been infected and no longer had symptoms also scored slightly lower than people who had never been infected, by the equivalent of 3 I.Q. points, even if they were ill for only a short time.

The differences in cognitive scores were relatively small, and neurological experts cautioned that the results did not imply that being infected with the coronavirus or developing long Covid caused profound deficits in thinking and function. But the experts said the findings are important because they provide numerical evidence for the brain fog, focus and memory problems that afflict many people with long Covid.

“These emerging and coalescing findings are generally highlighting that yes, there is cognitive impairment in long Covid survivors — it’s a real phenomenon,” said James C. Jackson, a neuropsychologist at Vanderbilt Medical Center, who was not involved in the study.

He and other experts noted that the results were consistent with smaller studies that have found signals of cognitive impairment.

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The new study also found reasons for optimism, suggesting that if people’s long Covid symptoms ease, the related cognitive impairment might, too: People who had experienced long Covid symptoms for months and eventually recovered

had cognitive scores similar to those who had experienced a quick recovery, the study found.

In a typical I.Q. scale, people who score 85 to 115 are considered of average intelligence. The standard variation is about 15 points, so a shift of 3 points is not usually considered significant and a shift of even 6 points may not be consequential, experts said.

“The issue is: Are people able to function in their routine capacity in whatever they are doing? And this is not really answered by 3 points more or less,” said Dr. Igor Koralnik, the chief of neuro-infectious diseases and global neurology at Northwestern Medicine in Chicago, who was not involved in the study.

He added: “The determination of X points on an I.Q. scale is less important than the people’s perception of their cognitive difficulties.”

Still, Dr. Jackson, the author of a book about long Covid called “Clearing the Fog,” said that while cognitive tests like the one in the study “identify relatively mild deficits,” even subtle difficulties can matter for some people. For example, he said, “if you’re an engineer and you have a slight decline in executive functioning, that’s a problem.”

The study, led by researchers at Imperial College London, involved 112,964 adults who completed an online cognitive assessment during the last five months of 2022. About 46,000 of them, or 41 percent, said they had never had Covid. Another 46,000 people who had been infected with the coronavirus said their illness had lasted less than four weeks.

About 3,200 people had post-Covid symptoms lasting four to 12 weeks after their infection, and about 3,900 people had symptoms beyond 12 weeks, including some that lasted a year or more. Of those, 2,580 people were still having post-Covid symptoms at the time they took the cognitive test.

The researchers noted that they relied on self-reported symptoms, rather than diagnoses of long Covid, and that the demands of taking a cognitive test might have meant that participants in the study were not the most seriously impaired.

The vast majority of the participants were white, and more than half were female. There were more people from affluent areas than from economically struggling areas.

The test, which the researchers developed and have used in previous studies of patients with brain injuries, Covid and other conditions, consisted of eight tasks designed to evaluate skills such as spatial planning, verbal reasoning and word definitions, along with several aspects of memory.

The senior author of the study, Paul Elliott, an epidemiologist and public health specialist, said the assessment, called Cognitron, has been consistent with other cognitive scales. He also said that, as an online test rather than an in-person or paper assessment, it is useful for studying large numbers of people. He said that the team took the statistical results from the test and computed how they would translate to a standard I.Q. scale.

Professor Elliott noted that the study measured performance at only one point in people's lives, and that the I.Q. computations were averages for the different groups, so they may not have reflected individual results. He also said it was impossible to know if other stresses in people's lives, not just Covid, had contributed to their test performances.

The lowest scores were generally seen in people who had infections earlier in the pandemic, before vaccines and antiviral treatments were available. People who were vaccinated performed somewhat better than those who were not. People who were infected more than once scored only slightly lower than those who were infected a single time.

Most study participants, including those who had developed long Covid, had not been hospitalized for their infection, meaning they had a manageable or mild illness during that initial stage. Still, as in other studies, outcomes were worse for people who had been hospitalized. The 228 participants in the study who spent time in intensive care units scored the equivalent of 9 I.Q. points lower than people who had not been infected.

An encouraging signal from the study was that brain fog and other long Covid cognitive problems do not have to be permanent. Professor Elliott said that "someone who had persistent symptoms that resolved, even if it lasted more than a year" showed test scores that "looked like people who had a short-duration illness."

However, even people whose symptoms lasted only a short time scored lower than uninfected people. Dr. Koralnik said it was striking that "those who got

Covid and recovered, they were still not entirely the same as those who never got Covid.”

Professor Elliott said the participants who were still struggling with long Covid symptoms, like brain fog, exhibited difficulties on tests of executive function skills like planning and focusing, and had problems “forming new memories, rather than forgetting” existing ones.

Dr. Ziyad Al-Aly, the chief of research and development at the V.A. St. Louis Health Care System and a clinical epidemiologist at Washington University in St. Louis, who co-wrote [an editorial about the study](#), said the findings raise many questions: How significant are the real-life effects of the small cognitive deficits identified? Do they raise people’s risk of dementia later in life? What other factors might affect Covid patients’ cognitive scores?

Dr. Jackson said that overall, the fact that cognitive scores showed some deficit in patients with lingering symptoms is concerning, but should also “validate many people with long Covid whose cognitive complaints have been dismissed.”

[Pam Belluck](#) is a health and science reporter, covering a range of subjects, including reproductive health, long Covid, brain science, neurological disorders, mental health and genetics. [More about Pam Belluck](#)

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