UK imaging study finds that even in mild COVID cases there is brain atrophy and cognitive decline

Benjamin Mateus
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"There is a greater cognitive decline … a decline in mental ability, in being able to perform complex tasks." Professor Gwenaëlle Douaud, lead author of the UK Biobank study reviewing the impact of COVID on the brain.

Every day new evidence emerges from studies conducted across the globe highlighting the serious dangers posed by infection with SARS-CoV-2, the virus that causes COVID. The recent publication in the journal *Nature* by the UK Biobank on the impact of COVID and loss of the brain's grey matter is quite alarming.

Led by scientists from the University of Oxford, the UK Biobank study is a 30-year-long project launched in 2006 intending to follow 500,000 volunteers ages 40 to 69 to investigate the impact genetics and environment may have on disease development. The imaging arm of the large trial was opened in 2015 aimed at supplementing the overall findings with high-quality scans of the brain and other organs to gain better insight into disease processes and the impact of treatments.

With the plan of scanning 100,000 images, the study had already conducted more than 40,000 brain scans when the pandemic hit. As more and more reports of severely ill patients suffering from neurological consequences of their infections surfaced, the researchers turned their attention to studying the impact COVID had on the brains of the infected.

Their initial findings were released in preprint form in June 2021, and "revealed a significant, deleterious impact of COVID-19 on the olfactory cortex [the region of the brain responsible for smell perception] and gustatory cortex [taste and flavor], with a more pronounced reduction in grey matter thickness and volume in the left para-hippocampal gyrus, the left superior insula and the left lateral orbitofrontal cortex in COVID patients." In the current study, the authors attempted to discern if even milder cases of COVID led to brain pathology after the acute phase of the infection had subsided.

Dr. Gwenaëlle Douaud, lead author of the UK Biobank study and professor in the department of clinical neurosciences at the University of Oxford, said, "What is really different in this study is that we had mild participants who were not hospitalized, so they were well enough to stay at home, and some were asymptomatic." Additionally, a control group was used for comparison who also had two brain scans conducted and were confirmed never to have been infected with the SARS-CoV-2 virus.

Participants who had been diagnosed with a COVID infection were scanned, on average, four to five months after their infection. The results of the second brain scan were contrasted with their previous scans obtained before their COVID infection (in most instances, completed before the pandemic) offering a direct comparison. The authors wrote, "The availability of pre-infection imaging data reduces the likelihood of pre-existing risk factors being misinterpreted as disease effects."

This facet of the study is highly critical in confirming their findings, as the infected participant's previous scan becomes a baseline comparison. Control participants without previous infection assist in eliminating bias from changes that occur during aging.

The study measured hundreds of distinct brain imaging-derived phenotypes (IDP) where each IDP reflected one specific aspect of the brain's structure or function. Comparing a participant's brain scan at two different time points, they were able to identify effects associated with tissue damage and atrophy [shrinkage] caused by SARS-CoV-2 infection. Douaud added, "We are not seeing the kind of gross pathology that you would see in all of these other brain imaging studies that have focused on hospitalized patients. We are looking at much more subtle kind of differences here."

In all, there were 785 UK Biobank participants between the ages of 51 to 81. There were 401 cases who tested positive for SARS-CoV-2 infection between their brain scans and 384 controls that were "matched for age, sex, ethnicity, comorbidities, economic status, and time elapsed between the two scans."

The scientists remarked on three primary findings from their analysis:

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1) There was greater reduction in grey matter thickness and tissue-contrast in the orbitofrontal cortex and para-hippocampal gyrus, areas of the brain involved with decision making and memory encoding and retrieval.

2) Greater changes in markers of tissue damage in regions functionally connected to the primary olfactory cortex responsible for the sense of smell.

3) Greater reduction in global brain size equivalent to a decade's worth of aging.

They wrote: "… we identified significant effects associated with SARS-CoV-2 infection primarily relating to greater atrophy [shrinkage] and increased tissue damage in cortical areas directly connected to primary olfactory cortex, as well as changes in global measures of brain and cerebrospinal fluid volume." Additionally, corroborating these visual changes, infected participants also demonstrated a larger "cognitive decline" between the two scans, shown in cognitive testing administered during the trial.

When they compared hospitalized patients to non-hospitalized cases (mild cases), though less pronounced, similar patterns in the loss of grey matter was seen. The affected regions included areas that control cognitive processes in decision-making and "attention" allocation that include ethics and morality, impulse control, and emotions. It is no wonder that some people suffering from Long COVID have complained of brain fog and feeling of a loss of identity.

Attempting to place their findings into context, the authors first note that the "strongest" structural changes observed between those infected and control groups corresponded to a loss of around two percent of mean baseline IDP value.

They wrote, "This additional loss in the infected participants of 0.7 percent on average across the olfactory-related brain regions—and specifically ranging from 1.3 to 1.8 percent for the FreeSurfer volume of the para-hippocampal/perirhinal and entorinal cortex [these regions are involved in the formation and processing of memories]—can be helpfully compared with for instance, the longitudinal loss per year of around 0.2 percent (middle-age) and 0.3 percent (older age) of hippocampal volume [regions related to memory] in community-dwelling individuals."

The implications of these findings will require longer follow-up times but infection with SARS-CoV-2, as some are hypothesizing, may predispose some to the development of Alzheimer's disease and other forms of dementia. Though no memory impairment was established among those with mild disease, when they were administered the Trail Making Test (parts A and B), they took a significantly longer time to complete the tasks compared to non-infected controls. The test is a commonly used neuropsychological test of visual attention and task switching, as well as executive function, that is sensitive to detecting cognitive impairments associated with dementia.

Participants previously infected with COVID had a "significantly greater time" completing part B of the test, also known as the alphanumeric trail B, which is associated with "longitudinal changes in the cognitive part of the cerebellum." As the authors note, this part of the brain is associated with cognitive impairments in patients with stroke. These participants and, in general, those infected with COVID will need to be followed closely for years to see if these findings correlate with the development of memory problems or dementia.

One concerning finding was that the differences between the infected and uninfected grew with age. Though the performances were similar between the two groups for those in their 50s and 60s, the performance gap widened considerably for the eldest. Douaud admitted, "I don't know if that's because younger people recover faster or they were not as affected to start with, [it] could be either or it could be both." It should be added, it is unknown when the damage incurred is of sufficient magnitude that it surfaces as a clinical finding. Younger people may manifest more cognitive flexibility, but whether they will suffer the consequences of this harm sooner in their future lives remains an important question.

Serious as these findings are and the insight they offer into the complex processes of cognition, one fundamental question must be asked: "Was it necessary for the population to have undergone this social trauma caused by policies that have allowed the virus to spread throughout communities unimpeded?"

Clearly, the results of the study should evoke a deep sense of unease, if not horror, at what is happening to the billions of people on the planet who have become infected. The findings are more than just the exposure of the devastating impact COVID has on the human body, but irrefutable proof of the dangerous policies being imposed by the ruling elites forcing the population to "live with the virus." If the precautionary principles of medicine hold no sway, the results are chilling, and they reinforce the demand a radical shift in policy to eliminate COVID once and for all.

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