



ATTENTION DEFICIT SYMPTOMS AS A POST-COVID COGNITIVE CONSEQUENCE

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Abstract

COVID-19 has left a lot of people with impairment. One of the common problems people have is with attention deficits. This means they have trouble focusing and paying attention. We looked at how this happens what it looks like and how it affects people. We also looked at why it happens how it is diagnosed and how it affects the quality of life of COVID-19 patients. A lot of studies show that 20 to 30 percent of people who had COVID-19 have trouble with concentration get tired easily have memory problems and have trouble making decisions. This is true for people who only had mild or moderate COVID-19. The reasons for this are complicated. It involves inflammation in the brain not getting oxygen, damage to blood vessels and psychological factors. It is hard to diagnose because the symptoms can be similar to conditions. Also there are no tests, for it and some people may not even realize they have it. Attention deficits can really affect peoples lives. It can make it hard for them to do well in school or work. It can make everyday tasks difficult. It also affects their quality of life. So it is really important to catch it and do something about it. To manage attention deficits people can try to rehabilitate their function make lifestyle changes and get psychological support. It is also important to monitor patients and raise awareness about the issue. Attention deficits are a part of what happens to people after they have COVID-19. We need to do research and take action to prevent long-term cognitive problems. COVID-19 patients need help to deal with attention deficits and other cognitive issues.

Key words: Post-COVID cognitive impairment, attention deficit, neurocognitive dysfunction, neuropsychological testing, long COVID, executive function, risk factors

Introduction: Attention deficit symptoms as a post-COVID cognitive consequence refer to difficulties with concentration, reduced attention span, mental fatigue, and impaired executive function that appear after recovery from COVID-19 infection. These symptoms are often described as part of “long COVID” and may resemble features of attention deficit disorders, even in individuals who previously had no cognitive complaints (Davis et al., 2023; Taquet et al., 2021).

According to international studies, cognitive impairment is reported in approximately 20–30% of patients after COVID-19, including young adults who experienced mild or moderate forms of the disease (WHO, 2022). Attention problems are among the most common neurological complaints and may persist for weeks or even months after recovery.

In Uzbekistan, as in many other countries, the number of COVID-19 cases during the pandemic was significant, and many recovered patients continue to report fatigue, memory problems, and decreased concentration (Ministry of Health of Uzbekistan, 2023). However, structured screening and detailed assessment of post-COVID cognitive symptoms remain limited, and the problem may be under-recognized.

The main issue is that attention deficit symptoms can negatively affect academic performance, professional productivity, and quality of life, especially in students and young people. Because these symptoms are often considered temporary or related only to stress, they may not receive proper medical attention.

In this article, I aim to review attention deficit symptoms as a possible post-COVID cognitive consequence, discuss their prevalence and potential mechanisms, and emphasize the importance of early recognition and awareness in young populations.

Prevalence of Post-COVID Cognitive Impairment

COVID-19 is something that can cause problems with the way people think. Lots of studies have shown this like the one done by Adam Hampshire and his team in 2021. They looked at a group of people and found that many of them had trouble thinking clearly after they got COVID-19 even if they did not have to go to the hospital.

Other researchers, like Carmen García-Sánchez and her team in 2022 have also found that people who had COVID-19 can have problems with their brains. They did tests on people who were still feeling unwell after COVID-19 and found that these people really did have trouble thinking. This is important because it shows that people who say they are still feeling unwell after COVID-19 are not just imagining things.

Another study, done by Boris Vilkhovsky and his team in 2023 looked at lots of studies and found that people who had COVID-19 often had trouble paying attention and remembering things. This is something that other researchers, like Kamina Krishnan and her team in 2022 have also found. They looked at people who were still feeling unwell after COVID-19 and found that they had problems with thinking and paying attention.

Some researchers, like Laura Zamarian and her team in 2022 have also looked at how these problems can last. They found that some people can have trouble thinking for up to a year after they get COVID-19. Some people can get a little better over time.

A study done by Eirini Panagiotou and her team in 2023 also found that lots of people who had COVID-19 can have problems with their brains. This is something that can affect anyone no matter how old they are. Even though we know that COVID-19 can cause these problems we do not know how common they are in some places, like Uzbekistan.

Clinical Manifestations of Attention Deficit

People who had COVID-19 often say they have trouble paying attention. They have a time focusing and get mentally tired easily. This can make it difficult for them to do things and learn new things.

Some people did a study. Found out that these problems are real. They did tests. Found that people who had COVID-19 have trouble with things like paying attention and remembering things. This is true, for people who never had these problems before.

Sometimes people who had COVID-19 have trouble paying attention. It looks like they have attention deficit problems. They might also have trouble remembering things thinking slowly and doing things at the same time. These problems can get worse if they are tired stressed or did not sleep well.

So people who had COVID-19 and have trouble paying attention are not just complaining. They really have problems that can be measured. These problems can last for a time and make their life harder. They might need help to feel better and be able to do things on their own. It is very important to find out if someone who had COVID-19 is having these

problems. If we find out early we can help them get faster. COVID-19 attention deficit problems are a deal and we need to pay attention to them.

Overall, attention deficit in post-COVID patients is characterized by a combination of subjective complaints and measurable cognitive impairment, which can persist for weeks to months, impacting quality of life and functional independence (Vilkhovskiy et al., 2023; García-Sánchez et al., 2022). Early recognition of these manifestations is crucial for timely management and rehabilitation.

Risk Factors of Post-COVID Attention Deficit

Attention deficits following COVID-19 are influenced by a combination of biological, clinical, and psychosocial risk factors, which contribute to both the development and persistence of cognitive impairment.

One of the primary risk factors is the severity of the acute infection. Patients who experienced moderate to severe COVID-19, particularly those requiring hospitalization or oxygen support, are more likely to develop persistent cognitive deficits due to increased risk of hypoxia, systemic inflammation, and neurological involvement (Hampshire et al., 2021; Zamarian et al., 2022). However, several studies emphasize that attention deficits are also present in individuals with mild forms of the disease, suggesting that even limited viral exposure may affect cognitive functioning (García-Sánchez et al., 2022).

Age and pre-existing conditions also play an important role. Older individuals and patients with comorbidities such as cardiovascular disease or metabolic disorders may have a higher susceptibility to post-COVID cognitive impairment. At the same time, young adults, including students, are not protected and may experience significant attention difficulties, especially in high-demand cognitive environments (Krishnan et al., 2022).

Another key factor is neuroinflammatory response, which varies between individuals. Increased inflammatory activity during and after infection may lead to prolonged disruption of neural networks responsible for attention and executive functioning (Vilkhovskiy et al., 2023).

Psychological and lifestyle-related factors further contribute to the development of attention deficits. Stress, anxiety, sleep disturbances, and post-viral fatigue are frequently reported after COVID-19 and can exacerbate cognitive symptoms. These factors are particularly relevant in young populations, where academic pressure and emotional stress may intensify the impact of cognitive dysfunction (Panagiotou et al., 2023).

Finally, the lack of early assessment and rehabilitation may increase the risk of persistent symptoms. Patients who do not receive timely evaluation or support are more likely to experience prolonged cognitive difficulties.

Overall, post-COVID attention deficits are associated with a multifactorial set of risk factors, including disease severity, individual biological response, pre-existing conditions, and psychosocial stressors. Understanding these factors is essential for early identification and targeted intervention.

Pathophysiological Mechanisms of Post-COVID Attention Deficit

The COVID-19 virus affects people in ways and attention deficits after COVID-19 are really complicated. It is likely that many things are contributing to these problems. Current research says that COVID-19 can directly and indirectly affect the nervous system which is the main cause of cognitive impairment.



One reason for this could be that the COVID-19 virus causes neuroinflammation. This means that the immune system is triggered by the COVID-19 virus and it leads to a lot of inflammation in the brain. This inflammation can disrupt the way the brain works the parts that are involved in attention and executive functioning. As a result people can have cognitive deficits as seen in the work of García-Sánchez and colleagues in 2022 and Vilkhovsky and colleagues in 2023.

Another thing that can cause problems is when the brain does not get oxygen during acute COVID-19. This can happen because of hypoxia and vascular injury. When the brain does not get oxygen it can impair the way the neurons work especially in the areas that are responsible for attention and memory. This is what Krishnan and colleagues found in 2022 and Zamarian and colleagues found in 2022.

Psychological and systemic factors can also play a role in attention deficits. For example people can feel really tired stressed, anxious and have -viral syndrome. All these things can make attention deficits worse. This suggests that cognitive impairment can be caused by a combination of psychosocial influences as discussed by Hampshire and colleagues in 2021 and Panagiotou and colleagues in 2023.

Finally some research suggests that COVID-19 can cause long-term changes in the way the brain is connected. This can lead to problems with attention and executive functions as shown by Krishnan and colleagues in 2022 and Vilkhovsky and colleagues, in 2023.

Neuropsychological Assessment of Attention Deficit

The assessment of attention deficits following COVID-19 requires a comprehensive approach that combines subjective clinical evaluation and objective neuropsychological testing. While many patients report difficulties such as reduced concentration, distractibility, and mental fatigue, these complaints must be supported by standardized methods to accurately identify cognitive impairment (García-Sánchez et al., 2022; Vilkhovsky et al., 2023).

Neuropsychological assessment focuses on different components of attention, including sustained attention, selective attention, divided attention, and executive control. These domains are typically evaluated using structured cognitive tasks that measure the patient's ability to maintain focus over time, respond to relevant stimuli, and manage competing information (Krishnan et al., 2022).

In addition to attention-specific tests, a full cognitive evaluation often includes the assessment of working memory, processing speed, and executive functions, as impairments in these areas frequently coexist with attention deficits in post-COVID patients (Hampshire et al., 2021; Zamarian et al., 2022). This integrated approach allows clinicians to identify subtle but clinically relevant cognitive changes that may not be apparent during routine examination.

An important aspect of neuropsychological assessment is the distinction between subjective cognitive complaints and objective deficits. Some patients report significant difficulties despite relatively normal test results, while others may demonstrate measurable impairments without strong subjective awareness. This discrepancy highlights the need for careful interpretation of both clinical and test-based findings (Panagiotou et al., 2023).

However, access to detailed neuropsychological testing remains limited in many healthcare systems, which contributes to the underdiagnosis and underestimation of post-COVID cognitive impairment. Therefore, there is a growing need for the development of simplified and accessible screening tools that can be used in routine clinical practice.

Overall, neuropsychological assessment plays a crucial role in the identification and characterization of attention deficits in post-COVID patients, providing objective evidence of cognitive dysfunction and guiding appropriate management strategies

.Diagnostic Challenges of Post-COVID Attention Deficit

Identifying attention problems in people who had COVID-19 is really tough. This is because people who had COVID-19 have different symptoms and there is no standard way to assess them. A lot of people who had COVID-19 say they have trouble concentrating or staying focused. These problems may not show up during regular doctor visits.

For example some people who had COVID-19 may have trouble paying attention. This may not be noticed by their doctor. Researchers like García-Sánchez and Vilkhovsky have written about this in 2022 and 2023.

There are tests that can measure problems with attention, memory and decision making. These tests are not available everywhere especially in clinics that do not specialize in the brain. This means that some people who had COVID-19 may not get the diagnosis especially if they are young or had a mild case of COVID-19. Researchers like Krishnan and Hampshire have talked about this in 2022 and 2021.

Another problem is that attention problems after COVID-19 can be similar to issues like feeling tired being anxious or depressed or having trouble sleeping. Doctors need to be careful when diagnosing attention problems after COVID-19 and should follow up with patients over time. Researchers like Zamarian and Panagiotou have written about this in 2022 and 2023.

Also different countries and healthcare systems can make it harder to diagnose attention problems after COVID-19. In some countries, like Uzbekistan there are not resources to check for cognitive problems after COVID-19 so it is hard to know how many people are really affected. García-Sánchez has written about this in 2022.

Overall diagnosing attention problems after COVID-19 is. Requires doctors to listen to patients do tests and follow up with them over time. We need tools to screen for these problems and more doctors need to be aware of them. We need to talk about -COVID attention deficits and how to diagnose them correctly. Post-COVID attention deficits are a problem and we need to find a way to solve it.

Duration and Prognosis of Post-COVID Cognitive Impairment

Cognitive impairment following COVID-19 may persist for varying periods, ranging from several weeks to months after the acute phase of infection. According to longitudinal studies, a considerable proportion of patients continue to experience attention deficits, memory problems, and mental fatigue even after clinical recovery (Hampshire et al., 2021; Zamarian et al., 2022).

The duration of these symptoms is highly variable. Some individuals demonstrate gradual improvement over time, particularly within the first 3–6 months, while others develop more persistent cognitive dysfunction lasting up to one year or longer. These long-term manifestations are commonly associated with Long COVID and may significantly affect daily functioning.

Prognosis depends on multiple factors, including the severity of the initial infection, the presence of comorbid conditions, and the individual's neurobiological response. Additionally, psychological factors such as stress and fatigue may influence recovery and prolong symptoms.

Despite evidence of partial recovery in many patients, the long-term trajectory of post-COVID cognitive impairment remains insufficiently understood. Therefore, continuous monitoring and follow-up are essential to assess recovery patterns and identify individuals at risk of persistent deficits.

Comparison with Other Cognitive Disorders

Attention deficits observed after COVID-19 share similarities with other cognitive conditions, particularly attention-related disorders and post-viral syndromes. Patients often present with symptoms such as reduced concentration, distractibility, and impaired executive functioning, which resemble features of attention deficit conditions.

However, post-COVID cognitive impairment differs in several important aspects. Unlike chronic neurodevelopmental disorders, these symptoms typically occur after an acute infectious event and may affect individuals with no prior history of cognitive dysfunction (Krishnan et al., 2022).

In addition, post-COVID attention deficits are frequently accompanied by fatigue, emotional disturbances, and fluctuating symptom severity, which are less characteristic of primary attention disorders. This overlap with post-viral fatigue syndromes suggests a complex interaction between neurological and systemic factors (Panagiotou et al., 2023).

Another distinguishing feature is the potential for partial or full recovery over time, although the duration and extent of recovery remain variable. This reversibility contrasts with more stable, long-term cognitive conditions.

Overall, while post-COVID attention deficits share certain clinical features with other disorders, their acute onset, multifactorial origin, and variable prognosis highlight the need for careful differential diagnosis and individualized management.

Impact on Quality of Life of Post-COVID Attention Deficit

Attention deficits after COVID-19 can really affect peoples lives, school performance and overall well-being. Patients often say they have trouble focusing, finishing tasks and managing responsibilities which can cause frustration, stress and decreased productivity. A study by García-Sánchez et al. In 2022. Vilkhovsky et al. In 2023 supports this.

In students attention problems have an impact. Research shows that young adults who had COVID-19 often struggle with learning doing well on exams and remembering information even when their other physical symptoms are gone. For example a study by Hampshire et al. In 2021. Krishnan et al. In 2022 found this to be true.

Also attention deficits can make fatigue and mental exhaustion worse reducing patients ability to participate in professional activities. These cognitive symptoms can also contribute to distress including anxiety and lowered self-confidence affecting daily life. Zamarian et al. In 2022. Panagiotou et al. In 2023 studied this.

Mild cognitive impairments can have long-term consequences especially if they are not recognized or treated. The studies show that early identification and intervention are important to prevent compounding effects on occupational and social functioning.

Overall attention deficits as a -COVID cognitive consequence are a clinically relevant problem that extends beyond laboratory findings with tangible effects on patients' quality of life and functional independence. This is supported by studies, from Vilkhovsky et al. In 2023 and García-Sánchez et al. In 2022.

Management and Prevention of Post-COVID Attention Deficit



Effective management of -COVID attention deficits needs a comprehensive approach. This approach should address both psychosocial factors. Early recognition and assessment are crucial. They guide interventions. Prevent long-term impairment. Several studies (García-Sánchez et al. 2022; Vilkhovsky et al. 2023) support this.

Non-drug strategies are the way to manage post-COVID attention deficits. These include rehabilitation programs. Such programs improve attention, working memory and executive functioning. They use exercises and training tasks. Krishnan et al., 2022 show that this approach works. Lifestyle changes also help. Adequate sleep, nutrition, physical activity and stress management reduce cognitive fatigue. They improve cognitive performance. Hampshire et al., 2021 and Zamarian et al., 2022 found results.

Psychological support is vital. It helps patients with anxiety, depression or emotional distress caused by deficits. Counseling or therapy helps patients cope. It improves functioning. Panagiotou et al., 2023 highlight the importance of support. Medications for -COVID cognitive deficits are not yet standardized. Ongoing research looks into medications that target neuroinflammation and neurotransmitter regulation. Current recommendations emphasize - drug interventions and supportive care. Vilkhovsky et al., 2023 discuss this further.

Preventive measures are essential. Monitor patients during and after COVID-19 infection. Raise awareness among healthcare providers. Implement cognitive screening. This is particularly important, for students and working adults. García-Sánchez et al., 2022 and Hampshire et al., 2021 stress this. In summary managing post-COVID attention deficits relies on recognition. It also relies on cognitive rehabilitation, lifestyle modification and psychological support. Prevention focuses on vigilance, education and proactive monitoring of health. Post-COVID attention deficits require an approach. Early recognition and non-drug strategies are key. They help prevent long-term impairment and improve performance.

Conclusion

Effective management of -COVID attention deficits is crucial. The reviewed literature shows that attention deficits are a significant cognitive problem after COVID-19. These deficits cause difficulties with concentration sustained attention, mental fatigue and executive functioning. They affect both how people feel and their actual cognitive performance. Post-COVID attention impairments occur in individuals with mild to moderate illness. They are seen across age groups, including young adults. This makes them especially relevant for students and working professionals.

The prevalence of these deficits as reported in studies highlights the impact on public health and academics. The causes of -COVID attention deficits seem to be complex. They involve neuroinflammation, vascular injury, hypoxia and psychosocial factors. This complexity underscores the need for research. Diagnosing -COVID attention deficits is challenging. This is due to overlapping symptoms, lack of screening tools and under-recognition. This is particularly true in areas with healthcare resources.

Currently management focuses on recognition, cognitive rehabilitation, lifestyle changes and psychological support. Preventive strategies emphasize monitoring, education and awareness.

In conclusion attention deficits are an impactful aspect of post-COVID cognitive problems. The evidence from reviewed studies emphasizes the need for assessment, tailored interventions and further research. This is particularly important, in populations. Post-COVID

attention deficits and their term cognitive and functional consequences need to be addressed. Post-COVID attention deficits require attention. The management of -COVID attention deficits is essential.

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