

# Investigating the Link Between Covid-19 Infection and ADHD

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## Introduction

Cognitive impairment and other neuropsychiatric problems are well-documented sequelae of Covid-19 infection [1]. The cause of these symptoms is not entirely clear, however Covid-19 has been shown to cause neuroinflammation, microvascular ischemia, autoimmune phenomena, direct infection of the CNS, and reactivation of other latent pathogens, all of which could produce neuropsychiatric symptoms [2]. Despite these findings, there is currently a lack of consensus as to whether Covid-19 infection is a risk factor for ADHD.

ADHD diagnoses have increased in recent years. The prevalence of ADHD in the US from 2017-2022 was estimated to be 10.08%-10.47%, up from 6.1% in 1997 [3]. Additionally, the number of stimulant prescriptions has increased significantly in recent years and this has resulted in ongoing drug shortages. Per the DEA, stimulant prescriptions increased by 57.9%, from 50.4 million in 2012 to 79.6 million in 2022 [4].

Stimulants have been shown to be effective in treating fatigue and cognitive problems in patients with a wide variety of diagnoses [5], however no published data currently exists on whether stimulants are an effective treatment for Covid-19 related fatigue and neurocognitive complaints, or whether a history of Covid-19 infection increases a patient's likelihood of subsequently being prescribed a stimulant.

Our study aims to evaluate whether a history of Covid-19 infection is correlated with ADHD diagnosis and/or treatment. We hypothesize that patients with a history of Covid-19 infection are more likely to receive an ADHD diagnosis and/or stimulant prescription compared to patients who have not been infected with Covid-19. Additionally, we hypothesize that this likelihood increases with each additional Covid-19 infection a patient has had.

## Objectives

- To determine whether a history of Covid-19 infection is correlated with the likelihood of receiving an ADHD diagnosis
- To determine whether a history of Covid-19 infection is correlated with the likelihood of being prescribed a stimulant
- To determine if a history of  $\geq 2$  Covid-19 infections increases the likelihood of being diagnosed with ADHD and/or being prescribed a stimulant compared to a history of 1 infection

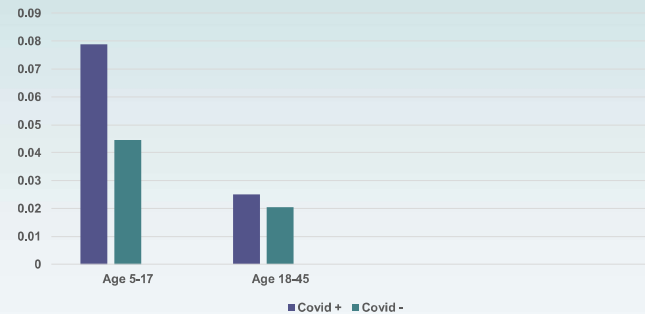
## Results

In pediatric patients (ages 5-17), patients who had tested positive for Covid-19 were 77.1% more likely to have been diagnosed with ADHD (7.88% vs 4.45%) and were 63.4% more likely to have been prescribed a stimulant (5.49% vs 3.36%) compared with patients who had tested negative.

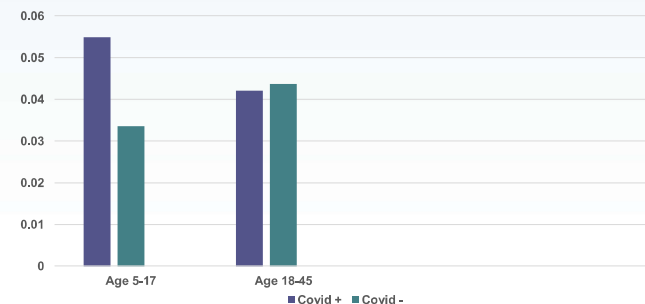
In adult patients (ages 18-45), patients who had tested positive for Covid-19 were 23.0% more likely to have been diagnosed with ADHD (2.50% vs 2.04%) but had similar rates of stimulant prescriptions (4.20% vs 4.37%) compared to those who had tested negative.

The number of patients with  $\geq 2$  documented Covid-19 infections was insufficient to determine whether a history of  $\geq 2$  infections confers additional risk for being diagnosed with ADHD and/or prescribed a stimulant compared to a history of 1 infection.

### Prevalence of ADHD Diagnoses



### Prevalence of Stimulant Prescriptions



## Methods

We analyzed aggregate data from 41,336 patients ages 5-45 in the UChicago Medicine system who had at least 1 documented Covid-19 PCR test result (including both positive and negative test results) to determine whether a history of Covid-19 infection was correlated with having an ADHD diagnosis or being prescribed a stimulant. Patients were divided into 2 groups: those with  $>1$  positive test result and those who had exclusively tested negative. The prevalence of ADHD diagnoses and stimulant prescriptions were compared between the 2 groups. We also attempted to investigate the prevalence of ADHD diagnoses and stimulant prescriptions in patients with  $\geq 2$  positive test results, however the number of patients meeting this criteria was too small to yield meaningful data.

## Conclusion

From the preliminary data we have collected, Covid-19 infection appears to be positively correlated with ADHD diagnoses in both pediatric and adult patients, as well as with stimulant prescriptions in pediatric patients. These findings are unsurprising given the number of patients who report cognitive difficulties after Covid-19 infection. Further data to be collected may help to clarify whether there is a causal relationship between Covid-19 and ADHD or whether these findings are the result of other confounding factors. The correlation between Covid-19 infection and ADHD diagnoses/stimulant prescriptions appears to be much stronger in pediatric patients compared to adult patients, and the reasons for this warrant further investigation. Understanding the relationship between Covid-19 and ADHD will hopefully allow psychiatrists to provide better care to patients who have been infected with Covid-19.

## References

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