

EFFECT OF SARS-COV-2 ON COGNITIVE AND BRAIN FUNCTION: FINDINGS FROM THE UK BIOBANK COVID-19 CASE CONTROL DATASET

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BACKGROUND

- 10-30% of non-hospitalized cases of SARS-CoV-2 infection are estimated to suffer from some Long Covid symptoms [1,2].
- Up to 50% of individuals with other Long Covid symptoms reported also having problems with memory, cognition or concentration [3,4-7].
- In most cases, multiple cognitive domains are affected, and symptoms last for less than 1 year [8].
- Effect on executive functions and episodic memory tests found across multiple studies [8,9].
- Brain studies report reduced hippocampal volumes, structural abnormalities in grey and white matter, fronto-parietal hypometabolism and changes in connectivity in rs-fMRI [8].

METHODS

Data:

UK Biobank Covid-19 case control dataset (N=2092, 51-83 years, 53% females)

Pre-pandemic control group (N=2360, 49-82 years, 49.9% females)

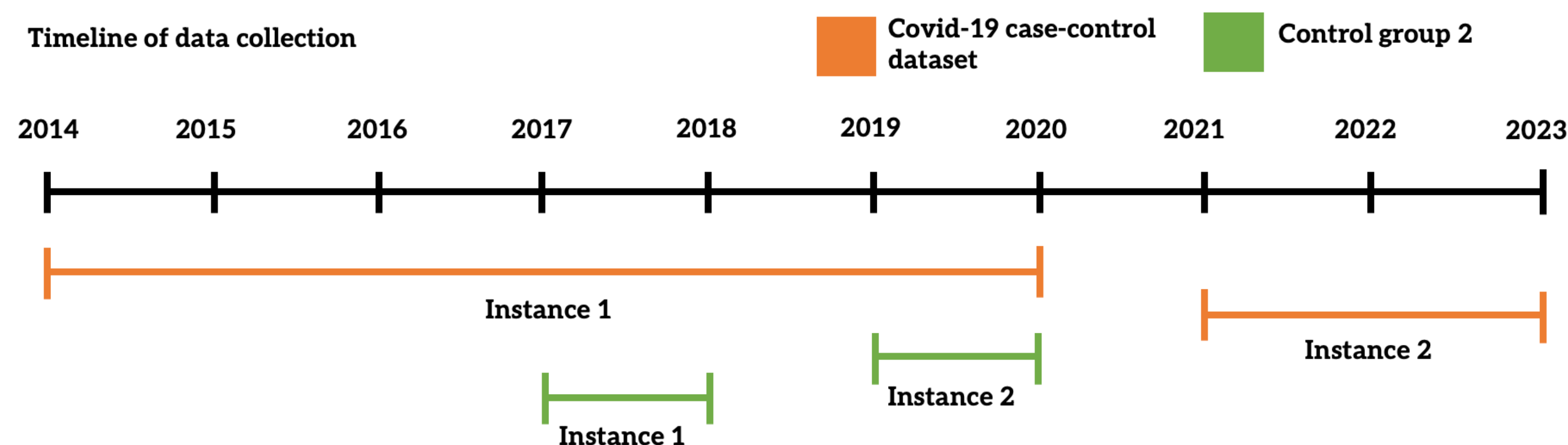


Figure 1 shows the timeline of data collection for the Covid-19 case-control dataset and the additional subsample from UK Biobank that will be used as a control group.

ANALYSIS PLAN

$Test\ 2 \sim Covid\ group * Test\ 1 + Age\ difference\ between\ Test2\ and\ Test1 + Age\ difference\ between\ Test2\ and\ Test1^2 + Age\ at\ Test\ 2 + Ethnicity + Sex + SES + Time\ since\ infection$

Previous studies using a subset of the same dataset found:

- Impairment on TMT A and B [10,11].
- Reduction in grey matter thickness and tissue [10].
- Contrast in orbitofrontal cortex and parahippocampal gyrus [9].
- Significant effect on global brain volume measures [10].
- Accelerated brain aging for both Covid-19 group and control group from the Covid-19 case-control dataset [11].
- Correlation between impairment on TMT and brain aging in the Covid-19 group [11].

Our aim is to partially replicate those findings on larger sample and extend them.

Cognition:

- TMT (trail making test) A & B
- Associative memory test
- Fluid Intelligence test
- Matrix completion test

Neuroimaging:

- Grey matter volume
- White matter hyperintensities
- Hippocampal volume and grey matter volume

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CONTACT

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REFERENCES

- [1] Bull-Otterson L et al. Morb Mortal Wkly Rep (2022); 71: 713-717.
- [2] Ceban F et al. Brain Behav Immun (2022); 101: 93-135.
- [3] Dennis A et al. J R Soc Med (2023); 01410768231154703.
- [4] Hampshire A et al. EClinicalMedicine (2021); 39: 101044.
- [5] Wild CJ et al. Cell Rep Med (2022); 3: 100750.
- [6] Guo P et al. Front Aging Neurosci; 14. (2022). DOI: 10.3389/fnagi.2022.804937.
- [7] Cohn M et al. Psychol Aging (2008); 23: 93-103.
- [8] Zhao, S et al. Trends in Cognitive Sciences (2023), 27(11), 1053-1067. <https://doi.org/10.1016/j.tics.2023.08.008>
- [9] Weinerova et al. Peer Community In RR (in prep). <https://osf.io/tjs5u>
- [10] Douaud, G et al. Nature (2022), 604(7907), 697-707. <https://doi.org/10.1038/s41586-022-04569-5>
- [11] Mohammadi-Nejad, Ali-Reza, et al. medRxiv (2024): 2024-07. <https://doi.org/10.1101/2024.07.22.24310790>