

LETTER TO THE EDITOR

Open Access



Author response to “post-infection cognitive impairments in a cohort of elderly patients with COVID-19”

Yu-Hui Liu^{1,2}, Ye-Ran Wang^{1,2}, Qing-Hua Wang^{1,2}, Juan Liu^{1,2} and Yan-Jiang Wang^{1,2,3*} 

To the Editor,

We appreciate the comments on our study about the 6-month cognitive outcomes of COVID-19 among older adults by Dr. Rahmouni Nesrine et al. In this study we found that COVID-19 survivors, especially those who survived severe infection, had worse cognitive performances than their uninfected spouses [1]. We agree with Rahmouni and colleagues that the methods used in our study have limitations. For the reason of feasibility during the pandemic, we chose uninfected spouses as the control. As their age, living conditions, and lifestyles were similar to those of patients, this control selection could help to reduce the bias attributed to these factors which are known to closely relate to cognitive functions. However, the choice of uninfected spouses as the control group would also cause some bias, because, as expected, uninfected spouses would certainly be in better health conditions. As pointed out by Rahmouni and colleagues, ICU admission was also found to be associated higher risk of dementia [2, 3], it is possible that ICU admission, but not severe COVID-19 itself, contributed to the long-term cognitive decline in severe cases. Subjects with pneumonia infected by non-COVID viruses and non-COVID ICU patients would be more appropriate as controls to examine the specific impact of COVID-19 on cognition.

As the aim of our study was to investigate whether COVID-19 could cause long-term cognitive decline, we did not use the cognitive assessment upon discharge as the baseline cognitive status, as it was post-infection status and the cognitive impairment was found to be common at acute stage of COVID-19 [4]. The pre-infection cognitive performance would be the ideal baseline cognitive status; however, this was not practical for our cohort. Therefore, the changes of cognition after infection were assessed with the Chinese version of the short form Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE), which is often used to assess the longitudinal cognitive decline under circumstances where the baseline cognitive information is lacking [5]. The reporters of IQCODE questionnaire were informants who co-lived with the patients and their spouses, most of them were adult children of the patients who were familiar with the cognitive status of their parents. We did not collect the information about whether the informants were also infected with COVID-19, which is related to the reliability of their report on the cognitive change of their parents. We agree that sleep disorders after COVID-19 might generate impacts on the cognition of the survivors. This is an important issue and needs to be addressed to better understand the long-term impact of COVID-19 on cognition.

The COVID-19 pandemic has been profoundly plaguing our life and society and is still raging worldwide. The long-term health consequences of COVID-19 are an important public health issue but remain largely unknown at present time. We conducted this pilot study among the first bulk of patients in Wuhan COVID-19

*Correspondence: yanjiang_wang@tmmu.edu.cn

¹ Department of Neurology and Centre for Clinical Neuroscience, Daping Hospital, Third Military Medical University, Chongqing, China
Full list of author information is available at the end of the article



pandemic and the data may not be entirely applied to the current COVID-19 patients as the virus has been mutated to Omicron strains with less toxicity. However, due to restrictions caused by the pandemic conditions, the methodology of our study has some limitations which might cause bias in interpreting the research findings. Emerging studies identified the long-term impacts of COVID-19 on both the structure and function of the brain [6–10]. In the future, the improvement of the methodology, more rigorous study design, and more intensive mechanistic investigations are needed to unveil the long-term impacts of COVID-19 on cognition and formulate the corresponding interventions to meet the challenge of the pandemic.

Authors' contributions

All authors contributed to the drafting of the manuscript. All authors read and approved the final manuscript.

Funding

This study is supported by National Natural Science Foundation of China (81930028 to WYJ, 81971024 to Y.H.L.).

Availability of data and materials

Not applicable.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

All authors qualified for the authorship and approved the publication of this study.

Competing interests

None.

Author details

¹Department of Neurology and Centre for Clinical Neuroscience, Daping Hospital, Third Military Medical University, Chongqing, China. ²Chongqing Key Laboratory of Ageing and Brain Diseases, Chongqing, China. ³Center for Excellence in Brain Science and Intelligence Technology, Chinese Academy of Sciences, Shanghai, China.

Received: 22 August 2022 Accepted: 29 August 2022

Published online: 26 September 2022

References

- Liu YH, Wang YR, Wang QH, Chen Y, Chen X, Li Y, et al. Post-infection cognitive impairments in a cohort of elderly patients with COVID-19. *Mol Neurodegener.* 2021;16:48.
- Guerra C, Linde-Zwirble WT, Wunsch H. Risk factors for dementia after critical illness in elderly Medicare beneficiaries. *Crit Care.* 2012;16:R233.
- Davydow DS, Zatzick D, Hough CL, Katon WJ. In-hospital acute stress symptoms are associated with impairment in cognition 1 year after intensive care unit admission. *Ann Am Thorac Soc.* 2013;10:450–7.
- Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, et al. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan China. *JAMA Neurol.* 2020;77:683–90.
- McGovern A, Pendlebury ST, Mishra NK, Fan Y, Quinn TJ. Test accuracy of informant-based cognitive screening tests for diagnosis of dementia and multidomain cognitive impairment in stroke. *Stroke.* 2016;47:329–35.
- Douaud G, Lee S, Alfaro-Almagro F, Arthofer C, Wang C, McCarthy P, et al. SARS-CoV-2 is associated with changes in brain structure in UK biobank. *Nature.* 2022;604:697–707.
- Gordon MN, Heneka MT, Le Page LM, Limberger C, Morgan D, Tenner AJ, et al. Impact of COVID-19 on the onset and progression of Alzheimer's disease and related dementias: a roadmap for future research. *Alzheimers Dement.* 2021.
- Hampshire A, Trender W, Chamberlain SR, Jolly AE, Grant JE, Patrick F, et al. Cognitive deficits in people who have recovered from COVID-19. *EClinicalMedicine.* 2021;101044.
- Taquet M, Geddes JR, Husain M, Luciano S, Harrison PJ. 6-month neurological and psychiatric outcomes in 236 379 survivors of COVID-19: a retrospective cohort study using electronic health records. *Lancet Psychiatry.* 2021.
- Ollila H, Pihlaja R, Koskinen S, Tuulio-Henriksson A, Salmela V, Tiainen M, et al. Long-term cognitive functioning is impaired in ICU-treated COVID-19 patients: a comprehensive controlled neuropsychological study. *Crit Care.* 2022;26:223.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

