



ELSEVIER

Contents lists available at ScienceDirect

International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid

Letter to the Editor

Parasites Protect from Severe COVID-19. Myth or Reality?

Dear Editor

During the overheating investigations of factors that can decrease COVID-19 severity, coinfection with some parasitic diseases was identified (Gluchowska et al., 2021). In this letter, we will elaborate why we think that the protective effect of intestinal parasitic coinfection with COVID-19 could be a myth.

One paper by Bamorovat et al. described how cutaneous leishmaniasis can decrease the morbidity and mortality of COVID-19 using a case-control study design (Bamorovat et al., 2021). We found that there are major concerns in the design of this study. First, the authors included the control group according to their “probable status of COVID-19 infection”. Then, the authors dichotomized them according to the polymerase chain reaction (PCR) test result into positive and negative (retrospectively), whereas the case participants were selected according to their “leishmaniasis” status and then (prospectively) a follow-up was conducted to detect whether they were infected with SARS-CoV-2. This leads to selection bias (the criteria for inclusion in the case and control groups are different), differential misclassification, and observer bias (a physician assessing the patients with leishmaniasis can alter the disease course). Moreover, the authors have not adjusted for any covariates in the study.

In another prospective cohort study, Wolday et al suggested that intestinal parasitic coinfection was attributed to having less COVID-19 complications (Wolday et al., 2021). We believe selection bias is a major concern in this study because the authors included all patients screened for COVID-19 and then tested them for parasites. Therefore, the probability of inclusion is associated with the exposure (COVID-19) and the outcome (proportion of parasite coinfection). There could also be admission bias owing to the selection from the screening program held at that time in Ethiopia.

Other case reports, animal studies, and reviews have claimed that some parasites can protect against COVID-19 and other respiratory diseases (Hussein et al., 2020, Mohamed et al., 2020, Schwartz et al., 2018, Siles-Lucas et al., 2021). In contrast, a study has found that other parasitic infections such as helminths (Abdoli, 2020) increase the risk of COVID-19 severity. Moreover, the authors of those articles failed to properly investigate causation by describing temporality, biological gradient, analogy, and reversibility.

Thus, we believe that the evidence provided in the studies above may not support the conclusion that parasitic coinfection can reduce the severity of COVID-19. In addition, we believe that further studies with better methodology should be conducted to

discover the true impact of parasitic coinfection in patients with COVID-19.

Financial support statement

None.

Ethical approval

Not applicable.

Authors' contribution and acknowledgments

MA and NTH developed the idea. All authors contributed to the literature review and manuscript writing. All authors approved the final version under the supervision of NTH. No one other than the listed authors contributed to this work.

Conflict of interest

All authors declare no conflict of interest.

References

- Abdoli A. Helminths and COVID-19 Co-Infections: A Neglected Critical Challenge. *ACS Pharmacol Transl Sci* 2020;3(5):1039–41.
- Bamorovat M, Sharifi I, Aflatoonian MR, Karamoozian A, Tahmouresi A, Jafarzadeh A, et al. Prophylactic effect of cutaneous leishmaniasis against COVID-19: A case-control field assessment. *Int J Infect Dis* 2021.
- Gluchowska K, Dzieciatkowski T, Sedzikowska A, Zawistowska-Denziak A, Mlocicki D. The New Status of Parasitic Diseases in the COVID-19 Pandemic-Risk Factors or Protective Agents? *J Clin Med* 2021;10(11).
- Hussein MIH, Albashir AAD, Elawad O, Homeida A. Malaria and COVID-19: unmasking their ties. *Malar J* 2020;19(1):457.
- Mohamed MFH, Mohamed SF, Yousaf Z, Kohla S, Howady F, Imam Y. COVID-19 unfolding filariasis: The first case of SARS-CoV-2 and *Wuchereria bancrofti* coinfection. *PLoS Negl Trop Dis* 2020;14(11):e0008853.
- Schwartz C, Hams E, Fallon PG. Helminth Modulation of Lung Inflammation. *Trends Parasitol* 2018;34(5):388–403.
- Siles-Lucas M, Gonzalez-Miguel J, Geller R, Sanjuan R, Perez-Arevalo J, Martinez-Moreno A. Potential Influence of Helminth Molecules on COVID-19 Pathology. *Trends Parasitol* 2021;37(1):11–14.
- Wolday D, Gebrecherkos T, Arefaine ZG, Kiros YK, Gebreegzabher A, Tasew G, et al. Effect of co-infection with intestinal parasites on COVID-19 severity: A prospective observational cohort study. *EclinicalMedicine* 2021;39.

Abdelrahman M Makram

School of Public Health, Imperial College London, London, United Kingdom

Marcel Alied

Faculty of Pharmacy, University of Aleppo, Aleppo, Syria

Zeeshan Ali Khan
Shadan Institute of Medical Sciences, Hyderabad, Telangana, India

Nguyen Tien Huy*
School of Tropical Medicine and Global Health, Nagasaki University,
Nagasaki 852-8523, Japan

*Corresponding author: Nguyen Tien Huy, School of Tropical
Medicine and Global Health, Nagasaki University, Nagasaki
852-8523, Japan

E-mail addresses: abdelrahman.elsayid21@imperial.ac.uk (A.M.
Makram), aliedmarcel@gmail.com (M. Alied),
alizkhan99@gmail.com (Z.A. Khan), tienhuy@nagasaki-u.ac.jp (N.T.
Huy)