



PULMONOLOGY

www.journalpulmonology.org

CORRESPONDENCE

Mould exposure and COPD outcomes: Association or causation?

Dear Editor,

Kosmidis and colleagues have revealed an association between activities related to mould exposure and the medical visits and antibiotic usage in individuals with chronic obstructive pulmonary disease (COPD).¹ However, it is essential to note that their study is based on a questionnaire survey, and thus, the relationship between the two remains a mere correlation and cannot be considered causal.

To demonstrate that the relationship between mould exposure and COPD outcomes is causal, it is necessary to reconstruct the research design using Bradford Hill's criteria. Bradford Hill's criteria is a classical method to evaluate whether a factor is related to the onset of a particular disease.² Specifically, it consists of nine items: strength, consistency, specificity, temporality, biological gradient, plausibility, coherence, experiment, and analogy. Amongst these criteria, their study lacks sufficient verification in the aspects of temporality, biological gradient, and coherence.

Firstly, regarding "temporality," incorporating questions about the timing of COPD onset and mould exposure into the survey could potentially resolve this issue. Secondly, concerning "biological gradient," a more quantitative investigation into the frequency of both mould exposure and COPD outcomes might resolve this issue, but it would require more individuals with COPD. Lastly, regarding "coherence," it is necessary to investigate whether avoiding mould exposure leads to a reduction in COPD outcomes. As a more straightforward approach, researchers could also consider studying whether COPD outcomes decrease with masque-wearing. Although there is a debate about the effectiveness of masque-wearing,^{3,4} many people wore masks to prevent the spread of infection during the pandemic of coronavirus disease 2019. Thus, examining whether the frequency of COPD

outcomes changed during this period might indirectly provide clues about the causal relationship between mould exposure and COPD outcomes.

If these processes can determine whether the association between mould exposure and COPD outcomes is not just a mere correlation but a causal relationship, it could make it easier to formulate strategies for reducing COPD outcomes. I hope their study will be conducted with a larger sample size and more detailed questionnaire items.

Conflicts of interest

The author declares no potential conflicts of interest.

Authors contribution

Conceptualisation, manuscript writing: Hiroshi Ito

Financial support

No financial support involved.

Final approval of manuscript

all authors

Acknowledgments

None.

<https://doi.org/10.1016/j.pulmoe.2023.10.001>

2531-0437/© 2023 Sociedade Portuguesa de Pneumologia. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: H. Ito, Mould exposure and COPD outcomes: Association or causation?, Pulmonology (2023), <https://doi.org/10.1016/j.pulmoe.2023.10.001>

H. Ito

References

1. Kosmidis C, Hashad R, Mathioudakis AG, McCahery T, Richardson MD, Vestbo J. Impact of self-reported environmental mould exposure on COPD outcomes. *Pulmonology*. 2023;29(5):375–84. <https://doi.org/10.1016/j.pulmoe.2021.05.003>.
2. Hill AB. *The environment and disease: association or causation?* *Proc R Soc Med*. 1965;58(5):295–300.
3. Ippolito M, Vitale F, Accurso G, Iozzo P, Gregoretti C, Giarratano A, et al. Medical masks and respirators for the protection of healthcare workers from SARS-CoV-2 and other viruses. *Pulmonology*. 2020;26(4):204–12. <https://doi.org/10.1016/j.pulmoe.2020.04.009>.
4. Alizargar J. Wearing masks and the fight against the novel coronavirus (COVID-19). *Pulmonology*. 2021;27(1):89. <https://doi.org/10.1016/j.pulmoe.2020.05.011>.

Hiroshi Ito

Division of General Internal Medicine, Department of Internal Medicine, Tokyo Medical University Ibaraki Medical Centre, 3-20-1 Chuo, Ami-machi, Inashiki-gun, Ibaraki 300-0395, Japan

E-mail address: itohirokan@yahoo.co.jp

Received 4 October 2023; Accepted 6 October 2023

Available online xxx