



Contents lists available at ScienceDirect

# Safety and Health at Work

journal homepage: [www.e-shaw.net](http://www.e-shaw.net)

## Letter

### Letter to the Study by Hyvönen et al. on Moisture Damage and MCS

#### Keywords:

Epidemiology  
Indoor air  
MCS  
Moisture damage  
Symptoms

#### A B S T R A C T

Due to the significant methodological problems in the empirical part of the paper and the very selective literature review, the conclusions of the paper are mostly unsupported.

#### To the editor,

The article by Hyvönen et al. [1] attempt to address the association of exposure to moisture and microbes at their workplace in a hospital with the risk of neurological symptoms and multiple chemical sensitivity. Unfortunately, the empirical part has several major problems and unclear methods, and therefore provides little evidence. Despite of this, in the discussion exaggerated conclusions are drawn from the results.

Authors were able to contact only 13% of the personnel working at the hospital. All of them were symptomatic and most reported several illnesses, e.g. 69% reported to have asthma. The hospital in question has attracted a lot of attention in the national media, and there are also ongoing litigations, which is likely to affect the self-reported symptoms. There were no objective markers of health status and little, if any, exposure assessment (duration, amount or quality of personal exposure).

There are also many problems with the statistical analyses. All persons from the hospitals were female, but only half of the control group. The methods promise a test for the confounding effect of gender, but it is not reported in the results. In addition, other statistical methods are unclear, e.g. the methods speak of Mantel-Hanzel, the result about logistic regression and the table misses the crucial footnote, which might have explained what was really carried out.

Taken together, the low response rate, likely high selection bias and reporting bias, missing exposure assessment and unclear and missing statistical adjustments make the empirical results of the article quite unreliable.

In their review of literature, the article completely neglects the majority of the literature on multiple chemical sensitivity and only concentrates on articles supporting the authors' unidirectional toxicological interpretations. Current knowledge supports the biopsychosocial origin of environmental intolerance, e.g. multiple chemical sensitivity, which is not due to exposure [2–5], but relate to negative expectations and prior beliefs [6]. Thus, multiple chemical sensitivity, other environmental intolerances and functional

disorders share common manifestations and nocebo-related mechanisms [6–9]. In Finland, an excess of building-related environmental intolerance is seen, likely due to the raised alertness on dampness-related health risks [10]. Thus, the relationship between microbes and nonspecific symptoms presented in this article should be interpreted with considerable caution.

Based on these very weak cross-sectional data and their biased review of the literature, the authors in their conclusion still propose causality between mould exposure and multiple chemical sensitivity.

Owing to the significant methodological problems in the empirical parts of the article and the very selective literature review, the conclusions of this article are mostly unsupported and it contributes little to current scientific literature.

#### Conflict of interest

None of the authors have conflict of interest with this letter.

#### References

- [1] Hyvönen S, Lohi J, Tuuminen T. Moist and mold exposure is associated with high prevalence of neurological symptoms and MCS in a Finnish hospital workers cohort. *Saf Health Work* 2020. <https://doi.org/10.1016/j.shaw.2020.01.003>.
- [2] Das-Munshi J, Rubin GJ, Wessely S. Multiple chemical sensitivities: a systematic review of provocation studies. *J Allergy Clin Immunol* 2006;118:1257–64.
- [3] Azuma K, Uchiyama I, Tanigawa M, Bamba I, Azuma M, Takano H, Yoshikawa T, Sakabe K. Chemical intolerance: involvement of brain function and networks after exposure to extrinsic stimuli perceived as hazardous. *Environ Health Prev Med* 2019 Oct 22;24(1):61.
- [4] Bornschein S, Hausteiner C, Römmelt H, Nowak D, Förstl H, Zilker T. Double-blind placebo-controlled provocation study in patients with subjective Multiple Chemical Sensitivity (MCS) and matched control subjects. *Clin Toxicol* 2008;46:443–9.
- [5] Hetherington L, Battershill J. Review of evidence for a toxicological mechanism of idiopathic environmental intolerance. *Hum Exp Toxicol* 2013;32:3–17.
- [6] Van den Bergh O, Brown RJ, Petersen S, Witthöft M. Idiopathic environmental intolerance: a comprehensive model. *Clin Psychol Sci* 2017;5:551–67.

DOI of original article: <https://doi.org/10.1016/j.shaw.2020.01.003>.

2093-7911/\$ – see front matter  
<https://doi.org/10.1016/j.shaw.2020.05.005>

- [7] Bailer J, Witthöft M, Paul C, Bayerl C, Rist F. Evidence for overlap between idiopathic environmental intolerance and somatoform disorders. *Psychosom Med* 2005;67:921–9.
- [8] Eis D, Helm D, Mühlinghaus T, et al. The German multicentre study on multiple chemical sensitivity (MCS). *Int J Hyg Environ Health* 2008;211:658–81.
- [9] Szemerszky R, Köteles F, Lihi R, Bárdos G. Polluted places or polluted minds? An experimental sham-exposure study on background psychological factors of symptom formation in 'Idiopathic Environmental Intolerance attributed to electromagnetic fields. *Int J Hyg Environ Health* 2010;213:387–94.
- [10] Karvala K, Sainio M, Palmquist E, Claeson AS, Nyback MH, Nordin S. Building-related environmental intolerance and associated health in the general population. *Int J Environ Res Public Health* 2018;15:2047.

Juha Pekkanen\*

*University of Helsinki, Department of Public Health and Environmental Health Unit, Finnish Institute for Health and Welfare, Finland*

Jussi Karjalainen  
*Pulmonary Diseases and Allergology, Allergy Centre, Tampere University Hospital, Tampere, Finland*

Jussi Lampi  
*Environmental Health Unit, Finnish Institute for Health and Welfare, Finland*

\* Corresponding author. *University of Helsinki, Department of Public Health, P.O.Box 20, 00014, Finland.*  
E-mail address: [Juha.pekkanen@helsinki.fi](mailto:Juha.pekkanen@helsinki.fi) (J. Pekkanen)

16 March 2020  
Available online 12 June 2020