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The study of recovery rates of COVID-19 olfactory and gustatory dysfunctions requires psychophysical evaluations

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Dear Editor,

We read the paper of Biadsee et al. entitled “*Eight-month follow-up of olfactory and gustatory dysfunctions in recovered COVID-19 patients*” [1]. Authors attempted to determine the 8-month recovery rates of olfactory (OD) and gustatory (GD) dysfunctions in coronavirus disease 2019 (COVID-19) patients through a phone-based 7-item telephone questionnaire. At 8-month post-infection, authors observed that 61.5% and 52% of patients self-reported full recovery of smell and taste senses. They concluded that ‘complete recovery of smell and taste functions occurred in 52% and 61.5%, respectively’. We acknowledge the authors for this study. However, many methodological points may limit the establishment of reliable conclusions.

First, it is difficult to state that patients had OD and GD because authors based their evaluations on patient-reported outcome questionnaire. Indeed, OD and GD are usually confirmed with the realization of psychophysical olfactory and gustatory evaluations, which are semi-objective (or semi-subjective) testing defining the presence of ‘true’ smell and taste dysfunctions [2,3]. The use of psychophysical evaluations makes particularly sense in COVID-19 patients because there would exist a mismatch between the prevalence of self-reported OD and the prevalence of psychophysical-based OD (anosmia and hyposmia) [4]. In the study of Biadsee et al., we did not find the definition of ‘*normal smell sense*’ in the questionnaire. It is important to specify the definition of normal smell sense because many COVID-19 patients who recovered smell sense may have parosmia, which is a smell disorder [5]. This finding was supported by Hopkins et al., who observed that 43.1% of COVID-19 patients self-reported completed smell recovery at 6 months, but 20.3% of these patients reported persisting smell disorder consisting of parosmia [5].

Second, to assess the taste recovery, the authors used the following question: “*Rate your sense of taste to date, on a scale from 0 to 10*” [1]. They did not define taste dysfunction that is commonly defined as impairment of salty, sweet, bitter, and sour perception [6]. The use of a

consistent and validated definition of taste/gustatory dysfunction is important because there is confusion in the population about taste and aroma definitions [7]. In other words, many patients think they have taste dysfunction but, after testing, they only have OD and related aroma disorder. The risk of confusion may be reduced further by gustatory psychophysical or objective evaluations that are reliable methods to really evaluate the recovery rate of taste sense. The evaluation of GD with patient-reported outcome questionnaire and without psychophysical gustatory evaluations may perpetuate the confusion.

The last point that needs additional information is the patient management of OD and GD. The authors did not specify if patients received nasal or general treatment (e.g., nasal or oral corticosteroids) or were instructed to respect olfactory or gustatory training during the follow-up period. To date, there are controversial data about the usefulness of olfactory training, nasal or oral corticosteroids [8,9]. Authors that will investigate the recovery of post-COVID-19 smell, taste, and aroma senses have to consider the use of psychophysical olfactory and gustatory evaluations and the types of patient management, including medication or olfactory training advice.

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References

- [1] Biadsee A, Dagan O, Ormianer Z, Kassem F, Masarwa S, Biadsee A. Eight-month follow-up of olfactory and gustatory dysfunctions in recovered COVID-19 patients. *Am J Otolaryngol* 2021.
- [2] Schuster B, Iannilli E, Gudziol V, Landis BN. Gustatory testing for clinicians. *B-ENT* 2009;5(Suppl. 13):109–13.
- [3] Rumeau C, Nguyen DT, Jankowski R. How to assess olfactory performance with the Sniffin&aposts; sticks test. *Eur Ann Otorhinolaryngol Head Neck Dis* 2016;133(3): 203–6. <https://doi.org/10.1016/j.anorl.2015.08.004>.
- [4] Lechien JR, Cabaraux P, Chiesa-Estomba CM, Khalife M, Hans S, Calvo-Henriquez C, Martiny D, Journe F, Sowerby L, Saussez S. Objective olfactory evaluation of self-

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- reported loss of smell in a case series of 86 COVID-19 patients. *Head Neck* 2020;42(7):1583–90. <https://doi.org/10.1002/hed.26279>.
- [5] Hopkins C, Surda P, Vaira LA, Lechien JR, Safarian M, Saussez S, Kumar N. Six month follow-up of self-reported loss of smell during the COVID-19 pandemic. *Rhinology* 2021;59(1):26–31. <https://doi.org/10.4193/Rhin20.544>.
- [6] Bhattacharyya N, Kepnes LJ. Contemporary assessment of the prevalence of smell and taste problems in adults. *Laryngoscope* 2015;125:1102–6. <https://doi.org/10.1002/lary.24999>.
- [7] Stevenson RJ, Oaten MJ, Mahmut MK. The role of taste and oral somatosensation in olfactory localization. *Q J Exp Psychol (Hove)* 2011 Feb;64(2):224–40. <https://doi.org/10.1080/17470218.2010.491922>.
- [8] Lechien JR, Hoch CC, Vaira LA, Saussez S. The interest of fluticasone nasal spray in COVID-19 related anosmia is still not demonstrated. *Am J Otolaryngol* 2021: 103008. <https://doi.org/10.1016/j.amjoto.2021.103008>.
- [9] Singh CV, Jain S, Parveen S. The outcome of fluticasone nasal spray on anosmia and triamcinolone oral paste in dysgeusia in COVID-19 patients. *Am J Otolaryngol* Jan 16 2021;42(3):102892. <https://doi.org/10.1016/j.amjoto.2020.102892>.

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