

## Changes in Smell and Taste As a potential markers of COVID-19 Infection

Priyanka Chaurasia<sup>1\*</sup>, Pradeep Rawat<sup>2</sup>, Achin Pant<sup>3</sup>

<sup>1</sup>Junior Resident, Department of ENT, Head & Neck Surgery, Government Medical College, Haldwani, Uttarakhand, India

<sup>2</sup>Senior Resident, Department of ENT, Head & Neck Surgery, Government Medical College, Haldwani, Uttarakhand, India

<sup>3</sup>Assistant Professor, Department of ENT, Head & Neck Surgery, Government Medical College, Haldwani, Uttarakhand, India

Received: 10-07-2020 / Revised: 23-08-2020 / Accepted: 19-09-2020

### Abstract

**Background:** Anosmia and dysgeusia have been reported as potential symptoms of coronavirus disease 2019. This study aimed to confirm whether anosmia and dysgeusia are specific symptoms among those who tested positive for covid-19. **Method:** We conducted a prospective study in S.T.H. Haldwani (Uttarakhand) between August 2020 to September 2020. We included suspected covid-19 patients admitted in S.T.H. Haldwani who tested for covid-19 in the institution. Clinical symptoms associated with anosmia and dysgeusia were obtained by direct/telephone interview with a standardized questionnaire. **Result:** Among all participants (1596) around 62% patients complaints of loss of smell before any covid-19 testing, among which 80.6% came covid-19 positive and 19.4% came negative. And 56% patients complained for loss of taste before or during other major symptoms appearance in which 90% came out to be positive for covid-19 and 10% came as covid-19 negative. In our study we also find out that Loss of taste is more specific and consistent symptom for covid-19 diagnosis than loss of smell. **Conclusion:** Olfactory and gustatory dysfunction are common in patients with COVID-19 and may represent early symptoms in the clinical course of infection. Increased awareness of this fact may encourage earlier diagnosis and treatment of COVID-19, as well as heighten vigilance for viral spread. The significantly higher prevalence detected by validated instruments suggests that the true prevalence of olfactory and gustatory dysfunction in COVID-19 patients may remain underestimated.

**Key words:** COVID-19, coronavirus, anosmia, olfactory, ageusia.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

### Introduction

The 2019 novel coronavirus (COVID-19) was first identified in Wuhan, Hubei province, China, on December 31, 2019, in association with a severe human respiratory disease.[1,2,3] In the current coronavirus disease 2019 (COVID-19) pandemic, anosmia and dysgeusia have been described as potential symptoms of the disease. A growing body of literature has mentioned anosmia and dysgeusia as potential symptoms of SARS-CoV-2 infection.[1,6,7]

Anosmia is associated with other respiratory tract infections, and it is not clear whether this symptom is a consequence of nasal obstruction and congestion, or is a symptom specific to SARSCoV-2 infection.[8] We are eight months into the pandemic and by now it has been established that loss of smell and/or taste remains one of the most common symptoms of the novel coronavirus. Infect, apart from fever, dry cough and exhaustion, smell and taste loss has become the hallmark of this novel contagion. It should be noted that loss of smell (and partial loss of taste) was previously associated with a bad bout of cold and flu.

\*Correspondence

**Dr. Priyanka Chaurasia**

Department of ENT, Dr. Sushila Tiwari Hospital, Haldwani, Uttarakhand, India.

**E-mail:** [chourasiapriyanka38@gmail.com](mailto:chourasiapriyanka38@gmail.com)

**Methods**

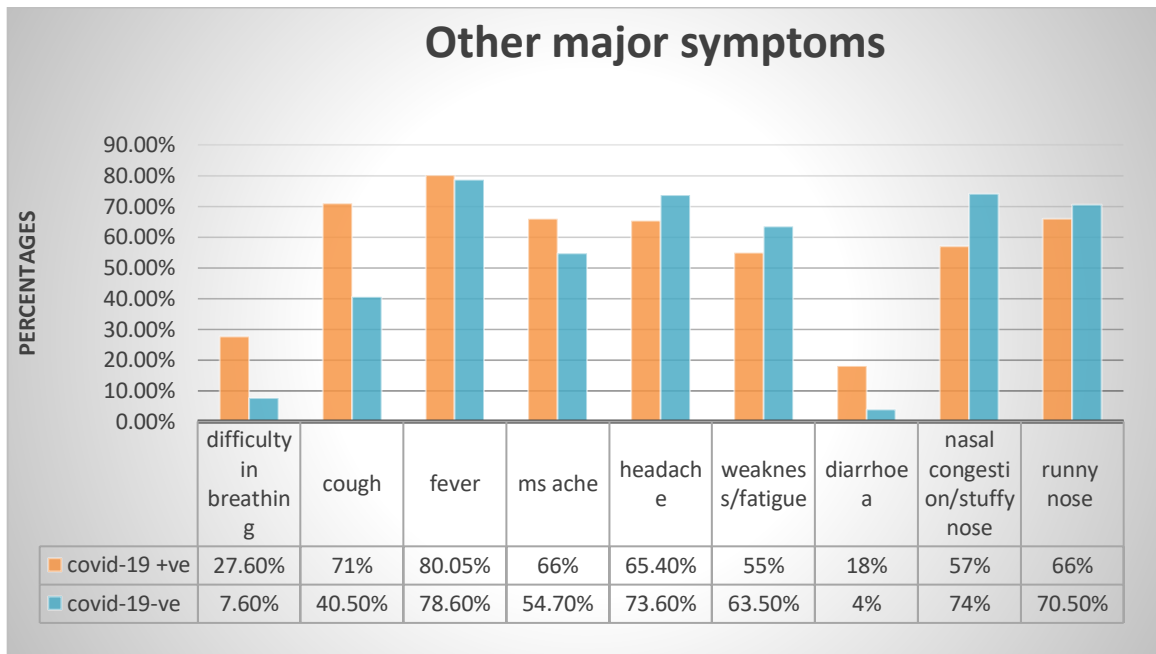
We conducted a prospective study in Dr. Sushila Tiwari hospital Haldwani (Uttarakhand) between August 2020 to September 2020. We included suspected covid-19 patients admitted in S.T.H. Haldwani who tested for covid-19 in the institution. Clinical symptoms associated with anosmia and dysgeusia were obtained by telephone interview with a standardized questionnaire.

**Sampling technique:**Total enumeration.

**Result**

Total 1596 were met inclusion. Fig 1 gives detailed demographic information. Among all respondents, 1359

(85.15%) were covid-19 positive by testing or diagnosing by a health care practitioner, while 237 (14.85%) were not. Although most respondents experienced other major COVID-19-related symptoms during or after their chemosensory changes. Respondents with new-onset difficulty breathing, cough, fever, muscle aches, and headaches were statistically more likely to be tested/diagnosed than those without, whereas those with no symptoms other than smell/taste change were less likely.

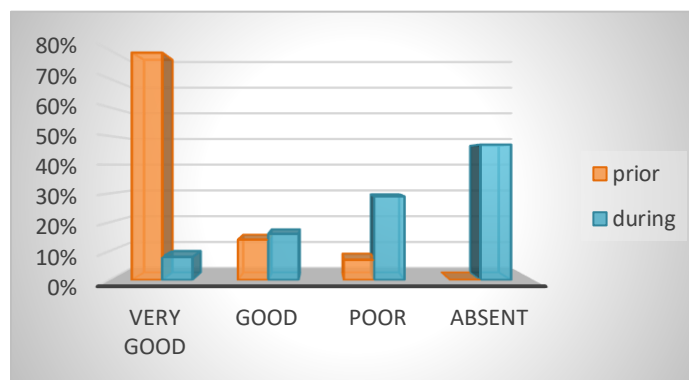


**Fig 1:Detailed demographic information**

Among all participants around 62% patients complaints of loss of smell before any covid-19 test among which 80.6% came covid-19 positive and 19.4% came negative for covid-19 And 56% patients complained for loss of taste before or during other major symptoms appearance in which 90% came out to be positive for covid-19 and 10% came as covid-19 negative. On an average around 59% patients in all participants experienced both loss of smell as well as loss of taste(Figure 2 ,3 ).



**Fig 2: Subjective smell prior to and symptomatic (all patients)**



**Fig 3: Subjective taste prior to and while symptomatic (all patients).**

Patients experienced complete loss of taste and smell after 7-12 days of appearing other major symptoms and aggravated with days. These symptoms goes completely after 2-3 weeks. (Figure 4)



**Fig 4: shows severity of loss of taste and smell with relation to time**

**Discussion**

To date, preliminary work worldwide has demonstrated a high incidence of smell or taste change in patients

with COVID-19, ranging from 39% to 85%[11-13]. However, the wide variation in populations studied, methods of recruitment, and severity of COVID-19 infection, among others, has likely effected reported

rates. Irrespective, chemosensory changes associated with COVID-19 are well established, leading most health organizations worldwide to include acute changes in smell or taste among symptoms suggestive of COVID-19. The pathophysiological mechanisms leading to the olfactory and gustatory dysfunctions in the COVID-19 infection are still unknown. Coronavirus has already been identified as a family of viruses that may be associated with anosmia [14]. In 2007, Suzuki et al. demonstrated that coronavirus may be detected in the nasal discharge of patients with olfactory dysfunction. Moreover, they observed that some patients with normal acoustic rhinometry did not recover their olfaction, suggesting that nasal inflammation and related obstruction were not the only etiological factors underlying the olfactory dysfunction in viral infection. Among all respondents experiencing olfactory disturbances in our study, This is consistent with 59% of hospitalized patients with reporting smell or taste disturbances, but substantially higher than other reports based on patient populations with presumably milder disease[10-13]. While both the current study and that of Hopkins et al include individuals with acute smell loss without confirmation of COVID-19 infection by testing, the co-occurrence of multiple well-known symptoms of COVID-19 suggests that many of these respondents were undiagnosed COVID-19 infections [13]. Patients with smell or taste loss who were not tested were presumed to have COVID-19, but without confirmatory testing, these findings cannot be applied to all patients who test positive for COVID-19. Yet the current high prevalence of COVID-19 and the substantial recent rise in subjective changes in smell and taste as compared with basal rates suggests that many, if not most, of these patients may have had COVID-19, regardless of the absence of a confirmatory test[15-17].

### Conclusion

Olfactory and gustatory dysfunction are common in patients with COVID-19 and may represent early symptoms in the clinical course of infection. Increased awareness of this fact may encourage earlier diagnosis and treatment of COVID-19, as well as heighten vigilance for viral spread. The significantly higher prevalence detected by validated instruments suggests that the true prevalence of olfactory and gustatory dysfunction in COVID-19 patients may remain underestimated.

### References

1. Hopkins C, Kumar N. Loss of sense of smell as marker of COVID-19 infection. London: ENT UK at The Royal College of Surgeons of England; 2020. Available: <https://www.entuk.org/sites/default/files/files/Loss%20of%20sense%20of%20smell%20as%20marker%20of%20COVID.pdf> (accessed 2020 Apr. 16).
2. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun.* 2020 ;109:102433.
3. World Health Organization. Pneumonia of unknown cause— China. Accessed April 23, 2020. <http://www.who.int/csr/don/05-january-2020-pneumonia-of-unknown-cause-china/en/>
4. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395:497-506.
5. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med* 2020;382:1708-20.
6. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 2020; 323:1061-9.
7. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA* 2020 ;2(1):98
8. Giacomelli A, Pezzati L, Conti F, et al. Self-reported olfactory and taste disorders in SARS-CoV-2 patients: a cross-sectional study. *Clin Infect Dis* 2020;71(15):889-890.
9. Spinato G, Fabbris C, Polesel J, et al. Alterations in smell or taste in mildly symptomatic outpatients with SARS-CoV-2 infection. *JAMA* 2020;323(20):2089-2090.
10. Konstantinidis I, Haehner A, Frasnelli J, et al. Post-infectious olfactory dysfunction exhibits a seasonal pattern. *Rhinology* 2006;44:135-9.
11. Harris, PA, Taylor, R, Thielke, R, Payne, J, Gonzalez, N, Conde, JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009;42(2):377-381.
12. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med* 2020;382:1708-20.

13. Beltrán-Corbellini, Á, Chico-García, JL, Martínez-Poles, J, et al. Acute-onset smell and taste disorders in the context of COVID-19: a pilot multicenter PCR-based case-control study. *Eur J Neurol.* 2020;27(9):1738-1741
14. Yan, CH, Faraji, F, Prajapati, DP, Boone, CE, DeConde, AS. Association of chemosensory dysfunction and Covid-19 in patients presenting with influenza-like symptoms. *Int Forum Allergy Rhinol.* 2020;10(7):806-813
15. Lechien, JR, Chiesa-Estomba, CM, De Siati, DR, et al. Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID-19): a multicenter European study. *Eur Arch Otorhinolaryngol.* 2020;277(8):2251-2261.
16. Suzuki M, Saito K, Min WP, Vladau C, Toida K, Itoh H, Murakami S. Identification of viruses in patients with postviral olfactory dysfunction. *Laryngoscope.* 2007; 117(2):272–277
17. Heidari, F, Karimi, E, Firouzifar, M, et al. Anosmia as a prominent symptom of COVID-19 infection. *Rhinology.* 2020;58(3) :302-303.

**Source of Support:** Nil

**Conflict of Interest:** Nil