

Olfactory and Gustatory Symptoms in COVID-19 Patients in South India

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ABSTRACT

Aim: The study aims to research the incidence of olfactory and gustatory symptoms in coronavirus disease 2019 (COVID-19) patients.

Materials and methods

- Study design: Cross-sectional study
- Setting: Tertiary care hospital in Karnataka, India
- Subjects: A total of 100 patients diagnosed with COVID-19 infection by reverse transcription polymerase chain reaction (RT-PCR) were included in the study.
- Method: Taste was examined using solutions of salty, sour, bitter, and sweet taste. Two or more wrong answers were considered abnormal. The smell was evaluated using cardamom, soap, talcum powder, cinnamon, onion, mango, rose, paint thinner, lemon and orange. A score of more than 6 was considered normosmia, 6 or less as hyposmia, and 2 or less as anosmia.

Results: In this study, 25% ($n = 25$) of patients had smell disturbance out of which 10 patients had anosmia and 15 had hyposmia. No case of parosmia was seen.

A total of 21 patients had complaints of taste disturbance. Among those, 19 (90.5%) presented with ageusia/hypogeusia, and 2 (9.5%) with dysgeusia.

The incidence of taste and smell disturbance in this study was statistically significant. A total of 15 patients had both symptoms; 10 patients had isolated smell disturbance and 6 patients had isolated taste disturbance.

Conclusion: Coronavirus disease 2019 is continuing to be a health threat in many cities of India. Many of the patients had olfactory and gustatory dysfunction as one of the earliest symptoms, presenting even before testing. This can be made use of by doctors for early diagnosis and management of COVID-19.

Clinical significance: This study gives us the statistics of olfactory and gustatory dysfunction in the South Indian population. Early recognition of these symptoms will help otorhinolaryngologists to diagnose and treat COVID-19 in its early stage, hence reducing the complications.

Keywords: Anosmia; Coronavirus disease 2019, Hyposmia, Olfaction disorder; Taste disorder.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) emerged in Wuhan, China at the end of 2019. It is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It has now spread all over the world and has been recognized as a pandemic by the World Health Organization (WHO).¹ Coronaviruses have been known to cause respiratory diseases in both humans and animals. Among humans, there are mainly two pathogens named severe acute respiratory syndrome CoV (SARS-CoV) and Middle East respiratory syndrome CoV (MERS-CoV). Also, SARS-CoV-2 has around 70–80% genetic similarity to SARS-CoV.^{2,3}

Coronavirus disease 2019 is a type of upper respiratory tract infection with symptoms ranging from mild to severe respiratory disease. It can present with symptoms such as fever, arthralgia, malaise, dry cough, shortness of breath, nausea, vomiting, and diarrhea.⁴ These patients can also have ear, nose, and throat (ENT) complaints such as rhinorrhea, nasal obstruction, sudden onset of hyposmia or anosmia, and dysgeusia or ageusia.¹ In the early stages, patients can be asymptomatic or mildly symptomatic even though they are contagious.⁵ In some studies, it was noted that anosmia and ageusia may present as the first symptom of the disease and it may be present even before molecular confirmation of the disease.^{6,7}

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Coronavirus disease 2019 disease is currently a major health concern in India and all over the world. This necessitates more research on this topic to help in a better understanding of the disease. This will further help in planning the prevention and management of the disease. As smell and taste dysfunction has been found to be one of the early symptoms of the disease, it can be used in early diagnosis of the same. Thus, in this study, we aim to research on the incidence of olfactory and gustatory symptoms in COVID-19 patients in a tertiary health center in India.

METHODOLOGY

This is a cross-sectional study with a sample size of 100 subjects. For this study, patients of either sex in the age group of 18–70 years diagnosed to have COVID-19 virus infection by reverse transcription polymerase chain reaction (RT-PCR) were admitted to or receiving treatment on an outpatient basis in a tertiary care hospital in Karnataka, India were included. A written informed consent was taken from the study subjects. An ENT surgeon who was fully equipped with personal protection equipment examined the confirmed COVID-19 patients. After a detailed history taking regarding sinonasal symptoms along with taste and smell symptoms, an examination of the nose and oral cavity was undertaken.

Smell perception in the patient was evaluated using commonly used items such as cardamom, soap, talcum powder, cinnamon, onion, mango, rose, paint thinner, lemon, and orange. The opaque container containing the testing item was placed 1 cm away from the nostril and the patient was given four options for each smell to choose from. Between two smells, a gap of 30 seconds was given. The patient was given a score of 1 for every correct answer and 0 for the wrong answer. Less than or equal to a score of 6 was diagnosed as hyposmia and less than or equal to 2 was diagnosed as anosmia. A score of more than 6 was normosmia.

Taste perception was examined using solutions of different tastes, salty, sour, bitter, and sweet. Two drops of the solution were placed directly on the tongue using a dropper and the patient was asked to identify. Between testing each taste 30 seconds of gap were given. The patient was asked to rinse the mouth before the next testing. Two or more wrong answers were considered as abnormal.

Inclusion Criteria

Patients of the age group between 18 and 70 years were diagnosed with COVID-19 by RT-PCR and were admitted to the hospital or taking treatment on an outpatient basis.

Exclusion Criteria

Patients had smell and taste abnormalities before getting infected with COVID-19, patients with respiratory distress or who were unable to respond to the questions, patients admitted to intensive care unit (ICU) setup, patients who have undergone nasal surgeries, and who have undergone neurosurgical interventions previously were excluded.

Statistical Analysis

Categorical data were represented in the form of frequency and percentage. The association of variables was assessed with the Chi-square test. Quantitative data were represented as mean and standard deviation (SD). The comparison was done with an unpaired *t*-test. A *p*-value of below 0.05 was considered statistically significant. Also, statistical package for the social sciences (SPSS), version 22, software (IBM) for Windows was used for analyzing the data.

RESULTS

We studied 100 participants in this study, among which 71 were males and 29 females. The mean age of the subjects is 50 years, ranging from 18 to 70 years.

The incidence of taste disturbance and smell disturbance among the study subjects was checked. 25 patients had smell disturbance and 21 patients had taste disturbance. Among these, 15 patients had both smell and taste dysfunction. The results of the same are shown in Figure 1 and Table 1. This was found to be statistically significant

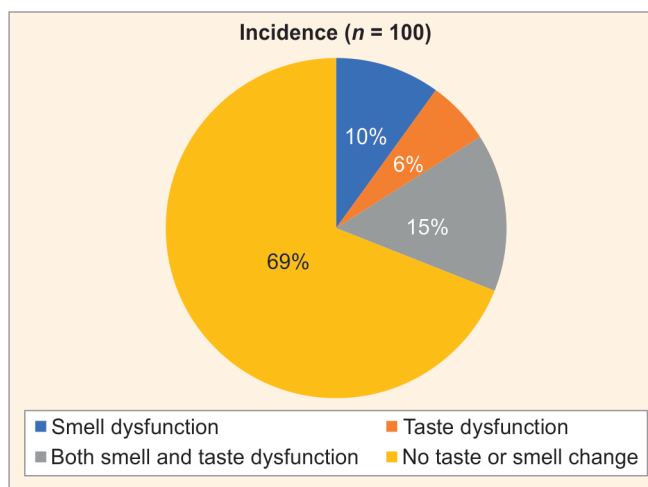


Fig. 1: Incidence of taste and smell disturbance in the study population

Table 1: Incidence of taste and smell dysfunction in the study population (N = 100)

	N	Unpaired t-test	
		<i>p</i> -value	Significance
<i>Taste dysfunction</i>			
Present	21	<0.001	Highly significant
Absent	79		
<i>Smell dysfunction</i>			
Present	25	<0.001	Highly significant
Absent	75		

indicating that the presence of these symptoms was highly related to the presence of COVID-19 infection.

When the sex of the subjects and the symptoms were correlated, it was found that males had more symptoms compared to females. This could also be due to the fact that the number of male subjects in this study was more compared to females.

Most of the study subjects had smell and taste dysfunction as one of the early symptoms of COVID-19. When the first day of arising of COVID-19 symptoms and the day of noticing symptoms of taste and smell disturbance were correlated, significant results were found which has been depicted in Table 2. Both smell and taste dysfunction were noticed by a majority of patients within 5–7 days of noticing the first symptoms of COVID-19. This signifies that most patients develop taste and smell symptoms within a week of developing other symptoms. As other symptoms such as fever, and malaise can be due to various reasons, when the symptoms of taste and smell dysfunction arise this can prompt the medical practitioners to suspect COVID-19 and get it tested early.

The majority of the patients in this study had developed smell and taste disturbance just 1–4 days before the day of conducting this survey.

In this study, 25% (*n* = 25) of patients had smell disturbance, among whom 32% (*n* = 8) had sudden onset of the symptom and the remaining 68% (*n* = 17) presented with gradual onset. Furthermore, 10 patients out of 25 presented with anosmia and 15 presented with hyposmia. In our study, no case of parosmia was seen. Associated symptoms such as rhinitis and nasal obstruction were present in 15 and 8 patients, respectively. The factors are shown in Table 3.

Table 2: Correlation between the day of arising of the first symptom of COVID-19 and the day of noticing smell and taste dysfunction (N= 100)

Parameters	Taste dysfunction		Chi-square test	
	Present	Absent	p-value	Significance
Day since first symptom				
2-4	6	34	<0.006	Highly significant
5-7	9	41		
8-10	6	4		
	Smell dysfunction			
Day since first symptom				
2-4	3	37	<0.001	Highly significant
5-7	14	36		
8-10	8	2		

Table 3: Details about the onset, type, and progression of smell disturbance

Smell disturbance	Number of cases (n = 25)	%
Onset		
Sudden	8	32
Gradual	17	68
Type		
Anosmia	10	40
Hyposmia	15	60
Parosmia	0	0
Progression		
Decreased	4	16
Increased	21	84

Table 4: Details about the onset, type, and progression of taste disturbance

Taste disturbance	Number of cases (n = 21)	%
Onset		
Sudden	8	38.1
Gradual	13	61.9
Type		
Ageusia/hypogeusia	19	90.5
Dysgeusia	2	9.5
Progression		
Decreased	3	14.3
Increased	18	85.7

The majority of the patients had an increase in the intensity of symptoms since the day of noticing the same.

A total of 21 patients had complaints of taste disturbance. Among those patients, 19 (90.5%) presented with ageusia/hypogeusia and 2 (9.5%) with dysgeusia; 13 patients had gradual onset of symptoms; and the remaining 8 had sudden onset of symptoms. The statistics of the same have been represented in Table 4. The majority of patients had symptoms that were progressive nature.

DISCUSSION

Coronavirus disease 2019 as a pandemic has created a global threat. Currently, with strategic planning and management, the situation

has gotten under control, but there is always a risk of the situation flaring up and causing threats again.

Severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) uses angiotensin-converting enzyme (ACE2) receptors for entry into the cells. Nasal epithelial cells show the highest expression of these receptors in the respiratory pathway.⁸ The oral cavity is also one of the regions in the human body where ACE2 receptors are found in higher amounts. Other sites in the body where these receptors are present are the lungs, kidney bladder, myocardial cells, and esophagus. Hence, these sites are more prone for getting infected by the SARS-COV-2 virus.⁹ Even though the exact mechanism of the pathogenesis of olfactory and gustatory dysfunction in COVID-19 is unknown it is mostly suggested that it is because of the involvement of nerves and epithelial cells.⁴

Speth MM et al. found in their study that 61.2% had olfactory dysfunction and 65% had gustatory dysfunction.¹ Total incidence of olfactory dysfunction was 61.2% with 14.6% people having hyposmia and 46.6% having anosmia. Gustatory dysfunction incidence was 65% with hypogeusia being 25.2% and ageusia being 39.8%.¹

In a multicentric study performed in Europe by Lechein et al., 85.6% had olfactory dysfunction. Among them, 79.6% of patients were anosmic and 20.4% were hyposmic; 88.8% also reported gustatory disorders.¹⁰

In another study performed in India, the incidence of taste and smell disturbance in COVID-19-positive patients was found to be very high in contrast to our study. Furthermore, 81.6% of 76 patients had smell dysfunction and 84.2% had taste dysfunction.¹¹

When compared to these studies, our study showed less incidence of olfactory and gustatory dysfunction which was 25 and 21%, respectively. Moreover, 15% of these had both symptoms. However, our results were also statistically significant. The difference in the incidence may be attributed to the difference in the number of people studied and also due to the ethnic and regional differences. In olfactory dysfunction, the majority of the patients had gradual onset of symptoms with 15 patients having hyposmia and 10 patients having anosmia. Also, in gustatory dysfunction, the majority had gradual onset with 19 patients having hypogeusia/ageusia and 2 patients having dysgeusia. These symptoms occur in the early stage of the disease.

By this study, we can conclude that olfactory and gustatory dysfunction are indeed related to COVID-19 infection and appear early in the disease stage. This helps in early diagnosis and treatment of the disease. By recognizing these symptoms early, even medical practitioners can protect themselves from getting infected by taking necessary precautions. However, as the study has been conducted on a small study group, further research including a larger sample size from multiple centers can help confirm the results of this study.

CONCLUSION

Many lives were lost during the COVID-19 pandemic all over the world. However, even though the disease incidence and severity have decreased, it remains a major health concern in many countries including India. By learning about the symptoms and signs and by recognizing early symptoms of the disease, early diagnosis, and management can be applied, hence decreasing the effect of the disease. As by our study, we have concluded that olfactory and gustatory dysfunction are some of the early and important symptoms associated with COVID-19, it can help in raising a

suspicion in medical practitioners about the disease and in turn help in early diagnosis and treatment.

Clinical Significance

This study gives us the statistics of olfactory and gustatory dysfunction in the South Indian population. Early recognition of these symptoms will help otorhinolaryngologists to diagnose and treat COVID-19 in its early stage, hence reducing the complications.

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Ethical Approval

The study was done after approval of the Institutional Ethics Committee in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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REFERENCES

- Speth MM, Singer–Cornelius T, Oberle M, et al. Olfactory dysfunction and sinonasal symptomatology in COVID-19: Prevalence, severity, timing, and associated characteristics. *Otolaryngol Head Neck Surg* 2020;163(1):114–120. DOI: 10.1177/0194599820929185.
- Altin F, Cingi C, Uzun T, et al. Olfactory and gustatory abnormalities in COVID-19 cases. *Eur Arch Otorhinolaryngol* 2020;277(10):2775–2781. DOI: 10.1007/s00405-020-06155-9.
- Lu R, Zhao X, Li J, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: Implications for virus origins and receptor binding. *Lancet* 2020;395(10224):565–574. DOI: 10.1016/S0140-6736(20)30251-8.
- Mehraeen E, Behnezhad F, Salehi MA, et al. Olfactory and gustatory dysfunctions due to the coronavirus disease (COVID-19): A review of current evidence. *Eur Arch Otorhinolaryngol* 2021;278(2):301–312. DOI: 10.1007/s00405-020-06120-6.
- Kang YJ, Cho JH, Lee MH, et al. The diagnostic value of detecting sudden smell loss among asymptomatic COVID-19 patients in early stage: The possible early sign of COVID-19. *Auris Nasus Larynx* 2020;47(4):565–573. DOI: 10.1016/j.janl.2020.05.020.
- da Costa KVT, Carnaúba ATL, Rocha KW, et al. Olfactory and taste disorders in COVID-19: A systematic review. *Braz J Otorhinolaryngol* 2020;86(6):781–792. DOI: 10.1016/j.bjorl.2020.05.008.
- Lee Y, Min P, Lee S, et al. Prevalence and duration of acute loss of smell or taste in COVID-19 patients. *J Korean Med Sci* 2020;35(18):e174. DOI: 10.3346/jkms.2020.35.e174.
- Sungnak W, Huang N, Becavin C, et al. SARS-CoV-2 entry factors are highly expressed in nasal epithelial cells together with innate immune genes. *Nat Med* 2020;26:681–687. DOI: 10.1038/s41591-020-0868-6.
- Xu H, Zhong L, Deng J, et al. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. *Int J Oral Sci* 2020;12(1):8. DOI: 10.1038/s41368-020-0074-x.
- Lechein JR, Chiesa–Estomba CM, De Siaty 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):2251–61. DOI: 10.1007/s00405-020-05965-1.
- Bidkar V, Mishra M, Selvaraj K, et al. Testing olfactory and gustatory dysfunctions among quarantine COVID-19 suspects. *Indian J Otolaryngol Head Neck Surg* 2021;73(3):304–309. DOI: 10.1007/s12070-020-02210-3.