

## Follow-up and Outcome of Olfactory and Gustatory Dysfunctions in Patients with COVID-19

Ali Hosseininasab, M.D. <sup>1</sup>, Mehrdad Farokhnia, M.D. <sup>2</sup>, Ali-Asghar Arabi Mianroodi, M.D. <sup>3</sup>, Elham Iranmanesh, M.D. <sup>4</sup>,  
Sobhan Mohammadi <sup>5</sup>, Adel Soltani <sup>5</sup>, Mehran Ilaghi <sup>5</sup>, Saja Shahdforush <sup>5</sup>, Alireza Hashemi <sup>5</sup>

1- Associate Professor, Infectious and Tropical Research Center, Kerman University of Medical Sciences, Kerman, Iran

2- Assistant Professor, Department of Internal Medicine, Infectious and Tropical Research Center, Kerman University of Medical Sciences, Kerman, Iran

3- Assistant Professor, Department of Head and Neck Surgery, Kerman University of Medical Sciences, Kerman, Iran

4- MD, Department of Pediatrics. Resident of Pediatrics, Kerman University of Medical Sciences, Kerman, Iran, (Corresponding author: Email: E.iranmanesh@gmail.com)

5- Medical Student, Kerman University of Medical Sciences, Kerman, Iran

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### Abstract

**Background:** Olfactory and gustatory dysfunctions can be considered as important symptoms to screen for the mild cases of the COVID-19 disease. However, there are limited studies on the specificity of olfactory and gustatory changes in patients with COVID-19, and it is unclear to what extent the changes may be unique to the disease. This study aimed to evaluate the duration and outcome of olfactory and gustatory disorders in patients with COVID-19.

**Methods:** The study population was patients with COVID-19 at Afzalipour Hospital whose disease was confirmed by nasopharyngeal polymerase chain reaction (PCR) test. 20 patients with olfactory and gustatory dysfunctions were studied. Data were collected using two forms, which were completed at the time of diagnosis and two weeks after the onset of the disease.

**Results:** In 20% of the patients, olfactory and gustatory dysfunctions were among the early symptoms. In 85% of the cases, these dysfunctions were permanent during the disease. 30% of the cases had a chronic underlying disease such as sinusitis, nasal polyps, and allergy. In follow-up, 13 patients (60%) reported that their olfactory dysfunctions had completely improved.

**Conclusion:** The patients whose only symptom is the sudden olfactory or gustatory dysfunction or the dysfunctions are among their early symptoms, should be screened for COVID-19. Most of the patients will recover over the time.

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### Introduction

Coronavirus disease 2019 (COVID-19) is currently one of the major human concerns. It may present with fever, cough,

sore throat, shortness of breath, fatigue, myalgia, arthritis, diarrhea, and chest pain. However, recent studies have

identified olfactory and taste dysfunction as symptoms reported by many patients with COVID-19 (1).

Olfactory dysfunction (OD) following upper respiratory tract infections (URTIs) is not a new issue. Many viruses, including rhinovirus, parainfluenza, and Epstein-Barr viruses, can cause olfactory dysfunctions following the inflammatory response of the nasal mucosa and the development of rhinorrhea (2). However, it is still unclear how this dysfunction develops in COVID-19, as its incidence may be independent of the occurrence of rhinorrhea and other symptoms of viral infection (3).

Besides, the coronavirus was initially presented with a lower respiratory tract infection. However, these manifestations and OD by this new virus were unknown to many physicians in the early stages of this epidemic. However, the OD associated with COVID-19 appears to be a unique display. There were also a small number of patients with OD in the absence of other symptoms such as fever, cough, or other systemic complaints (1).

Therefore, the present study was performed to evaluate OD in patients with COVID-19 and to establish the stability and temporality of this complication.

## Materials and Methods

All patients with COVID-19 who were treated at Afzalipour Hospital affiliated to Kerman University of Medical Sciences in Southeastern Iran and met the inclusion criteria were evaluated. The study population was patients with COVID-19 whose disease was confirmed by nasopharyngeal polymerase chain reaction test. The study was approved by the Ethics Committee of Kerman University of Medical Sciences on behalf of the National Ethics Committee in Biomedical

Research (Ethical code: IR.KMU.REC.1399.129). Data were collected using 2 forms that were designed and approved by the Otolaryngology-Head and Neck Research Center of Tehran University of Medical Sciences, Tehran.

The first form is the data collection form for patients with COVID-19, which consists of three parts. The first part is demographic information, the second part is the signs and symptoms related to COVID-19 disease and olfactory and gustatory dysfunctions, and the third part is related to the examination of other possible causes of olfactory and gustatory dysfunctions. This form was completed at the patients' bedside through the face-to-face interview. If the patients' information was not completed at the time of admission or if the patients were not hospitalized and treated on an outpatient basis, this form was completed by making a phone call to the patients.

The second form includes the patients follow-up form, which was completed after the discharge or at least 2 weeks after the start of the treatment or the onset of the disease by making a phone call to the patients.

At the time of completing the data, the patients who had one of the following histories were excluded from the study: 1) head and neck surgery, 2) head and neck radiotherapy, 3) chemotherapy, 4) personal contact with chemicals and industrial materials, 5) head trauma, 6) alcohol consumption, 7) smoking, and 8) olfactory and gustatory dysfunctions before developing COVID-19 disease.

Data were analyzed using SPSS version 22. The descriptive data were presented through frequency, percentage, mean, standard deviation, figures, and tables. Chi-square ( $\chi^2$ ) and Fisher's exact test were employed to compare the differences between subgroups. An alpha value less than 0.05 was considered statistically significant.

## Results

Out of a total of 150 patients with COVID-19 diagnosed by PCR and/or lung CT scan, it was possible to telephone or interview 123 patients. Of these patients, 20 individuals (16.2%) with olfactory disorders were evaluated and followed up. Of 20 patients with COVID-19 with impaired olfactory and taste function, 55% were female and 60% had no underlying impairment.

### Results from the first form

In 4 cases (20%), the olfactory and gustatory dysfunctions were among the early symptoms and only 2 cases (10%) had a history of reduced sense of smell and taste. The frequency and frequency percentage of different types of olfactory and gustatory dysfunctions are given in Table 1.

In 5 cases (25%), the onset of olfactory dysfunctions was gradual, while in 15 cases (75%), it was sudden.

In 3 cases (15%), the olfactory dysfunction was fluctuating while in 17 cases (85%), this dysfunction was permanent during the disease.

Five cases (25%) reported the feeling of dry mouth, 4 cases (20%) reported the feeling of bitter taste in the mouth, 1 case (5%) reported the sour taste in the mouth, and 10 cases (50%) reported no specific taste in the mouth.

The degree of annoyance in olfactory dysfunctions was reported high in 8 cases (40%), moderate in 4 cases (20%), low in 4 cases (20%), and not significant in 4 cases (20%).

Regarding the changes in olfactory dysfunctions during the disease, 10 cases (50%) mentioned that they got better, 8 cases (40%) reported complete recovery, and 2 cases (10%) reported no improvement in olfactory dysfunction.

In this study, 14 cases (70%) had no chronic nasal problems, 3 cases (15%) had sinusitis, 1 case (5%) had nasal polyps, and 2 cases (10%) had allergies.

In this study, 18 cases (90%) had evidence of pulmonary involvement in CT scan or plain X-ray of the lungs and 2 cases (10%) had no evidence of pulmonary involvement. Two cases (10%) had a history of head and neck surgery, 2 cases (10%) had a history of alcohol consumption, and 3 cases (15%) had a history of smoking.

In this study, in terms of the severity of nasal congestion, 11 cases (55%) had no nasal congestion, 6 cases (30%) had partial congestion, and 3 cases (15%) had complete congestion.

Among the patients examined in this study, the coronavirus test result was positive in 16 cases (80%). Also, in 16 cases (80%), the result of the coronavirus test in the family was positive.

### Results from the second form (follow-up form)

In terms of olfactory dysfunctions, 7 cases (35%) had no olfactory problems, 5 cases (25%) had minor problems in tasting and smelling the foods, 6 cases (30%) had problems in smelling, and 1 case (5%) reported major problems in tasting the salinity, sourness, sweetness, and bitterness.

Regarding the existence of a certain permanent taste in the mouth, 15 cases (75%) had no specific taste in the mouth, 2 cases (10%) had the feeling of dry mouth, 2 cases (10%) had the feeling of bitter taste in the mouth, and 1 case (5%) reported the feeling of salinity in the mouth.

One case (5%) reported the feeling of unpleasant smell in the environment without the presence of any smell in the environment.

Thirteen patients (60%) reported that their olfactory dysfunctions were completely improved, 6 cases (30%) got

better, and 1 case (5%) reported no change in the olfactory dysfunction.

**Table 1.** Frequency and frequency percentage of olfactory and gustatory dysfunctions

No.	Types of Olfactory Dysfunctions	Frequency	Frequency Percentage (%)	Total
1	Overall olfactory dysfunctions	20	16.2	123
2	Major problems in tasting salinity, sourness, sweetness, and bitterness	4	20	20
3	Minor problems in tasting flavor and aroma of food	3	15	20
4	2 and 3	4	20	20
5	A problem in tasting smells	4	20%	20
6	2 and 5	1	5%	20
7	3 and 5	2	10%	20
8	Anosmia	1	5%	20

## Discussion

Twenty hospitalized patients with COVID-19 were examined for olfactory and gustatory dysfunctions at Afzalipour Educational and Medical Center in Kerman, Iran. The parameters reviewed include the onset of olfactory or gustatory dysfunction, sudden or gradual onset of the dysfunction, permanent or fluctuating nature of the dysfunction, feeling of a specific taste in the mouth, degree of annoyance of the dysfunction, recovery process, history of chronic nasal and sinus problems, evidence of pulmonary involvement on plain X-ray or CT scan, the severity of nasal congestion, and the result of PCR test for COVID-19. The patients were followed up for the dysfunctions after the discharge or two weeks after the development of the disease.

In different heterogeneous studies, the high prevalence of this complication (5-85%) was reported (4). This diversity can be due to different races and populations and different studies in different geographical areas in this study. The olfactory and gustatory dysfunctions in 20% of the patients were among the

early symptoms of COVID-19 disease. Another study by Speth et al. in Switzerland on 103 patients with COVID-19 showed that the olfactory and gustatory dysfunctions were among the early symptoms of the disease in 8.7% of the patients, as well as the only symptom in 2.9% of the patients on the first day of admission. The reason for this difference is that in the present study, the sample size is less than the mentioned study, and only the patients with olfactory and gustatory dysfunctions were studied (5).

In this study, the majority of patients reported a history of sudden onset of olfactory and gustatory dysfunctions. A study by Otte et al. in Germany also found that olfactory dysfunctions occur suddenly in most patients with COVID-19, and a small number of patients report a gradual onset (6).

In the present study, the olfactory and gustatory dysfunctions occurred permanently in most patients and a small number of patients reported a history of recurrence and recovery of the dysfunctions during the disease. A study conducted by D'Ascanio et al. in Italy showed that the olfactory

dysfunctions persisted permanently in patients for 5 days and most patients recovered after 30 days, which is consistent with the results of the present study in terms of permanent dysfunction (7).

More than half of the patients with olfactory and gustatory dysfunctions did not have nasal congestion or rhinorrhea. A study by Lechien et al. in France also showed that the majority of patients with COVID-19 and olfactory dysfunctions had no nasal congestion or rhinorrhea (8).

In the follow-up of the patients, the olfactory dysfunction was completely improved in more than half of the patients after approximately 2 weeks. Another study conducted by Kosugi et al. in Portugal showed that in patients with COVID-19 and sudden olfactory dysfunctions as hyposmia or anosmia, the duration of the complete recovery from olfactory dysfunctions was longer than that in the patients without COVID-19 (9).

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## Conclusion

The olfactory and gustatory disorders occur suddenly in most cases of patients with COVID-19 but completely improved in more than half of the patients after approximately 2 weeks. Given the global prevalence of COVID-19, the patients whose only symptom is the sudden olfactory or gustatory dysfunctions or the dysfunctions are among their early symptoms, should be screened for COVID-19.

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