COVID-19 is a potentially deadly respiratory disorder caused by the SARS-CoV-2 virus. Among many other clinical manifestations, COVID-19 can cause sensory dysfunction such as loss of smell (anosmia) and taste abnormalities (dysgeusia). These can be challenging to recognize and manage because they may mimic other olfactory and gustatory disorders.

Diminished smell sensitivity significantly compromises a patient’s safety because it makes detecting toxic agents, smoke, and spoiled food more challenging. Losing the ability to smell and taste can also directly influence a person’s ability to select and enjoy food, which may impact nutritional intake and social interactions.

Olfactory impairment is recognized as a hallmark of COVID-19 and may be a predictor of clinical outcome.

Abstract: Olfactory impairment is recognized as a hallmark of COVID-19. This article highlights dysfunction of smell and taste associated with COVID-19 and discusses implications for nursing practice.

Keywords: ageusia, anosmia, COVID-19, dysgeusia, olfactory disorders, smell disorders, taste disorders
This article highlights olfactory and gustatory dysfunction associated with COVID-19 and discusses implications for nursing practice. To review terminology associated with these disorders, see A glossary of terms.

**Incidence and prevalence**

Emerging evidence shows that olfactory impairment is highly prevalent among patients with COVID-19. A study that surveyed 355 patients with lab-confirmed COVID-19 found that the overall population prevalence of both smell/taste loss or one of the two disorders was 70%. Most patients who reported a complete loss fully recovered after 14 days (median recovery time, 10 days).

In a retrospective review of patients with lab-confirmed COVID-19 presenting to a San Diego hospital, researchers analyzed olfactory and gustatory data available for 128 patients. They found that hospital admission for COVID-19 was associated with intact sense of smell and taste, increased age, diabetes, and parameters associated with respiratory failure. In contrast, anosmia was strongly and independently associated with outpatient care. The authors concluded that anosmia may be associated with a milder course of disease and that normosmia (subjectively perceived normal olfactory function) is an independent predictor of hospital admission in patients with COVID-19. Other research has found that both olfactory and gustatory dysfunction are more prevalent in home-quarantined participants, such as younger people and females. Non-Hispanic Black Americans with a history of cardiovascular disease and those who consumed more than four alcoholic drinks per day had a higher prevalence of taste impairment in another study. Only ethnicity, heavy alcohol consumption, and history of cardiovascular disease were associated with a higher prevalence of taste dysfunction among patients in this study. Factors significantly associated with smell dysfunction were age, gender, ethnicity, educational attainment, family income, light-to-moderate alcohol consumption, and history of asthma or cancer. Other researchers have found that ageusia and anosmia in patients diagnosed with COVID-19 are not related to rhinitis or nasal obstruction symptoms.

A prospective, cross-sectional study was conducted to investigate depressed mood, anxiety, and associated disease characteristics in patients with COVID-19. Researchers used standardized questionnaires and telephone follow-up to measure mood and anxiety levels at enrollment and for the participants’ baseline, pre-COVID-19 state. Along with mood and anxiety levels, they assessed severity of smell loss, loss of taste, nasal obstruction, rhinorrhea/mucus production, fever, cough, and shortness of breath (SOB). They found that despite the presence of such signs and symptoms as SOB, only the loss of smell and taste were associated with depressed mood and anxiety. They hypothesize that emotional disturbance may be a central nervous system manifestation of COVID-19 related to trans-olfactory tract penetration of the central nervous system by coronaviruses.

Currently, the relationship between COVID-19 and the development of taste disorders is not well understood. However, alterations to the sense of smell are believed to be associated with direct injury to tissue in the olfactory system, such as

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**A glossary of terms**

**Smell disorders**
- anosmia: inability to smell
- dysosmia: altered smell perception
- hyposmia: decreased ability to smell
- normosmia: normal ability to smell.

**Taste disorders**
- ageusia: complete loss of taste
- dysageusia: distorted taste perception
- hypogeusia: reduced ability to taste.

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On the nose

- Superior nasal concha
- Middle nasal concha
- Inferior nasal concha
- Eustachian tube opening
- Internal nares
- External nares
- Esophagus
- Soft palate
- Hard palate

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the olfactory epithelium (see On the nose). The virus also seems to cause an inflammatory response in the nasal cavity that temporarily obstructs odorants from reaching olfactory receptor neurons. Other factors besides COVID-19, such as advancing age and certain medications, may contribute to olfactory disorders.

Assessment and treatment

The University of Pennsylvania Smell Identification Test (UPSIT) is a well-validated tool that tests a person’s ability to detect odors. Forty different odors are released by scratching a panel of microencapsulated “scratch and sniff” odorants. For each of the 40 odors, the patient chooses an answer from four possible options; only one answer is correct. Test results are scored out of 40, with higher scores denoting better olfaction. The validity and reliability of the UPSIT have been reported in the literature. The test-retest reliability is excellent.

In one study, the UPSIT was administered to 60 patients with confirmed COVID-19 and 60 uninfected control subjects matched by age and gender. Fifty-nine patients in the test group exhibited some degree of smell dysfunction; 35 of them either had severe dysfunction or had lost the sense of smell entirely. Deficits were evident for all 40 UPSIT odorants tested.

Many tools are available to test taste disorders, including:

- the whole mouth taste test, which tests the patient’s ability to detect, identify, and rate the intensity of various concentrations of sweet, sour, salty, and bitter taste solutions.

- spatial testing, used to evaluate the patient’s ability to taste in taste bud regions throughout the mouth and throat. All regions are independently tested with each taste solution, and the patient is asked to describe taste quality and intensity. Examples include antimicrobial agents such as amoxicillin and azithromycin, antipyretic drugs such as aspirin and acetaminophen, and antihistamines. Antiallergenic agents such as loratadine or prednisone and antihypertensive drugs such as amlopidine and diltiazem may also cause gustatory or olfactory dysfunction.

Research has identified various potential treatments for olfactory impairments; for example, acupuncture, theophylline, minocycline, vitamins, lipoic acid, and zinc. However, evidence supporting the effectiveness of these therapies is lacking. Nurses can inform patients that COVID-related loss of smell and taste often resolves spontaneously within 2 weeks of the initial onset of COVID-19 signs and symptoms.

Nursing considerations

When taking a patient’s health history, nurses can use OLDCART (onset, location, duration, characteristics, aggravating/associated factors, relieving factors, and treatment) to assess loss of smell or taste. For example, the nurse should ask questions such as: When did the patient first notice the loss of taste and/or smell? What was the duration of the loss (days, weeks, months, or years)? What is the patient not able to taste: salt, sour, bitter, or sweet? Is the loss of taste or smell partial or complete? What relieves or aggravates the presenting signs and symptoms? Does the patient have any other symptoms?

Nurses should also obtain a detailed medication history to assess for drugs that can affect smell and taste. Examples include antimalarial agents such as amoxicillin and azithromycin, antipyretic drugs such as aspirin and acetaminophen, and antihistamines. Antiallergenic agents such as loratadine or prednisone and antihypertensive drugs such as amlopidine and diltiazem may also cause gustatory or olfactory dysfunction.

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Reporting COVID-19-related anosmia

The American Academy of Otolaryngology—Head and Neck Surgery has created a COVID-19 Anosmia Reporting Tool to collect information about COVID-19-related anosmia and dysgeusia worldwide. Patients and healthcare professionals alike are invited to submit data. The confidential questionnaire is available at: entnet.org/content/reporting-tool-patients-anosmia-related-covid-19.
diminishing appetite and interfering with eating and drinking. Nutritional intake may be inadequate as a result. Nurses need to assess patients with COVID-19 for anosmia and dysgeusia and counsel those at risk for developing taste or smell alterations about such hazards as exposure to smoke, natural gas, and spoiled foods. Nurses should also assess patients’ dietary habits, food preferences, and food choices when managing anosmia and dysgeusia. With appropriate interventions and patient teaching, nurses can help rule out other disorders that may impair the sense of smell or taste and optimize patient outcomes.

REFERENCES

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The author has disclosed no financial relationships related to this article.

DOI:10.1097/NURSE.0000736920.83024.0e