

# Letters

## RESEARCH LETTER

### Alterations in Smell or Taste in Mildly Symptomatic Outpatients With SARS-CoV-2 Infection

Since December 2019, a pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread globally.<sup>1</sup> A spectrum of disease severity has been reported, with main symptoms that include fever, fatigue, dry cough, myalgia, and dyspnea. Previous strains of coronavirus have been demonstrated to invade the central nervous system through the olfactory neuroepithelium and propagate from within the olfactory bulb.<sup>2</sup> Furthermore, nasal epithelial cells display the highest expression of the SARS-CoV-2 receptor, angiotensin-converting enzyme 2, in the respiratory tree.<sup>3</sup>

Despite anecdotal reports of anosmia, only 1 study to our knowledge has evaluated the prevalence of smell and taste disturbance in hospitalized patients with COVID-19, reporting an overall prevalence of 34% but without data on timing of onset in relation to other symptoms.<sup>4</sup>

This study evaluated prevalence, intensity, and timing of an altered sense of smell or taste in patients with SARS-CoV-2 infections.

**Methods** | The study was approved by the ethics committee of Treviso and Belluno provinces, and informed consent was obtained verbally for telephone interviews. Adults ( $\geq 18$  years) consecutively assessed at Treviso Regional Hospital between March 19 and March 22, 2020, were included if they tested positive for SARS-CoV-2 RNA by polymerase chain reaction on nasopharyngeal and throat swabs that were performed according to the World Health Organization recommendation<sup>5</sup> and if they were suitable for home management as mildly symptomatic.

Patients were contacted 5 to 6 days after the swab was performed, the demographic information was reported, and the Acute Respiratory Tract Infection Questionnaire (ARTIQ; with symptoms scored as none, 0; a little, 1; a lot, 2) was administered. During the telephone interview, they were asked whether they had experienced a sudden onset of an altered sense of smell or taste in the 2 weeks before the swab through completion of the Sino-nasal Outcome Test 22 (SNOT-22). The SNOT-22 grades symptom severity as none (0), very mild (1), mild or slight (2), moderate (3), severe (4), or as bad as it can be (5).<sup>6</sup> Symptom prevalence was expressed as the percentage of total patients; 95% confidence intervals were calculated using Clopper-Pearson method. Prevalence was compared using the Fisher exact test. *P* values  $< .05$  (2 sided) were considered statistically significant. Statistical analyses were performed using R version 3.6.

**Results** | Of 374 eligible patients, contact information was available for 283; 202 (71.4%) completed the telephone survey.

Demographic data and clinical features are summarized in Table 1. The median age was 56 years (range, 20-89 years); 52.0% were women. Any altered sense of smell or taste was reported by 130 patients (64.4%, 95% CI, 57.3%-71.0%), with a median SNOT-22 score of 4 (interquartile range, 3-5); 23.8% reported a score of 5 (Table 2). Of 130 patients reporting an

**Table 1. Characteristics and Prevalent Symptoms of 202 Patients Positive for SARS-CoV-2**

	No. of patients	Prevalence, % (95% CI) <sup>a</sup>
Age, median (IQR), y	56 (45-67)	
Sex		
Men	97	48.0 (41.0-55.1)
Women	105	52.0 (44.9-59.0)
Smoking status		
Never	139	68.8 (61.9-75.1)
Ever	63	31.2 (24.9-38.0)
Current alcohol drinking		
No	80	39.6 (32.8-46.7)
Yes	122	60.4 (53.3-67.2)
Comorbidity		
None	89	44.1 (37.1-51.2)
Any	113	55.9 (48.8-62.9)
Indication for testing		
Exposure to confirmed SARS-CoV-2 contact	70	34.7 (28.1-41.7)
Symptomatic presentation	132	65.4 (58.3-71.9)
Symptoms based on the ARTIQ <sup>b</sup>		
Fever	113	55.9 (48.8-62.9)
Dry cough or coughing up mucus	122	60.4 (53.3-67.2)
Blocked nose	73	36.1 (29.5-43.1)
Problems breathing	83	41.1 (34.2-48.2)
Headache	86	42.6 (35.7-49.7)
Sore throat	63	31.2 (24.9-38.1)
Muscle or joint pains	90	44.6 (37.6-51.7)
Chest pain	33	16.3 (11.5-22.2)
Sinonasal pain	35	17.3 (12.4-23.3)
Loss of appetite	110	54.5 (47.3-61.5)
Felt tired	138	68.3 (61.4-74.7)
Diarrhea	88	43.6 (36.6-50.7)
Nausea	40	19.8 (14.5-26.0)
Vomit	13	6.4 (3.5-10.8)
Abdominal pain	25	12.4 (8.2-17.7)
Dizziness	28	13.9 (9.4-19.4)

Abbreviations: ARTIQ, Acute Respiratory Tract Infection Questionnaire; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

<sup>a</sup> 95% CIs were calculated using Clopper-Pearson method.

<sup>b</sup> Patients were asked, "During the 2 weeks preceding the swab administration of the questionnaire, did you experience any of the following symptoms?" (Prevalence is combined responses of "a little" or "a lot.")

**Table 2. Characteristics of Altered Sense of Smell or Taste in 202 Patients Positive for SARS-CoV-2**

	No. of patients	Prevalence, % (95% CI) <sup>a</sup>
Severity of alteration of sense of smell or taste		
None	72	35.6 (29.1-42.7)
Very mild	5	2.5 (2.5-5.7)
Mild or light	23	11.4 (7.4-16.6)
Moderate	27	13.4 (9.0-18.9)
Severe	27	13.4 (9.0-18.9)
As bad as it can be	48	23.8 (18.1-30.2)
Time of onset of alteration of sense of smell or taste		
None	72	35.6 (29.1-42.7)
Only symptom	6	3.0 (1.1-6.4)
Prior to other symptoms	24	11.9 (7.8-17.2)
Concomitant with other symptoms	46	22.8 (17.2-29.2)
After other symptoms	54	26.7 (20.8-33.4)

Abbreviation: SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

<sup>a</sup> 95% CIs were calculated using Clopper-Pearson method.

altered sense of smell or taste, 45 (34.6%) also reported blocked nose. Other frequent symptoms were fatigue (68.3%), dry or productive cough (60.4%), and fever (55.5%). Among all patients, the timing of an altered sense of smell or taste onset in relation to other symptoms occurred before other symptoms in 24 (11.9%); at same time as in 46 (22.8%); and after other symptoms in 54 (26.7%; Table 2). An altered sense of smell or taste was reported as the only symptom by 6 patients (3.0%). An altered sense of smell or taste was more frequent among 105 women (72.4%, 95% CI: 62.8%-80.7%) than among 97 men (55.7%, 95% CI: 45.2%-65.8%;  $P = .02$ ).

**Discussion** | Alterations in smell or taste were frequently reported by mildly symptomatic patients with SARS-CoV-2 infection and often were the first apparent symptom. The results must be interpreted with caution due to study limitations: data were self-reported and based on a cross-sectional survey, the sample was relatively small and geographically limited, more severe patients were not included, and data regarding the subsequent course of the disease was not available. Although the SNOT-22 questionnaire has been shown to correlate with objective testing of olfactory function, patients may have difficulty in quantifying olfactory function; objective tests should be included in future studies.

If these results are confirmed, consideration should be given to testing and self-isolation of patients with new onset of altered taste or smell during the COVID-19 pandemic.

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