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Incidence and Resolution of COVID-19 Associated Anosmia Amongst 608 Patients

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INTRODUCTION

Olfactory dysfunction (OD) has been established as a common presenting symptom in COVID-19 patients. Viral tropism for cells constituting the olfactory epithelium can lead to colonization, inflammation, and damage in the nasal cavity. OD can occur in the absence of other symptoms and has been reported as an early sign of COVID-19 infection [1,2]. Notably, younger and healthier patients have presented more commonly with isolated OD [3].

As the cumulative number of patients with COVID-19 infection surpasses 600 million worldwide, there are an increasing number of patients reporting persistent symptoms, also known as "long COVID" or post-acute COVID syndrome (PACS) [4,5]. OD is the most commonly reported persistent symptom in patients with PACS [6]. Up to 7 % of patients remain anosmic for 12 months or longer after the onset of infection [7,8].

Initial reports based on this reporting tool have demonstrated that only 27 % of patients report anosmia improvement one week after COVID-19 diagnosis. As anosmia can severely impact quality of life, there is a need to further our understanding of risk factors for both anosmia development and long-term anosmia resolution [9].

This study aimed to determine the incidence of smell and taste dysfunction amongst patients with COVID-19.

Purpose

We aimed to determine associations between clinical, demographic, socioeconomic, and occupational factors that may put patients at increased risk for developing disordered taste and smell. These findings of this study aim to provide more accurate counseling for patients regarding expectations of OD resolution.

METHODS

This prospective, observational questionnaire study received University Hospitals Cleveland Medical Center Institutional Review Board approval (IRB# 20200447I). Patients who received a laboratory-confirmed positive COVID-19 diagnosis via polymerase chain reaction (PCR) test between August 2021 and November 2022 at a tertiary-care academic center were included in the recruitment cohort.

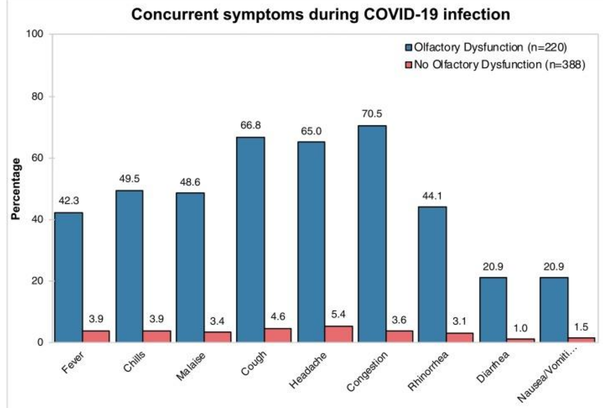
Each week, 1500 patients who met inclusion criteria were sent a recruitment email. Patients were prioritized by recency of COVID test. The email included a description of the study and a hyperlink to a REDCap survey.

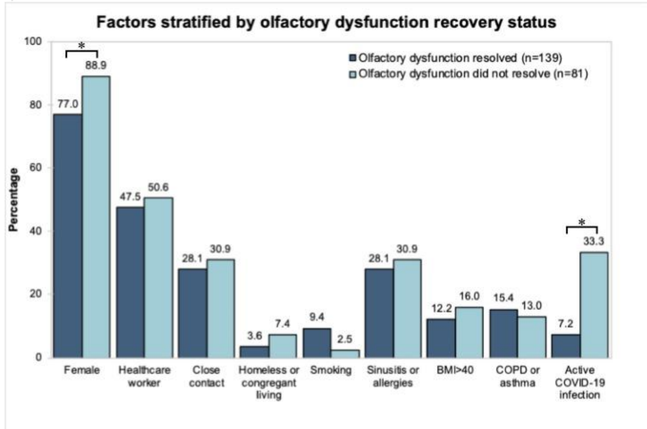
Patients were able to decline to participate or give informed consent to participate electronically. Pediatric patients who were identified as potential survey subjects were contacted through their parents for participation in the study. Patients were contacted by email one time to inform of participation in the study. No deadlines for survey response were mandated.

Categorical factors were described with frequencies and percentages, and compared using Pearson's Chi-square tests or Fisher's exact test. Normal variables were summarized with means and standard deviation (SD) and non-normal variables were summarized with medians and interquartile range (IQR). Continuous variables were compared using Student's t-test or Kruskal-Wallis test. All statistical analyses were performed in R software (version 3.5, Boston, MA) with p-values < 0.05 considered significant.

RESULTS

Variable	n = 608
Mean age at survey response, in years	42.71 ± 17.36
Gender (%)	
Female	472 (77.6)
Male	136 (22.4)
Identifiable source of COVID-19 infection	364 (59.9)
Risk factors	
Healthcare worker (%)	315 (51.8)
First responder (%)	10 (1.6)
Close contact with a confirmed case (%)	190 (31.2)
Homeless (%)	4 (0.7)
Congregant living (%)	12 (2.0)
High risk travel (%)	22 (3.6)
Occupational exposures (%)	8 (1.3)
Other risk factors (%)	61 (10.0)
No risk factors (%)	150 (24.7)
Medical comorbidities	211 (47.6)
Smoking (%)	34 (5.6)
Head trauma (%)	7 (1.2)
Cancer or immunocompromised (%)	13 (2.1)
Sinusitis or allergies (%)	180 (29.6)
Nasal polyps (%)	7 (1.2)
Chronic Kidney Disease (%)	6 (1.0)
Transplant on immunosuppressants (%)	1 (0.2)
Taking steroids or immunomodulators (%)	15 (2.5)
Liver disease (%)	5 (0.8)
Morbid obesity (BMI > 40) (%)	68 (11.2)
Chronic respiratory disease/Asthma (%)	82 (13.5)
Cardiac disease (%)	25 (4.1)
Neurologic disease (%)	8 (1.3)
Symptoms	
Both anosmia and dysgeusia	191 (31.4)
Anosmia only	20 (4.7)
Dysgeusia only	34 (5.6)
Neither anosmia nor dysgeusia	354 (58.2)
Current COVID-19 infection status	
Active	106 (17.4)
Recovered	502 (82.6)





The OD recovery rates amongst active and resolved COVID-19 infections was 27.0 % and 70.0 %, respectively ($p < 0.001$).

Variable	Olfactory dysfunction resolved (n = 139)	Olfactory dysfunction did not resolve (n = 81)	P value
Current COVID 19 infection status (%)			<0.001
Active	10 (7.2)	27 (33.3)	
Recovered	129 (92.8)	54 (66.7)	

CONCLUSIONS

This prospective, observational survey study including 608 patients with COVID-19 infection revealed an olfactory dysfunction incidence rate of 36 %, and a recovery rate of 63 %. Those with OD had a hospitalization rate of 2.7 %, lower than historic hospitalization rates for allcomers of COVID-19. Demographics, socioeconomic factors, occupational factors, and medical comorbidities were not associated with either development or resolution of OD. Although gender differences were not seen in either anosmia incidence or COVID-19 recovery, female respondents were more likely to report persistent anosmia. Overall, these findings inform the risk factors for and expected course of COVID-19 associated olfactory dysfunction.

References:

1. Borsetto D., Hopkins C., Philips V., et al. Self-reported alteration of sense of smell or taste in patients with COVID-19: a systematic review and meta-analysis on 3563 patients. Rhinology. 2020;58(5):430–436. doi: 10.4193/Rhin20.185. ….. (more references in the paper)