

Original Article

Prevalence of Anosmia & Ageusia in confirmed COVID-19 patients at teaching hospitals of District Bannu and Swat, Pakistan.

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Abstract

Background: Recent evidence suggests olfactory and gustatory sensory deficits among Coronavirus Disease 2019 (COVID-19) patients. It is important to assess the occurrence of anosmia and ageusia among infected individuals as it may be the potential symptom and assist in controlling the viral load. The objective of the present study was to determine the prevalence of ageusia and anosmia among COVID-19 patients admitted to the teaching hospitals of District Bannu and Swat-Pakistan.

Methodology: This retrospective cohort study was conducted between April to November 2020. A total of 100 confirmed COVID-19 cases, tested through polymerase chain reaction (PCR), were included in the study. Data including gender, age, smoking status, recent travelling history, nasal and paranasal disorder (NPND) history and COVID-19 severity were obtained from the patients' records. The symptomatology, including frequency of anosmia and ageusia was recorded.

Results: Out of 100 patients, 43.75% of patients had anosmia and 31.25% had ageusia, while 68% of patients were presented without olfactory and gustatory dysfunction. Most of the enrolled patients had no recent travel history (91.46%) and none of them were asymptomatic. Moreover, 88% of patients with a previous history of NPND did not have olfactory and gustatory dysfunction. Various characteristics features, including recent travel history, smoking, gender and disease severity, were significantly associated with anosmia and ageusia.

Conclusion: The COVID-19 patients were exclusively suffering from ageusia and anosmia. It can be concluded that amongst asymptomatic-to-mild disease severity patients, the existence of smell and taste might be an important differential demonstration for the apprehension and analysis of COVID-19.

Keywords

COVID-19, Anosmia, Ageusia, Olfactory Dysfunction, Gustatory Dysfunction.



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Introduction

The novel coronavirus started as a baffling illness in central China. It rapidly became a worldwide outbreak, shutting down several countries, affecting community health and challenging the strength of the global economy. It belongs to a large family of viruses, first discovered in the 1960s¹⁻³. Last year in December 2019, a few cases of pneumonia having unknown etiology were encountered in Wuhan, China^{4,5}. It was soon recognized as coronavirus and named as 2019-nCoV by World Health Organization (WHO)⁶. As of March 8, 2021, there have been 116,521,281 confirmed cases of COVID-19 worldwide, with more or less 2,589,548 deaths⁷.

At the time of the initial upsurge, COVID-19 was reported with clinical symptoms including fever, cough, shortness of breath (SOB), fatigue and sore throat etc. Recent studies suggest significant olfactory and gustatory dysfunction in association with COVID-19⁸⁻¹⁰. However, the documented prevalence of COVID-19 associated symptoms differs greatly between different countries and/or ethnic populations. Little is known regarding the effect of characteristics features like age, gender and disease severity⁹. Gilani et al. (2020) reported eight subjects with anosmia in five confirmed COVID-19 patients, whereas three cases remained untested due to lack of testing kits¹⁰. Another study suggested gustatory and olfactory abnormalities in European inhabitants¹¹.

The anosmia reporting tool was established by the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) effective from March 26, 2020. A sample of more than 800 patients has been submitted into this tool till now, and Anosmia was confirmed in over two-thirds of them¹².

Hence due to lack of awareness and preparedness, initially, the attention was only driven towards the symptomatic infected cases and individuals in direct contact with a suspected or confirmed COVID-19 patients. While a majority of asymptomatic carriers wandered openly, adding to the disease burden. It was later established that half of these stealthy carriers were the potential

transmitters¹³. The identified viral load in a few of these asymptomatic individuals was almost equal to that of the symptomatic ones. More surprisingly, some of these silent transmitters, when turned out positive for COVID-19, found that they weren't completely asymptomatic, i.e. the symptoms were mild and very few; they were paucisymptomatic¹⁴.

Therefore, it is vitally important to evaluate each case based on the frequency and intensity of the disease's predictive symptoms to prevent further spread of the infection using self-isolation and other preventive measures. The purpose of this study was to assess the prevalence of ageusia and anosmia among subjects suffering from COVID-19 admitted to the teaching hospitals of District Bannu and Swat-Pakistan.

Methodology

This retrospective cohort study was conducted at District Bannu and Swat teaching hospitals from April to November 2020. COVID-19 suspected the patient's oropharyngeal and nasopharyngeal swabs were sent for PCR analysis. A total of 100 positive cases were included in the study, while patients with incomplete data, psychological disturbances, history of ageusia and/or anosmia were excluded from the study. The ethical review committee approval was obtained from ethical review board of Bannu Medical College (Reference no. BMC/ENT/114; Dated 22/03/2020). Further, the study objectives were clearly explained and written informed consent were obtained prior inclusion.

Data regarding age, gender, recent travel history, past NPND, smoking history, and disease severity were obtained. The presence of symptoms was also assessed, and the patients were then categorized as symptomatic and asymptomatic. Disease severity was based on the following criteria¹⁵:

- Mild - patients with mild symptoms of cough, fatigue and fever.
- Moderate - patients with moderate symptoms of high fever, moderate RTI.

- Severe - patients with severe symptoms including dyspnea, blood-oxygen saturation 93%, and CT scan showing an increase of 50% in infiltrate volume.
- Critical - patients with septic shock, respiratory shutdown and oxygen function failure.

Statistical analysis was conducted using SPSS version 22.0. All categorical variables were compared among the patients with and without anosmia and ageusia using a chi-square test and

continuous variables via an independent T-test. A p-value < 0.05 was considered statistically significant.

Results

Out of 100 COVID-19 patients, 43.75% of patients had anosmia and 31.25% had ageusia, while 68% of patients were presented without olfactory and gustatory dysfunction, as shown in figure 1.

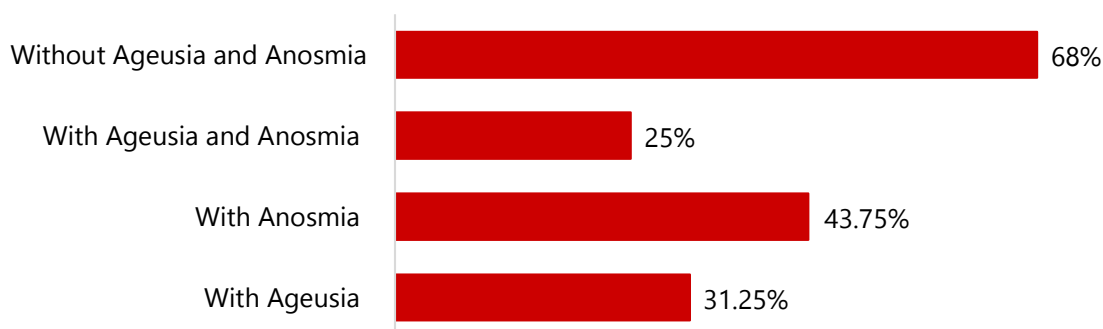


Figure 1: Prevalence of Ageusia and Anosmia among COVID-19 patients.

Table 1 shows the characteristics of COVID-19 patients with and without olfactory & gustatory dysfunction (anosmia and ageusia). There was a significant difference with respect to the gender, recent travel history, smoking status, and disease severity between the patients with anosmia and/or ageusia and those without any of the two ($p < 0.05$). While there was no significant association between age and frequency of anosmia. Most of the patients had no recent travel history 75(91.46%). None of the study cases were asymptomatic.

Table 1: Characteristics of COVID-19 patients presenting with or without Anosmia and Ageusia.

Variables		Olfaction		p-value	Gustation		p-value
		With Anosmia (n=14)	Without Anosmia (n=68)		With Ageusia (n=10)	Without Ageusia (n=68)	
Age Group	> 40 years	08(14.8)	46(85.18)	0.246	06(11.11)	48(88.8)	0.320
	< 40 years	06(21.42)	22(78.57)		04(16.66)	20(83.3)	
Gender	Male	12(15.38)	66(84.61)	0.021*	9(13.04)	60(86.95)	0.014*
	Female	2(50)	2(50)		1(11.11)	8(88.8)	
Recent Travel	Yes	4(57.14)	3(42.85)	0.001*	2(33.3)	4(66.6)	0.000*
	No	10(13.33)	65(86.66)		8(11.11)	64(88.8)	
Smoking	Yes	7(36.84)	12(63.15)	0.000*	4(28.57)	10(71.42)	0.000*
	No	7(11.11)	56(88.8)		6(9.37)	58(90.62)	
NPND history	Yes	8(16.0)	42(84.0)	0.112	6(11.53)	46(88.46)	0.000*
	No	6(18.75)	26(81.25)		4(15.38)	22(84.61)	
COVID-19 severity classification	Mild	4(9.09)	40(90.90)	0.000*	6(12.5)	42(87.5)	0.000*
	Moderate	9(25.71)	26(74.28)		4(13.3)	26(86.6)	
	Severe	1(33.33)	2(66.66)		-	-	
	Asymptomatic	-	-		-	-	

* $p < 0.05$ is considered significant; NPND-Nasal and Paranasal Diseases

Discussion

Gustatory and olfactory deficits have been recognized as the early identifier of COVID-19 infection. A study reports loss of smell and taste as the first and the only complaints among 10% of the COVID-19 patients. Furthermore, 19% experienced these smell and taste abnormalities (STA) even before other classical COVID-19 symptoms¹⁵. A Chinese study demonstrated fever (among 43.8% patients at the time of initial presentation and in 88.7% of patients during hospital stay), cough (67.8%), nasal congestion (4.8%), vomiting or nausea (5.0%), and diarrhea (3.8%) as the most communal symptoms of COVID-19¹⁵. By the time, both ageusia and anosmia were not revealed as common and atypical symptoms of coronavirus.

COVID-associated anosmia and ageusia are not accompanied by a nasal impediment or other rhinitis symptoms. Hence, it is perhaps due to the direct effect of the virus on the olfactory and gustatory receptors¹⁶. Presently, not much is known regarding the intensity of damage to the sense of smell and taste and recovery duration. The prevalence rates of anosmia, ageusia individually and together were 43.75%, 31.25%, and 25%, respectively (Figure 1). Existing literature suggests a comparatively higher prevalence of the two deficits; Qiu et al., in a multi-centric case series study, identified STA complaints among 41% of the COVID-19 patients¹⁵. Similarly, Paderno et al. observed olfactory and gustatory dysfunctions among 83% and 89% of COVID-19 patients, respectively¹⁷. Moreover, a systematic review including ten studies investigating the prevalence of Anosmia and Ageusia¹⁸. Although there were significant outcomes regarding the loss of smell and taste among these individuals, the variability in the symptomatic prevalence among various studies might be attributed to ethnic, sampling, geographical variations, disease severity, etc.

The data on the connection of COVID-19 with STA is scarce. No proven mechanism for this loss has been identified yet; it is suggested that the chemosensory senses are intimately correlated, which results in the co-occurring taste and smell abnormality¹⁹. Furthermore, Brann et al. identified that the virus affects the non-neuronal olfactory epithelium resulting in olfactory dysfunction and successively gustatory abnormality as well²⁰. However, building on this particular mechanism, cohort investigations with long-term follow-up and objective measures are required to assess STA occurrence and recovery among confirmed COVID-19 cases.

Besides the occurrence of anosmia and ageusia, the study determined characteristics features associated with the prevalence of these chemosensory dysfunctions. It was found that anosmia and ageusia were more prevalent among males than females ($p < 0.05$). This finding was in contrast to the prior studies^{15-17,21-23}. Furthermore, several studies reported that age has a significant impact on the STA^{16,24}. Although approximately 60% of the patients were > 40 years of age, there was no significant association between the age and prevalence of anosmia and ageusia ($p > 0.05$). The previous study reported a similar finding. It is evident that smokers and individuals with NPND are twice more likely to be infected, and they have a more severe course of illness^{12,17}. There were more non-smokers than smokers in the present study, but the association was significant between smoking and anosmia and/or ageusia ($p < 0.05$). No significant association was found between NPNDs history and anosmia, and a significant association existed between the NPNDs and ageusia.

As the study is retrospective, the conclusions drawn are limited by the heterogeneous nature of the available data. Furthermore, the sample size was small, and the study outcomes, i.e. the olfactory and gustatory functions, weren't followed psychophysically. To address these issues, future prospective large-scale studies are necessary.

Conclusion

In conclusion, both ageusia and anosmia appear to be significant symptoms for the identification of COVID-19 disease. The chemosensory dysfunction was prevalent in the studied population and highly frequent among males aged > 40 years. Given the high prevalence of ageusia and anosmia among COVID patients, these must be recognized as critical symptoms of the viral infection. The addition of early investigation related to olfactory and gustatory changes to the routine screening measures among the suspected COVID-19 subjects is highly recommended to prevent further disease transmission.

Conflicts of Interest

The authors have declared that no competing interests exist.

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