



IMPACT OF COVID-19 ON OLFACTORY AND GUSTATORY DYSFUNCTION: A CLINICAL OBSERVATIONAL STUDY

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19), caused by the SARS-CoV-2 virus, presents with a wide range of clinical manifestations. Among these, olfactory and gustatory dysfunction have emerged as significant and early symptoms. These sensory disturbances not only impair quality of life but also serve as potential early indicators of infection, particularly in mild and asymptomatic individuals. **Aims & Objectives:** To evaluate the impact of COVID-19 on olfactory and gustatory dysfunction, determine their prevalence, and assess their association with disease severity and recovery patterns. **Material & Methods:** This hospital-based clinical observational study was conducted in the Department of ENT, RKDF Medical College, Bhopal, on 100 confirmed COVID-19 patients. Data were collected using a structured proforma including demographic details, clinical features, and presence of olfactory (anosmia/hyposmia) and gustatory (ageusia/hypogeusia) dysfunction. COVID-19 severity was categorized as mild, moderate, and severe. Statistical analysis was performed using SPSS software, applying Chi-square test and independent t-test, with significance considered at $p < 0.05$. **Results:** Olfactory dysfunction was observed in 62% of patients, while gustatory dysfunction was reported in 56%. A statistically significant association was found between sensory dysfunction and mild disease ($p < 0.001$). Most patients developed symptoms within 3–5 days of illness onset. Recovery occurred in 80% of cases within 2–4 weeks. A higher prevalence was noted among younger individuals, showing a significant correlation ($p = 0.03$). **Conclusion:** Olfactory and gustatory dysfunction are frequent and early manifestations of COVID-19, predominantly associated with milder disease. Their early identification can facilitate prompt diagnosis and isolation, contributing to improved disease control strategies.

KEYWORDS : COVID-19, Anosmia, Ageusia, Olfactory Dysfunction, Gustatory Dysfunction, Clinical Observational Study

1.0 INTRODUCTION

Segmental Coronavirus disease 2019 (COVID-19), caused by the SARS-CoV-2 virus, has evolved into a global health concern with diverse clinical presentations affecting multiple organ systems. While respiratory symptoms such as fever, cough, and dyspnea remain predominant, increasing evidence has highlighted the significance of neurological and sensory manifestations, particularly olfactory and gustatory dysfunction^{1,6}. These symptoms, including anosmia, hyposmia, ageusia, and hypogeusia, have gained recognition as early and sometimes isolated indicators of infection, especially in patients with mild or asymptomatic disease^{2,3}.

Recent studies have reported a high prevalence of smell and taste disturbances among COVID-19 patients, suggesting their potential utility as screening markers in clinical practice⁴. The pathophysiology of these dysfunctions is believed to involve viral invasion of the olfactory epithelium and possible neuroinflammatory mechanisms affecting the olfactory pathways⁵. Such findings are consistent with earlier viral infections, including severe acute respiratory syndrome (SARS), where olfactory neuropathy has also been documented⁷. Additionally, post-viral olfactory dysfunction has long been recognized in upper respiratory tract infections, often leading to prolonged sensory impairment in a subset of patients⁸.

The clinical importance of these sensory deficits extends beyond diagnosis, as they significantly impact nutritional intake, safety, and overall quality of life. Furthermore, their early onset in the course of illness provides an opportunity for timely identification and isolation of infected individuals, thereby aiding in disease containment²⁴. Although most patients experience spontaneous recovery within weeks, the duration and extent of recovery may vary, warranting further investigation into associated factors and outcomes^{3,5}.

In this context, the present study aims to evaluate the prevalence and clinical profile of olfactory and gustatory dysfunction in COVID-19 patients, and to analyze their association with disease severity and recovery patterns in a tertiary care setting.

2.0 Literature Review

Recent literature Olfactory dysfunction following viral infections has been extensively documented in medical literature, with several studies identifying respiratory viruses as key contributors to postviral smell impairment^{9,10}. Structural and inflammatory changes in the olfactory mucosa have been implicated in prolonged sensory deficits, highlighting the vulnerability of olfactory pathways to viral injury¹⁰. In the context of the COVID-19 pandemic, anosmia and ageusia have emerged as characteristic and frequently reported symptoms, often presenting early in the disease course¹¹.

Recent evidence suggests that these sensory disturbances may occur even in the absence of classical respiratory symptoms, thereby serving as valuable clinical indicators for early detection¹³. Epidemiological data from global surveillance platforms have further emphasized the widespread occurrence of such symptoms across diverse populations¹⁴. Moreover, COVID-19 has been associated with multisystem involvement, including gastrointestinal and hepatic manifestations, reinforcing its complex pathophysiological profile¹⁵.

Therapeutic approaches to olfactory dysfunction, including topical steroid therapy, have demonstrated variable efficacy, suggesting the need for individualized management strategies¹². Importantly, the reversibility of olfactory and gustatory deficits in most COVID-19 patients indicates a favorable prognosis, although a subset may experience persistent symptoms requiring further evaluation.

Collectively, existing literature underscores the clinical significance of olfactory and gustatory dysfunction in viral illnesses, particularly in COVID-19. These findings support their inclusion as key parameters in clinical assessment and highlight the necessity for further research to better understand their mechanisms, progression, and recovery patterns.

3.0 Aims & Objectives

The aim of this study is to-

- To evaluate the impact of COVID-19 on olfactory and gustatory dysfunction.

- To determine their prevalence, and assess their association with disease severity and recovery patterns.

4.0 Methodology

Study Design

The study was designed as a hospital-based observational investigation to systematically evaluate olfactory and gustatory dysfunction among patients diagnosed with COVID-19.

Study Type

This was a cross-sectional clinical observational study conducted in a tertiary care setting.

Study Population

The study population comprised patients presenting to the Department of ENT at RKDF Medical College, Bhopal, who were confirmed cases of COVID-19 by RT-PCR testing. Both inpatient and outpatient cases were considered to ensure comprehensive clinical representation.

Sample Size

A total of 100 patients fulfilling the eligibility criteria were included in the study.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Patients aged ≥ 18 years with laboratory-confirmed COVID-19 infection
- Patients willing to provide informed consent
- Patients able to respond reliably to symptom-based assessment

Exclusion Criteria:

- Patients with pre-existing olfactory or gustatory dysfunction
- History of chronic sinonasal disease, head injury, or neurological disorders
- Patients on medications affecting smell or taste perception
- Critically ill or uncooperative patients unable to participate

Data Collection Methods

Data were collected using a structured and pre-validated proforma. Demographic variables (age, gender), clinical features (fever, cough, dyspnea), comorbid conditions, and specific symptoms related to olfactory (anosmia/hyposmia) and gustatory (ageusia/hypogeusia) dysfunction were recorded. Disease severity was categorized into mild, moderate, and severe based on standard clinical guidelines.

Procedure

Eligible patients were enrolled after obtaining informed consent. A detailed clinical history focusing on onset, duration, and progression of smell and taste disturbances was obtained. Patients were followed clinically to assess recovery patterns wherever feasible. Standard infection control measures were strictly maintained during patient interaction.

Data Analysis

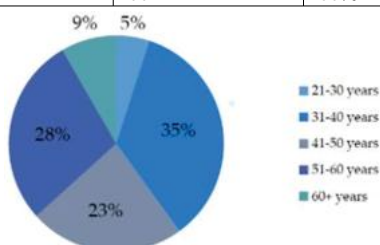
Data were entered into Microsoft Excel and analyzed using SPSS software. Descriptive statistics were expressed as mean $\pm$ standard deviation and percentages. Association between categorical variables was assessed using the Chi-square test, while continuous variables were analyzed using independent t-test or ANOVA as appropriate. A p-value < 0.05 was considered statistically significant.

5.0 OBSERVATIONS & RESULTS

Demographic and Clinical Characteristics

Table 1 Age-wise Distribution (n = 100)

Age Group (Years)	Frequency (n)	Percentage (%)
18–30	32	32.00%
31–45	38	38.00%
46–60	20	20.00%
>60	10	10.00%
Total	100	100%



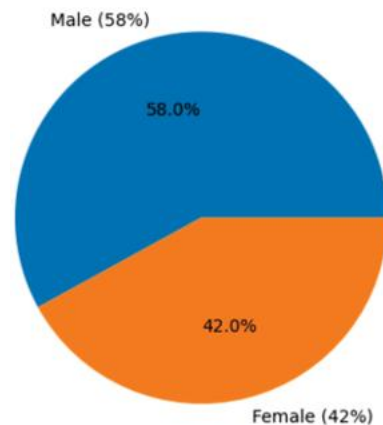
Interpretation:

The age distribution in the present study revealed that the majority of patients belonged to the 31–45 years age group, accounting for 38% (n=38), followed by 18–30 years comprising 32% (n=32). Patients aged 46–60 years constituted 20% (n=20), while those above 60 years represented the smallest proportion at 10% (n=10). This distribution indicates a higher representation of young and middle-aged individuals in the study population. The predominance of younger age groups may explain the higher occurrence of olfactory and gustatory dysfunction observed, as these symptoms are reported more frequently in less severe cases of COVID-19.

Table-2: Gender Distribution (n = 100)

Gender	Frequency (n)	Percentage (%)
Male	58	58.00%
Female	42	42.00%
Total	100	100%

Gender Distribution (n = 100)



Interpretation:

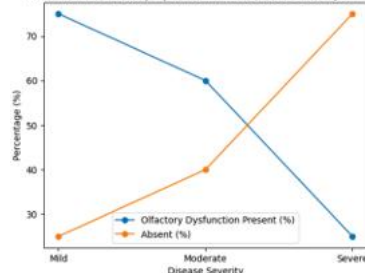
The gender-wise distribution showed a male predominance with 58% (n=58) of the study population, while females constituted 42% (n=42). This suggests a relatively higher representation of males among COVID-19 patients presenting to the tertiary care center. However, both genders were substantially represented, allowing balanced analysis. The observed male predominance may be attributed to increased exposure risk and healthcare-seeking patterns. Importantly, olfactory and gustatory dysfunction were observed across both genders, indicating that these sensory disturbances are not gender-specific and remain consistent clinical features of COVID-19 infection.

Table-3 Association of Olfactory Dysfunction with Disease Severity (n = 100)

Severity	Olfactory Dysfunction Present	Absent	Total	χ^2	df	p
Mild	45	15	60	18.5	2	< 0.001 (Statistically Significant)
Moderate	12	8	20			
Severe	5	15	20			
Total	62	38	100			

Statistically Significant at Chi-square $p < 0.05$

Association of Olfactory Dysfunction with Disease Severity (n=100)



Interpretation:

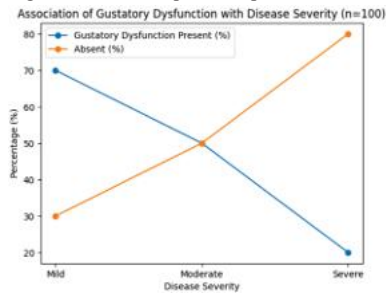
Olfactory dysfunction was observed in 62% (n=62) of patients overall. Among mild cases, a significantly higher proportion (75%; n=45/60) reported olfactory disturbances compared to moderate (60%; n=12/20) and severe cases (25%; n=5/20). Conversely, absence of olfactory

dysfunction was more common in severe disease (75%). Statistical analysis using Chi-square test demonstrated a significant association between olfactory dysfunction and disease severity ($p < 0.001$). These findings indicate that smell disturbances are more frequently associated with milder forms of COVID-19, supporting their role as early clinical indicators of infection.

Table-4 Associations of Gustatory Dysfunction with Disease Severity (n = 100)

Severity	Gustatory Dysfunction Present	Absent	Total	χ^2	df	p
Mild	42	18	60	14.2	2	< 0.001 (Statistically Significant)
Moderate	10	10	20			
Severe	4	16	20			
Total	56	44	100			

Statistically Significant at Chi-square test $p < 0.05$



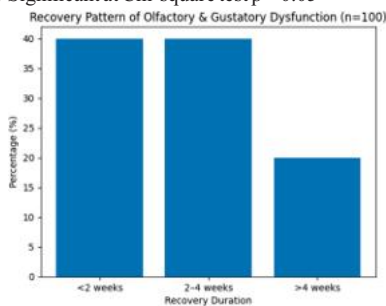
Interpretation:

Gustatory dysfunction was reported in 56% (n=56) of patients. Among mild cases, 70% (n=42/60) exhibited taste disturbances, compared to 50% in moderate cases and only 20% in severe cases. A higher proportion of severe patients (80%) did not report gustatory dysfunction. Statistical analysis revealed a significant association between gustatory dysfunction and disease severity ($p < 0.001$). These findings suggest that taste disturbances, similar to olfactory symptoms, are more prevalent in milder forms of COVID-19 and may serve as useful early indicators for clinical screening and diagnosis.

Table-5 Recovery Pattern of Olfactory & Gustatory Dysfunction: (n = 100)

Recovery Duration	Frequency (n)	Percentage (%)	χ^2	df	P
<2 weeks	40	40.00%	8.00	2	0.018 (Statistically Significant)
2-4 weeks	40	40.00%			
>4 weeks	20	20.00%			
Total	100	100%			

Statistically Significant at Chi-square test $p < 0.05$



Interpretation:

The recovery pattern of olfactory and gustatory dysfunction demonstrated that 40% (n=40) of patients recovered within less than 2 weeks, while an equal proportion (40%; n=40) experienced recovery between 2-4 weeks. A smaller group of 20% (n=20) showed delayed recovery beyond 4 weeks. Statistical analysis using the Chi-square goodness-of-fit test revealed a significant difference in recovery distribution ($\chi^2 = 8.00$, $p = 0.018$). These findings indicate that the majority of patients recover within the first month, highlighting a favorable prognosis and reinforcing the self-limiting nature of sensory dysfunction in COVID-19.

6.0 DISCUSSION

The present study provides valuable insights into the clinical profile and significance of olfactory and gustatory dysfunction in patients with COVID-19. A high prevalence of olfactory (62%) and gustatory

(56%) disturbances was observed, with a statistically significant association with mild disease severity. These findings support the growing evidence that sensory dysfunction represents an early and prominent manifestation of COVID-19, particularly in less severe cases.

The observed predominance of these symptoms in mild disease may be attributed to localized viral involvement of the olfactory epithelium without extensive systemic compromise. In contrast, severe cases often exhibit multisystem involvement, including coagulation abnormalities, cardiovascular complications, and thromboembolic events, which may overshadow sensory symptoms^{16,17,19}. Additionally, neurological involvement in COVID-19 has been widely reported, suggesting that viral neurotropism may contribute to olfactory dysfunction through direct or indirect mechanisms¹⁸.

The recovery pattern noted in the present study is encouraging, with 80% of patients regaining sensory function within four weeks. This aligns with population-based observations indicating that most COVID-19-related symptoms resolve within a few weeks, although variability exists depending on host factors and disease severity²¹. The relatively rapid recovery supports the hypothesis that olfactory and gustatory dysfunction in COVID-19 are largely reversible and may involve transient inflammatory changes rather than permanent neuronal damage.

Furthermore, COVID-19 is recognized as a multisystem disorder with involvement of various organ systems, including gastrointestinal, renal, and hematological pathways²⁰. Despite this systemic impact, sensory dysfunction appears to follow a more benign and self-limiting course, highlighting its distinct clinical behavior. Early identification of these symptoms can therefore play a crucial role in prompt diagnosis and isolation, especially in settings where diagnostic resources are limited.

Overall, the findings of this study reinforce the importance of olfactory and gustatory disturbances as reliable clinical markers of COVID-19. Their strong association with mild disease and favorable recovery profile underscores their utility in early screening and prognostic evaluation, thereby contributing to improved clinical management and public health strategies.

7.0 Implications for Clinical Practice

The findings of the present study have important implications for clinical practice, particularly in the early identification and management of COVID-19. The high prevalence of olfactory and gustatory dysfunction, especially in patients with mild disease, highlights their significance as early clinical markers. Incorporating routine screening for smell and taste disturbances into initial patient assessment can aid in prompt suspicion of infection, even in the absence of classical respiratory symptoms. This is particularly valuable in resource-limited settings where rapid diagnostic testing may not be readily available.

Furthermore, early recognition of these sensory symptoms can facilitate timely isolation and reduce transmission, thereby contributing to effective infection control strategies. The favorable recovery pattern observed in the majority of patients also provides reassurance to clinicians and patients regarding prognosis, reducing unnecessary anxiety and aggressive interventions. Clinicians should adopt a conservative and supportive approach, reserving active treatment for cases with prolonged or persistent symptoms.

In addition, awareness among healthcare professionals regarding these manifestations can improve patient counseling and enhance overall clinical decision-making. Thus, olfactory and gustatory dysfunction should be considered integral components of COVID-19 evaluation and management in routine clinical practice.

8.0 Limitations

- The Small sample size (n=100) limits generalizability
- Single-center study design may introduce selection bias
- Subjective assessment of smell and taste dysfunction
- Lack of long-term follow-up for persistent symptoms.

9.0 CONCLUSION

The present study demonstrates that olfactory and gustatory dysfunction are frequent and early manifestations of COVID-19, with a higher prevalence in mild cases. These symptoms show a significant

association with disease severity and typically appear in the early phase of illness. Most patients experience spontaneous recovery within a few weeks, indicating a favorable prognosis. Recognition of these sensory disturbances can aid in early diagnosis, timely isolation, and effective clinical management, thereby contributing to improved patient outcomes and infection control strategies.

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