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Otorhinolaryngological Manifestations in COVID-19: A Cross-Sectional Analysis

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Abstract **Original Research Article**

Introduction: Otorhinolaryngological manifestations, including symptoms like anosmia, dysgeusia, sore throat, and nasal congestion, have been widely recognized as key indicators of COVID-19 infection. This study aims to explore the otorhinolaryngological symptoms in COVID-19 patients. ***Methods:*** A cross-sectional study was conducted at Department of ENT, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from March 2020 to March 2021, to analyze the otorhinolaryngological manifestations in COVID-19 patients. The study was carried out in a tertiary care hospital, and data collection spanned six months. The study population consisted of 100 patients who were diagnosed with COVID-19 via RT-PCR. Statistical analysis was performed using SPSS software. Descriptive statistics were calculated for demographic variables, while chi-square tests were used to assess associations between categorical variables. A p-value of <0.05 was considered statistically significant. ***Result:*** The study involved 100 participants with a balanced age distribution, 55% male and 45% female, and 20% having hypertension and 15% diabetes mellitus. The most prevalent otorhinolaryngological symptoms were sore throat (50%), anosmia (40%), and dysgeusia (35%), all of which were statistically significant. The severity of symptoms varied by age, with anosmia most common in younger participants (66.7%) and sore throat more frequent in older groups (66.7% in those over 50). There were no significant gender differences in symptom prevalence. Co-morbidities such as hypertension and diabetes were linked to higher symptom prevalence, with anosmia and sore throat more common in hypertensive individuals, and anosmia and dysgeusia more common in those with diabetes. Participants without co-morbidities reported lower symptom rates. ***Conclusion:*** Symptoms such as sore throat, anosmia, and dysgeusia were common, with anosmia being strongly associated with younger age groups and co-morbidities, particularly hypertension and diabetes mellitus. While no significant gender differences were observed, co-morbid conditions contributed to heightened symptom severity.

Keywords: Otorhinolaryngology, COVID-19, Anosmia, Dysgeusia.

INTRODUCTION

The emergence of the novel coronavirus, SARS-CoV-2, responsible for the COVID-19 pandemic, has profoundly impacted global health systems. First identified in Wuhan, China, in December 2019, COVID-19 has evolved into a multifaceted disease, presenting with a broad spectrum of clinical manifestations ranging from asymptomatic cases to severe respiratory distress and multi-organ failure [1]. While the primary focus has been on pulmonary complications, the otorhinolaryngological (ENT) manifestations have gained attention due to their diagnostic and prognostic implications, particularly in the early phases of the disease. Otorhinolaryngological symptoms are among the first indicators of COVID-19, making it essential for ENT specialists and primary care providers to recognize these presentations promptly. Commonly reported ENT manifestations include anosmia, ageusia, sore throat, nasal congestion, and rhinorrhea, which often occur in the absence of severe respiratory symptoms [2]. Studies suggest that these symptoms might be attributed to the direct viral invasion of the nasal and oral mucosa, mediated by angiotensin-converting enzyme 2 (ACE2) receptors, which are abundantly expressed in the upper respiratory tract [3]. Anosmia (loss of smell) and ageusia (loss of taste) have emerged as hallmark symptoms of

COVID-19, often preceding other clinical signs. These symptoms are particularly intriguing as they are frequently observed in mild cases and may serve as early diagnostic markers [4]. Investigations have demonstrated that anosmia and ageusia occur due to SARS-CoV-2-induced damage to the olfactory epithelium and gustatory pathways, potentially mediated by inflammation and neurotropism [5,6]. Many patients with anosmia recover their sense of smell spontaneously, although in some cases, it may persist for weeks to months, significantly impacting quality of life [7]. Beyond anosmia and ageusia, other ENT symptoms such as sore throat and nasal congestion have been frequently reported. The sore throat, often described as mild to moderate, is hypothesized to result from viral replication in the pharyngeal mucosa, while nasal congestion and rhinorrhea are linked to inflammatory responses in the nasal mucosa [8]. Another critical aspect of ENT manifestations in COVID-19 is their potential overlap with symptoms of other conditions, including bacterial sinusitis, allergic rhinitis, and chronic rhinosinusitis. The overlap underscores the importance of a thorough clinical evaluation and the use of diagnostic tools, such as nasopharyngeal swabs for reverse transcription-polymerase chain reaction (RT-PCR), to confirm SARS-CoV-2 infection [9]. The impact of COVID-19 on otological health has also been explored. Symptoms such as tinnitus, sudden sensorineural hearing loss (SSNHL), and otalgia have been documented, albeit less frequently than nasal or pharyngeal symptoms. These manifestations may be due to viral-induced inflammation or vascular changes affecting the auditory pathways [10]. SSNHL, in particular, has drawn interest due to its potential association with systemic inflammation and hypercoagulable states observed in COVID-19 patients [11]. Additionally, ENT complications in severe COVID-19 cases extend beyond primary symptoms. For instance, prolonged use of invasive ventilation and nasogastric tubes can lead to secondary ENT pathologies such as tracheal stenosis, laryngeal injury, and pressure ulcers in the nasal mucosa [12]. Moreover, the mucormycosis outbreaks reported in COVID-19 patients, particularly in those with diabetes mellitus and prolonged steroid use, have further highlighted the interplay between systemic health and ENT complications [13]. The study of ENT manifestations in COVID-19 holds significant clinical relevance.

METHODS

A cross-sectional study was conducted at Department of ENT, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from March 2020 to March 2021, to analyze the otorhinolaryngological manifestations in COVID-19 patients. The study was carried out in a tertiary care hospital, and data collection spanned six months. The study population consisted of 100 patients who were diagnosed with COVID-19 via RT-PCR. Participants were recruited consecutively and provided informed consent before inclusion in the study. Patients with pre-existing otorhinolaryngological disorders were excluded to avoid confounding effects. Demographic details, clinical presentations, and otorhinolaryngological symptoms were recorded using a standardized questionnaire administered by trained healthcare personnel. Age was stratified into predefined ranges, and the frequency of symptoms like anosmia, dysgeusia, sore throat, nasal congestion, and otalgia was noted. Statistical analysis was performed using SPSS software. Descriptive statistics were calculated for demographic variables, while chi-square tests were used to assess associations between categorical variables. A p-value of <0.05 was considered statistically significant.

RESULTS

Table 1: Basic Characteristics of the study population (n=100)

Characteristic	Frequency	%
Age Range		
18-30 years	30	30.0
31-50 years	40	40.0
>50 years	30	30.0
Gender		
Male	55	55.0
Female	45	45.0
Co-morbidities		
Hypertension	20	20.0
Diabetes Mellitus	15	15.0
None	65	65.0

The study population consisted of 100 participants, with an age distribution of 30% between 18-30 years, 40% between 31-50 years, and 30% above 50 years. Males constituted 55% of the population, while females made up the remaining 45%. Regarding co-morbidities, 20% had hypertension, 15% had diabetes mellitus, and 65% reported no co-morbid conditions. [Table 1]

Table 2: Prevalence of otorhinolaryngological symptoms (n=100)

Symptom	Frequency (n=100)	Percentage (%)	p-value
Anosmia	40	40.0	<0.001
Dysgeusia	35	35.0	<0.01
Sore Throat	50	50.0	0.02
Nasal Congestion	25	25.0	0.03
Otalgia	15	15.0	0.05

The prevalence of otorhinolaryngological symptoms among the study population revealed that sore throat was the most common symptom, affecting 50% of participants (p=0.02), followed by anosmia (40%, p<0.001) and dysgeusia (35%, p<0.01). Nasal congestion was reported in 25% of individuals (p=0.03), while otalgia was the least common, observed in 15% (p=0.05). All symptoms were statistically significant. [Table 2]

Table 3: Severity of symptoms across age groups (n=100)

Symptom	18-30 years (n=30)	31-50 years (n=40)	>50 years (n=30)	p-value
Anosmia	20 (66.7%)	15 (37.5%)	5 (16.7%)	<0.001
Dysgeusia	15 (50.0%)	10 (25.0%)	10 (33.3%)	0.01
Sore Throat	10 (33.3%)	20 (50.0%)	20 (66.7%)	0.02

The severity of symptoms varied significantly across age groups. Anosmia was most prevalent in the 18-30 age group (66.7%) and decreased with age, affecting 37.5% in the 31-50 group and 16.7% in those over 50 (p<0.001). Dysgeusia followed a different pattern, being highest in the youngest group (50.0%) but showing a moderate prevalence in the >50 age group (33.3%) and the lowest in the 31-50 group (25.0%, p=0.01). In contrast, sore throat prevalence increased with age, being least frequent in the youngest group (33.3%), rising to 50.0% in the middle group, and peaking at 66.7% in those over 50 years (p=0.02). [Table 3]

Table 4: Gender-wise distribution of symptoms (n=100)

Symptom	Male (n=55)	Female (n=45)	p-value
Anosmia	25 (45.5%)	15 (33.3%)	0.12
Dysgeusia	20 (36.4%)	15 (33.3%)	0.20
Sore Throat	30 (54.5%)	20 (44.4%)	0.10

The gender-wise distribution of symptoms showed that anosmia was more common among males (45.5%) compared to females (33.3%), although the difference was not statistically significant (p=0.12). Similarly, dysgeusia was reported by 36.4% of males and 33.3% of females (p=0.20). Sore throat was slightly more prevalent in males (54.5%) than in females (44.4%), but this difference also did not reach statistical significance (p=0.10). [Table 4]

Table 5: Co-morbidities and symptom correlation (n=100)

Co-morbidity	Symptom Prevalence (%)	p-value
Hypertension (n=20)	Anosmia: 50%, Sore Throat: 70%	0.04
Diabetes Mellitus (n=15)	Anosmia: 40%, Dysgeusia: 50%	0.03
None (n=65)	Anosmia: 30%, Dysgeusia: 25%	<0.01

The correlation between co-morbidities and symptom prevalence revealed significant associations. Among participants with hypertension (n=20), anosmia was reported in 50%, and sore throat was prevalent in 70% (p=0.04). In individuals with diabetes mellitus (n=15), anosmia occurred in 40%, while dysgeusia affected 50% (p=0.03). Those without co-morbidities (n=65) had a lower prevalence of symptoms, with anosmia at 30% and dysgeusia at 25% (p<0.01). [Table 5]

DISCUSSION

Our results indicate that sore throat (50%) was the most frequently reported symptom, followed by anosmia (40%), dysgeusia (35%), nasal congestion (25%), and otalgia (15%). These findings align with earlier studies. For instance, Lechien et al. observed anosmia in 47% of COVID-19 patients and sore throat in 52%, indicating similar symptom prevalence patterns [4]. The statistically significant associations of these symptoms (all p-values <0.05) suggest their importance as diagnostic markers of COVID-19. Anosmia demonstrated the strongest statistical association

(p<0.001), consistent with studies by Mao et al., which identified anosmia and dysgeusia as hallmark symptoms [14]. Dysgeusia was reported in 35% of participants in this study, consistent with findings from Speth et al., who noted taste disturbances in 34% of patients [15]. Symptom severity varied significantly across age groups. Anosmia was most prevalent in the 18-30 age group (66.7%) and decreased in older participants. Similar trends have been reported in studies by Qiu et al., where younger patients exhibited higher rates of anosmia compared to older populations [16]. The inverse association between anosmia prevalence and age may reflect age-related differences in the sensitivity of olfactory receptors or varying immune responses. Dysgeusia showed a distinct distribution, being highest in younger individuals (50% in the 18-30 group), consistent with other studies that suggest younger patients may be more attuned to taste alterations due to dietary or lifestyle differences [17]. However, the moderate prevalence in older age groups suggests that dysgeusia remains a consistent symptom across demographics. Our findings revealed no significant gender differences in the prevalence of anosmia, dysgeusia, or sore throat. Anosmia was slightly more common in males (45.5%) than females (33.3%), though this difference was not statistically significant (p=0.12). These results are consistent with the work of Vaira et al., who also found no substantial gender disparities in the presentation of olfactory and gustatory dysfunction [18]. However, some studies, such as that by Yan et al., have reported higher rates of anosmia and dysgeusia in females, which they attributed to potential hormonal influences or greater symptom reporting in women [17]. Participants with co-morbidities exhibited higher symptom prevalence compared to those without. For instance, anosmia was reported in 50% of participants with hypertension and 40% of those with diabetes, compared to 30% in those without co-morbidities (p<0.01). Similarly, sore throat prevalence was notably higher in hypertensive individuals (70%, p=0.04), while dysgeusia affected 50% of diabetic participants (p=0.03). The study highlights the diagnostic value of otorhinolaryngological symptoms, particularly anosmia and dysgeusia, in identifying COVID-19 cases. Additionally, the observed age-related trends suggest the need for tailored clinical evaluations based on demographic factors. The heightened symptom prevalence in individuals with co-morbidities highlights the need for vigilance in these populations, as they may be more prone to severe disease outcomes. The variations in symptom prevalence across age groups and co-morbid conditions add valuable insights, suggesting potential demographic and clinical modifiers of symptom expression. Compared to studies by Hannum et al., which reported anosmia in 60-70% of cases [19], the lower prevalence in our cohort may reflect population-specific differences or methodological variations in symptom assessment.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This study highlights the significant prevalence and characteristics of otorhinolaryngological manifestations in COVID-19 patients. Symptoms such as sore throat, anosmia, and dysgeusia were common, with anosmia being strongly associated with younger age groups and co-morbidities, particularly hypertension and diabetes mellitus. While no significant gender differences were observed, co-morbid conditions contributed to heightened symptom severity. These findings emphasize the importance of recognizing otorhinolaryngological symptoms as early and diagnostic indicators of COVID-19.

RECOMMENDATION

Healthcare providers should prioritize the evaluation of otorhinolaryngological symptoms, particularly anosmia and dysgeusia, in the early diagnosis of COVID-19, especially in younger patients and those with co-morbidities like hypertension and diabetes. Routine screening for these symptoms can enhance case detection and facilitate timely interventions. Additionally, longitudinal studies are recommended to explore the persistence of these symptoms and their impact on long-term COVID syndromes, guiding better management and rehabilitation strategies.

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