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Early Detection of ENT Symptoms in Mild to Moderate COVID-19 Cases: A case control study

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A B S T R A C T

Background: As the COVID-19 pandemic continues, understanding the diverse symptomatology associated with the virus is crucial for effective diagnosis and management. ENT symptoms, such as anosmia and sore throat, have gained prominence as potential early indicators of COVID-19 infection.

Objective: This study aims to investigate the prevalence of these symptoms in patients with mild to moderate COVID-19 compared to healthy individuals.

Methodology: A total of 380 participants were enrolled in this study. The study cases divided into two group, of which 190 individuals with mild to moderate COVID-19 as the case group and 190 healthy individuals forming the control group. Data on demographic characteristics, comorbidities, and the prevalence of various symptoms were systematically collected and analyzed.

Results: The analysis revealed that ENT symptoms were significantly more prevalent in COVID-19 cases, occurring in 67% of participants compared to only 19% in the control group. Notably, symptoms such as loss of smell (42.1%), blocked nose (63.1%), and sore throat (50%) exhibited strong associations with COVID-19 infection, as indicated by high odds ratios. Furthermore, asthenia-related symptoms were reported in 52% of COVID-19 cases, highlighting the multifaceted nature of symptom presentation in this population. The data suggest that these symptoms are critical indicators of infection and warrant attention during clinical assessments.

Conclusion: The findings underscore the importance of early recognition of ENT symptoms for timely diagnosis and effective management of COVID-19. Recognizing these symptoms can facilitate prompt testing, isolation, and treatment, ultimately leading to improved patient outcomes and reduced transmission rates.

Keywords: COVID-19; ENT Symptoms; Anosmia; Sore Throat; Early Diagnosis

Introduction

The global COVID-19 pandemic, caused by the SARS-CoV-2 virus, has rapidly evolved since its emergence, impacting millions of people worldwide and presenting diverse clinical manifestations across varied populations.[1,2] Characterized by a wide range of symptoms, ranging from mild respiratory issues to severe illness, COVID-19 has strained healthcare systems and disrupted daily life worldwide. The virus spreads primarily through respiratory droplets, leading to an urgent need for preventive measures such as vaccination, social distancing, and mask-wearing. As researchers continue to study the virus, the focus remains on understanding its variants, improving treatments, and enhancing public health responses to mitigate future outbreaks.

The COVID-19 pandemic has reshaped our understanding of infectious diseases, highlighting the importance of timely diagnosis and intervention. While the virus is commonly associated with respiratory symptoms, emerging evidence suggests that ENT (ear, nose, and throat) symptoms play a crucial role in identifying mild to moderate cases.[3] Symptoms such as loss of taste or smell, sore throat, nasal congestion, and ear discomfort may not only serve as early warning signs but also provide critical insights into the presence of the virus.[4]

Recognizing ENT symptoms early in the course of infection is essential for several reasons.[5] Firstly, these symptoms can be among the first indicators of COVID-19, allowing for prompt testing and isolation of individuals.[6] This is vital in controlling the spread of the virus, as many mild cases go unnoticed, enabling further transmission within communities. By raising awareness of these signs, we can foster a more proactive approach to public health, encouraging individuals to seek care when symptoms arise.

Moreover, distinguishing COVID-19 from other respiratory illnesses based on ENT symptoms can enhance clinical decision-making.[7] Healthcare providers can better allocate resources and implement appropriate treatment strategies, ultimately leading to improved patient outcomes. Early identification also empowers individuals, giving them the knowledge and confidence to take charge of their health. When patients recognize these symptoms, they are more likely to adhere to testing recommendations and public health guidelines.[8]

In essence, the early identification of ENT symptoms in mild to moderate COVID-19 cases is of paramount importance. It serves as a cornerstone for effective public health strategies, aids in clinical management, and supports better health outcomes for individuals. As we navigate the ongoing challenges of the pandemic, understanding and recognizing these symptoms can be instrumental in our collective response and recovery.

Recognizing ENT symptoms in mild to moderate COVID-19 cases is essential for multiple reasons.[9] These symptoms, including anosmia, sore throat, and nasal congestion, often present before respiratory distress, making them valuable early indicators of infection. Since mild cases can easily go undiagnosed, potentially contributing to further transmission, identifying these symptoms could prompt early testing and isolation, reducing spread and improving outcomes. Despite their significance, ENT symptoms are often underemphasized in clinical assessments, particularly when distinguishing COVID-19 from other respiratory illnesses. This study aims to address this gap by examining the prevalence and association of ENT symptoms in COVID-19 patients compared to healthy individuals, supporting early diagnosis and timely intervention to enhance patient care and public health strategies.

Objective

This study aims to investigate the prevalence of these symptoms in patients with mild to moderate COVID-19 compared to healthy individuals.

Methodology

In this study, we aimed to assess the significance of early identification of ENT symptoms in mild to moderate COVID-19 cases at Khyber Teaching Hospital, Khyber Pakhtunkhwa. A total of 380 participants were included, with 190 individuals diagnosed with mild to moderate COVID-19 serving as the case group, and 190 healthy individuals forming the control group. Data collection involved a structured questionnaire designed to capture the prevalence and onset of ENT symptoms, including sore throat, nasal congestion, and loss of taste or smell. Clinical assessments and patient histories were analyzed to identify patterns and correlations between ENT symptoms and COVID-19 severity. Statistical methods, including chi-square tests and logistic regression analyses, were employed to evaluate the differences between the two groups, providing insights into the potential role of ENT symptoms as early indicators of COVID-19 infection.

For the primary data collection, a cohort study was established at selected healthcare facilities that were actively treating COVID-19 patients. The inclusion criteria for this study comprised adults aged 18 and older, with the case group consisting of individuals diagnosed with mild to moderate COVID-19, confirmed through PCR or rapid antigen tests. Participants in the case group were required to report at least one ENT symptom, such as anosmia, ageusia, sore throat, or nasal congestion, at the time of diagnosis. The control group included healthy individuals without a history of COVID-19 or any current respiratory illness, and all participants needed to be

Table 1. Different comorbidities found among study cases

Comorbidities	Cases (n=190)	Controls (n=190)	p-value
Hypertension	67 (35.2%)	25 (13.1%)	< .001
Cardiovascular diseases	35 (18.4%)	11 (5.7%)	0.003
Diabetes	28 (14.7%)	6 (3.1%)	< .001
COPD	15 (7.8%)	7 (3.6%)	0.629
Tumors	12 (6.3%)	8 (4.2%)	0.424
Renal diseases	10 (5.2%)	3 (1.6%)	0.344
Cerebrovascular diseases	9 (4.7%)	1 (0.5%)	0.219
Hepatic diseases	5 (2.6%)	1 (0.5%)	0.999
Other Conditions	9 (4.7%)	1 (0.5%)	0.150

evaluated within the first two weeks of symptom onset. Conversely, exclusion criteria included individuals diagnosed with severe COVID-19 requiring hospitalization or intensive care, as well as those with pre-existing conditions that affect the ENT system, such as chronic sinusitis or severe allergies. Additionally, participants with any respiratory infections in the month prior to the study, immunocompromised individuals, and those unable or unwilling to provide informed consent were also excluded.

Once enrolled, participants underwent a clinical assessment that included a detailed medical history and a physical examination focused on respiratory and ENT symptoms. Nasopharyngeal swabs were collected for PCR testing to confirm the presence of SARS-CoV-2, allowing researchers to establish a direct link between

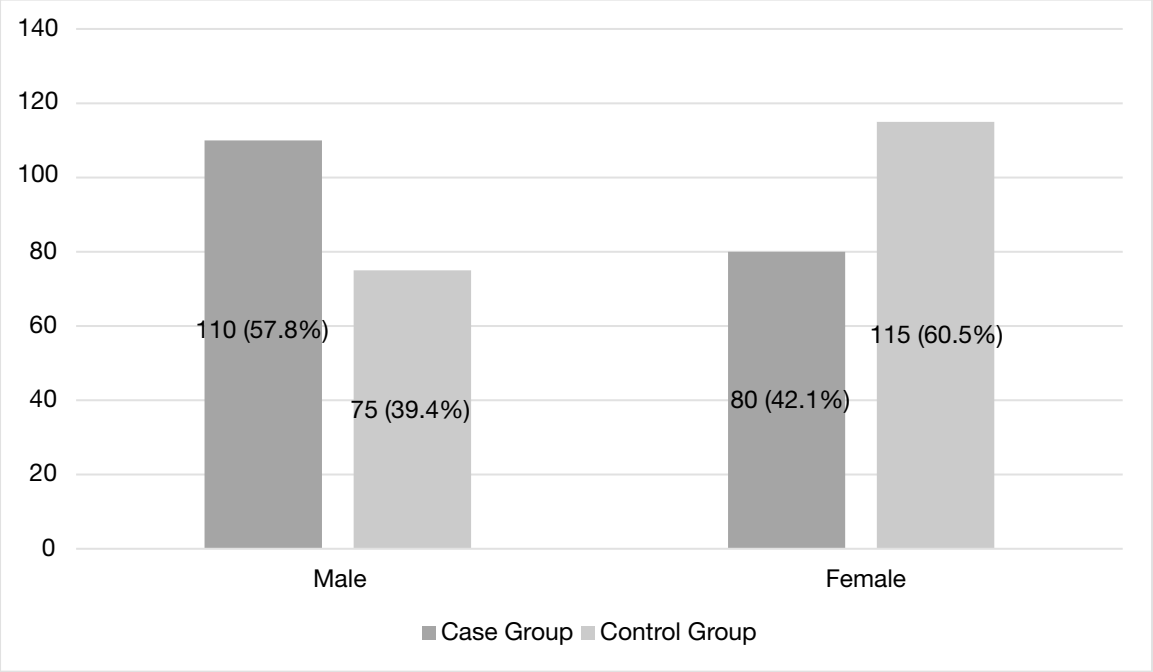

Figure 1. Gender wise distribution of study cases

Table 2. Prevalence of ENT Symptoms in Mild to Moderate COVID-19 cases compared to control group

ENT Symptom	Cases (n=190)	Controls (n=190)	p-value	Odds Ratio (95% CI)
Blocked Nose	120 (63.1%)	45 (23.7%)	< 0.001	5.29 (3.40 - 8.25)
Runny Nose	110 (57.8%)	30 (15.8%)	< 0.001	6.34 (4.12 - 9.83)
Sore Throat	95 (50.0%)	25 (13.2%)	< 0.001	5.66 (3.39 - 9.43)
Loss of Smell	80 (42.1%)	10 (5.3%)	< 0.001	10.07 (4.48 - 22.68)
Coughing	85 (44.7%)	40 (21.1%)	0.001	2.77 (1.69 - 4.55)
Difficulty Swallowing	45 (23.7%)	10 (5.3%)	0.002	5.88 (2.63 - 13.15)
Ear Pain	40 (21.1%)	5 (2.6%)	< 0.001	9.49 (3.78 - 23.54)
Hoarseness	35 (18.4%)	8 (4.2%)	0.003	5.25 (2.08 - 13.27)
Nasal Congestion	70 (36.8%)	20 (10.5%)	< 0.001	4.88 (2.93 - 8.16)
Sinus Pressure	50 (26.3%)	12 (6.3%)	0.001	5.23 (2.62 - 10.47)
Vertigo	30 (15.8%)	5 (2.6%)	< 0.001	6.90 (2.73 - 17.41)
Headache	75 (39.5%)	20 (10.5%)	< 0.001	5.40 (3.21 - 9.14)
Wheezing	40 (21.1%)	10 (5.3%)	< 0.001	4.69 (2.05 - 10.74)
Shortness of breath	90 (47.4%)	15 (7.9%)	< 0.001	9.16 (5.15 - 16.26)

reported symptoms and actual infection. Participants also completed standardized questionnaires that assessed various factors, including demographic information, the onset, duration, and severity of symptoms. These questionnaires were designed to provide a thorough profile of symptoms, highlighting the importance of early identification of ENT symptoms.

Alongside the quantitative data, qualitative research methods were used to gain a better understanding of patients' experiences. Participants was invited to take part in semi-structured interviews that explored their thoughts on identifying symptoms and what influenced their decision to seek medical care. These interviews included open-ended questions, which allowed participants to share their experiences in their own words. The qualitative data was transcribed and analyzed to identify key themes and patterns about early symptom recognition and how it affected their decisions to seek help.

For data analysis, statistical software was employed to perform quantitative analyses on the collected survey data. Descriptive statistics summarized the demographics and symptom profiles of the participants. Chi-square tests and logistic regression analyses were used to evaluate the associations between specific ENT symptoms and COVID-19 confirmation, while controlling for potential confounding variables such as age, gender, and pre-existing health conditions. The aim was to determine whether early identification of ENT symptoms was associated with improved testing rates and outcomes.

Ethical approval for the study was obtained from the hospital's ethical committee.

Result

Our study included 380 participants, with 190 individuals diagnosed with mild to moderate COVID-19 serving as the case group, and 190 healthy individuals forming the control group. The study cases included 57.8% male in cases group and 60.5% in control group with mean age and standard deviation of 45.3 ± 12.4 years in cases group and 44.7 ± 11.9 years in control group (Figure 1).

Table 3. Prevalence of Symptoms in COVID-19 cases compared to healthy controls

Symptom	Cases			Controls		
	Absent	At least one	At least one severe	Absent	At least one	At least one severe
Asthenia-related symptoms (6 marker symptoms)	92 (48%)	100 (52%)	32 (16%)	173 (91%)	25 (13%)	15 (7%)
ENT symptoms (7 marker symptoms)	65 (34%)	129 (67%)	49 (25%)	164 (86%)	37 (19%)	19 (10%)
Influenza-like symptoms (6 marker symptoms)	52 (27%)	142 (74%)	64 (33%)	169 (88%)	27 (14%)	14 (7%)
Breathing issues (4 marker symptoms)	68 (35%)	131 (68%)	35 (18%)	167 (87%)	29 (15%)	7 (3%)
Total (23 marker symptoms)	19 (10%)	181 (95%)	110 (57%)	151 (79%)	41 (21%)	21 (11%)

Among group of COVID-19 cases, majority of study cases (35.2%) were hypertension along with COVID issue and least common was hepatic diseases (2.6%), whereas in control group, also majority of cases (13.1%) experienced hypertension and renal disease, cerebrovascular disease and hepatic diseases were less common (0.5%). Significant positive association was found with hypertension and diabetes against COVID-19 infection (Table 1). Table 2 highlights the prevalence of various ENT symptoms in mild to moderate COVID-19 cases compared to a control group. Significant differences were observed, with symptoms such as loss of smell (42.1%), blocked nose (63.1%), and runny nose (57.8%) showing the highest odds ratios, indicating a strong association with COVID-19 infection. These findings highlight the critical role of early recognition of ENT symptoms as key indicators for diagnosing COVID-19, which can lead to more timely and effective patient management (Table 2).

On comparison among both the groups, it was found that, notably, 67% of cases reported at least one ENT symptom, while 95% exhibited any symptom. In contrast, only 19% of controls reported ENT symptoms, underscoring the significant difference in symptom presentation between the two groups (Table 3).

Discussion

Early identification of Ear Nose and Throat (ENT) symptoms in mild to moderate COVID-19 cases is crucial for timely diagnosis and effective management.[10] The findings from the present study underscore the prevalence of specific ENT symptoms such as loss of smell, blocked nose, and sore throat, which were significantly more common in COVID-19 patients compared to healthy controls.

This study reveals that specific symptoms, such as loss of smell (42.1% of cases), blocked nose (63.1%), and sore throat (50%), are significantly more prevalent among COVID-19 patients than in healthy controls. These findings align with research by Lechien et al. (2020), which also identified that approximately 85% of COVID-19 patients reported anosmia (loss of smell), while about 88% experienced ageusia (loss of taste).[11] Notably, 11% identified anosmia as their first symptom, often preceding other COVID-19 symptoms. The findings emphasize the importance of olfactory and gustatory dysfunction as key indicators for early identification of the virus. Furthermore, these sensory symptoms, especially the loss of smell and taste serve as distinctive clinical markers that may help differentiate COVID-19 from other respiratory infections. Recognizing these signs early can support timely isolation and intervention, reducing the risk of transm-ission. The data underscores the critical role of olfactory and gustatory screening in COVID-19 diagnosis and highlights the potential of targeted symptom tracking in pandemic management.

The significance of recognizing these symptoms early can lead to quicker testing, isolation, and contact tracing, ultimately helping to curb the virus's spread. Studies like those by Mao et al. (2020) have suggested that early symptom recognition can significantly reduce the risk of severe outcomes, particularly for patients with comorbid conditions like hypertension and diabetes. In this study, a high prevalence of these comorbidities (35.2% for hypertension and 14.7% for diabetes) among COVID-19 patients emphasizes the need for vigilant monitoring and

early intervention.[12]

Moreover, the overlap of COVID-19 symptoms with other respiratory illnesses makes it imperative for healthcare professionals to differentiate COVID-19 based on ENT symptoms. Research by Kaye et al. (2020) found that many patients with COVID-19 presented with ENT symptoms that could easily be misattributed to allergies or other infections. This highlights the necessity for clinicians to be alert to the potential for COVID-19 in patients presenting with such symptoms, especially during periods of high transmission.[13]

The summary of symptoms in both groups reveals that asthenia-related symptoms were present in 52% of cases versus 13% of controls. ENT symptoms were found in 67% of cases compared to 19% in controls, showing their significant role in identifying COVID-19. Breathing issues were reported in 68% of cases compared to 15% in controls. A study by Zhang et al. (2020) reported that shortness of breath or difficulty breathing was observed in 55% of COVID-19 patients, which correlates with the 68% of cases in your findings. This suggests that respiratory symptoms are prevalent in COVID-19 cases and further emphasizes the need for comprehensive assessments that include a range of symptoms, from ENT to respiratory and asthenia-related symptoms.[14]

Incorporating screening tools focused on ENT symptoms into routine assessments can enhance early detection. A study by Al-Ani et al. (2021) supports this approach, advocating for the inclusion of a symptom checklist in primary care settings to facilitate the early identification of COVID-19. Public health campaigns that emphasize the recognition of these symptoms can empower individuals to seek medical attention sooner, leading to better management and outcomes.[15]

The early identification of ENT symptoms in mild to moderate COVID-19 cases is crucial for improving diagnosis, enhancing patient management, and reducing transmission rates. The findings of this study resonate with existing literature, which consistently underscores the importance of recognizing these symptoms as key indicators of COVID-19. This proactive approach not only aids in individual patient care but also contributes to broader public health efforts aimed at controlling the pandemic.

Conclusion

The early identification of ENT symptoms in mild to moderate COVID-19 cases is crucial for effective diagnosis and management. The strong association of symptoms such as anosmia, ageusia, and sore throat with COVID-19 underscores their importance as early indicators of the infection. Recognizing these symptoms can facilitate timely testing and isolation, ultimately reducing the spread of the virus. Furthermore, the prevalence of multiple symptom clusters highlights the necessity for comprehensive assessments in clinical settings. By integrating ENT symptoms into routine evaluations, healthcare providers can improve patient outcomes and enhance public health responses to the pandemic. This proactive approach not only aids in individual patient care but also contributes to broader efforts to control the transmission of COVID-19.

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