



# Clinical Characteristics of COVID-19 from the Otorhinolaryngologist's Perspective: First Report from Oman, Middle East

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**Abstract** To study the otorhinolaryngological clinical characteristics of COVID-19 positive patients. A prospective cross sectional study on sixty five patients who were SARS-CoV-2 PCR positive, and completed 14 days of isolation period were surveyed with a questionnaire. The responses were evaluated and assessed. Sixty five SARS-Cov-2 PCR positive cases were included in the study. There were 57 (87.6%) males and 8 (12.3%) females. Thirty five (53.8%) were in home isolation, whereas, 30 (46.2%) were under institutional care. Forty five patients (72.6%) presented with mild symptoms, and 4 (6.4%) developed moderate symptoms. Thirteen (21%) were asymptomatic. Overall, 46 patients (70.7%) presented with upper airway symptoms with or without general symptoms. More than half of the patients experienced pharyngodynia or sorethroat, smell and taste dysfunction as common symptoms (66.7%, 61.4% and 50.7% respectively). Severe headache was noticed by eighteen (27.7%) patients. Other respiratory symptoms such as nasal congestion, rhinorrhoea, sneezing, facial pain, etc. were present with less frequency. In more than half of the patients (61.5%), all the symptoms recovered within 5 days, in 12 (18.5%) between 5 and 8 days, and in 9 (13.8%), between 9 and 14 days. However, in four patients, symptoms lasted for 28–30 days. In seven patients (10.7%), symptoms recurred after the period of isolation, however, the retest was

negative. Fever, cough and or shortness of breath are the commonly reported prominent symptoms of COVID-19, however, there is a changing trend of clinical presentation towards variable otorhinolaryngologic manifestations. Pharyngodynia, taste and smell dysfunctions are common in patients with COVID-19, and could represent potential characters.

**Keywords** COVID-19 · Corona · Otorhinolaryngology · Symptoms · Survey

## Introduction

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic was first recognized as a local endemic disease in Wuhan, the capital of Hubei province of China on 31st December 2019. The disease is currently affected in more than 260 countries, and WHO declared it as a Public Health Emergency of International Concern on January 30, 2020, and then renamed it as coronavirus disease 2019 (COVID-19) on February 11, 2020. On March 11, 2020, it was declared as the global pandemic [1, 2]. As of September 2020, COVID-19 is having a turnover of total of 28,562,083 confirmed cases, and a total of 917,213 deaths were reported worldwide with a case fatality rate of 4%. Till date, 88337 positive cases have been reported in Oman with a death rate of 762.

The clinical symptoms of COVID-19 at the onset of illness vary, but over the course of the disease, most of the patients will experience fever or chills, cough, shortness of breath or difficulty in breathing [3]. The Centre for Disease Control and Prevention (CDC) has later expanded its list of possible symptoms of the coronavirus such as chills, muscle pain, headache, sore throat and loss of taste or smell

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etc. that reflects the broad variation, and unpredictability of the disease. In more severe cases, COVID-19 leads to viral pneumonia, which in turn could lead to severe acute respiratory distress syndrome (ARDS) and even death [4].

The nasal, nasopharyngeal and/or the oropharyngeal tissue remain as one of the most common site of the infection, and forms the main source of sample for testing. An otolaryngologist could be the first to evaluate patients with COVID-19, and the most likely route of transmission of SARS-CoV-2 is by contact and respiratory droplets (aerosols). As a result, an understanding of otorhinolaryngological manifestations in COVID-19 require a greater degree of suspicion for prompt screening, and effective control of the pandemic spread of SARS-CoV-2 [5]. Therefore, we studied the clinical characteristics of 65 laboratory confirmed COVID-19 cases, to assess the importance of otorhinolaryngological manifestations as presenting symptoms with a review of literature.

## Materials and Methods

A prospective cross sectional study was conducted on 65 COVID-19 positive subjects who agreed to participate with informed consent. Cases were defined as self-reported clinical details as a response to a set of well-structured 40 multiple choice questionnaire based survey after 14 days of isolation. Participants who are more than 12 years old with laboratory-confirmed COVID-19 infection by reverse transcription polymerase chain reaction (RT-PCR) test, and completed 14 days of institutionalised or home isolation were included. The COVID-19 diagnosis was based on the national case definition and confirmed COVID-19 interim guidance [6]. The responses were collected electronically and assessed. Patients who are children, critically ill or hospitalised during isolation were excluded.

The online questionnaire was in google document format (<https://docs.google.com/forms/d/e/1FAIpQLSeutjRu7tnYViV6lhS46biGVq18FW2gJDyDy2Q8vehVI06-WQ/viewform>). The variables consist of clinical presentations, epidemiological details, risk factors, nature of contact, and recovery pattern. The severity of illness, and the type of risk exposure were recorded based on the WHO definition [7]. Descriptive statistics were used to describe the data. For categorical variables, frequencies and percentages were reported. Statistical analyses were conducted using STATA version 16.1.

## Results

Sixty five SARS-Cov-2 PCR positive cases who completed 14 days of isolation were included in the study. All the participants were of Asian origin. There were 57 (87.6%) males and 8 (12.4%) females. Thirty five (53.8%) were in home isolation, whereas, 30 (46.2%) were under institutional care. Forty (61.5%) patients were aged 18–40 years, and 19 (29.2%) were between 41 to 65 years of age. Six (9.3%) were below age 18 and none of them were above 65. Thirty three (50.7%) participants had no obvious detectable contact with positive COVID-19 patients. Eighteen (27.7%) patients had low risk, and 14 (21.5%) high risk exposure. Forty five patients (72.6%) presented with mild symptoms, and 4 (6.4%) developed moderate symptoms, whereas thirteen (21%) were asymptomatic. More than two third of them (87.3%) were not associated with any risk factors, while 6 (9.2%) were daily alcohol users, and 4 were smokers.

Overall, 46 patients (70.7%) presented with otorhinolaryngological symptoms with or without general symptoms. In 23 (35.38%), there were more than one upper airway symptoms. Pharyngodynia with or without sore throat was the most common symptom as revealed by 43 (66.7%) patients. In 28 (43%) patients, it presented as early symptom, and in another 15 (23.7%), it developed during the course of isolation. Smell abnormalities (ageusia and hypogeusia) were present in 22 (33.8%) as early symptom, and in 18 (27.6%) as late symptom, whereas, taste abnormalities (anosmia and hyposmia) were present in 21 (32.3%) and 12 (18.4%) respectively. Severe headache was noticed by eighteen (27.6%) patients. Other less common symptoms included rhinorrhoea (7.5%), nasal congestion (12.3%), sneezing (6.1%), ear pain (3.3%), and facial pain (3.3%) (Fig. 1).

Fever was the most common presenting symptom in 42 (64.6%) people followed by dry irritating cough in 40 (61.5%). Fatigability as a presenting symptom were present in 23 (35.3%), while myalgia was prominent in 20 (30.7%). 5 (7.6%) patients experienced chest tightness, and three (4.6%) developed respiratory distress. Diarrhoea was experienced by 10 (15.3%), in addition, nausea and vomiting were the distressing early symptoms in 9 (13.8%) patients (Fig. 2). Associated chronic medical illness included chronic obstructive pulmonary disease (COPD) in 12 (18.4%), hypertension in 6 (9.2%) and diabetes in 5 (7.6%).

More than half of the patients (61.5%) became symptom free within 5 days, in 12 (18.5%) between 5 and 8 days, and in 9 (13.8%), between 9 and 14 days. However, in four patients (6.1%), symptoms lasted for 14–28 days (Fig. 3). In seven patients (10.7%), symptoms recurred in milder

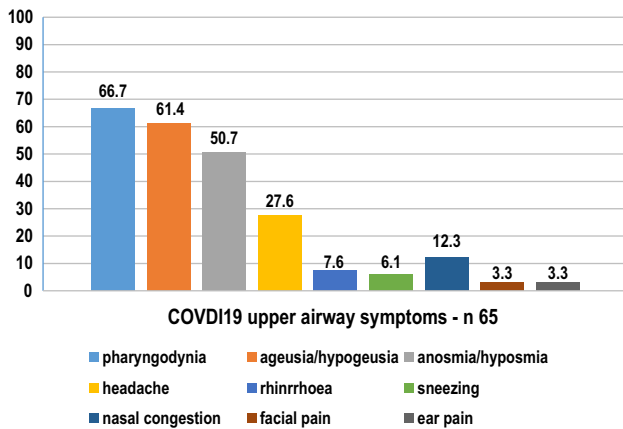


Fig. 1 Chart showing the distribution of different otorhinolaryngological symptoms in COVID-19

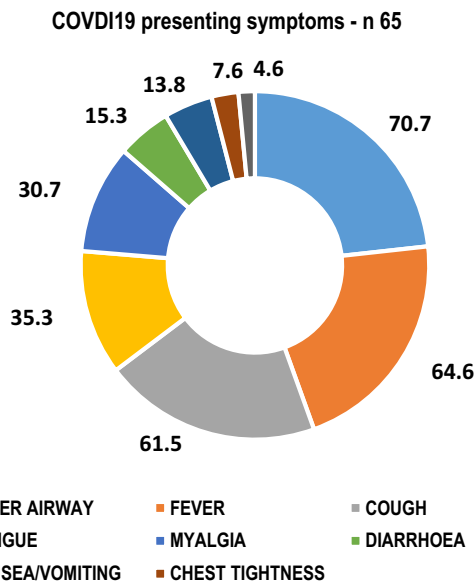


Fig. 2 Chart showing the distribution of otorhinolaryngological and non otorhinolaryngological symptoms in COVID-19

form after the period of isolation, however, the retest was negative in all of them at that point of time.

### Discussion

The presentation of COVID-19 remain vague to large extend, and manifests with a wide clinical spectrum ranging from no symptoms to septic shock, and multi-organ dysfunctions. In a largest case series of COVID-19, the Chinese Centre for Disease Control and Prevention, classified most of the cases are mild to moderate (81%) with an

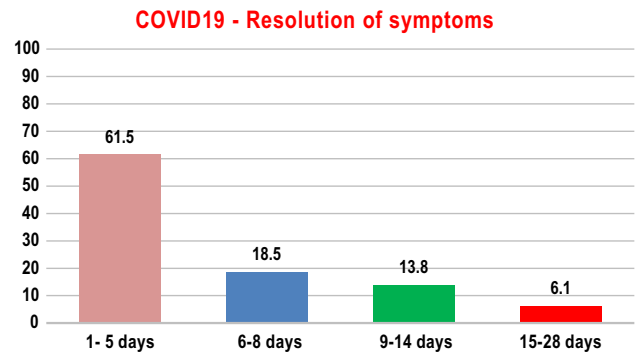


Fig. 3 Chart showing the distribution of recovery from symptoms in COVID-19

overall case-fatality rate (CFR) of 2.3% [8]. As a result, mild to moderate infections are becoming important in screening the pandemic spread of SARS-CoV-2 more than epidemiological risk factors that are associated. In our study, a large majority of patients had only mild symptoms (72.6%), whereas 21% were asymptomatic. A similar study also reported asymptomatic cases in 19.2% in their series of 215 patients [9]. Among the COVID-19 cases, males had a higher rate of confirmed cases than females, (87.6% as against 12.4%). This was similar to the data from Italy and USA where 82% and 67% of patients were males and females respectively [10, 11].

The clinical characteristics of COVID-19 mainly displays general and or lower respiratory tract manifestations. Patients with severe infection can also develop neurological manifestations such as acute cerebrovascular diseases, skeletal muscle injury, and impaired consciousness [12]. A meta review of 38 studies reported fever (80.4%), fatigue (46%), cough (63.1%) and expectoration (41.8%) as the most common clinical manifestations [13]. In another systematic review, Sun et al. showed that the incidence of fever was 89.1% while the incidence of cough was 72.2% [14]. Another study by Li et al. also indicated that the main clinical symptoms of COVID-19 patients were fever (88.5%), cough (68.6%) and myalgia or fatigue (35.8%) [15]. Anorexia, dyspnoea, sputum production are reported in more than 25% of cases [16]. However, Kim et al. reported fever in only 11.6% of their series, in which cough was the most common symptom [9]. In our study, fever was the most common presenting symptom as reported by 42 (64.6%) people followed by dry irritating cough in 40 (61.5%), Fatigability and myalgia were present in a quarter of patients. In less than 10%, gastrointestinal symptoms such as diarrhoea, nausea and vomiting were significant.

Multiple evidences confirm that the nasal cavity and upper airway are vital areas susceptible to SARS-CoV-2 infection. Using rhesus macaques model of coronavirus infection, the researchers who compared the pathology

among corona viruses found that nose and throat are the main pathogenic sites in SARS-CoV-2 infections [17]. Viral loads in the patient's nasal cavity were higher than the viral loads in the pharynx, in both symptomatic individuals and asymptomatic ones, indicating that the nasal cavity could be the first gateway for the initial infection [18]. Goblet cells and ciliated cells in the nasal mucosa may be the initial site of SARS-CoV-2 infection, implicating primary SARS-CoV-2 transmission is through infectious droplets [19]. These findings could also explain the highly infectious and highly pathogenic nature of COVID-19 which necessitate the importance to detect upper airway symptoms promptly. However, otorhinolaryngological manifestations of COVID-19 are poorly defined and less frequently reported than systemic symptoms in the literature.

Sore throat and headache were the most common otorhinolaryngological symptoms that were noticed in recent studies [5, 16]. Nasal congestion, pharyngeal erythema, rhinorrhoea etc. were reported only in 2.1% cases [20]. American Academy of Otolaryngology Head and Neck Surgery (AAO-HNS) opined that anosmia and dysgeusia have been detected in patients ultimately testing positive for SARS-CoV-2 and proposed to add these symptoms to the list of screening tools for possible COVID-19 infection. European otolaryngologists observed that many patients infected by SARS-CoV-2 presented with severe olfactory and gustatory dysfunctions without rhinorrhoea or nasal obstruction or other systemic complaints [21]. Furthermore, European Rhinology Society reported that "a significant part of the COVID-19 patients (20–60%) appear to have loss of smell [4]. A recent Chinese based study found nasal congestion (62%) as the most common symptom in mild COVID-19 infection [22]. In a meta review on ENT manifestations of COVID-19 cases on 1773 patients, sore throat (11.3%) was the most prominent symptom followed by headache (10.7%). Smell was affected in only 6% of their review [20]. A recent European multicenter study by Lechien et al. investigated self-reported olfactory dysfunction in 417 mild to moderate COVID-19 cases, in which olfactory dysfunction was reported in 85.6% of cases, and this occurred in 11.8% before the presence of other symptoms. Out of the 18.2% of patients without nasal obstruction or rhinorrhea, 79.7% were hyposmic or anosmic [21]. A US based study reported anosmia in 73% of cases, headache in 37% and nasal congestion in 25% [23]. In another review of 50 studies, Krajewska et al. reported cough (48.2–81%), sore throat (5–46%) and rhinorrhoea (4–40%) as three prominent manifestations [24]. In a study on 172 patients by Kim et al. cough was the most common symptom followed by hyposmia which was observed in only 11.6% cases [9]. Klopfenstein et al. analysed 114 confirmed COVID-19

patients and demonstrated anosmia to be present in 47%, along with dysgeusia in 85%, of cases [25]. All these studies suggest that patients with upper respiratory symptoms could be the hidden carriers of SARS-CoV-2 as they do not meet the current criteria for diagnosing COVID-19 and could be the potential source of the rapid spread of COVID-19. In our prospective study of 65 patients, overall, 46 patients (70.7%) presented with upper airway symptoms with or without general symptoms, more than half of them were presented with more than one otorhinolaryngological symptoms. Pharyngodynia was the most common symptom as revealed by overall 41 (66.7%) patients. Significantly, smell abnormalities (ageusia and hypogeusia) were present in 40 (61.4%) of individuals, and taste dysfunction (anosmia and hyposmia) was the third most common abnormality which were present in 33 (50.7%). Severe headache was noticed by eighteen (27.6%) patients (Table 1).

Unlike other viral infections, nasal congestion, rhinorrhoea and sneezing were present only in a small group of patients. However, olfactory dysfunction was one of the major symptom as exemplified by the current study. Olfactory dysfunction in the absence of other common nasal symptoms seems to be a unique feature of COVID-19 which needs to be studied further. The Young-Otolaryngologists of the International Federation of Oto-rhinolaryngological Societies (YO-IFOS) has taken initiative to conduct an international epidemiological study to characterize olfactory and gustatory disorders in infected patients. According to Lechien et al. the prevalence of olfactory and gustatory dysfunction is more pronounced in European COVID-19 patients [21]. But contrary to this observation, all of our patients with prominent olfactory or gustatory dysfunctions were all of Asian origin. There are studies which showed that individuals with smell disorders tend to have a taste disorder, suggesting a probable association between the two, and the incidence of smell disorders is higher in females [26–28]. We noticed, in more than half of the cases both symptoms co-existed, however, all of them were males.

In summary, our study convincingly showed that upper respiratory symptoms are increasingly evident in COVID-19 positive cases. These symptoms could manifest even without fever or other generally appeared symptoms, and therefore, should be considered as potential cases. Smell and taste loss is significantly affected in large groups of patients, and given the urgency and lethality of the current pandemic, this knowledge have great value in suspecting and screening COVID-19 cases. The physicians evaluating patients with acute-onset of ENT symptoms should have a high index of suspicion for concomitant SARS-CoV-2 infection and should be mindful of the symptom of upper airway in outpatients so as not to delay the diagnosis of COVID-19. Targeted COVID-19 testing in these subjects

**Table 1** Otorhinolaryngological manifestations of COVID-19—literature review

Study	Number of cases	Pharyngodynia/sore throat	Smell dysfunction	Taste dysfunction	Headache	Rhinorrhoea	Nasal congestion	Facial pain	Others
Levato et al. [5] (Systemic review) Total studies—5	1556	12.4			4	3.7			
El-Anwar et al. [20] (Systemic review) Total studies—11	1773	11	6		10.7	2.1	4.1		
Lechien et al. [21]	417	7.9	85.6	88.8		4.3	12	12.9	Ear pain 3.13 Post nasal drip 6.9
Chang et al. [22]	13				23.1	7.7	61.5		
Kaye et al. [23]	237		73		37	18	25		
Krajewska et al. [24] (Systemic review) Total studies 20	2719	5–46				4–40	4.8–7.7		Dizziness 16 Tonsil edema 2.1
Klopfenstein et al. [25]	114	43		85	82	57	30		Epistaxis 11 Tinnitus 11 Hearing loss 7 Sneezing 33
Giacomelli et al. [26]	59	1.7	5.1	10.2	3.4				Mixed smell & taste disorder 18.6
Bagheri et al. [27]	10,069	19.3	76.2	83.3	48.6	15.6	43.7	18.5	Orbital pain 18.8 Otalgia 9.9 Sneezing 9.08
Menni et al. [28]	579		59.4	59.4					Hoarseness of voice 32.3
Present study	65	66.7	50.7	61.4	27.6	7.6	12.3	3.3	Sneezing 6.1 Otalgia 3.3

could be helpful in diagnosing new SARS-CoV-2 infections and serve as a new criterion for early self-isolation. [29, 30].

The main limitation of the study is an apparently low sample size, and the study didn't compare the pattern of symptoms with other similar viral disease which is beyond the scope this preliminary study. The observations demands a detailed multicentre study analysing the mechanism behind the mucosal involvement of upper airway in SARS-CoV-2 infections leading to symptoms.

## Conclusion

Otorhinolaryngological manifestations in COVID-19 are not rare, but prominent in COVID-19, especially in mild or moderate form of the disease and should be considered as potential clinical characteristics. The study stress the importance of identifying the pathophysiological mechanism for better understanding of COVID-19 for effective prevention and spread. Timely identification of otorhinolaryngological symptoms can lead to early detection of otherwise asymptomatic carriers.



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**Authors' contribution** All authors contributed to the study conception and design. Data collection, assessment, and manuscript preparation were done by AAK, The draft had been edited and revised by RAA and MAW. The literature search and contribution of text were provided by YAB and AAB. All authors read and approved the final manuscript.

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**Data Availability** Available and all data and materials as well as software application comply with field standards.

#### Declarations

**Conflict of interest** No conflict of interest and do not have any potential financial conflict of interest related to or could influence this work.

**Consent to Participate** A online consent is obtained at the time of survey.

**Ethical Approval** MREC #2135: Medical Research Ethics Committee (MREC), College of Medicine and Health Sciences, Sultan Qaboos University.

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