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Otorhinolaryngological Symptoms during Covid-19 Pandemic

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Abstract

Aim: This study is aimed to evaluate the most common Otorhinolaryngological symptom during Covid 19 Pandemic.

Methodology: It's a retrospective study, Data was collected from 166 lab confirmed Covid cases admitted in wards in a tertiary care centre in Bangalore from June 2020 to June 2021.

Result: Most number of cases affected were in 5th decade. 76.8% cases were symptomatic and 23.3%were asymptomatic. Most common presentation was fever75.4%, followed by cough 41.3% and myalgia 21.4%. Smell disorder and dysgeusia was noted in 7 (5.6%) out of 166 cases. Sore throat was seen in 11.9% of cases. Loss of smell and taste sensation was found more common in 5th and 6th decade and more common in female.

Conclusion: The novel COVID-19 started as an uncertain, serious and confusing illness. The sudden onset anosmia or ageusia are recognized by the international scientific community as important symptoms of the COVID-19 infection. Our study showed prevalence of anosmia in Indian population to be 5.6%, Dysgeusia to be 5.6%, and sore throat in 11.9%. Based on our results, it seems that patients with acute onset olfactory and taste dysfunction along with sore throat are more likely to have COVID-19. Sore throat is more prevalent ENT symptom seen during Covid 19 presentation.

Keywords: SARS-CoV-2, ACE2 expression, TMPRSS2 expression, COVID-19, respiratory epithelium, olfactory epithelium

Introduction

In December 2019, in Wuhan, Hubei Province, China, a cluster of patients with pneumonia of unknown cause was observed.[1] Later, it was found that a new corona virus caused it. In February 2020, the WHO designated the new virus as SARS-CoV- 2 and the disease as COVID-19. According to this organisation, since the onset of this disease until 27 March 2020, SARS-CoV-2 has infected more than half a million people in 136 countries, leading to the death of 23,335.[2]

The common symptoms of COVID-19 are general malaise, fever, cough, and shortness of breath. Other symptoms include muscle and joint pain, sore throat, headache, nausea or vomiting, diarrhoea, and some nasal symptoms, especially smell and taste dysfunction. Similar to other upper airway viral infections (URTI), such as common cold or flu, the loss of smell is a frequent symptom in COVID 19 patients. However, a sudden, severe, and isolated loss of smell and/or taste may also be present in COVID-19 patients who are otherwise asymptomatic.[3]

Loss of smell is a common (> 60%) and usually transient (3-7 days) symptom in common cold and acute rhinosinusitis [4], with the post-viral etiology being also the most frequent cause of permanent loss of smell.

Loss of smell in URTI is caused by a multifactorial combination of mechanical obstruction for the odorant transmission in the olfactory cleft due to mucosal inflammation (cytokine storm) and shedding

(neurodegeneration) of the olfactory neuro-epithelium which interfere with odorants binding to olfactory receptor (OR) [5].

ACE2 and TMPRSS2, two protein receptors which are required for host cell entry and facilitate accumulation, replication, and binding of SARS-CoV-2, are expressed in the sustentacular cells and to a lower extent, in the OR neurons of the olfactory neuro-epithelium, having a potential role for the loss of smell in COVID-19 patients [6].

Nasal airflow odorants reach the olfactory neuro-epithelium which covers a surface of 8–10 cm2 of the olfactory cleft in the upper part of the nasal cavities and where they bind/activate OR proteins. The olfactory neuro-epithelium contains 5–30 million receptor neurons which express up to 350 different OR [7]. On the other hand, the sense of taste is conveyed through only 5 taste receptors (sweet, salted, bitter, acidic/sour, umami/sodium glutamate) expressed in the tongue and palate gustatory buds.

The OLFACAT (OLF Action in CATalonia) survey reported a prevalence of loss of smell, either partial (hyposmia, 1 out of 5) or total (anosmia, 1 out of 300), of almost 20% of the European general population (82 million of EU citizens) [8].

Major causes of acquired smell loss include URTI by respiratory viruses (adenovirus, rhinovirus, coronavirus, influenza), traumatic brain injury, upper airway inflammation (rhinitis, rhinosinusitis), and neurodegenerative (Parkinson and Alzheimer) diseases while minor causes are intracranial/ sinonasal tumors, drugs, exposure to toxic substances, irradiation, or iatrogenic factors [9].

Methodology:

It's a retrospective study, Data was collected from 166 lab confirmed Covid cases admitted in wards in a tertiary care centre in Bangalore from June 2020- to June 2021

Inclusion criteria- RT-PCR confirmed covid 19 cases.

Exclusion criteria

Patients who are laboratory confirmed COVID positive but critically ill.

Patients with pre-existing Anosmia and Loss of taste.

Pregnant women

Patients without detailed information about initial symptoms were excluded.

Patients who were admitted in intensive care unit were excluded.

Data collection- Information on age, gender, symptoms, co-morbidites, and severity of covid infection were extracted from the case records and history sheets.

Statistical analysis

The characteristics of the included patients were reported by using descriptive statistics. The proportions of patients with each individual symptom among the symptomatic patients were calculated.

Data was entered into Microsoft excel data sheet and was analysed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. **Chi-square test or Fischer's exact test** (for 2x2 tables only) was used as test of significance for qualitative data.

Continuous data was represented as mean and standard deviation. **ANOVA** was used as test of significance to identify the mean difference between more than two quantitative variables

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs

P value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) was used to analyse data

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Results:

Table 1:- Distribution of subjects according to age group

Age group	Frequency	Percent
1-10yrs	6	3.7
11-20yrs	8	4.9
21-30yrs	21	12.8
31-40yrs	32	19.5
41-50yrs	33	20.1
51-60yrs	34	20.7
61-70yrs	18	11.0
>70yrs	12	7.3
Total	164	100.0

Incidence of Covid -19 was more common in 5th decade

Table 2:- Distribution of subjects according to sex

Sex	Frequency	Percent
Female	52	31.7
Male	112	68.3
Total	164	100.0

Table 3:- Distribution of subjects according to symptoms

	Frequency	Percent
Asymptomatic	38	23.2
Symptomatic	126	76.8
Total	164	100.0

Figure 1:- Graph showing Distribution of subjects according to symptoms

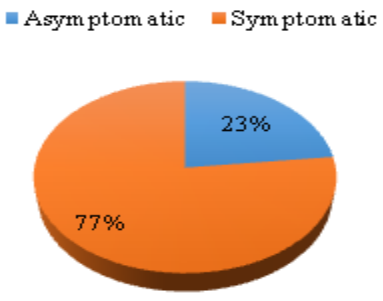

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Table 4:- Frequency Distribution of symptoms among symptomatic subjects

	N	%
Fever	95	75.4%
Cough	52	41.3%
Myalgia	27	21.4%
GI symptoms	22	17.5%
Sore throat	15	11.9%
Tinnitus	0	0%
Hearing loss	0	0%
Breathlessness	15	11.9%
Loss of smell	7	5.6%
Loss of taste	7	5.6%
Headache	5	4.0%

Figure 2:- Graph showing Frequency Distribution of symptoms among symptomatic subjects

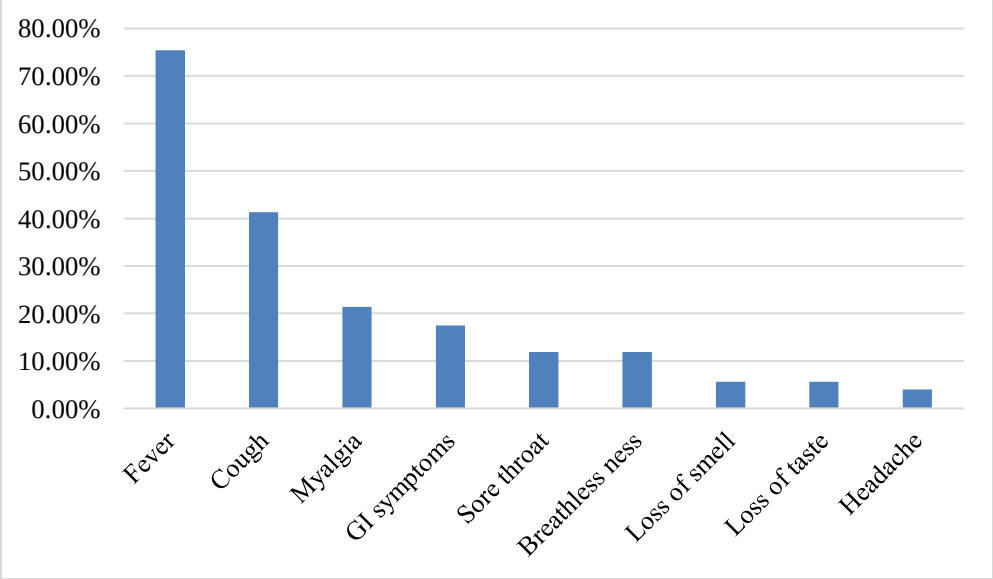

Table 5:- Frequency Distribution of severity among symptomatic subjects.

Severity	Frequency	Percent
Mild	113	89.7
Moderate	10	7.9
Severe	3	2.4

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Figure 3:- Graph showing Frequency Distribution of severity among symptomatic subjects.

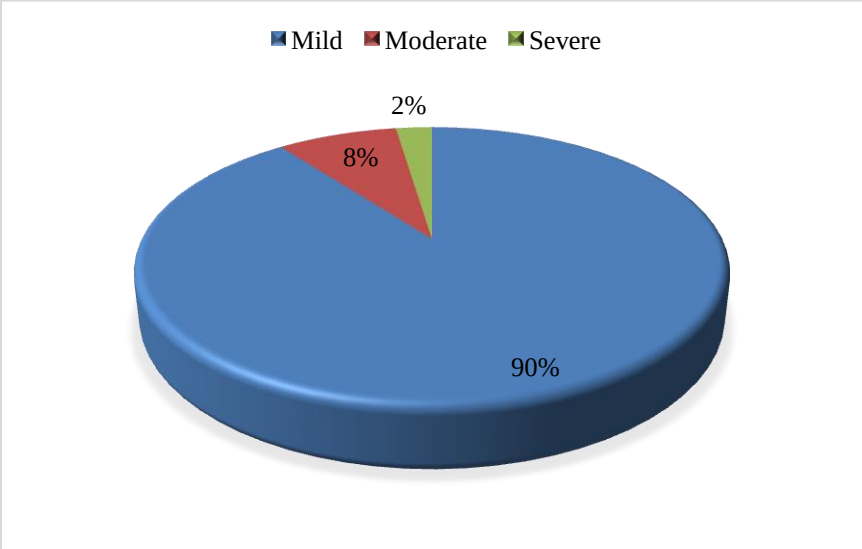

Table 6:- Comparison of age and sex according to severity

	Mild		Moderate		Severe		P value
Age group	N	**%**	**N**	**%**	**N**	**%**	
1-10yrs	3	2.7%	0	.0%	0	.0%	0.470
11-20yrs	6	5.3%	0	.0%	0	.0%	
21-30yrs	11	9.7%	0	.0%	0	.0%	
31-40yrs	24	21.2%	0	.0%	0	.0%	
41-50yrs	25	22.1%	2	20.0%	0	.0%	
51-60yrs	22	19.5%	4	40.0%	2	66.7%	
61-70yrs	13	11.5%	3	30.0%	1	33.3%	
>70yrs	9	8.0%	1	10.0%	0	.0%	
Sex							
Female	37	32.7%	3	30.0%	1	33.3%	0.094
Male	76	67.3%	7	70.0%	2	66.7%	

There was no statistically significant difference found between age and severity

There was no statistically significant difference found between sex and severity

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Table 7:- Comparison of mean age according to severity

	Mean	Std. Deviation
Mild	45.94	17.608
Moderate	57.40	9.070
Severe	58.33	5.859
Total	47.14	17.234

P value 0.068, there was no statistically significant difference found between age and severity

Table 8:- Comparison of various symptoms according to severity

	Mild		Moderate		Severe		P Value
	N	%	N	%	N	%	
Fever	82	72.6%	10	100.0%	3	100.0%	0.094
Loss of smell	4	3.5%	2	20.0%	1	33.3%	**0.010**
Loss of taste	4	3.5%	2	20.0%	1	33.3%	**0.010**
Cough	47	41.6%	4	40.0%	1	33.3%	0.956
Sore throat	15	13.3%	0	.0%	0	.0%	0.376
Headache	4	3.5%	1	10.0%	0	.0%	0.567
Tinnitus	0	0%	0	0%	0	0%	0
Hearing loss	0	0%	0	0%	0	0%	0
GI symptoms	19	16.8%	2	20.0%	1	33.3%	0.740
Breathless ness	8	7.1%	5	50.0%	2	66.7%	**<0.001**
Myalgia	21	18.6%	6	60.0%	0	.0%	**0.006**

There was a statistically significant difference found between Loss of smell and severity.

There was a statistically significant difference found between Loss of taste and severity.

There was a statistically significant difference found between Breathlessness and severity.

There was a statistically significant difference found between Myalgia and severity

Results: Out of 166 RT-PCR confirmed Covid cases, 68.3% were male and 31.7% were female.

Most number of cases affected were in 5th decade. 76.8% cases were symptomatic and 23.3%were asymptomatic. Most common presentation was fever75.4%, followed by cough 41.3% and myalgia 21.4%. Smell disorder and dysgeusia was noted in 7 (5.6%) out of 166 cases. Sore throat was seen in 11.9% of cases. Loss of smell and taste sensation was found more common in 5th and 6th decade and more common in female.

Discussion:

Patients infected with SARS - CoV - 2 present with a wide range of ENT -related and/or general symptoms, with new symptoms added to the list every day. In recent weeks, both published articles

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and anecdotal reports on COVID -19 have indicated that the virus may also cause STL. Here, we investigated the frequency and severity of ENT - related and general symptoms in patients with confirmed SARS -CoV -2 infection.

The rapid increase in the number of patients infected with SARS - CoV -2 and in deaths due to infection place a major burden on the healthcare systems of countries struggling with the disease. Success against COVID -19 disease requires early detection and isolation of infected patients. Therefore, it is very important to determine the probabilities of all symptoms caused by the disease [10].

The most common symptoms of COVID-19 are fever, cough, myalgia, fatigue, and difficulty breathing. In addition, ear, nose, and throat (ENT) symptoms, including loss of sense of smell and/or loss of sense of taste have been reported as symptoms caused by the virus [11,12]. Rhinoviruses, Epstein–Barr virus, parainfluenza virus, and some coronaviruses have been shown to cause upper respiratory infections, nasal congestion, and rhinorrhea, and may result in loss of smell and taste.

Various theories regarding pathophysiology of anosmia in COVID-19 positive patients have been studied recently. A study by Sungnak et al. [13] suggested that nasal epithelial cells show a high angiotensin converting enzyme 2 (ACE2) expression in SARS-CoV-2 infection, and thus this may allow the viral entry. The binding of the virus to ACE 2 receptors causes degeneration of the epithelial cells of the nasal mucosa and subsequent inflammation and damage to the neural receptors responsible for olfaction. It may have significance in identifying asymptomatic carriers or those with mild symptoms that would otherwise not raise suspicion for COVID-19 [14].

The prevalence of olfactory dysfunction (hyposmia and anosmia) in our study was 5.6%. A study conducted by Mishra P et al. in Indian population, showed the prevalence of 14%. One of the studies conducted by Lechien et al. showed the prevalence of olfactory dysfunction in European population as high as 85.6% [15] whereas in another study conducted by Klopfenstein it was 47% [16]. The prevalence of olfactory dysfunction in Indian population seems to be lesser as compared to European population. The reason for such a difference in anosmia prevalence rates between European and Asian population is still unclear.

In our study 5.6% of the patients reported taste dysfunction. Loss of smell and taste sensation was mainly noted in mild and moderate severity cases. Ageusia may be a secondary result of olfactory dysfunction. The angiotensin-converting enzyme 2 receptor, which is the main host cell receptor of SARS-CoV-2 for binding and penetrating cells, is widely expressed on epithelial cells of the oral mucosa. Damage to the mucosal epithelial cells of the oral cavity may explain loss of taste observed in the early stage of COVID-19 [17].

Around 5.6% of the patients had both loss of smell and loss of taste before testing of COVID-19 suggesting that both the symptoms are having higher positive predictive value for COVID-19 i.e. if both loss of smell and loss of taste are present in any patient, he is more likely to be affected with COVID-19.

Sore throat was noted in 11.9% of cases, which co-relates with the study done by Saee Savtale et al [18].

Auditory manifestation was not reported in the studies on COVID-19 and auditory complication due to coronavirus is little mentioned in the literature.

Conclusion:

The novel COVID-19 started as an uncertain, serious and confusing illness. The sudden onset anosmia or ageusia are recognized by the international scientific community as important symptoms of the COVID-19 infection. Our study showed prevalence of anosmia in Indian population to be 5.6%, Dysgeusia to be 5.6%, and sore throat in 11.9%. Based on our results, it seems that patients with acute onset olfactory, taste dysfunction along with sore throat are more likely to have COVID-19. Sore throat is more prevalent ENT symptom seen during Covid 19. As early diagnosis is important for the control of COVID-19, recognition of early signs such as anosmia, sore throat and loss of taste sensation can be used as a indicator for the diagnosis COVID-19 and isolation of the patients.

Limitation: Since it's a retrospective study follow up and progression of symptoms was not available.

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