

# Prevalence of Symptoms and their Correlation with Severity of Disease in 236 Patients with COVID19: An Asian Study

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**Abstract:** *The present study aimed to assess prevalence of symptoms and their correlation with severity of disease in patients with COVID 19. This Retrospective study was conducted on 236 patients in department of Otorhinolaryngology, Pt. B. D. Sharma PGIMS Rohtak. Data regarding age, gender, history of recent travel, specific symptoms correlated with COVID - 19, comorbidities and personal habits were obtained using a standardized questionnaire telephonically. The mean age of patients was 37.91±14.69 years. Among them, 61.9% were male and only 38.1% were female. 52.1% patients were admitted in hospital, 14.0% had ICU admission and rest opted for home quarantine. Patients were divided into 2 groups: the SpO<sub>2</sub> < 90% group (12.3%) and the SpO<sub>2</sub> ≥ 90% group (87.7%). SpO<sub>2</sub> < 90% group showed more underlying comorbidities when compared with the SpO<sub>2</sub> ≥ 90% group, such as hypertension, cardiovascular disease, and diabetes. The most common symptom was fever (71.2%), followed by myalgia (55.1%), cough (51.3%), sore throat (34.7%), dyspnoea (26.3%). 48.4% of patients had mild disease, 38.5% moderate and 13.1% had severe diseases. Patients with coexisting conditions were more susceptible to severe disease. This study brings forth a comprehensive profile of various parameters in COVID - 19 patients.*

**Keywords:** COVID 19, comorbidity, pandemic, symptoms, severity

## 1. Introduction

Corona viruses are enveloped, single - stranded, positive - sense RNA viruses that are phenotypically and genotypically divergent and are prevalent in bats around the world. They can also infect other species including humans and other mammals. In humans, corona viruses cause mild respiratory illness.<sup>1</sup> There have been previous outbreaks of coronaviruses (CoVs) including the severe acute respiratory syndrome (SARS) - CoV and the Middle East respiratory syndrome (MERS) - CoV which were outlined as agents causing great public health hazard.<sup>2</sup>

In late December 2019, several patients were admitted in hospitals of Wuhan, Hubei Province, China with pneumonia of unknown aetiology, later diagnosed as infection by a deadly virus. Full - genome sequencing and phylogenetic analysis unveiled that they had features typical of corona virus family.<sup>3</sup> The new beta - coronavirus was then specified as 2019 severe acute respiratory syndrome corona virus 2 (SARS - CoV - 2) and formed another clade within the subgenus sarbecovirus, Orthocoronavirinae subfamily.<sup>1, 3</sup> It infects the host cells by binding to the receptor which is angiotensin - converting enzyme 2 receptor (ACE2) with the help of an envelope - anchored spike protein which mediates its entry into host cells which is rationale for the lung epithelial cells being the primary targets of the virus.<sup>2, 4</sup>

The incubation period of the coronavirus infection is approximately 5.2 days (95% confidence interval [CI], 4.1 to 7.0).<sup>5</sup> The clinical manifestations of the disease spectrum include fever, non - productive cough, sore throat, dyspnoea, myalgia, fatigue being the majority of symptoms. Minor symptoms include diarrhoea, vomiting, haemoptysis,

anorexia, headache, dizziness, palpitations and chest pain. Severe disease led to acute respiratory distress syndrome, acute cardiac injury, acute kidney injury, secondary infections and death.<sup>6</sup> COVID - 19 has emerged with new atypical symptoms i.e. olfactory (85.6%) and gustatory (88%) dysfunctions. Anosmia and/or ageusia can be present alone or in association with other symptoms. So it becomes mandatory to test and recognise the disease in such individuals.<sup>7, 8</sup>

We aim to study the prevalence of symptoms and their association with severity of the disease in the patients with COVID - 19.

## 2. Material and Methods

This Retrospective study was conducted on 236 patients in Otorhinolaryngology department, Pt. B. D. Sharma PGIMS Rohtak. Patients with proven COVID - 19 infection by real time polymerase chain reaction (PCR) on nasopharyngeal and oropharyngeal swabs were enrolled in the current study by collecting the details from medical records. Data regarding the age, gender, history of recent travel, specific symptoms potentially correlated with COVID - 19 (fever, cough, sore throat, dyspnoea, myalgia, fatigue, anosmia, ageusia, nasal symptoms), comorbidities and personal habits (smoking / drinking) were obtained using a standardized questionnaire telephonically. Patients were asked to retrospectively recount the presence or absence of symptoms during the acute phase of COVID - 19 and whether each symptom persisted later on. More than 1 symptom could be reported.

**Table 1:** Criteria for selection of patients for the study

Inclusion Criteria	Exclusion Criteria
Laboratory confirmed case (RT - PCR)	Patients without laboratory confirmed infection
Clinically able to fulfil the questionnaire	Subjects with incomplete data
	Loss to follow up (not responding to 3 telephone calls)
	Psychological disturbances
	Previous anosmia/ageusia or other symptom mimicking COVID
	Not willing to take part in study

**Table 2:** Classification of disease based on the severity as per WHO Criteria

	Clinical Category	Definition
1.	Mild disease	only low - grade fever, mild cough, slight fatigue or other non - specific symptoms
2.	Moderate disease	clinical signs of pneumonia (high grade fever, cough, dyspnoea) but no signs of severe pneumonia including spo <sub>2</sub> >90% at room air
3.	Severe disease	along with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing) there is severe respiratory distress or respiratory rate>30/min or spo <sub>2</sub> <90% at room air
4.	Critical patients	with respiratory failure, septic shock, and/or multiple - organ dysfunction or failure

SPSS statistical software version 22 was used for analysing the data. Chi - Square test was used to compare between categorically variables. Independent - Samples T - test was used for the comparison of the means. P - value was considered a statistically significant difference if it is less than 0.05.

### 3. Results

A total of 236 patients were enrolled in the study. All were confirmed of infection with SARS - CoV - 2 with PCR tests of oral and nasopharyngeal swabs. The mean age of patients was 37.91±14.69 years with median of 34.0 years (interquartile range [IQR] 5 - 81years). Among them 146 (61.9%) were male and 90 (38.1%) were female. 26 (11%) patients had h/o recent travel and 35 (14.8%) patients were chronic smokers. 24 (10.2%) patients had h/o nasal or post nasal complaints in past.

Out of these 236 patients 123 (52.1%) were admitted in hospital, 33 (14.0%) had ICU admission and rest opted for home quarantine. According to the lowest SpO<sub>2</sub> records during admission, these patients were divided into 2 groups: the SpO<sub>2</sub> < 90% group (n = 29 [12.3%]) and the SpO<sub>2</sub> ≥ 90% group (n = 207 [87.7%]). The mean age of the SpO<sub>2</sub> ≥ 90% group was 37.29±14.36 years whereas the mean age of the SpO<sub>2</sub> < 90% group was 42.28±16.47 years. Of the total patients, less than half had underlying comorbidities (42 [17.8%]). Patients of the SpO<sub>2</sub> < 90% group showed more underlying comorbidities when compared with the SpO<sub>2</sub> ≥ 90% group, such as hypertension (4 [13.8%] vs.15 [7.2%]), cardiovascular disease (2 [6.9%] vs.4 [1.9%]), and diabetes (6 [20.7%] vs.8 [3.9%], P <.001).

**Table 3:** Association of comorbid factors with oxygen saturation above and below 90%

Comorbidity	SpO <sub>2</sub> <90 (n=29)	SpO <sub>2</sub> >90 (n=207)	P - Value
No comorbidity	17 (58.6%)	177 (85.5%)	0.0004
CAD	2 (6.9%)	4 (1.9%)	0.108
CKD	1 (3.4%)	0	-
CLD	1 (3.4%)	2 (1.0%)	0.285
DM	6 (20.7%)	8 (3.9%)	0.0004
HTN	4 (13.8%)	15 (7.2%)	0.221

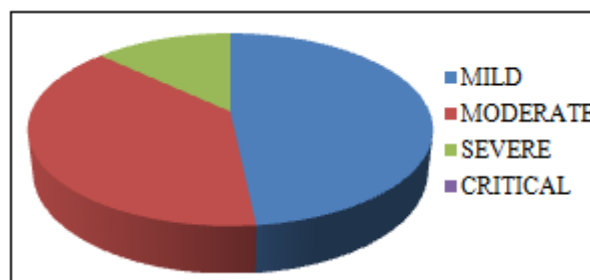
**Table 4:** Comparison of factors and symptoms with oxygen saturation above and below 90%

Factors	SpO <sub>2</sub> <90 (n=29)	SpO <sub>2</sub> >90 (n=207)	P - value
Age	42.28±16.47	37.29±14.36	0.087
Gender (male)	16 (55.2%)	130 (62.8%)	0.428
Fever	28 (96.6%)	140 (67.6%)	0.001
Myalgia	15 (51.7%)	115 (55.6%)	0.698
Sore throat	10 (34.5%)	72 (34.8%)	0.975
Cough	20 (69.0%)	101 (48.8%)	0.042
Dyspnea	20 (69.0%)	42 (20.3%)	0.001
Anosmia	5 (17.2%)	40 (19.3%)	0.789
Ageusia	4 (13.8%)	17 (8.2%)	0.323

The most common clinical feature at the onset of illness was fever (168 [71.2%]), followed by myalgia (130 [55.1%]), cough (121 [51.3%]), sore throat (82 [34.7%]), dyspnoea (62 [26.3%]). A total of 45 patients (19.1%) had anosmia related to the infection and ageusia was reported by 21 (8.9%) patients. The patients of SpO<sub>2</sub> < 90% group tend to show more frequency of fever (28 [96.6%], p value - 0.001), cough (20 [69%]) and dyspnoea (20 [69%]), p value - 0.001 vs.140 (67.6%), 101 (48.8%) and 42 (20.3%) compared to those having SpO<sub>2</sub> ≥ 90% respectively. Sore throat (72 [34.8%]), anosmia (40 [19.3%]) and myalgia (115 [55.6%]) were slightly more prevalent in those with SpO<sub>2</sub> > 90% with values 10 (34.5%), 5 (17.2%) and 15 (51.7%) in SpO<sub>2</sub> < 90% group.

**Table 5:** Prevalence of symptoms in patients infected with SARS CoV - 2

Symptoms	Frequency	Percentage
Fever	168	71.2
Myalgia	130	55.1
Sore throat	82	34.7
Cough	121	51.3
Dyspnea	62	26.3
Anosmia	45	19.1
Ageusia	21	8.9



**Figure 1:** Prevalence of severity of SARS CoV - 2 infection in study subjects

Patients were categorized into mild, moderate, severe and critically ill levels of severity based on the criteria shown in Table 2. 114 (48.4%) patients were identified to have mild

disease, 91 (38.5%) had moderate disease and 31 (13.1%) had severe diseases. The sex distribution for the various levels of severity showed that among mild cases 75 (65.8%) were male, among moderate cases 52 (57.1%) were male, among severe cases 19 (61.3%) were male. Out of the 114 patients with mild disease, 110 (96.5%) had no comorbidities. Patients with coexisting conditions were more susceptible to severe disease and 14 of our 31 severely ill patients had 1 or more coexisting diseases, including hypertension in 5 (16.1%, p value - 0.001) cases, diabetes mellitus in 6 (19.4%, p value - 0.001), cardiac disease in 4 (12.9%, p value - 0.001) vs. 14 (15.4%), 7 (7.7%) and 2 (2.2%) in moderate cases.

**Table 6:** Association of comorbid factors with severity of disease

Comorbidity	Mild (n=114)	Moderate (n=91)	Severe (n=31)	P - value
No comorbidity	110 (96.5%)	67 (73.6%)	17 (54.8%)	0.001
CAD	0	2 (2.2%)	4 (12.9%)	0.001
CKD	0	0	1 (3.2%)	0.036
CLD	1 (0.9%)	1 (1.1%)	1 (3.2%)	0.575
DM	1 (0.9%)	7 (7.7%)	6 (19.4%)	0.001
HTN	0	14 (15.4%)	5 (16.1%)	0.001
ONCO	0	1 (1.1%)	1 (3.2%)	0.209
RESP	1 (0.9%)	0	1 (3.2%)	0.239
THYR	1 (0.9%)	3 (3.3%)	0	0.302
OTHERS	0	0	1 (3.2%)	0.036

Out of 31 patients with severe disease, 30 (96.8%) had fever, 23 (74.2%) dyspnoea, 20 (64.5%) cough and 18 (58.1%) myalgia all with p value - 0.001 when compared to 87 (95.6%), 39 (42.9%), 62 (68.1%), 63 (69.2%) in moderate and 51 (44.7%), 0, 39 (34.2%), 9 (43.0%) in mild cases respectively. Anosmia was predominantly present in mild 21 (18.4%) to moderate 19 (20.9%) disease.

**Table 7:** Comparison of factors and symptoms with disease severity

Factors	Mild (n=114)	Moderate (n=91)	Severe (n=31)	P - value
Fever	51 (44.7%)	87 (95.6%)	30 (96.8%)	0.001
Gender (male)	75 (65.8%)	52 (57.1%)	19 (61.3%)	0.447
Myalgia	49 (43.0%)	63 (69.2%)	18 (58.1%)	0.001
Sore throat	38 (33.3%)	34 (37.4%)	10 (32.3%)	0.795
Cough	39 (34.2%)	62 (68.1%)	20 (64.5%)	0.001
Dyspnea	0	39 (42.9%)	23 (74.2%)	0.001
Anosmia	21 (18.4%)	19 (20.9%)	5 (16.1%)	0.820
Ageusia	9 (7.9%)	8 (8.8%)	4 (12.9%)	0.685

**Table 8:** Association of various factors in the patients infected with SARS CoV - 2

Factors present	Frequency	Percentage
Nasal & PND	24	10.2
Smoking	35	14.8
Recent travel	26	11.0
Hospital admission	123	52.1
ICU admission	33	14.0
Antiviral intake	28	11.9
Steroid intake	26	11.0
SpO <sub>2</sub> <90%	29	12.3

Treatment strategy - Along with the symptomatic treatment given to all patient, 28 (11.9%) patients received a trial of

antiviral therapy and 26 (11%) were given steroids owing to their comorbidities and severity of illness.

#### 4. Discussion

COVID - 19 can occur in any age group. Its symptomatology varies from totally asymptomatic patients to mildly symptomatic with fever and constitutional symptoms, to pneumonia, adult respiratory distress syndrome (ARDS) and extra pulmonary manifestations.

Wang Z et al. in their study on 69 patients infected with covid, reported fever (60 [87%]) as most common symptom followed by cough (38 [55%]), and fatigue (29 [42%]). Compared with SpO<sub>2</sub> ≥ 90%, patients of the SpO<sub>2</sub> < 90% were older and showed more comorbidities, such as hypertension in 36%, cardiovascular disease in 36% and diabetes in 43% and higher plasma levels of interleukin (IL) 6, IL10, lactate dehydrogenase, and C reactive protein.<sup>1</sup>

Wang D et al. reported in case series of 138 patients with common symptoms being fever (136 [98.6%]), fatigue (96 [69.6%]), and dry cough (82 [59.4%]). 36 patients (26.1%) had ICU admissions because of complications, including acute respiratory distress syndrome (22 [61.1%]), arrhythmia (16 [44.4%]), and shock (11 [30.6%]). Patients treated in the ICU (n = 36), compared with patients not treated in the ICU (n = 102), were older (median age, 66 years vs 51 years), were more likely to have underlying comorbidities (26 [72.2%] vs. 38 [37.3%]), and were more likely to have dyspnoea (23 [63.9%] vs. 20 [19.6%]), and anorexia (24 [66.7%] vs. 31 [30.4%]).<sup>3</sup>

Sun Y et al. conducted study on 63 patients with COVID- 19 and reported that mild illness appears predominately in those under 30 years of age. Older individuals develop higher levels of severity of disease. There was a slight male predominance in the study (58.7%). Fever was the most common presentation (84.1%), but cough was present in only slightly over half of the patients.<sup>9</sup>

Lu et al. conducted a study to look for non - respiratory symptoms in COVID - 19 patients and described that out of 72, 314 COVID - 19 patients, 889 had no symptoms at all. Some patients had mild urticaria.<sup>10</sup>

Sun *et al.* conducted a study on the paediatric population of Wuhan aged between 2 months and 15 years and described that the most common symptom in this population is polypnea, followed by fever and cough.<sup>11</sup>

Our study showed an association of comorbidities and symptoms of COVID 19 with severity of the disease. There was slight male predilection for mild, moderate and severe cases as 65.8%, 57.1% and 61.3% respectively in sync with study done earlier.<sup>9</sup>

The commonest symptoms were fever (71.2%), cough (51%) and breathlessness (26.3%) in our study, as has been universally reported around the world in previous studies.<sup>1, 3, 10</sup>

Fever proportion in COVID has been reported variably in different studies, and as high as 98.6% in some studies.<sup>3</sup> These variations could result from varying admission criteria

and the site of care (ICU/ isolation ward) where study was conducted. In our study, fever was present in 96.8% of the patients having severe disease but in less than 50% of mild category of patients. Published literature is lacking on the duration of symptoms and its association with mortality. Duration of fever and other symptoms could be used as an important marker for risk stratification and prognosis. Further multicentric studies will need to be conducted to establish the same.

Cough was present in the majority of patients with moderate (68.1%) to severe disease (64.5%), but was less common in mild category of patients (34.2%). Breathlessness was present in 72.44% of patients in severe, 42.9% in moderate and 0% of mild category patients. When symptoms were analysed in combinations viz., fever, cough and breathlessness together, a significant association was found to be present with severity ( $p < 0.001$ ), all consistent with the findings of Kaur R et al. retrospective study on syndromic spectrum of COVID - 19.<sup>14</sup>

Sore throat and myalgia were present in higher number of patients (34.7% and 55.1%) in our study, while other workers reported in lesser numbers (sore throat - 5% and 20.9% and myalgia - 11% and 16.5%).<sup>12, 13</sup> Among the comorbidities, diabetes was found to be the most common (19.4%) comorbidity followed by hypertension in 16.1% of the patients with severe disease same as findings of Wang Z et al.<sup>1</sup>

The prevalence of anosmia and ageusia was 19.1% and 8.9% vs 85.6% 88.8% in previous study by Lechien JR et al.<sup>7</sup> This difference could be due to geographical variations as the previous study is European continental or subject variations.

A variety of treatments have been experimented to control the infection, reduce mortalities and limit spread of the disease. At present, there are no specific antiviral drugs or vaccine against COVID - 19 infection. Trials have been done for broad - spectrum antiviral drugs like Nucleoside analogues and also HIV - protease inhibitors that could attenuate virus infection until the specific antiviral becomes available.<sup>15</sup>

## 5. Conclusion

The present study outlines the clinical profile of COVID - 19 patients stratified in to mild, moderate and severe categories. Our study highlights that the number of symptoms increase as severity of illness increases, and when all three of fever, cough and breathlessness are present, the prognosis needs to be guarded. Also, diabetes and hypertension continue to be the commonest comorbidities encountered, and their presence carries a poor prognosis. This study brings forth a comprehensive profile of various parameters in COVID - 19 patients.

## 6. Future Scope

The pattern of COVID infection is changing rapidly with increased infection rates in younger age group. Though more and more people are preferring home isolation, institutional

facilities and manpower play a critical role in reducing the impact of the infection.

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