

## ORIGINAL ARTICLE

**Clinical Characteristics, Seasonal Variation, Outcome and Disturbance of Taste and Smell in Cases of COVID-19**

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**ABSTRACT**

**Objective:** To assess the various clinical characteristics, seasonal variation, outcome and disturbance of taste (aguesia) and smell (anosmia) in cases of COVID-19.

**Study Design:** Cross sectional study.

**Place and Duration of Study:** The study was carried out in the Department of COVID-19 at Combined Military Hospital (CMH), Mardan from March 2020 to February 2021.

**Materials and Methods:** Suspected case of corona virus disease-2019 (COVID-19) admitted and managed at CMH Mardan from March 2020 to February 2021 were included in the study and their nasopharyngeal swabs were sent for COVID-19 polymerase chain reaction (PCR) test. Only those clinically suspected cases with positive PCR for COVID-19 were considered as cases of COVID-19. Demographic and clinical data including gender, age, result of COVID-19 PCR test, symptoms, severity of disease, body system affected with COVID and outcome, were recorded and entered in SPSS 21. Chi square was used to analyze qualitative variables and T test was used for quantitative variables. *P* value less than 0.05 was considered significant.

**Results:** The reported clinically suspected cases of COVID-19 were 1552. Positive PCR test for COVID-19 were 221 (14.2%) with mean age 37.53 ±11.05. The highest number of COVID-19 cases were seen from May 2020 to July 2020. The positivity ratio of COVID-19 was highest during May 2020 (29.9%). Majority of COVID-19 cases were asymptomatic (45.7%) and only ten cases died of COVID-19, i.e. mortality was 4.5%. Out of 221 COVID-19 patients, 38.5% cases had olfactory and taste dysfunction.

**Conclusion:** COVID-19 surged during the months of May to July 2020 followed by a downhill course. Majority of COVID-19 cases were asymptomatic. Respiratory system of body was most common system involved followed by gastrointestinal and combination of respiratory and gastrointestinal system. Olfactory and taste dysfunction (anosmia and aguesia) was seen commonly in COVID-19 patients.

**Key Words:** Ageusia, Anosmia, COVID-19, Nasopharyngeal, Olfactory, Outcome, Smell, Taste.

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**Introduction**

On December 29<sup>th</sup> 2019, patients were presented in a

local hospital of Hubei province of China with pneumonia from unknown pathogen working in a sea food store which was later identified as SARS-Cov2 and the condition was named as corona virus disease 2019 (COVID-19). The clinical symptoms were fever, lethargy, cough, flu, stuffed nose, myalgias. Based upon the clinical presentation of patients and severity of symptoms the COVID-19 was further categorized into asymptomatic, mild, moderate, severe and critical state. Asymptomatic presents with absence of any symptoms but serological positive result for COVID-19. Mild disease

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comprises sore throat, fever, myalgias. Moderate disease had patients with respiratory symptoms including evidence of pneumonia on radiography, while in severe disease patients present with respiratory distress & dropping oxygen saturation. Critical form had patients with respiratory and end organ failure and in need of mechanical ventilator.<sup>1</sup>

This virus infects all age groups but has serious implications in individuals at the extremes of age i.e. neonates, children, elderly and also patients with chronic diseases such as cardiovascular, diabetics, stroke and cancer patients on chemotherapy. It runs a different course in every patient depending upon the immune status and it has been deduced that people with low immunity are more likely to suffer extreme complications including death.<sup>2</sup> Complete blood count show reduced white blood cells, lymphopenia and no response to antibiotics for the respiratory symptoms. Apart from the clinical suspicion the diagnosis of COVID-19 is based upon the real time PCR of the oral, nasal swabs and respiratory secretions followed by gene sequencing. CT chest shows ground glass appearance and pulmonary infiltrates.<sup>3</sup>

Like any other respiratory disease the virus is spread through droplets and respiratory secretions disseminated into the air through cough or sneeze. In addition to being an air borne infection, it also spread through fomite or direct contact with the affected person (with or without any manifestations of the disease). Social distancing, regular hand washing, isolation have proven to reduce the spread of the infection. The use of personal protective equipment, surgical masks and gloves for the health care professionals should be available.<sup>4,5</sup>

World Health organization announced COVID-19 outbreak as sixth public health emergency of international concern on 30<sup>th</sup> January 2020 and later as pandemic on 11<sup>th</sup> March 2020.<sup>6</sup> First case of COVID-19 was reported in Pakistan in February 2020, when an individual travelled back after visiting Iran.<sup>7</sup> In Pakistan, first death of COVID-19 was reported in March 2020.<sup>8</sup> Till date, total 581,365 confirmed cases of COVID-19 have been reported with 12896 deaths due to this illness.<sup>9</sup>

Efforts are being made all over the world to find cure for the disease and prepare vaccine with 100 percent efficacy to put an end to this unprecedented

epidemic of history. Current study was carried out to study clinical characteristics, seasonal variation, outcome and associated taste & smell disturbance of admitted cases at Mardan CMH, to understand epidemiology of this new unprecedented epidemic.

## Materials and Methods

The study was carried out in the Department of COVID-19 at CMH, Mardan from March 2020 to February 2021. Ethical Review Board of CMH Mardan granted permission and consent was taken from all the eligible participants.

### Inclusion criteria:

1. Cases with fever, cough, sore throat, myalgias, shortness of breath, loss of sense of smell or taste, vomiting, diarrhea, headache (any combination of these) whose Nasopharyngeal swabs PCR was positive for COVID-19.
2. Cases in direct contact with COVID-19 patients whose PCR was positive for COVID-19.
3. Cases who had recent travel history.
4. Asymptomatic cases whose PCR was positive for COVID-19.

### Exclusion Criteria:

1. All the cases with fever, sore throat, cough, myalgias, loss of taste or smell, vomiting, diarrhea etc whose PCR was negative for COVID-19 were excluded.
2. The cases who did not consent for inclusion in the subject study were also excluded.

All the data including gender, age, result of COVID-19 PCR test, symptoms, type of system involved (asymptomatic, respiratory, gastrointestinal, combined respiratory & gastrointestinal system, severity of disease (asymptomatic, mild, moderate, severe, critical) outcome of case i.e death, were recorded and entered in SPSS 21 on monthly basis. Severity of disease was categorized from asymptomatic to critical depending on condition of the patient. Patients with symptoms of fever, cough, sore throat, headache without lung involvement (normal chest X-ray and CT scan) were classified as "mild disease". The individuals who had pneumonia and irritability, without any distress, were termed "moderate disease". The cases in whom, lung involvement was more than 50% with dyspnea, distress and hypoxemia (Oxygen saturation <94%) were classified as "severe disease". In "Critical

disease”, the cases had respiratory distress syndrome, septic shock, cytokine release syndrome or multi-organ failure. Chi square was used to analyze qualitative variables (gender, type of disease). *P* value less than 0.05 was considered significant.

**Results**

There were total 1552 cases suspected of covid-19 at our hospital from March 2020 to February 2021 (01 year). Their nasopharyngeal swab was taken and sent for COVID PCR to the laboratory under full protocol. Sterile swab was inserted along the floor of nose till nasopharynx and rotated several times against walls of nasopharynx. The swab was then removed carefully and placed in the transport tube which was sent to laboratory immediately. Among 1552 suspected cases of COVID-19, there were 841 (54.2%) males and 710 (45.7%) females. Out of them, 1331 (85.6%) results came negative for COVID-19 PCR and rest 221 (14.2%) were positive. The positivity ratio of COVID-19 PCR result was 14.2%. Age range was 10 to 76 years with mean age 35.94 ± 11.43 years. Age range of PCR positive COVID-19 cases was from 15 to 70 years with mean age 37.53 ± 11.05. The age range of COVID-19 negative cases was 10 to 76 years with mean age 35.68 ± 11.48 years. First suspected case of COVID-19 was reported in March 2020. Month wise number of cases suspected of COVID and their COVID polymerase chain reaction

**Table 1: Month wise Prevalence/percent positive rate of COVID-19 (P=0.000)**

S/No	Month	Suspected COVID cases (n)	COVID PCR Negative cases(n)	COVID PCR Positive cases (n)
1	March 2020	14(0.9%)	13 (0.9%)	1(0.5%)
2	April 2020	63(4.1%)	43(3.2%)	20(9%)
3	May 2020	264(17%)	198(14.9%)	66(29.9%)
4	June 2020	97(6.2%)	73(5.5%)	24(10.6%)
5	July 2020	99(4.1%)	69(5.2%)	30(13.6%)
6	August 2020	64(4.1%)	59(4.4%)	5(2.3%)
7	September 2020	131(8.4%)	124(9.3%)	7 (3.2%)
8	October 2020	106(6.8%)	95(7.1%)	11(4.9%)
9	Nov 2020	162(10.4%)	148(11.1%)	14(6.3%)
10	Dec 2020	177(11.4%)	165(12.4%)	12(5.4%)
11	Jan 2021	214 (13.8%)	195(14.6%)	19(8.6%)
12	Feb 2021	161(10.3%)	149(11.2%)	12(5.4%)
Total		1552	1331	221

(PCR) results and Prevalence/Percent positivity rate of COVID-19 cases are shown in Table 1. The highest number of COVID-19 cases were seen from May 2020 to July 2020. Prevalence/Positivity rate was highest during May 2020 (29.9%) followed by July 2020 (13.6%) and June 2020 (10.6%).

The study showed, majority of COVID-19 cases were asymptomatic n=101 (45.7%). Out of symptomatic individuals 80 (36.2%) had respiratory system, 15 (6.8%) had gastrointestinal system and 25 (14.2%) had combination of respiratory and gastrointestinal system involvement. (Table 2)

**Table 2: Type of systems involvement (Asymptomatic, respiratory, gastrointestinal and combined respiratory & gastrointestinal system) ( P = 0.000)**

Type of system	Cases		Total
	COVID PCR Negative	COVID PCR Positive	
Asymptomatic	782(58.8%)	101(45.7%)	883(56.9%)
Respiratory	425(31.9%)	80(36.2%)	505(32.5%)
Gastrointestinal	111(8.3%)	15(6.8%)	126(8.1%)
Combined respiratory and gastrointestinal system	13 (0.9%)	25(11.3%)	38(2.4%)
Total	1331 (85.8%)	221(14.2%)	1552

The results showed that in severe-critical categories, 10 died of COVID-19, i.e mortality was 4.5% of COVID-cases (Table 3).

**Table 3: Severity of COVID-19 (P=0.000)**

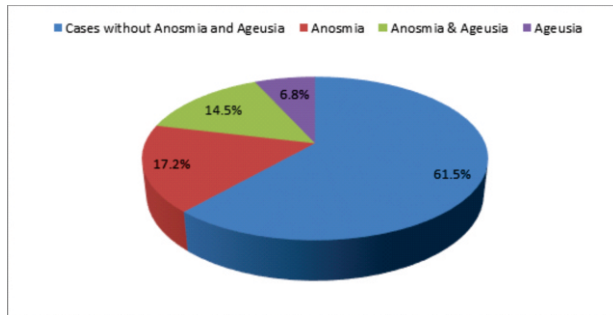
Severity of Disease (COVID-19)	Total COVID PCR Positive	P- value
Asymptomatic	101 (45.7%)	0.000
Mild	96(43.4%)	
Moderate	11 (5%)	
Severe	4 (1.8%)	
Critical	9(4.1%)	
<b>Total</b>	<b>221(14.2%)</b>	

The number of cases without disturbance of taste or smell were 136 (61.5%). Cases with combined anosmia (disturbance of smell) and aguesia (disturbance of taste) were 32 (14.5%) only with anosmia 38 (17.2%) and only aguesia were 15(6.8%) (Figure 1).

Clinical Characteristics, Seasonal Variation, Anosmia and Aguesia in COVID-19.

**Discussion**

In current research, 221 confirmed cases of COVID-19 were reported from March 2020 to February 2021



**Fig 1: Frequency of olfactory and taste dysfunction**

First case of corona virus was admitted during March 2020 and cases increased gradually over the next months. We saw that maximum numbers of coronavirus patients reported in May. Majority of cases were reported from May 2020 to July 2020. This surge of cases in our hospital coincided with peak/surge of cases in the country, during same months.<sup>10</sup> COVID-19 cases hiked from May to July 2020 with downhill course during remainder of year, followed by another surge at the end of year 2020. The downhill course was possibly due to government lockdowns of cities, social distancing and weather change. The individuals, who died of COVID-19, all had co-morbid conditions. Same has been seen worldwide.<sup>11,12</sup> Hypertension, diabetes mellitus, obesity, immunocompromised conditions (carcinomas), chronic kidney disease, chronic obstructive pulmonary diseases are strongly associated co-morbid conditions with severity and mortality of COVID-19.<sup>11</sup> Majority of COVID-19 cases were asymptomatic in our study i.e 45.7% followed by mild disease (43.4%). He J et al. showed that 15.6% of COVID-19 cases were asymptomatic which is much less than shown in our study.<sup>13</sup> He J et al. further found that ratio of asymptomatic cases was highest in children than any age group. In our study, we had no pediatric case with positive PCR result. Peterson I and co-workers had reported asymptomatic COVID-19 infection in 76.5% cases in their study.<sup>14</sup> Chen J et al reported that majority of SARS CoV-2 infected individuals had mild symptoms.<sup>15</sup> In our study, we saw respiratory involvement in 36.2%, gastrointestinal system in 6.8% and combined respiratory and gastrointestinal involvement in 11.3 %. Ghoshal UC et al showed 85.2 % asymptomatic cases which is much higher than our study.<sup>16</sup> Ghoshal Et al showed that 18 cases out of total 208 (8.7%) had respiratory symptoms (fever,

sore throat), 15 cases of total 208 (7.2%) had gastrointestinal symptoms (nausea, diarrhea, pain abdomen, vomiting) and 11 of 208 (5.3%) had combination of both respiratory and gastrointestinal symptoms. He showed higher frequency of asymptomatic and lower frequency of respiratory symptoms than in our study.<sup>16</sup>

Nose is the entry point of this sinister virus. Sino-nasal involvement is quite common in COVID-19 patients. Many cases present with complaints of olfactory and taste dysfunction.<sup>17</sup> In our study, we saw 38.5% COVID-19 patients had anosmia and ageusia. It is higher than study of Lee Y et al, who had reported these symptoms in approximately 15% of COVID-19 cases.<sup>17</sup> Speth MM and co-workers have reported olfactory dysfunction in 61.2% patients of COVID-19, which is higher than our finding.<sup>18</sup> Olfactory and taste disturbance have been reported from 19.4% to as high as 85.6% cases of COVID-19.<sup>18,19,20</sup>

### Limitations

The study was carried out in Combined Military Hospital Mardan, which mainly caters for personnel and families of armed forces in the area. The number of COVID-19 cases presenting in our hospital were a meager portion of cases in Mardancity and surroundings.

### Conclusion

Coronavirus disease (COVID-19) pandemic has spanned more than a year. It has affected mankind in an unprecedented manner with varying severity and symptomatic distribution in different individuals. COVID-19 cases hiked from May to July 2020 with downhill course during remainder of year, followed by another surge at the end of year 2020. Majority of COVID-19 cases were asymptomatic. Respiratory system of body was most common system involved followed by gastrointestinal and combination of respiratory & gastrointestinal system. Olfactory and taste dysfunction was seen commonly in COVID-19 patients.

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