

# Clinico-Epidemiological Profile of COVID-19 of Patients Presenting to Emergency Department of a Tertiary Medical College of Central Nepal

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## ABSTRACT

### Background

Clinico-epidemiological profile of COVID-19 includes varied clinical symptoms like fever, cough, and fatigue, with a potential for rapid community spread through respiratory droplets. Understanding the clinical characteristics of patients is crucial for planning human resources and logistics support. This study aims to identify the clinical characteristics observed in patients suspected of having COVID-19 presenting to emergency department of College of Medical Sciences and Teaching Hospital.

### Methods

This is a retrospective cross-sectional study conducted at Department of General Practice and Emergency Medicine of College of Medical Sciences, Bharatpur, Nepal from April 2020 to February 2021. Ethical approval was taken from institutional review committee of College of Medical Sciences. Data was collected from record file of emergency department. Data was entered and analyzed by using descriptive statistical tools in SPSS-20.

### Results

Majority (25.2%) of them were in the age group 50-60 years. Mean±SD of age was 55.2±16.5 years. Majority (54.3%) respondents were male. In presenting complaints 71.42% had cough, 69.5% had fever, 62.9% had shortness of breath. Also, 34.28% had severe symptoms, and 33.34% had moderate symptoms, 20% were asymptomatic and 12.38% had mild symptoms. Finding showed that 69.52% of patients required oxygen supplementation. The motility of COVID-19 patients during emergency stay was 6.67% while 36.19% were admitted in ward and 31.43% were admitted in ICU, 20% patients were sent for home isolation.

### Conclusions

Young adults were the most commonly affected age group and males showed a higher incidence of COVID-19. Since many patients were symptomatic with fever and cough as the typical presentations in the emergency department. Majority of patients during presentation had moderate and severe symptoms and needed oxygen supplementation.

**Keywords:** COVID-19; Nepal; emergency medicine; laboratory; Bharatpur.

## INTRODUCTION

COVID-19 was initially diagnosed in Wuhan, China, towards the end of 2019, and it rapidly spread worldwide, leading to its declaration as a pandemic by the WHO on March 11, 2020.<sup>1</sup> COVID-19, caused by novel coronavirus (SARS-COV-2) from the Orthocoronavirinae family, is characterized by its highly contagious nature. The virus possesses a single-stranded RNA enclosed within an envelope, with

distinctive "crown-like" spikes adorning its surface. Belonging to the same viral family as the Severe Acute Respiratory Syndrome (SARS-COV) and the Middle East Respiratory Syndrome (MERS-COV) viruses, the mode of transmission of COVID-19 is widely recognized, yet its complete pathogenesis remains unclear.<sup>2</sup> The first case of COVID-19 in Nepal was confirmed on January 13, 2020.<sup>3</sup> The number of cases in Nepal gradually increased, reaching a peak around

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mid-October 2020 and then declining by the end of January 2021. However, a second wave of infections was experienced in the year 2021.<sup>4</sup> COVID-19 is spread by human transmission via droplets or direct contact, and infection has been estimated to have mean incubation period of 6.4 days. COVID -19 may cause disease ranging from asymptomatic to fatal disease.<sup>5</sup> Although the clinical profile of patients has been reported, little is known regarding the presentation of patients with COVID-19 requiring emergency care. Most of the cases have mild to moderate course of disease and recovered after good medical intervention, however, small numbers of patient may develop severe pneumonia, 15-32% with acute respiratory distress syndrome (ARDS) and multiple organ failure, or even death.<sup>6</sup> In this study, we look into the clinical presentation and severity of patients with COVID-19 presenting to our emergency room.

## METHODS

A retrospective cross-sectional study was conducted at Department of General Practice and Emergency Medicine of College of Medical Sciences, Bharatpur, Nepal from April 2021 to September, 2021. Ethical approval was taken from institutional review committee of College of Medical Sciences, Bharatpur, Chitwan (RefNo. COMSTH-IRC/2022-025), and administrative approval for data collection was taken from Bharatpur Hospital. Out of total patients presented to emergency departments from April 2020 to February 2021 and screened for COVID-19 infection using RT-PCR, 210 patients tested positive. Some of these COVID-19 positive patients, along with others already diagnosed with COVID-19 at different centers who are presented in Emergency department were included in this study. Data was collected from record file of emergency department. Record file consisted of epidemiological data, clinical parameters, laboratory parameters, oxygen supplementation administered, and patient outcomes during the stay in emergency department. According to WHO guidelines, the severity of COVID-19 is categorized into several levels: asymptomatic, mild, moderate and severe levels.<sup>7</sup> Oxygen supplementation was provided to maintain a SpO<sub>2</sub> level above 90%. The degree of inflammation was assessed using the CT Severity Score (CTSS) in High-Resolution Computed

Tomography (HRCT) chest scans and C-reactive protein (CRP) values at admission. Patients with D-dimer levels below 3000 ng/mL and no suspicion for Venous Thromboembolism (VTE) were given standard thromboprophylaxis.<sup>8</sup> The collected data was checked for completeness and then entered into SPSS-20 for analysis. Descriptive statistical tools were utilized for the analysis. For categorical variables like gender, address, comorbidities, symptoms, severity of COVID at admission, categories of lab values, HRCT findings, and outcome parameters were displayed in term of frequency and percentages in tables with suitable diagram. Measurement variables like age and absolute lab parameters were presented as group means for normally distributed variables and as medians for skewed distributions.

## RESULTS

This research was conducted among 210 COVID-19 positive cases. Among the total COVID-19 positive cases, majority (25.2%) of them were in the age group 50-60 years followed by 22.4% in the age group 40-50 years and least (5.7%) were in the age group less than 30 years. The Mean±SD of age was 55.2±16.5 years. Regarding the gender majority (54.3%) respondents were male while 45.7% were female (Table 1).

Variables	Frequency (%)
<b>Age (years)</b>	
<30	12(5.7)
30-40	25(11.9)
40-50	47(22.4)
50-60	53(25.2)
60-70	35(16.7)
>70	38(18.1)
Mean±SD	55.2±16.5
<b>Gender</b>	
Female	96(45.7)
Male	114(54.3)

Regarding the presenting complaints of COVID-19 patients in Emergency Department, majority (71.42%) had cough, 69.5% had fever, 62.9% had SOB, followed by 21.9% had Myalgia and least (1%) had skin rash (Table 2).

Table 2. Presenting complaints of COVID-19 positive cases. (n=210)	
Presenting complaints	Frequency (%)
Fever	146(69.5)
Cough	150(71.42)
Chest pain	25(11.9)
SOB	132(62.9)
Myalgia	46(21.9)
Throat pain	4(1.9)
Vomiting	14(6.7)
Diarrhoea	13(6.2)
Loss of smell	6(2.9)
Loss of taste	21(10.0)
Skin rash	2(1.0)
Digit discoloration	6(2.9)

Regarding the severity at presentation, 34.28% had severe, 33.34% had moderate, 12.38% had mild level of severity while 20% were asymptomatic (Figure 1).

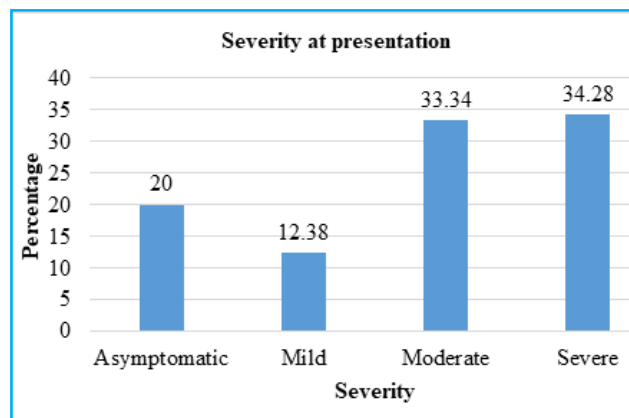


Figure 1. Severity at presentation (n=210).

Following table shows the clinical characteristics of COVID -19 case this showed that, 5.2% patients had high grade fever ( $>102^{\circ}\text{F}$ ), 60% patients had respiratory rate 21-30 breaths per minute while 1.9% had respiratory rate  $>40$  per minute with Mean  $\pm$  SD as  $26.78\pm 6.79$  per minute. Regarding  $\text{SpO}_2$  level at arrival 37.6% had 76-90%, and 10.5% patients had less than 60% while  $\text{SpO}_2$  with support only 0.5% had  $\text{SpO}_2$  level less than 60%. CO-RADS provides a level of suspicion for pulmonary involvement of COVID-19 based on the features seen at unenhanced chest CT this research showed that 89.82% had high level of suspicion for pulmonary involvement. Of 155 patients, 48.38% had moderate level of CTSS, 42.58% had severe level of CTSS and 9.03% had mild level of CTSS (Table 3).

Table 3. Clinical characteristics of COVID-19 cases (n=210).	
<b>Temperature</b>	
$<99.6$	157(74.8)
99.6-101.9	42(20)
$>102$	11(5.2)
Mean $\pm$ SD	98.92 $\pm$ 1.2578
<b>Respiratory rate (per minute)</b>	
$<20$	39(18.6)
21-30	126(60)
31-40	41(19.5)
$>40$	4(1.9)
Mean $\pm$ SD	26.78 $\pm$ 6.79
<b>Spo2 at arrival</b>	
$<60\%$	22(10.5)
61-75%	32(15.2)
76-90%	79(37.6)
$>90\%$	77(36.7)
Mean $\pm$ SD	82.54 $\pm$ 15.8
<b>SPO2 with support</b>	
$<60\%$	1(0.5)
61-75%	7(3.3)
76-90%	45(21.4)
$>90\%$	157(74.8)
Mean $\pm$ SD	92.25 $\pm$ 6.66
<b>CO-RADS</b>	
1-2	4(1.79)
3-4	18(8.38)
5-6	188(89.82)
<b>CTSS</b>	
Mild	19(9.03)
Moderate	102(48.38)
Severe	89(42.58)

D-dimer reports were available for only 74.8% of the patients with a median value of 754 ng/mL, among which 64.96% of them having a level  $> 1000$  ng/mL. Of 186 patients who had CRP measured at presentation, 79.56% had a CRP value  $> 20$  mg/L. The median CRP value of those patients was 90.75 mg/L. Complete blood count reports showed that 4.91% of the patients had total leukocyte count  $<4000$ , 27.21% patients had Hemoglobin level less than 11 and 8.33% patients had Platelet count less than 100000 while 29.76% had 100000-150000 (Table 4).

At emergency department 69.52% of patients required oxygen supplementation of which 19% required

face masks and non-rebreather mask (NRBM) was required for 29%, 16% required nasal prongs and

**Table 4. Laboratory characteristics of COVID-19 cases. (n=210)**

Laboratory characteristics	Frequency (%)
<b>D-dimer at presentation (ng/mL)</b>	
Report not available	53(25.2)
Report available (n=157)	
<500	30(19.10)
500-1000	25(15.92)
1000-3000	52(33.12)
3000-10000	44(28.02)
More than 10000	6(3.82)
<b>CRP at presentation mg/L</b>	
<20	43(20.43)
20-50	41(19.35)
50-100	33(15.59)
>100	94(44.62)
Median	90.75
<b>Total leukocyte count (per cumm)</b>	
<4000	10(4.91)
4000-12000	123(58.46)
>12000	77(36.61)
Mean±SD	10791±5564
<b>Hemoglobin</b>	
<11	57(27.21)
12-15	139(66.27)
>16	38672(18415)
Mean±SD	12.56±2.09
<b>Platelet count (mcL)</b>	
<10000	17(8.33)
100000-150000	62(29.76)
>150000	130(61.9)

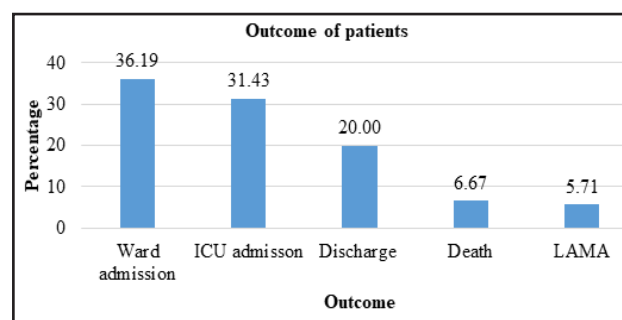
**Table 5. Oxygen delivery devices on Emergency department.**

Oxygen delivery devices	Frequency (%)
Face masks	40(19)
Not required	64(30)
Nasal prongs	34(16)
NRBM	62(29)
Venturi Mask	10(4)

only 4% patients required Venturi Mask (Table 5).

Following bar diagram showed the outcome of COVID-19 patients. This research finding showed that 36.19% patients were admitted in ward, 31.43%

patients were admitted in ICU, 20% patients were discharged for home isolation, 6.67% died during the emergency stay and 5.71% left against medical



**Figure 2. Outcome of COVID-19 patients.**

advice (LAMA) (Figure 2).

## DISCUSSION

This study presents the clinico-epidemiological profile of COVID-19 patients who were presented in Emergency department of College of Medical Science. Among the COVID-19 positive patients presented in emergency department majority (25.2%) were in the age group 50-60 years followed by 22.4% in the age group 40-50 years with Mean±SD of age 55.2±16.5 years. Majority (54.3%) of them were male while 45.7% were female by gender while research conducted by Pukar et al., showed that 24.6% were in the age group 60-69 years with Mean±SD 61.5±17.0 years also, 58.8% of patients were male.<sup>9</sup> A study conducted by Bajracharya et al., in Nepal showed that the average age of the COVID positive cases presented in emergency department were 37.9 years, with a median age of 37 years with the age range varied from 2 months to 83 years. Among the participants, 56.7% were male and 43.3% were females.<sup>10</sup> Research conducted by Karki et al., in Mid-Western region of Nepal showed that the average age of the patients was 33.6 years with a standard deviation of 13.8 years. The majority of cases (49.5%) were in the 20-29 years age group, and 73.7% of the patients were male.<sup>11</sup> Research conducted by Reilly et al., in Australia showed that the mean age of patients was 60 years.<sup>12</sup> Research of Farooq in Pakistan showed that the most frequent age group of COVID-19 positive in 2019 was 15-25 (27.7%), whereas it was 25-35 years in 2020 (24.1%).<sup>13</sup>



Another data of Pakistan showed that median age of COVID-19 patients was 53 (IQR 40-64) years and 67% were males by gender.<sup>14</sup> Research conducted in America showed that 15% of the participants were aged 75 years or older, 47% were female.<sup>15</sup> Study conducted by Lal et al., in India showed that median age of patients was 33.5 years, ranging from 13 to 79 years, with (58%) being male by gender.<sup>16</sup> Twenty-two percent of the patients required hospitalization, with a median age of 55 years, and 368 individuals (61%) were male.<sup>17</sup> A study from China that evaluated clinical characteristics of suspected or confirmed cases showed a female predominance (72.9%), which contradicts our findings. Also the mean age in that study was 39.08 years, which contradicts our findings. Both studies analyzed confirmed and suspected cases, but other studies analyzing clinical characteristics suggested male predominance with average ages ranging from 45 to 56 years.<sup>18</sup> Our research showed 34.28% had severe and 33.34% had moderate symptoms at presentation. Regarding commonest presenting complaints, majority (71.42%) had cough, 69.5% had fever, 62.9% had shortness of breath, followed by myalgia (21.9%) and least (1%) had skin rash. Another research showed commonest symptoms were fever (70.6%), cough (67.2%) and dyspnea (64.7%).<sup>9</sup> Bajracharya et al., found that during arrival at the emergency department, the most common presenting symptom was fever, observed in 131 patients, accounting for 65.2% of the cases.<sup>10</sup> An epidemiological review published in China also indicates that fever (98.6%) is one of the common symptoms observed among patients.<sup>19</sup> Fever is considered one of the key criteria in defining a suspected case. It has been widely recognized for decades that fever during an infection is triggered by both endogenous and exogenous pyrogens.<sup>18</sup> Research of Reilly et al., in Australia, found that the most common symptoms were acute shortness of breath (67%), cough (56%) or fever (51%), fever or hypoxia was recorded in 23 (10%).<sup>12</sup> Research conducted in Pakistan showed that Gastrointestinal complaints (15.7% and 11.3%), genitourinary complaints (14.9% and 7.9%), trauma (11.9% and 12.4%).<sup>13</sup> Lal et al.,

found that the most common presenting complaints were fever (77%), cough (54%), and shortness of breath (20.8%).<sup>16</sup> The majority of patients presented with fever (66%), dyspnea (65%) and cough (61%).<sup>17</sup> In total, 136 patients (18.9%) from the COVID-19 group and 87 patients (27.2%) hospitalized for other reasons were admitted to the intensive care unit.<sup>20</sup> The majority of patients (52.2%) presented with a single symptom, while the rest presented with a combination of multiple symptoms. A meta-analysis of COVID-19 patients revealed that fever (88.8%) was the most common symptom, followed by dry cough (68%) and fatigue (33%).<sup>21</sup> This research showed that among the total COVID-19 positive case 5.2% patients had high grade fever, 60% patients had respiratory rate 21-30 per minute with Mean value as 26.78 per minute, 37.6% had SpO<sub>2</sub> level less than 60% at arrival while only 0.5% had SpO<sub>2</sub> level less than 60% after oxygen support, 89.82% had high level of suspicion for pulmonary involvement, 48.38% had moderate level of CTSS, 42.58% had severe level of CTSS. Lal et al., found that nineteen patients (17%) exhibited hypoxia (SpO<sub>2</sub> < 94%) upon presentation, and 36 patients (31%) had tachypnea (respiratory rate > 24).<sup>16</sup> Among COVID cases, 161 individuals (20%) experienced a critical outcome, and 393 individuals (49%) were hospitalized. The median D-dimer value was 754 ng/mL, among which 64.96% had D-dimer level > 1000 ng/mL, 79.56% had a CRP value > 20 mg/L with median CRP level as 90.75 mg/L, 4.91% of the patients had total leukocyte count <4000, 27.21% patients had Hemoglobin level less than 11 and 8.33% patients had Platelet count less than 100000. Another study showed that abnormal D-dimer levels was present in (90.1%), C-reactive protein (CRP) levels (86.1%), and lymphopenia (41.7%).<sup>17</sup> Data from California also indicated that patients who developed Acute Respiratory Distress Syndrome (ARDS) had an average D-dimer level of 1160 ng/mL, whereas those who did not develop ARDS had an average level of 520 ng/mL.<sup>22</sup> Severe cases of COVID-19 are believed to be linked to infection-induced coagulopathy and secondary hyper-fibrinolysis.<sup>23</sup> At emergency department 69.52% of patients required oxygen

supplementation of which 19% required Face mask and NRMB was required for 29%, 16% required Nasal prongs and only 4% patients required Venturi Mask while another research finding showed that 82.4% of patients required oxygen supplementation of which 25.2% required each of Face masks and NRMB with 100% FiO<sub>2</sub>.<sup>9</sup> This research finding showed that 36.19% patients were admitted in ward, 31.43% patients were admitted in ICU, 20% patients were discharged for home isolation, 6.67% were death and 5.71% left against medical advice (LAMA) while another research showed that 56.3% recovered 27.7% left against medical advice and 16.0% expired.<sup>9</sup> Research of Reilly et al., in Australia showed that eleven (5%) patients received mechanical ventilation in the emergency department.<sup>12</sup> Lal et al., found that eighteen patients (52%) required admission to the intensive care unit (ICU), with three patients (2.6%)

needing assisted ventilation. The observed mortality rate was 2.6% (3 patients).<sup>16</sup>

## CONCLUSIONS

Young adults are the most commonly affected age group and males show a higher incidence of COVID-19. Since many patients were symptomatic with fever and cough as common presenting symptoms in emergency department. Majority of patients during presentation had moderate and severe symptoms and needed oxygen supplementation. Studying the epidemiological and clinical characteristics, as well as the diagnosis approaches of the initial COVID-19 patients, is highly significant for identifying, preventing, and controlling the spread of the disease. Nepal must enhance its preparedness to detect, manage, and treat a higher number of infections in the upcoming days to prevent overwhelm in the healthcare system.

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