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### COVID-19 Patients and Their Management in a Tertiary Care Center in Nepal

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#### ABSTRACT

**Introduction:** Corona Virus Disease (COVID-19) is a novel infectious disease. Generally, supportive management is provided according to each patient's need. The objective of this study was to find out clinical features of COVID-19, pharmacological measures employed and approximate total cost of the drugs for COVID-19 cases in a tertiary care center.

**Methods:** The retrospective study was carried out from records of COVID-19 patients visiting KIST Medical College and Teaching Hospital between 4th June 2020 to 31st January 2021. Out of 541 patients, a systematic random sampling was performed. Every fourth case was selected for the study with a sample size of 136 patients. Data was collected using a structured and piloted proforma. Descriptive statistical analysis was performed.

**Results:** Severity of COVID-19 was categorized as mild, moderate and severe in 101 (74.3%), 28 (20.6%) and 7 (5.1%) patients respectively. 130 patients were managed in isolation ward, 10 patients required intensive care and 1 patient needed ventilator support. Supplemental oxygen was provided to 31 patients. Most common medicines used were vitamin C (90.4%), vitamin D (90.4%), Zinc (90.4%) and Pantoprazole (72.8%). Remdesivir was used in 21 (15.4%) patients. 127 patients were discharged, 5 patients died and 4 patients were referred to other centers. Average total approximate cost of drugs was Nepalese Rupees 8966.4.

**Conclusion:** The most frequently used medicines were vitamin C, vitamin D, Zinc and Pantoprazole. The average cost for medicines is quite high in regard to per capita income of Nepal. Thus, effective preventive measures are required to control COVID-19 pandemic.

**Keywords:** Corona virus disease; Cost; Teaching hospital; Treatment

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## INTRODUCTION

COVID-19 (Corona Virus Disease 2019) is a novel infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).<sup>1</sup> Coronavirus is associated with human severe acute respiratory syndrome (SARS) and Middle east respiratory syndrome (MERS).<sup>2</sup> While the origin of the SARS-CoV-2 is still being investigated, current evidence suggests spread to humans occurred via transmission from wild animals illegally sold in the seafood wholesale market of Wuhan, Hubei Province in China.<sup>3</sup> The virus then spread outside Hubei and subsequently, to the rest of the world via human transmission. The World Health Organization (WHO) declared corona virus disease as a pandemic on March 11, 2020.<sup>4</sup>

The common symptoms of COVID-19 are fever, cough, dyspnea, expectoration, headache, myalgia and fatigue. The less common symptoms include diarrhea, hemoptysis and shortness of breath.<sup>5</sup> Patients with severe disease can develop acute respiratory distress syndrome (ARDS) and can die of multiple organ failure.<sup>6</sup> People with asymptomatic infections are suspected of transmitting infections.<sup>5</sup>

The treatment guidelines for COVID-19 vary between countries. There is no approved treatment for COVID-19. Generally, supportive management is provided according to each patient's need. WHO has also published a series of mythbusters as advice for public on COVID-19.<sup>7</sup> Remdesivir, an antiviral drug received emergency use authorization by US Food and Drug Administration (FDA) on May 1 2020, and since then this drug is being used extensively across many parts of the globe.<sup>8-10</sup> Hydroxychloroquine, ivermectin and azithromycin are few other pharmacological measures being studied for the prophylaxis and treatment of COVID-19 infection.<sup>11, 12</sup> Convalescent plasma therapy has also been used for the management in different countries including Nepal.<sup>13-15</sup> However, there are no generally recognized effective treatments for COVID-19 till date across the world. Our study aims to find out the clinical features of COVID-19, pharmacological measures and approximate drug cost for the management of COVID-19 in a tertiary care center of Nepal.

## METHODS

The study was designed as a retrospective hospital based cross sectional study. The ethical approval

was obtained prior to conduct this study from the institutional review committee of KIST Medical College and Teaching Hospital. The data was collected for the patients admitted to KIST Medical College and Teaching Hospital, Lalitpur, Nepal between the time periods of 4<sup>th</sup> June 2020 to 31<sup>st</sup> January 2021. The record of these patients who were tested real-time reverse transcription–polymerase chain reaction (RT-PCR) positive for COVID-19 were considered as our study population. The records for the COVID-19 patients admitted to the KISTMCTH were reviewed for the clinical features and management of the disease. A total of 541 people were found to have tested RT-PCR positive for COVID-19. The sampling method used for the study was systematic random sampling. Every fourth case was selected to collect total of 136 cases. Data collection was done using a structured questionnaire developed on the basis of the possible types of information from the patient's records available from the record section of the hospital.

The questionnaire contained the demographic information of the patients, number of RT- PCR tests for COVID-19, oxygen saturation levels, requirements for the supplementary oxygen, severity classification for the disease along with the drug history and the co-morbidities if present. Other information collected were for the signs and symptoms of the disease and the management strategies. The medicines used for the treatment were also noted along with the outcome of the patient. The duration of the hospital stay was also noted.

The questionnaire was pretested using the records of five patients. Changes were made based on the pretesting of these five patients in the questionnaire.

The cost for the use of medicine was also calculated for the pharmacological management of the disease. The unit price of the medicines used was collected from the hospital pharmacy of the hospital. The cost did not include the cost of the medicine used for the patients' co-morbidities. The data collected are presented using descriptive statistics.

## RESULTS

From 4th June 2020 to 31st January 2021, 541 patients with COVID 19 positive were admitted in the KIST medical College Teaching Hospital out of which only 136 patients were selected in the study. Among them more than half of the patient were male

(68.4%) and age group was dominated by 41-50 years (27.9%) with no close contact with COVID-19 patients or travelling history (91.2%). Almost half of the patients admitted in the hospital simultaneously were presented with co-morbidity conditions (47%), hypertension and diabetes mellitus being the most common conditions. Most of the patient admitted in the hospital had mild COVID-19 infections (74.3%). The patients were categorized as asymptomatic (23.5%) and remaining 76.5% were admitted with symptoms. The common symptoms were fever (44.9%), cough (34.6%), headache (11.8%) and myalgia (11.8%). The range of oxygen saturation (SpO<sub>2</sub>) was 62-99% for the admitted patients. Detail regarding the demographics and other characteristics are given in the Table 1 and Table 2.

**Table 1.** Demographic Characteristics

Characteristics	Number ( Percentages)
<u>Age</u>	
Below 20	2 (1.5)
20-30	22 (16.2)
31-40	31 (22.8)
41-50	38 (27.9)
51-60	20 (14.7)
61-70	9 (6.6)
71-80	8 (5.9)
More than 80	6 (4.4)
<u>Gender</u>	
Male	93 (68.4)
Female	43 (31.6)
<u>Travel history/Close contact with COVID-19 patients</u>	
Yes	12 (8.8)
No	124 (91.2)

**Table 2. Other Characteristics**

Characteristics	Number (Percentages)
<u>Comorbidities</u>	
Yes	64 (47.0)
No	72 (53.0)
<u>Severity</u>	
Mild	101 (74.3)
Moderate	28 (20.6)
Severe	7 (5.1)
<u>Sign/ symptom</u>	
Asymptomatic	32 (23.5)
Fever	61 (44.9)
Cough	47 (34.6)
Myalgia	16 (11.8)
Headache	16 (11.8)
Vomiting	8 (5.9)
Diarrhoea	9 (6.6)
Loss of smell	4 (2.9)
Loss of taste	3 (2.2)
Shortness of breath	14 (10.3)
Sore throat	6 (4.4)
Others	14 (9.9)
Oxygen saturation (SpO <sub>2</sub> ) range	(62-99) (96)
Median Oxygen saturation (SpO <sub>2</sub> )	

### Management of COVID-19 cases

Thirty one patients required oxygen therapy during admission (Figure 1). The supplemental oxygen requires range was 1-15liters/minute. 130 patients were managed by admitting them in Isolation ward, 10 patients needed intensive care and 1 patient required ventilator support as shown in Figure 2.

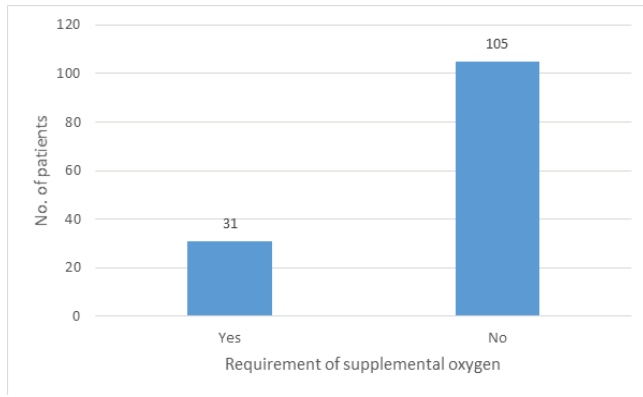


Figure 1. Requirement of Supplemental Oxygen

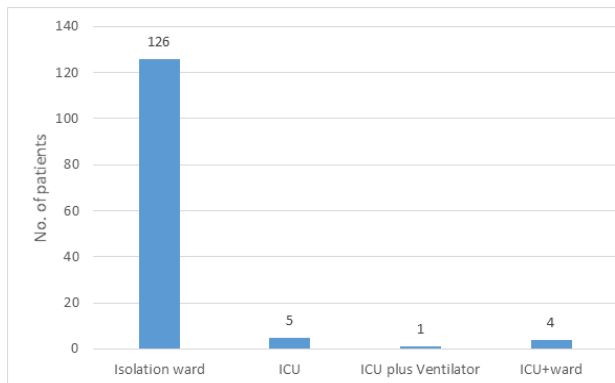


Figure 2. Management of COVID-19 cases

Pharmacological management of COVID-19 was based on the treatment guideline of the hospital. 123 patients received conventional supplement that includes Zinc, vitamin C and D. Pantoprazole was given to 99 patients. 60 patients received Paracetamol for fever. Levocetirizine was common antihistamine used. Antimicrobials namely Azithromycin, Ceftriaxone, Amoxicillin/Clavulanic acid were also used in the management for some patients. 21 patients received Remdesivir. Other medicines like Metronidazole, Ondansetron, Meropenem, Hyoscine etc. were given to 73 patients. No patient in our study received convalescent plasma therapy. Details of pharmacological management are given in figure 3.

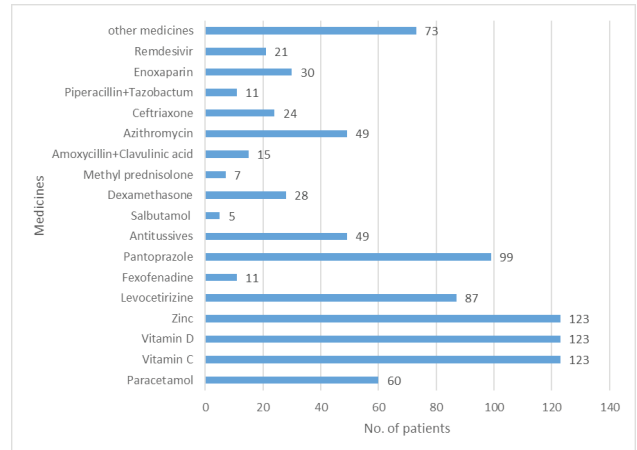


Figure 3. Pharmacological Management of COVID-19 Cases

Figure 4 shows 127 (93.4%) of the admitted patients were discharged after receiving a treatment. 5 (3.7%) patients died during the treatment process. The average stay of the patients in the hospital was 10.9 days. The total approximate range of cost of drugs spent were Rs.75 to Rs.72243 with an average approximate total cost of Rs.8966.44 as shown in Table 4.

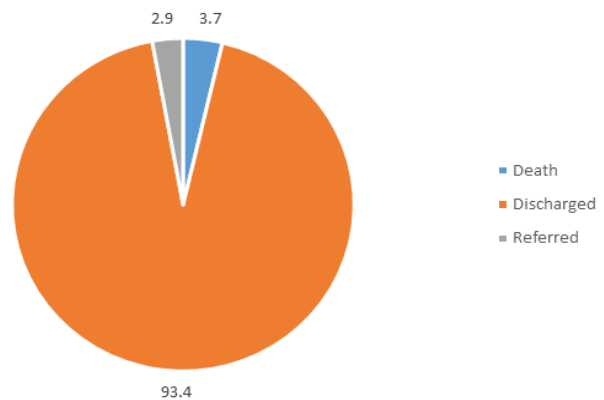


Figure 4. Outcome of Treatment

**Table 4.** Hospitalization and Cost of Treatment

Characteristics	
Average hospital stay of the patient	10.9 days
Range of approximate total cost of drugs	Rs.75 – Rs.72,243
Average approximate total cost of the drugs	Rs.8966.44

## DISCUSSION

The majority of cases of our study belongs to age 20-60 years and was male. This is in accordance with the study done by Khan et al and Akram et al.<sup>16, 17</sup> The male preponderance may be related the fact that women are more likely than men to follow hand-hygiene practices and seek preventive care.<sup>18, 19</sup>

Significant percentage of patients (23.5%) was asymptomatic at admission. Asymptomatic infected people are potentially infectious. Thus, timely isolation of those people was important for epidemic prevention and control. Fever (44.9%) and cough (34.6%) were the most common symptoms, which is similar to the study done by other studies.<sup>20-22</sup> In our study, 64 (47%) patients had co-morbidities. Wang et al also reported that 64 (46.4%) of cases among 138 had comorbidities.<sup>23</sup>

Thirty-one (22.8%) of the patients needed supplemental oxygen. In contrast, in the studies carried out by Guan et al and Huang et al, 453 (41.3%) patients and 27 (66%) patients respectively needed oxygen supplementation.<sup>21, 22</sup> In our study, 7 (5.1%) patients were reported to have severe disease which is similar to the previous studies.<sup>20, 24</sup> Moreover, there were 10 patients (7.3%) who required intensive care. In the study carried out by Richardson et al, in New York City, 373 (14.2%) needed intensive care treatment.<sup>25</sup> Similarly, in study carried out in China, 13 (32%) patients required intensive care.<sup>21</sup>

There is no approved treatment for COVID-19. Generally, supportive management is provided according to each patient's need. Different protocols for medicines are followed in different countries. In our study, most common medicines used were Vitamin C, Vitamin D and Zinc followed by Pantoprazole, Levocetirizine, Paracetamol, Azithromycin, Antitussives, Enoxaparin and Dexamethasone.

Remdesivir was used in 21 patients. In a study in India, combination of Lopinavir and Ritonavir, Oseltamivir and Chloroquine were used.<sup>26</sup> Likewise, in study carried out in China, Oseltamivir, antibiotics and steroids were used.<sup>21</sup>

In this study, 5 (3.7%) patients died, 127 (93.4%) patients were discharged and 4 (2.9%) patients were referred to other centers. Thus, large proportions of the patients were discharged and case fatality was low which is similar to the studies carried out in India (case fatality= 1.4%) and China (case fatality= 4.3%).<sup>20, 23</sup> The discharged patient had an average stay of 12 days in the study carried out by Bhattacharya et al.<sup>24</sup>

Our data demonstrate that the average approximate total cost of the drugs was Nepalese Rupees 8966.4 (equivalent to \$75.2) per patient of COVID-19 which is significantly lower than the costs given by study of Li et al.<sup>27</sup> The study showed that drug acquisition accounted an average of \$1375 for patients without underlying diseases and \$4511 for patients with underlying diseases. However, the cost in our study is quite high in context to per capita income of Nepal, which is \$1148 for fiscal year 2019-20.<sup>28</sup>

## CONCLUSION

In the current study, mild cases of COVID 19 were higher in number. The most commonly used medicines for the management of COVID-19 were vitamin C, vitamin D, Zinc and Pantoprazole. The average cost for medicines is quite high with regard to per capita income of Nepal. Therefore, effective preventive measures are required which may help to control the COVID-19 pandemic.

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