

Severity and Clinical Outcome of COVID-19 Patients Admitted at a Provincial Infectious and Communicable Disease Hospital of Nepal: A Cross-Sectional Study

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ABSTRACT

Background: This study provides information regarding severity and clinical outcome of people admitted with the diagnosis of COVID-19 infection during the global pandemic at a provincial infectious disease hospital in Gandaki Province in Nepal. The evidence from this study will be helpful to compare the clinical outcome of people admitted with COVID-19 during the outbreak.

Methods: Cross-sectional study was conducted from March 2023 to August 2023 after approval from NHRC (ref. no. 1448) with sample size of 1366 at the hospital. Structured questionnaire was used to collect secondary data (electronic and paper records) retrospectively from hospital records with a diagnosis of COVID-19 infection. Total enumeration technique was used with enlisting of all cases of COVID-19 to the hospital. The collected data was analyzed using SPSS version 11.5.

Results: The hospital admitted the highest number of cases between April to September 2021. Among the 1366 admitted cases, 791 (57.91%) were males and 575 (42.09%) were females, the most common age group affected was 31 to 40 years (22.99%); 1092 (79.94%) were from Kaski district. As per disease severity, 884 (64.71%) were moderate cases followed by 391 (28.62%) mild cases and 91 (6.67%) severe cases. A total of 1205 (88.21%) patients were discharged, 105(7.69%) patients were referred and 56 (4.10%) patients died of COVID - 19.

Conclusions: Almost 3/4th of the admitted cases came from the same district, majority had moderate disease and the hospital cure rate was almost 8/9th. As the majority of cases are from the active age group (21 years to 60 years old), public health measures can be targeted to these groups including surrounding population to stop the transmission and spread of COVID-19 or similar infectious diseases. The information from this study can guide for the preparation and planning of in-patient and isolation departments of similar other provincial infectious disease hospitals.

Keywords: clinical outcome; COVID-19; pandemic; severity, infectious disease, communicable disease.

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INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is a condition caused by Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV 2).¹ First recorded case of COVID-19 in Nepal was on January 23, 2020.² According to the Ministry of Health and Population, Nepal, there are 1,001,154 cases with 95,369 cases detected till date in Gandaki province (3rd October 2023). Its recovery rate is 98.8% and the fatality rate is 1.2% according to national data.³ Meta-analysis study on the demographics for COVID-19 infection indicate that those over the age of 70 years had a higher rate of infection, severity of infection as well as mortality.⁴ However, the information regarding demographic characteristics and the recovery and fatality among the COVID-19 cases is not available at the province level.

In Gandaki province the first wave of the pandemic occurred from March to November 2020.⁵ The second wave of the pandemic started mid-April of the next year.⁶ Despite the high burden of infection, the number of beds and other facilities managing COVID-19 were limited in government hospitals of Gandaki Province.⁶ Infectious and Communicable Disease Hospital (ICDH) is the first provincial infectious and communicable hospital in Nepal established by the government⁷ which is dedicated to care of patients suffering from infectious and communicable diseases.⁷ As specialized care and isolation services were available at this hospital, most of the COVID-19 cases from the province are admitted at this hospital. This provides a unique insight into COVID-19 disease burden for COVID-19, especially with regards to mortality and recovery.

The study aims to find the severity and clinical outcome and to assess the demographic factors of the admitted COVID-19 cases in Provincial infectious and communicable disease hospital of Nepal.

MATERIALS AND METHODS

A cross-sectional study was designed and conducted to learn the severity and clinical outcome of patients diagnosed and admitted with COVID-19 and ethical approval for the study was obtained from Nepal Health Research Council (Ref. no. 1448) on 5th January 2023. Permission was taken from the administrative head to include hospital records of the inpatients at ICDH. The study was conducted from March 2023 to August 2023. Structured questionnaires were used to collect data regarding demographic data, severity of infection, and duration of hospital stays and clinical outcomes of the patients admitted with COVID-19 infection retrospectively. For the purpose of the study the severity of infection was categorized according to the treatment guidelines. Total of 1366 patients had been admitted in the hospital with a diagnosis of COVID-19 and all patient records were included in the study. Secondary data of admitted patients was reviewed and collected from patient's files from the hospital. The data was reviewed by the investigators and cross-checked for accuracy and completeness.

All hospital record of patients of admitted at the Infectious and Communicable Disease Hospital (ICDH) in various departments including emergency, intensive care unit (ICU), high dependency unit (HDU) and isolation from August 2020 to November 2022, with a laboratory confirmed diagnosis of COVID-19 were included in the study. The clinical record of patients who were Rapid Diagnostic Test (RDT) or reverse transcriptase polymerase chain reaction (RT-PCR) positive for SARS-COV-2 was included in the study. Data was reviewed using the hospital

database system. ICDH had both a digital and paper-based database of patients admitted with the diagnosis of COVID-19 and both were utilized for the purpose of the study. Total enumeration technique was used with exclusion of only those patient records where data was incomplete. This technique was chosen to ensure that all cases of COVID-19 within the province were included in the study. COVID-19 cases were classified as mild, moderate and severe based on the following criteria:⁸Mild infection: Individuals who have any of the various signs and symptoms of COVID-19 (e.g., fever, cough, sore throat, malaise, headache, muscle pain, nausea, vomiting, diarrhea, loss of taste and smell) but who do not have shortness of breath, dyspnea, or abnormal chest imaging. Moderate infection: Individuals who show evidence of lower respiratory disease during clinical assessment or imaging and who have oxygen saturation measured by pulse oximetry (SpO₂) \geq 94% on room air at sea level. Severe infection: Individuals who have SpO₂ <94% on room air at sea level, a ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO₂ /FiO₂) > <300 mm Hg, a respiratory rate >30 breaths/min, or lung infiltrates >50%.

Based on the above classification, the mild cases could be followed up as outpatient while the moderate and severe cases need to be closely monitored or hospitalized with oxygen therapy. However, based on the co-morbidity of the patients, needs for isolation due to exposure to family members as well as the patients arriving from rural areas and other issues the mild cases were also admitted in the hospital.

Information collected from the questionnaire was entered into Microsoft Excel 2016. The data entered in excel was exported to Statistical Package for Social Sciences (SPSS) version 11.5 and analyzed. Categorical variables were presented as percentages and continuous variables were presented as mean and standard deviation (SD).

RESULTS

The hospital had managed 1366 cases of COVID-19 infection in 24 months. Figure 1 shows the analysis based on the date of admission of the cases showed that the hospital started admitting cases at the end of the first wave of pandemic in Gandaki province on August 2020 (Figure 1). The hospital was able to admit a maximum number of cases at the peak of the second wave of the pandemic between April of 2021 to September of 2021.

Figure 2 shows the age and sex of the cases admitted at the provincial hospital. The mean age of the patients was 46.17 (\pm 18.25) years, 11 months being the youngest age of patient admitted and 97 years being the eldest patient admitted. The most common age group affected by COVID-19 and admitted at ICDH were in the age group of 31 to 40 years (22.99%) (Figure 2). The next common age group was 41 to 50 years (16.98%) and then 51 to 60 years (16.91%). Among the admitted cases, majority were male 791 (57.91%).

Table 1 shows the district wise distribution of the cases in Gandaki Province. Out of 11 districts in Gandaki province, people with COVID-19 from 10 districts came to the hospital for treatment. There were no cases from Manang district. (Table 1). Out of 1366, there were 14 cases admitted at ICDH who were from the districts outside the Gandaki province of Nepal.

Table 2 shows the severity and outcome of the

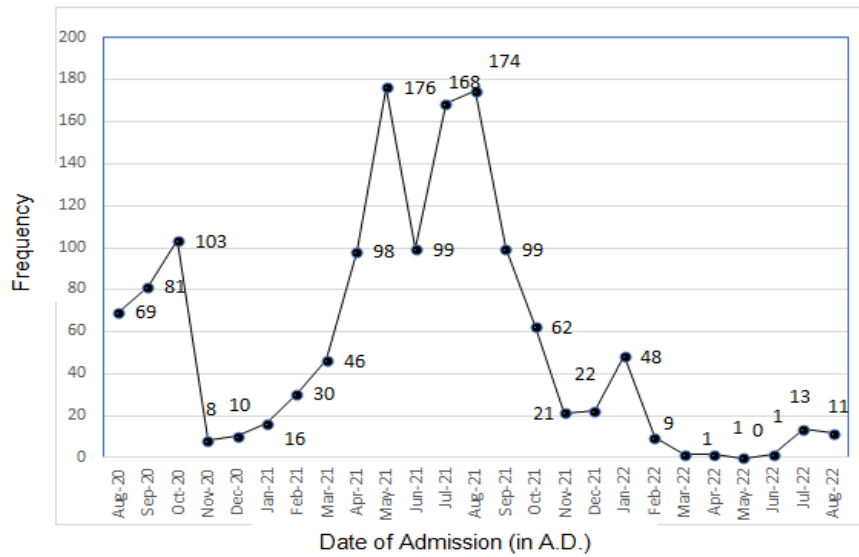


Figure 1. Line chart showing time trend of disease occurrence (N=1366)

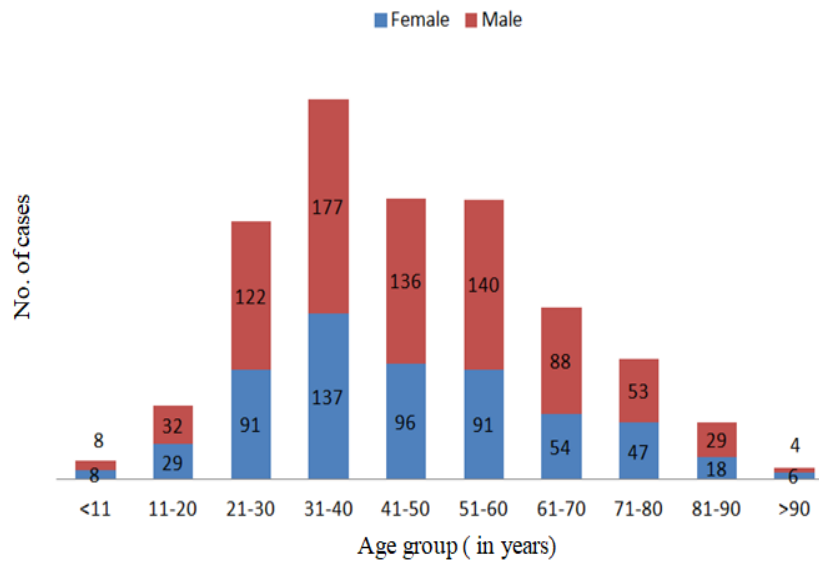


Figure 2: Distribution of age of COVID-19 patients according to sex (N=1366)

Table 1: District-wise distribution of the COVID-19 cases (N=1366)

Districts from Gandaki Province	Frequency	Percentage (%)
Kaski	1092	79.94
Tanahun	70	5.12
Syangja	39	2.86
Myagdi	38	2.78
Baglung	30	2.20
Lamjung	29	2.12
Parbat	22	1.61
Mustang	15	1.10
Gorkha	13	0.95
Nawalpur	4	0.30
Other districts (Outside Gandaki Province)	14	1.02
Total	1366	100

Table 2: Severity and outcome of the admitted cases of COVID-19 cases (N=1366)

Variable	Frequency	Percentage (%)
Severity of Infection		
Mild	391	28.62
Moderate	884	64.71
Severe	91	6.67
Total	1366	100
Outcome		
Cured	1205	88.21
Expired	56	4.10
Referred	105	7.69
Total	1366	100

COVID-19 cases. The average duration of stay at the hospital was 8.48 ± 5.29 days and the longest stay at the hospital was 37 days. The majority of the admitted patients which was 884 (64.71%) were moderate cases (Table 2). Severity of the cases were based on the treatment guidelines.⁵

DISCUSSION

This cross-sectional study aimed to find the severity and clinical outcome of the COVID-19 cases that were admitted at a provincial infectious and communicable disease hospital (ICDH) in Gandaki Province of Nepal. In our study, it was found that the highest numbers of cases were admitted during the two waves of the pandemic between August-November, 2020 and between April-September 2021, the largest numbers of cases were admitted during May 2021 (176) at ICDH. The province recorded its first case of COVID-19 in March 2020 in Baglung district with the number of cases rising until November 2020 during the first wave of the pandemic.⁵ Similarly, the second wave of the pandemic started mid-April.⁶ ICDH was established in July, 2020 and started admitting cases of COVID-19 in August, 2020 during the peak of the first wave of the pandemic and continued its services during both the first and second wave of the pandemic.

Among the cases admitted in the hospital, the majorities, 79.94%, were from Kaski district and 5.12% of cases were from Tanahun. There were cases recorded from ten districts of Gandaki province with 15 cases (1.10%) being recorded from Mustang district whereas no cases were admitted at ICDH from Manang. According to nationally reported statistics, 46,169 (48.41%) of the cases recorded from Gandaki province were from Kaski district whereas 229 (0.24%) of the cases were from Mustang and 82 cases (0.08%) were from Manang.³ The high number of cases from Kaski district could be due to the location of the Hospital in this district. The high altitude of Manang and Mustang could be one of the reasons for a smaller number of cases as per the nationally recorded data from these districts.^{9,10}

The study revealed that the majority of the patients being admitted in the provincial hospital were male (57.91%). This is consistent with other studies done in Nepal which have reported similar numbers.^{11,12} The national COVID-19 statistics suggest that 58.7% of the infections were among males, similar to the provincial data of Gandaki province (57.7%).³ A systematic review done by Abate et al. has concluded that COVID-19 infection occurs more commonly in male which may be linked to the

higher prevalence of smoking and alcohol consumption habits among the males.^{13,14} In our study, there were more male who had moderate infection (66.75%) and those having severe infection were almost equally distributed among the sex (6.57% males vs 6.78% females). However, research has shown that males are considered as having higher risk for severity of COVID-19 infection.^{15, 16} The higher percentage of male patients in our study could be the reason for almost equal severity and outcome of infection. The severity and outcome of infection is affected by various factors such as socio-economic factors, comorbidity, vaccination status and health service-related factors which could have had an influence on the results.

The mean age of the patients was 46.17 (± 18.25) years, 11 months being the youngest age of patient admitted and 97 years being the eldest patient admitted. The mean age in our study is similar to a study done in Beijing.¹⁷ In our study, 22.99% of the COVID-19 cases admitted, were in the age group of 31 to 40 years. Analysis based on severity of cases have indicated that most of the cases in mild (26.60%) and moderate (21.95%) category were of the age group 31-40 years whereas 24.18% of the severe cases were in the age group of 51-60 years. Analysis based on clinical outcome of the disease has shown that mortality was highest in the age group of 41-50 years (26.79%). According to national COVID-19 statistics, 24.91% of the infections were among the 21-30 years age group followed closely by 31-40 years age group (24.88%) whereas in Gandaki province the highest rate of infection was among 31-40 age group at 23.89%.³ The higher incidence of severe cases in older age group is supported by research that suggests that advanced age is a risk factor for severity of COVID-19 infection.¹⁵ Similar results were found in a study done at a tertiary hospital in Nepal by Bhansal et al. where the most common age group affected to be in the age group of 20-40 years.¹² The 31-40 age group represents the working population who could have been exposed to the virus on a daily basis which could be the reason that the infection was higher in this age group. The higher severity in the older age groups can be attributed to the presence of comorbidities at this age which can lead to complications.^{14,18}

The study has found that about two-third of the admitted cases had moderate severity of COVID-19 infection. The percentage of severe cases was 6.67% in our study which is much lower compared to other studies.^{19, 20} The differences observed could be largely influenced by the sociodemographic factors and co-morbidities in the individuals.²¹

The cure rate was 88.21%. One hundred and five (7.69%) patients were referred to another hospital. Mortality rate of hospital-admitted cases was 4.10%. According to national statistics, the recovery rate is 98.20% and fatality rate is 1.20%. The fatality rate was higher in our hospital compared to national and international data.^{3,22} However, some studies have reported similar^{23,24} or higher fatality rates.^{11,25,26} The differences in case fatality rate could have been influenced by many factors such as the availability of healthcare workers, resources, facilities, preparedness as well as due to comorbidities, vaccination status and various socio-economic factors.^{19,27,28} The higher case fatality rate compared to national data and international data could be due to a lesser number of people testing for the infection leading to a smaller denominator.²⁸ Another reason could be because the study was based on hospital records. ICDH received critical cases referred from other hospitals since it is COVID-19 dedicated hospital in the province, which could have led to a higher mortality.

Cure rate in the hospital was high compared to the results of meta-analysis study in China²⁹ (88.21% v/s 52%) but similar to some other countries such as Ethiopia-89.4%.³⁰ The cure rate for COVID-19 is influenced by many factors such as the clinical profile of the patient as well as other factors such as knowledge, attitude towards preventive measures all of which can influence the outcome of the disease.

CONCLUSIONS

Among all the admitted patients with COVID-19 infection at a provincial infectious & communicable disease hospital in Nepal, majority had moderate disease and the hospital cure rate was almost 8/9th. As the majority of cases are from the active age group from the age of 21 years to 60 years old with slightly higher occurrences of disease in male, public health measures can be targeted to these groups to stop the transmission and spread of COVID-19

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Study Limitation: The retrospective nature of the study could be the reason for bias since there could have been human error in recording the data. The study findings were based on hospital records which limits its generalizability. The patient record of patients who were hospitalized was analyzed in the study, since the more severe cases are the ones presenting to the hospital it could have led to bias. The clinical outcome of the patients who were referred to another hospital was not included in this study.

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