Mortality and Morbidity Patterns of COVID-19 Patients at a Tertiary Health Care Centre of Nepal

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ABSTRACT

Introduction

COVID-19 is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) associated with substantial morbidity and mortality putting the entire health system under strain. This study aims to assess the sociodemographic and morbidity factors of COVID-19 patients and their association with COVID-19 mortality.

Methods

It was an analytical cross-sectional hospital based study in a single tertiary level health care centre in Central part of Nepal. Total 425 COVID-19 patients who were treated at the tertiary health care centre from August 1st 2020 to December 31st 2020 were included in the research.

Results

Out of 425 patients, 230 (54.1%) were male and 195 (45.9%) were female. The mean age group of patients was 50.01±20.03 years, ranging from 7 days to 91 years of age. Total 262 (61.6%) patients had some type of comorbidity. The deaths were more in advancing age, in males and in patients residing in urban areas. Out of total deaths, 41(85.4%) patients had presence of some type of comorbidity. Age, place of residence, co-morbidities, length of hospital stay and place of treatment of patients showed a significant association with COVID-19 mortality with p-value <0.05.

Conclusions

COVID-19 mortality risk increases with advancing age and comorbidity. The global morbidity and mortality of the disease can only decline with the combined effect of preventive measures and health promotion of high risk groups especially those with morbidities like diabetes, hypertension and respiratory diseases.

Keywords: COVID-19; morbidity outcomes; mortality association; patient comorbidities; SARS-CoV-2 infection; sociodemographic factors

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INTRODUCTION

COVID-19 is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2).[1] World Health Organization (WHO) declared COVID-19 as a pandemic on 11th March 2020 which has cost millions of lives.[2] The first recorded case in Nepal was on Jan 23, 2020.[3] Even though the mortality of the cases was slow initially, the increase in the positive cases led to rapid progression after few months.[3] According to Ministry of Health and Population, Government of Nepal confirmed 8,06,517 positive cases with 11,305 deaths till date (19 Oct 2021).[4] The major public health challenge for Nepal is the lack of access to health care against the backdrop of weak and inadequate public health infrastructure.[5] With the limited manpower, fragile health infrastructure COVID 19 possessed a great threat to our nation. Due to the ease of the lockdown and ignorance of the people and inability to maintain the effective public health measures COVID-19 is associated with substantial morbidity and mortality which puts the entire health system under strain.

In a study done in UK, one in five people over 80 years were positive and had statistically higher likelihood of requiring hospital admission than younger population <30 yrs of age who required medical intervention.[6] Study done in India depicted that most of the cases are in age above 50 yrs.[7] A study done in Nepal concluded that nearly half of the deaths were people less than 50 years of age where female was at high risk of death. The majority of deaths were associated with co-morbidities most common cardiovascular diseases and diabetes followed by respiratory diseases.[8] According to research performed by Joshi et al, on the clinical profile of COVID-19 patients in the far Western showed that patients with positive were maximum males between 20-40 yrs of age.[9] In a study done in France by Prof Lionel Piroth et al, patients with COVID-19 were more frequently obese, had diabetes, hypertension and dyslipidemia. Mortality in patients with COVID-19 was three times higher than that of patients with influenza. Mortality was higher in patients admitted in ICU whether they were mechanically ventilated or not. Also patients with COVID-19 are more likely to need mechanical ventilation.[10] In another study of 44,672 cases in China diagnosed as of February 11, 2020, the overall CFR was 2.3%. However, the Case fatality rate (CFR) was 8.0% in patients aged 70 – 79 years and 14.8% in patients aged ≥80 years.[11] Study done in Paris by Guilmoto CZ at Paris depicted that male mortality from COVID-19 is systematically higher than female mortality, with a peak of excess male mortality occurring among 55-59 years old.[12]

Since there is lack of enough data regarding the association of socio-demographic variables with mortality and morbidity, this study aims to fill the void by assessing and analyzing the sociodemographic and morbidity factors of COVID-19 patients and their association with mortality. Hence help the health care professionals and policy makers in mitigation and control of the disease to reduce the patterns in the future.

METHODS

An analytical cross-sectional study was conducted on all COVID-19 patients of College of Medical Sciences Teaching Hospital, Bharatpur, Nepal from August 1st 2020 to December 31st 2020. Sample size was calculated by taking prevalence as 50%, 95% CI and 5% margin of error, the optimal sample size was 384 but this research was conducted among 425 patients. Sample was selected by using non- probability (convenient) sampling technique.

The information was collected from the hospital records. Ethical approval was taken from

Institutional Review Committee of College of Medical Sciences Teaching Hospital (Ref no. 2020-108). Confidentiality of all data and informations was maintained throughout the study.

The sociodemographic variables (age, gender, place of residence, occupation), morbidity and mortality variables (length of hospital stay, comorbidity, place of treatment, outcome) of the positive COVID-19 patients were studied and analyzed.

Data was entered, checked for completeness and accuracy and then analyzed by using SPSS version 17 software. Data were analyzed by taking descriptive and inferential statistical tools. In descriptive statistics for continuous variables mean and standard deviation was calculated while for categorical variables was expressed in term of frequency and percentage. In inferential statistics to find the association between dependent variable and independent variables chi-square test was used. P-value less than 0.05 were considered as statistically significant. The STROBE cross sectional checklist was used while writing the report.[13]

RESULTS

The mean age of patients was 50.01±20.03 years with the minimum and maximum age of 7 days and 91 years of age respectively. Majority of patients (140, 32.9%) were in the age group of 20-40 years. Out of total patients, 230 (54.1%) were males and 195 (45.9%) were females. Place of residence distribution showed 75 (17.6%) patients resided in rural area and 350 (82.4%) resided in an urban area. Amongst total COVID-19 patients 101 (23.8%) were health care workers and 324 (76.2%) were non-health workers (Table 1).

Table 1. Sociodemographic characteristics of the COVID-19 patients (n=425)

Variables	Frequency	Percent
Age group (years)		
0-20	9	2.1
20-40	140	32.9
40-60	109	25.6
60-80	134	31.5
>80	33	7.8
Mean±SD	50.01±20.03	
Gender		
Male	230	54.1
Female	195	45.9
Place of residence		
Rural	75	17.6
Urban	350	82.4
Occupation		
Non-health workers	324	76.2
Health care workers	101	23.8

Out of all COVID-19 patients, 262 (61.6%) had some type of comorbidity whereas 163 (38.4%) of them did not have presence of any comorbidity. The majority of patients had Community Acquired Pneumonia (262, 61.6%), followed by Hypertension (45, 17.2%), Diabetes Mellitus (31, 11.8%), Renal diseases (29, 11.1%), Chronic Obstructive Pulmonary Disease (COPD) (24, 9.2%) and others. The majority of the patients (388, 91.3%) were managed at the hospital isolation whereas 37 (8.7%) of them were managed at home isolation. The mean hospital stay was 6.18 ±5.64 days, with the majority of the cases 142 (36.6 %) staying for <3 days. Total 300 (80%) of the patients were discharged, 48 (11.3%) patients died and 37 (8.7%) of them were cured at home isolation. (Table 2)

Table 2. Morbidity and mortality patterns of COVID-19 patients

Variables	Frequency	Percent
Comorbidities		
Present	262	61.6
Absent	163	38.4
Types of Comorbidities (n = 262)		
Community Acquired Pneumonia	168	64.1
Hypertension	45	17.2
Diabetes Mellitus	31	11.8
Renal Diseaes	29	11.1
COPD (Chronic Obstructive Pulmonary Disease)	24	9.2
Accidents and Injuries	14	5.3
Liver Diseases	8	3.0
Cerebrovascular Accidents	8	3.0
Infections (Appendicitis, Meningitis, Osteomyelitis, Urinart Tract Infection)	8	3.0
Cardiac Diseases	7	2.7
Septic Shock	5	1.9
Thyroid Diseases	3	1.1
Pregnancy	3	1.1
Pulmonary Tuberculosis	2	0.8
Others	5	1.9
Length of hospital stay (days) (n=388)		
<3	142	36.6
4-7	100	25.8
8-11	75	19.32
12-15	36	9.27
>15	35	9.02
Place of treatment		
Home	37	8.7
Hospital	388	91.3
Outcome		
Discharged	340	80
Expired	48	11.3
Home isolation	37	8.7

Association of different sociodemographic and morbidity variables with COVID-19 mortality was analyzed which showed that age, place of residence, co-morbidities, length of hospital stay and place of treatment have a significant association with COVID-19 mortality with p-value <0.05. However gender showed no association with COVID-19 mortality. (Table 3)

Table 3. Association of sociodemographic and morbidity variables with COVID-19 mortality

Variables	COVID Mortality n (%)		Chi-square	p-value
	Yes	No		
Age group (years)				
0-20	1(2.1)	11(2.9)	33.11	<0.001
20-40	4(8.3)	139(36.9)		
40-60	10(20.8)	99(26.3)		
60-80	22(45.8)	108(28.6)		
>80	11(22.9)	20(5.3)		
Gender				
Male	28(58.3)	202(53.6)	0.38	0.53
Female	20(41.7)	175(46.4)		
Place of residence				
Rural	16(33.3)	59(15.6)	9.16	0.002
Urban	32(66.7)	318(84.4)		
Comorbidity				
Present	41(85.4)	221(58.6)	12.93	<0.001
Absent	7(14.6)	156(41.4)		
Length of hospital stay				
<3	24(50)	155(41.1)	9.46	0.048
4 7	16(33.3)	84(22.3)		
8 11	6(12.5)	69(18.3)		
12 15	2(4.2)	34(9)		
>15		35(9.3)		
Place of treatment				
Home		37(9.8)	5.16	0.023
Hospital	48(100)	340(90.2)		

DISCUSSION

In the present study the mean age of the patients was 50.01± 20.03, whereas another study from our country reported that the mean age was 33.6 ± 13.8 years.[14] Our analysis observed that 32.9% of COVID-19 patients were between the ages of 20 and 40, which may reflect the busiest part of life in outdoors and higher risk of human interaction was primarily infected. A similar study reported that the highest percentage (51.80%) of SARS-CoV-2 infected patients were observed in the 20–40 years old age range.[15] Earlier studies have shown that in Nepal the highest number of COVID-19 cases was in the age group of 21 to 30 years, which on June 12, 2020, accounted for nearly 39% of the total cases in Nepal. [16]

We discovered that the majority of COVID-19 cases 230 (54.1%) were male, similar to the findings of most other studies.[17] Male domination in COVID-19 instances could be due to gender disparities in testing patients, women's shyness, and a more active male population than the female population in our country, particularly in terms of jobs outside the home. Another study conducted by Bienvenu et al., also concludes that the male sex is a risk factor for COVID-19.[18] This proves that our findings were consistent with other contemporary studies.

The study found that urban people (82.4%) were more vulnerable to COVID-19 than rural people (17.6%) which is consistent with other studies reported by Ali et al., and Carozzi F et al.,.[14,19] Since COVID 19 is a highly transmissible disease, the urban individuals living in densely populated areas have more possibility of coming in close contact with others and consequently, the infection spreads quickly.

Amongst total COVID-19 patients, 324 (76.2%) were non-healthcare workers which contradicts with the study conducted by Nguyen LH et al.,.[20] Availability and use of preventive measures along with knowledge regarding transmission of COVID-19 in health care workers might be the reason for less incidence among them.

Comorbidities were present in 262 (61.6%) cases amongst which Community-Acquired Pneumonia (168, 64.1%) was the most common comorbidity observed followed by Hypertension (45, 17.2%) and Diabetes Mellitus (31, 11.8%). Another study conducted by Panthee B et al., showed that 61% were associated with comorbidities where Cardiovascular diseases and Diabetes accounted for most of the comorbidities.[8]

The mean length of hospital stay was 6.18 ±5.64 days with the majority of the cases (142, 36.6 %) staying for <3 days. This was lower than that reported from China (14 days). This may be explained by the differences in early detection, severity, admission and discharge criteria, and different timing within the pandemic. Nonetheless, this information on the length of hospital stay will be crucial to model bed occupancy demands for contingency planning.[21] Among the respondents, 91.3% of people were admitted to COVID specialized wards and intensive care units which contradicts the study conducted by Ali MR et al., which showed that approximately 69.33% were isolated at home and remaining were being treated at hospitals.[22] The reason for higher number of hospital admissions in our study could be due the study place being a referral tertiary care centre receiving more severe patients for specialized care. Out of the total cases, the majority of them 340 (80%) were discharged, 48 (11.3%) expired during their hospital stay. Similar findings was found in the study conducted by Jamil M et al.[23]

This study showed that age, place of residence, presence of co-morbidities, length of hospital stay and place of treatment of COVID-19 patients have a significant association with

COVID-19 mortality. The mortality percentage was found to be high in advancing age, in males and in patients residing in urban areas. In this study out of total deaths, the majority of patients i.e. 41(85.4%) had presence of some type of comorbidity similarly like the findings of study done by Panthee B et al.[8] However, in our study gender showed no significant association with COVID-19 mortality.

CONCLUSIONS

COVID-19 is an infectious disease that has spread in all places, throughout the year and among people of all age groups, gender, occupation and ethnicity. The global resurgence of the cases, morbidity and mortality can only decline with the combined effect of vaccines and stringent implementation of the preventive measureslike hand washing, wearing mask, maintaining social distancing, self-isolation in symptomatic and quarantine in asymptomatic cases. Health promotion of high risk groups especially those with morbidities like diabetes, hypertension, respiratory, liver and renal diseases should be prioritized to minimize mortality and further global burden of the disease to the mankind.

Strengths and limitations of this study

- Multiple variables at a data snapshot could be assessed and analyzed.

- This data set included almost all the patients of the first wave of pandemic of the centre.

- Direct patient interaction was not required as the source of data collection was secondary.

- The findings of the study might not be generalised as it was done in a single tertiary health care centre.

- The disease pattern at community level could not be assessed as it was a hospital based study.

Competing interests

I declare no existing competing interests.

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