Contribution of Comorbidities in Mortality of COVID-19 Patients Admitted to Tertiary Care Center: A Descriptive Cross-sectional Study

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ABSTRACT

Introduction
The majority of COVID patients with comorbidity were admitted to Intensive Care for treatment, and their outcomes were poor, necessitating the need for this study to determine the mortality due to comorbidities. This study aimed to find out the prevalence of comorbidities in COVID-19 mortality cases recorded in the tertiary hospital.

Methods
Cases with comorbidities among 162 cases of deaths due to COVID-19 were assessed in this retrospective cross-sectional study. Data were obtained from the Department of Biostatistics. Age, sex and comorbidity status were recorded in each mortality case. Ethical approval was obtained from the Institutional Review Committee.

Results
Out of 162 mortality cases, 62 (38.27%) patients had comorbidity. Among 62 mortality cases with ages ranging from 26-80 years and mean age was found to be 57.26 ± 11.18. Our data included a total of 41 (66.20%) males and 21 (33.80%) females. Diabetes with hypertension (23%) was the leading comorbidity in the COVID mortality case followed by hypertension (20%), diabetes (18%), chronic kidney disease (12%), hypothyroidism (9%), and other cases (18%). Other cases include upper gastrointestinal (UGI) bleeding, hepatic encephalopathy, old cerebrovascular accidents (CVA), liver abscess, and other surgical cases.

Conclusion
Diabetes with hypertension was the major comorbidity in COVID-19 mortality.

Keywords
Comorbidity; COVID; mortality; outcome

INTRODUCTION

WHO has identified the causative agent of coronavirus disease 2019, or COVID-19 pneumonia, as the new coronavirus (SARS-CoV-2). This virus was previously known as 2019-nCOV.[1] The illness was first documented in December 2019 due to an unidentified pneumonia outbreak that started in Wuhan, China.[2] SARS-CoV-2 has a 14-day incubation period, with a median of 4–5 days between exposure and the onset of symptoms.[3] Inhaling droplets or coming into contact with contaminated surfaces is how the virus is spread. [4]

With an average of 2-3% globally, case fatality rates for SARS-CoV-2 confirmed patients range from higher values, such as 8.8% in Mexico, to as low as 0.3% in the United Arab Emirates.[5] It has frequently been noted that the coexistence of comorbidities with COVID-19 increases the likelihood of a negative prognosis. Based on the frequency of chronic diseases, it is projected that one in five individuals globally is at a higher risk of experiencing unfavorable COVID-19 outcomes.[6]

It has been shown that those who already have a chronic condition have an increased risk of contracting the virus and developing severe symptoms. Literature indicates that individuals with comorbidities experience worsening outcomes more frequently than those without. Patients with COVID-19 who have a history of cardiovascular illness, diabetes, hypertension, obesity, or chronic lung disease have the worst prognosis and frequently experience worsening outcomes such as pneumonia and acute respiratory distress syndrome (ARDS).[7,8] There has not been many studies done in our country about the comorbidities in the deaths due to COVID-19. This study aims to find the prevalence of pre-existing comorbidities in patients who died of COVID-19.

METHODS

We conducted a descriptive, and cross-sectional study on patients with mortality due to COVID-19. All patients who had mortality due to COVID-19 infection during the second COVID-19 wave from 2021 April 16 to 2021 June 28 in the COVID ward of Nepalgunj Medical College Teaching Hospital (NMCTH) and all deaths occurring in the COVID ward diagnosed with COVID-19 were included in our study after the ethical clearance from the Institutional Review Committee of NMCTH (Ref.no: 10/079-080).

The study consisted of a confidential data review; no informed consent was deemed necessary, due to the retrospective nature of the study. We took precautions by blinding the patient's identification data. Demographic, clinical, laboratory information of all patients with COVID-19 were extracted from the Department of Biostatistics.

All those cases where there had been made an alternative diagnosis and death that cannot be related to COVID-19 disease (trauma etc.), cases with complete recovery during the stay of patient in hospital, all deaths reported suspected or probable due to case of COVID-19 and brought dead cases were not included in this study. To confirm COVID-19 infection, nucleic acids were extracted from clinical samples. The laboratory-based RT-PCR was applied as the main method to confirm COVID-19. The data collected were analyzed by using SPSS v23 software. Variables like age, sex, and comorbidities present were collected from the available samples for this study.

RESULTS

During the second wave of COVID-19, 797 patients were admitted to our hospital out of which 162 had mortality marking a case fatality rate of 20.32%. Our study showed 62 out of 162 dead patients accounting for 38.2% of mortality had comorbidities along with COVID-19.

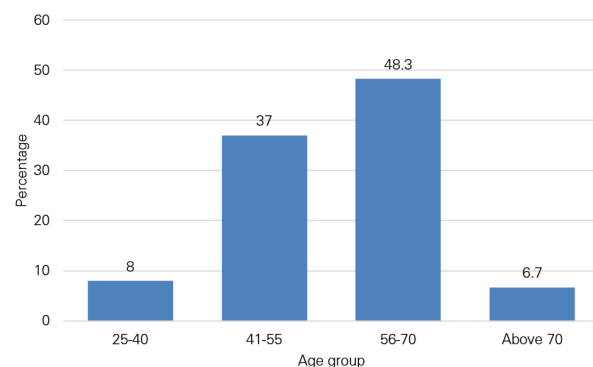Among 62 patients studied, with ages ranging from 26-80, the mean age was 57.26 ±11.18 years. Our

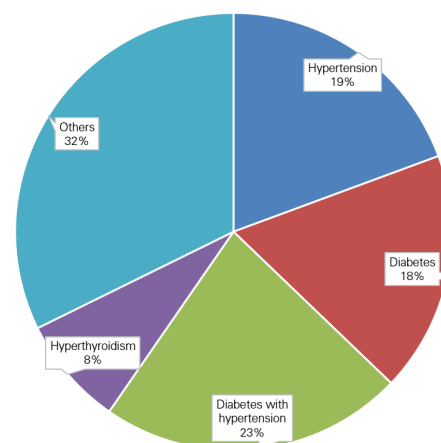*Figure 1. Distribution of age*

Figure 2. Associated comorbidities

data included a total of 41 (66.20%) males and 21 (33.80%) females.

Age distribution is shown in Figure 1 with the maximum patient (48.30%) falling in the 56-70 age group category.

Diabetes with hypertension 22.5% followed by hypertension 19.4% was the major comorbidity in our study shown in Figure 2. In Figure 2, other comorbidities include UGI bleeding, acute kidney injury (AKI), hepatic encephalopathy, old CVA, COPD, Pulmonary TB, chronic kidney disease (CKD) and surgical cases like liver abscess, cellulitis and appendicular abscess which contributed less than 5%.

DISCUSSION

There is a lack of enough data available regarding the new SARS Cov-19 virus, especially in developing countries with resource limited settings. However, patients having comorbidity have a higher risk of getting severely ill and have more deteriorating outcomes than those without.[9] COVID-19 is associated with disproportionate mortality with high rates in high-risk patients. The mortality varies significantly amongst the world population in different countries with multifactorial association.[10] We have tried to assess the contribution of different comorbidities in the mortality of COVID-19 patients admitted in only tertiary care centers in Western Nepal.

Our study showed that male patients are affected twice as females which is similar to the systematic review of other studies by Yang et al. and Irawaty Djaharyddin et. al.[11] Research suggests ACE2 is a co-receptor for SARS-CoV-2 viral entry into human cells that plays a significant role in the pathogenesis of the disease which is more expressed in Asian males. Immunological reactions and lack of protective effect of estrogen are other reasons why males are more affected than females.[12] Compared with someone younger than 40 years, the risk of death increases fourfold for people aged 56-70, and more than 10-fold for those aged over 70. Poor work-life balance, sedentary lifestyle, and lack of exercise lead to comorbidity in the age category above 50 years. The case fatality rate for COVID-19 is found to be 20.3% in our center. This fatality rate among hospitalized patients varies substantially among the previously published reports worldwide.

Hypertension with diabetes remains the highest prevalence comorbidity in our study which matches with the findings of the study done by Erjia Ge et. al.[13] in Canada and Margarita Posso et al.[14] in Spain. In-depth clinical analysis of 140 COVID-19 hospitalized patients in Wuhan revealed that diabetes (12.1%) was the second most common ailment after hypertension. More specifically, out of a sample of 52 COVID-19 patients in intensive care, diabetes was the most prevalent underlying comorbidity in about 22% of the 32 nonsurvivors.[15] Other comorbidities like chronic kidney disease, hypothyroidism, and surgical cases also contribute to the higher proportion of comorbidities. One study has shown hypertension (30%) and coronary heart disease (20%) as the most prevalent comorbidities (8%) in COVID-19-infected patients. Another investigation has shown that HTN (27%) and cardiovascular complications were the most prevalent comorbidities among COVID-19 patients with acute respiratory distress syndrome (6%)[16], but cardiovascular diseases, COPD remain on the back side of our study list due to the limited study population. The sample size for our study is limited which has in turn resulted in limited other comorbid conditions like cardiovascular disease, and COPD contrary to other studies where it shows a major contribution after hypertension and diabetes. Diabetes and hypertension are not only the contributors in mortality of COVID-19 but have been affecting the severity of other diseases also as shown by other studies done by Erener et al.[17] Increasing trends of hypertension and diabetes over these years have raised alarms for further health problems. Controlling these comorbidities and screening would reduce the number of other complications as well as the severity of COVID-19.

In our study, limitations and constraints were that the cases admitted to one tertiary care center were only considered in this study, this study has a small sample size.

CONCLUSION

Diabetes with hypertension was the major comorbidity in COVID-19 mortality followed by hypertension.

FINANCIAL SUPPORT

CONFLICT OF INTEREST

The author(s) declare that they do not have any conflicts of interest with respect to the research, authorship, and/or publication of this article.

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