Death analysis of COVID-19 patients admitted in dedicated COVID hospital in Mumbai

Pradnya N. Pawar¹, Smita S. Chavan², Viplove F. Jadhao³, Balkrishna B. Adsul⁴, Maharudra A. Kumbhar⁵, Prasad T. Dhikale², Chinmay N. Gokhale², Aniket R. Ingale²

¹Community Medicine-Junior Consultant, Seven Hills DCH, Mumbai, Maharashtra, ²Department of Community Medicine, HBTMC and RNCH, Mumbai, Maharashtra, ³Medicine Consultant, Seven Hills DCH, Mumbai, Maharashtra, ⁴Dean I/c, Seven Hills DCH, Community Medicine, LTMMC and GH, Mumbai, ⁵Officer Special Duty, Seven Hills DCH, Mumbai, Maharashtra, India

ABSTRACT

Introduction: COVID-19 poses a great threat globally and also a huge burden on developing countries due to its expensive, less effective, and toxic treatment. India is one of the countries with large number of confirmed cases. This study is done to assess the death due to COVID-19 on various parameters so that necessary action can be taken to reduce the disease burden of COVID-19. Aim and Objective: I) To find sociodemographic and other factors associated with mortality. II) To study various comorbidities related to the death due to COVID-19 infection. III) Recommendation for reducing mortality in COVID-19 patients. Material and Method: Data related to COVID-19 death was taken from MRD (Medical Record Department) & e-Health records from HMIS and was analyzed by Bivariate analysis in SPSS. Results: Results showed that people with 1-2 comorbidity have 62% death. Mortality was found to be more in elderly, that is, >60 years age group with 67.5% of total mortality. And in males (68.6%) as compared to female. Conclusion: People with comorbidities have significant association. Also, it showed that death was more common in male and elderly age group as compared to female and youngsters.

Keywords: Comorbidity, COVID-19, deaths, dedicated COVID hospital

Introduction

The rapid expansion of COVID-19 infection has jeopardized its global control. This exacerbating grim of COVID-19 pandemic infection poses a great threat globally and also it incurs a huge burden on developing countries due to its expensive, less effective, and toxic treatment.

According to World Health Organization, globally there were about 12,85,40,982 confirmed cases of COVID-19, including 28,08,308 deaths.[1] India reported over 12 million confirmed cases of coronavirus (COVID-19) as of March 30, 2021. Out of these, over 162 thousand cases were fatal. The number of people infected with virus was growing across South Asian countries and the government had swung into action to curtail further spread the outbreak. India currently has the largest number of confirmed cases in Asia, and as of March 2021, has the third highest number of confirmed cases in India. This study is done to assess the death due to COVID-19 on various parameters so that necessary action can be taken to reduce the disease burden of COVID-19.

Address for correspondence: Dr. Smita S. Chavan, Associate Professor, Community Medicine, HBTMC and RNCH, Mumbai, Maharashtra, India. E-mail: drsmitaschavan@yahoo.com

Received: 20-07-2021 Revised: 14-10-2021 Accepted: 20-10-2021 Published: 18-03-2022

Access this article online

Quick Response Code: Website: www.jfmpc.com
DOI: 10.4103/jfmpc.jfmpc_1460_21

How to cite this article: Pawar PN, Chavhan SS, Jadhao VF, Adsul BB, Kumbhar MA, Dhikale PT, et al. Death analysis of COVID-19 patients admitted in dedicated COVID hospital in Mumbai. J Family Med Prim Care 2022;11:1322-6.
**Aim and Objective**

I) To find sociodemographic & other factors associated with mortality.

II) To study various comorbidities related to the death due to COVID-19 infection.

III) Recommendation for reducing mortality in COVID-19 patients.

**Subjects and Methods**

1. **Study Design:** Observational study
2. **Study Setting:** Dedicated COVID-19 Hospital (DCH), in Mumbai, India run by MCGM
3. **Study Duration & Inclusion Criteria:** All patients with outcome as death since 1st April 2020-31st March 2021
4. **Sampling Technique:** Complete enumeration of all deaths in study period.
5. **Sample size:** Universal sample size
6. **Inclusion criteria:** Only COVID confirm cases
7. **Exclusion criteria:** Non-COVID and suspected case.
8. **Data collection:** Data was taken from MRD & e-Health records from HMIS.
9. **Data entry and Analysis:** Data was entered in MS Excel sheet with variables:
   - Sociodemographic, Patients clinical status on admission, duration of hospital admission, Use of special medicine (Remdesivir, Tocilizumab), Requirement of mechanical ventilation, Direct/Indirect admission
10. **Ethical consideration:** Study was approved by IEC of Seven Hills Hospital, Marol, Mumbai.

**Results**

This DCH was first started as quarantine center for International passengers arriving from various countries in the month of March 2020 and later since 28th March 2020 it was transformed into one of the largest isolation center in Mumbai urban agglomeration.

Total patient managed during this period were 21,348 out of which death rate was 61 per 1,000 and discharge rate was 89%. In our study, about 68.6% (897) of the death were in male and rest were female. Nearly 67.6% (883) of the deaths belonged to the age group of >60 years. Majority of the deaths had PCR status positive (96.2%) on admission. Also, maximum patients had more than 2 comorbidities (83.8%), (64.6%) were on NIV on admission and also (64.6%) were given either incomplete dose or were not given Special medicine (Remdesivir, Tocilizumab) before admission to ICU. (61.4%) of the admission to ICU were from other hospital while (38.6%) were from in house (Isolation ward of Seven Hills Hospital). Only 3.3% required admission up to 24 hr while others required either 1–7 days (33.1%), 8–14 days (33.4%), or >15 days (30.2%) [Table 1].

In this study, mortality was found to be more in elderly, that is, >60 years age group with 67.5% (791) of total mortality followed by 45–60 years age group and was minimum with 0.6% in <30 years age group. Mortality was high in males (68.6%) as compared to female [Table 2].

In our study, mortality was found to be more in-house patients (618; 52.8%) group as compared to referral patients from outside (553;47.2%) but there was no significant difference (P = 0.685) as shown in [Table 3].

Also mortality was seen more in patients in whom special medications (Inj Remdesivir or Inj Tocilizumab or both) was not given as compared to patients in whom these medications were given. But the result is not significant [Table 4.1].

9.1% patients were given complete doses of Remdesivir and Tocilizumab before death [Table 4.2].

Comorbidity presence found to be the most important factor in causation of death in a COVID-positive patient as compared to patients with no comorbidity. Mortality in a COVID-positive patient admitted with pneumonia & those having 1–2 comorbidity (62.3%) or more than two comorbidity (16.7%) were much higher as compared to patients without comorbidity (20.9%). The result is statistically significant with a P = 0.027 (P < 0.05) [Table 5].

Mortality in any illness is always determined by the severity with which patient has presented to hospital. In our study, we found maximum deaths occur in patients who required high flow or higher fio2 of oxygen (NRBM, NIV, HFNC, or Intubation) on admission which was 93.5% of total mortality and the result is not significant at P < 0.05 as shown in [Table 6].

Of all the patients, 40.8% (478) of patients died within 7 days of hospital stay, 31.93% (374) had stayed between 8 and 15 days, also 27.2% (319) patients had stayed for more than 15 days; this was statistically significant [Table 7].

More than 68.2% (799) patients were in intubated state before death also 22.2% (260) were on NIV or HFNC and 9.5% was on NRBM/FM prior to the time of death which includes death due to sudden cardiac events which is part of coagulopathy and cardiac arrhythmia due to COVID infection [Table 8].

56.9% patients required inotropic support during their ICU stay.

**Discussion**

In the beginning of COVID-19 pandemic, it has been observed that elder persons with comorbidities were at the higher risk of getting infected and also it continued throughout the pandemic. Evidence from the global outbreak has demonstrated that individuals with pre-existing comorbidities are at a much greater risk of dying from COVID-19.[2,3]
In our study, amongst all died <30 yrs 438 (7.6%). The result was not significant In a study by Pijls BG, Jolani S J et al. meta-analyses on 59 studies comprising 36,470 patients showed that maximum deaths occurred in those patients who required high flow or higher FiO2 of oxygen (NIV, HFNC or Intubation) that patient has presented to hospital; in our study, we found mortality was found to be more in elderly, that is, >65 years age group with 67.5% with high rates in males (68.6%) but the result was not significant In a study by Yanez ND et al. shows that death rate in individuals with age group of 55–64 years had 8.1 times higher than in individuals younger than 55 years. In our study, mortality is always determined by the severity with which patient has presented to hospital; in our study, we found that maximum deaths occurred in those patients who required high flow or higher FiO2 of oxygen (NIV, HFNC or Intubation) on admission which was 92% of total mortality, this result is not significant at P < 0.05. Another study by Chatterjee et al. showed both hypoxemia and tachypnoea were associated with mortality risk. Compared to normoxemic patients, those who were hypoxemic (oxygen saturation <92%) had a 1.8- to 4.0-fold increased mortality risk, depending on initial oxygen saturation of hospitalization.

Multiple comorbidities are associated with the severity of COVID-19 disease progression. Many of the poorer outcomes for COVID-19 have been related to hypertension, diabetes mellitus, cardiovascular comorbid conditions, chronic obstructive pulmonary disease (COPD); these diseases were observed to be the more significant risk factors in subjects when compared with other underlying disease. Diabetic individuals have an increased susceptibility to infection. In our study, amongst all died patients those having 1–2 comorbidity (62.3%) or more than two co-morbidity (16.7%) were much higher as compared to patients with no co-morbidity (20.9%). The health ministry’s data once again confirms that people who have underlying health conditions such as cardiovascular disease, diabetes, kidney disease, high blood pressure, or cancer are at greater risk of dying due to COVID-19.

Pre-existing diabetes is significantly associated with greater risk of severe/critical illness and in-hospital mortality in patients admitted to hospital with COVID-19.[4] Amongst demographic factors which have been consistently associated with greater mortality in COVID-19 infection are age and male sex.[5] In a study by Yaneez ND et al.,[6] shows that death rate in individuals with age group of 55–64 years had 8.1 times higher than in individuals younger than 55 years. In our study, mortality was found to be more in elderly, that is, >65 years age group with 67.5% with high rates in males (68.6%) but the result was not significant In a study by Pijls BG, Jolani S J et al., meta-analyses on 59 studies comprising 36,470 patients showed that men and patients aged 70 and above have a higher risk for COVID-19 infection, severe disease, ICU admission, and death.[7]

Evidence globally has shown that patients who have been able to be hospitalized in early stage of disease progression or got early oxygen therapy had better prognosis as compared to the others. COVID-19 patients often have unrecognized hypoxemia without experiencing overt respiratory symptoms[8,9] resulting in a missed opportunity to institute early, potentially life-saving treatment. Mortality in any illness is always determined by the severity with which patient has presented to hospital; in our study, we found that maximum deaths occurred in those patients who required high flow or higher FiO2 of oxygen (NIV, HFNC or Intubation) on admission which was 92% of total mortality, this result is not significant at P < 0.05. Another study by Chatterjee et al. showed both hypoxemia and tachypnoea were associated with mortality risk. Compared to normoxemic patients, those who were hypoxemic (oxygen saturation <92%) had a 1.8- to 4.0-fold increased mortality risk, depending on initial oxygen saturation of hospitalization.
So, early detection of hypoxia with early hospitalization and early intervention can have a significant impact over decreasing the occurrence of mortality in acute respiratory condition like COVID-19.

In our study, we have also calculated the days of hospital stay in order to predict the severity with which the disease progressed in seriously ill patients. We found of all the patients 40.8% of patients died within 7 days of hospital stay, 31.93% had stayed between 8 and 15 days also 27.2% patients had stayed for more than 15 days, suggesting the rapid clinical course of the disease causing to a drastic outcome as a death.

It has been a major debatable area of whether the medications such as injection Remdesivir, injection Tocilizumab which are being used in treating moderate to severe infection have any impact in preventing all-cause mortality.

A study by Chen-Yang Hsu,[11] showed that Remdesivir treatment group as opposed to the control group led to a statistically significantly 29% (95% CI: 22–35%) reduction of death from COVID-19. The treated group also revealed a 33% (95% CI 28–38%) significantly higher odds of discharge than the control group.

In our study, mortality was less in group given special medications (inj Remdesivir or injTocilizumab or both) as compared to the group where these were not given, although the result was not statistically significant.

So, the present study shows that comorbidity is the risk factor for death due to COVID-19 and among which it is found that those having comorbidities (e.g., diabetes, hypertension, diabetes & hypertension, diabetes & hypothyroidism, etc.) were at more risk than those with no comorbidities. Males are having more death compared to female. Death rate was higher in female with comorbidities. Special medicine (Remdesivir, Tocilizumab) is found to decrease the chances of death.

Therefore, this study shows that every primary care physician should screen, diagnose, and provide adequate treatment to the patients with comorbidities (hypertension, diabetes, hypothyroid, IHD, etc.) so that these diseases do not prove to be the risk factors for exaggerated mortality rates due to infectious diseases during pandemic.

**Conclusion**

The present study on patients with COVID-19 pneumonia revealed that death was more common in male as compared to female and in severely diseased patients with comorbidities.

In our Hospital, we practice 5E’s, that is, early diagnosis, early treatment, early HDU/ICU transfer, and early all medications treatment.
Early detection of hypoxia with early hospitalization and early intervention can have a significant impact over decreasing the cause of mortality in an acute respiratory condition like COVID-19.

We recommend these 5E's to be followed in order to reduce death due to COVID-19 infection in this grave pandemic.

Acknowledgement
We would like to acknowledge the entire administrative and data handling team of this Dedicated COVID-19 hospital for their contribution to this study.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. World Health Organization. Coronavirus disease (COVID-19): Data as received by WHO from national authorities, as of 04 October 2020, 10 am CEST. 2020. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20201005-weekly-epi-update-8.pdf. [Last accessed on 2021 Apr 05].
2. Emami A, Javanmardi F, Pirbonyeh N, Akbari A. Prevalence of underlying diseases in hospitalized patients with COVID-19: A systematic review and meta-analysis. Arch Acad Emerg Med 2020;8:e35.
3. Pearson-Stuttard J, Blundell S, Harris T, Cook DG, Critchley J. Diabetes and infection: Assessing the association with glycaemic control in population-based studies. Lancet Diabetes Endocrinol 2016;4:148-58.
4. Wang B, Li R, Lu Z, Huang Y. Does comorbidity increase the risk of patients with COVID-19: Evidence from meta-analysis. Aging (Albany NY) 2020;12:6049.
5. Navaratnam AV, Gray WK, Day J, Wendon J, Briggs TW. Patient factors and temporal trends associated with COVID-19 in-hospital mortality in England: An observational study using administrative data. Lancet Respir Med 2021;9:397-406.
6. Yanez ND, Weiss NS, Romand JA, Treggiari MM. COVID-19 mortality risk for older men and women. BMC Public Health 2020;20:1-7.
7. Pijls BG, Jolani S, Atherley A, Derckx RT, Dijkstra JL, Franssen GH, et al. Demographic risk factors for COVID-19 infection, severity, ICU admission and death: A meta-analysis of 59 studies. BMJ Open 2021;11:e044640.
8. Simonson TS, Baker TL, Banzett RB, Bishop T, Dempsey JA, Feldman JL, et al. Silent hypoxemia in COVID-19 patients. J Physiol 2021;599:1057-65.
9. Richardson S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, Davidson KW, et al. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. JAMA 2020;323:2052-9.
10. Chatterjee NA, Jensen PN, Harris AW, Nguyen DD, Huang HD, Cheng RK, et al. Admission respiratory status predicts mortality in COVID-19. Influenza Other Respir Viruses 2021;15:569-72.
11. Hsu CY, Lai CC, Yen AM, Chen SL, Chen HH. Efficacy of remdesivir in COVID-19 patients with a simulated two-arm controlled study. medRxiv. 2020. doi: 10.1101/2020.05.02.20088559.