Clinical profile and in-hospital outcomes of COVID-19 patients: Findings from secondary data analysis

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Abstract

Background: Uttarakhand, a hilly state in north India, reported the first coronavirus disease (COVID) case on 15 March 2020. Since then, the case numbers rose multiple folds. As Uttarakhand has been on a ‘war-footing’ amidst the recent second wave and is gearing up to fight against the third wave, the present study aims to uncover baseline clinical profile and in-hospital outcomes of COVID patients in Dehradun district (Uttarakhand) during the first wave. Methods: A record-based descriptive analysis was carried out for 671 COVID patients admitted to a private dedicated COVID hospital in Dehradun district between August 2020 and February 2021. Data was collected from medical records on a standardized abstraction form. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Results: The present study showed most admitted COVID patients were males, aged 40 years and above, moderately ill, had co-morbidities with about one-fourth lately succumbed to death. The proportions of deaths, moderate-to-severe and severe category of illness were invariably high for those with co-morbidities irrespective of the gender. Females, age <60 years, and absence of co-morbidities had overall high mean survival estimates from COVID. Conclusion: Females, younger age group, and absence of co-morbidities are more likely to survive from COVID than males, older age groups, and those with co-morbidities.

Keywords: Comorbidity, COVID-19, first wave, medical records

Introduction

India reported the first coronavirus disease 2019 (COVID-19) case on 30 January 2020, in a medical student from Kerala who travelled from Wuhan (China) and within few days there was escalation in number of cases.¹ By December 18, 2021, India has reported more than 34.7 confirmed cases with 4.77 lakhs deaths until, where Uttarakhand, a hilly state in Himalayan belt of north India contributed to 3.45 lakh cases of COVID-19 infection.² The first COVID-19 case of Uttarakhand was reported in an international traveller on 15 March 2020.³ By the end of next three months (i.e., 14 June 2020), the case numbers steadily rose to 1,816⁴ and slowly there were 90,920 cumulative positive cases by 31 December 2020, with overall 91.9% recovery rate and 1.7% mortality rates.⁵

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In the vogue of COVID control, varied preventive measures viz., physical distancing, isolating identified positive, incorporating public health strategies like retrospective contacts tracing and testing, laboratory-based surveillance followed by emergency lockdown and other different community containment measures were integrated and executed by the state Government. In the light of extraordinary heterogeneity of the illness worldwide, it soon became pertinent to determine the clinical and demographic characteristics of SARS-CoV-2 infection patients for better and effective management. In the same direction, the state government initiated vaccination drive against COVID-19 from 31 January 2021 onwards with the operational support of 38 dedicated COVID Hospitals and 422 COVID Care Centres functioning within the state.

As Uttarakhand has been on a ‘war-footing’ against the recent second wave of propagated epidemic in April 2021 and is gearing up to fight against the third wave with recently emerged Delta Plus variant (AY.1) of novel coronavirus, the present study aims to uncover the baseline clinical profile and in-hospital outcomes of COVID patients reporting to a dedicated COVID hospital of private set-up in Dehradun district (Uttarakhand) during the first wave that reportedly lasted till February 2021. The findings of the present study describe the clinical profile of COVID-19 patients admitted in a tertiary care hospital and expect to help prepare the physicians and design better preventive strategies by state government against the impending future waves.

Material and Methods

The present descriptive analysis was carried out by the Department of Community Medicine at a tertiary level private hospital, a recognized dedicated COVID hospital of Doiwala block, in Dehradun district (Uttarakhand).

A prior ethical clearance was obtained from the institutional ethics committee (Letter of Approval Ref No.: HIMS/RC/2021/209). Following approval, prior permission was obtained to access medical records of all in-patient COVID cases that fell in moderate-severity category of illness as per the then existing guidelines and positive on either RT-PCR or Rapid Antigen COVID-19 test. After obtaining the required permission, medical records of above patients admitted to either COVID ward/Intensive Care Unit (ICU)/Emergency in the hospital were retrieved from the medical records department for the period between 26 August 2020 and 12 February 2021. Medical records mostly reviewed were discharge summary, death summary, ICU summary, investigation reports, RT-PCR, and Rapid antigen COVID-19 test etc., Abstraction forms were prepared, and baseline data on clinical parameters was collected during 16-28 February 2021. Subjects whose medical records were found incomplete were excluded from the study.

Statistical analysis

Data was entered and analysed in Statistical Package for Social Sciences (SPSS) version 20. Continuous variables were described using mean and standard deviation and categorical variables were expressed in percentages and proportions. Univariate analysis using Pearson Chi-square test was done and \( P < 0.05 \) was considered to be statistically significant. To plot the survival curves, Kaplan Meier method was used.

Results

Demographic characteristics of the study subjects

The present study enrolled a total of 671 COVID positive cases, of which more than two-thirds were males (\( n = 455; \) 67.8%); remaining were females (\( n = 216; \) 32.2%). The mean \( \pm \) standard deviation (SD) age of the recruited cases was 54.6 \( \pm \) 15.7 years. Around three-fourths of the total (\( n = 535; \) 79.7%) aged 40 years and above. Only nine subjects (1.4%) were below 20 years of age. Less than one-fourth (\( n = 129; \) 19.2%) had personal habits, mostly tobacco use (\( n = 73; \) 56.6%), alcohol consumption (\( n = 54; \) 41.9%). Two cases reported on substance abuse (\( n = 2; \) 1.5%).

More than 90% of the cases (\( n = 654; \) 97.5%) reported in moderate category of illness and were admitted to COVID ward; though later about one-third of them (\( n = 244; \) 36.4%) became critical and were re-shifted to ICU. Less than 3% of the subjects (\( n = 17; \) 2.5%) directly reported in critical condition at the time of admission and were admitted to ICU at their first visit. Following management, however, about one-fourth of the total (\( n = 161; \) 24.0%) succumbed to death. Remaining majority (\( n = 510; \) 76.0%) recovered and discharged.

More than half of the cases (\( n = 351; \) 52.3%) reporting to the hospital had co-morbidities. Out of all the co-morbidities, diabetes (52.4%) and hypertension (51.0%) were most frequently reported. Other minor co-morbidities reported were chronic heart diseases, chronic kidney diseases, asthma/chronic obstructive pulmonary diseases (COPD), cancer, tuberculosis, and acute lung injury etc., [Figure 1]

Table I represents the sub-group analysis of association between COVID cases with respect to their gender, co-morbidities,
disease severity, and hospital outcomes. It showed more than half of the females (n = 119; 55.1%) and males (n = 232; 51.0%) had co-morbidities. More than half of males (n = 269; 59.1%) and females (n = 141; 65.2%) belonged to moderate category of illness. The proportions of deaths, moderate-to-severe and severe category of illness were invariably high for those with co-morbidities, irrespective of the gender; those without co-morbidities, presented mostly with mild illness. Out of all those who died, more than three-fourths of them were males (n = 124; 77.0%) [Table 1].

Figure 2 shows frequency changes in the proportion of deaths among expired subjects (N = 161) with increasing age. With increasing age, the proportion of deaths was seen increasing; however for those without co-morbidities, death frequency became static beyond 40 years of age ($\chi^2 = 8.713; P$ value = 0.033).

Survival analysis

The Kaplan-Meir Survival Plot Estimate curves demonstrated the risk of death with respect to different age-group and gender [Figure 3a, b]. Visibly, the mean survival estimate for females was overall higher compared to males. However, those aged >60 years recorded lesser chances of survival compared to other age-groups.

Figure 3c-f showed gender-wise Kaplan Meir Survival Plot Estimate curves for diabetes and hypertension. As seen, the chances of survival from COVID was lower among male diabetics and hypertensives compared to male non-diabetics and non-hypertensives, respectively [Figure 3c and 3e]. Whereas, on the contrary, female diabetics were more likely to survive from COVID than female non-diabetics [Figure 3d]. However, Figure 3f shows hypertensive COVID females with reduced hospital stay had higher chances of survival compared to those who had prolonged hospital stay.

Discussion

The present study recruited a total of 671 COVID positive patients with a mean (±SD) age of 54.6 ± 15.7 years. Similar
findings were reported by Chen et al.; however Huang et al., Mowla et al. and Chung et al. showed mean age of the admitted patients as 41.7 years and 51 years, respectively. The present study showed that most patients admitted to the hospital aged 40 years and above; with rarely affecting the younger age-group. The findings were consistent with that of Guan et al. This came in sharp contrast to the Mamun et al. and other study findings that reported most COVID cases were admitted in the age group between 50 and 64 years.

As per the gender-wise distribution of cases, the present study reported male preponderance over females. This finding was supported by Guan et al., Mamun et al. and Colaneri et al. which showed similar preponderance of males over females as 58%, 62%, and 58%, respectively. Some Indian studies did mention that COVID-19 infection targeted males more as compared to females. Reduced susceptibility of females to viral infections due to inherent protection from X chromosome and sex hormones has been postulated. The findings on the present study showed that females have better chances of survival compared to males, is with the observations of Salinas-Escudero et al. A meta-analysis conducted by Galbadage et al. also showed that men are more likely to die from COVID-19 than women. On the contrary, Ali et al. reported that patient’s gender does not increase the likelihood of death. Moreover, irrespective of the gender difference, older age (>60 years) had invariably greater
risk of dying compared to younger age-groups. Several studies had also reported that the risk for fatal complications increases in individuals aged 50 years and above.\textsuperscript{[26,27]}

More than 50\% of the patients in our study had co-morbidities that most frequently included diabetes and hypertension. In the similar direction, Lechien \textit{et al.}\textsuperscript{[28]} reported that 54\% of their admitted patients had hypertension (54\%) followed by diabetes (47\%). Paudel \textit{et al.}\textsuperscript{[29]} conducted a meta-analysis on COVID-19 comorbidities among 1786 patients and showed hypertension (15.8\%) and diabetes (9.4\%) to be the common comorbidities for COVID1-19 infection. On the other hand, the findings by Saha \textit{et al.}\textsuperscript{[30]} reported that about half of patients by COVID-19 in their study had chronic underlying diseases, mainly cardiovascular diseases, cerebrovascular diseases, and diabetes.

This study shows that proportions of deaths, moderate-to-severe and severe category of illness were invariably high for those with co-morbidities irrespective of the gender; those without co-morbidities, presented mostly with mild illness. It was observed in the present study that more than 50\% of the patients were in moderately category of illness. The findings by Saha \textit{et al.}\textsuperscript{[30]} also showed that majority of the patients reporting to hospitals for admission were moderately ill with COVID.

In the present study, the duration of hospital stay ranged from one to 64 days. However, median hospital stays in China ranged between four and 53 days, and 4 to 21 days across 45 studies outside China.\textsuperscript{[31]} Another study conducted in Dhaka (Bangladesh) reported that the median hospital stay in their study was from 01-36 days.\textsuperscript{[32]} This could be due to provision of better health services in these countries.

The present study poses some limitations. As the study was conducted retrospectively from a single tertiary healthcare center, therefore, results may not be generalized to other populations and could not guide about mild-to-moderate illness among patients. Moreover, follow-up and data on relapse could not be recorded. Despite above limitations, to the best of our knowledge, no research from Uttarakhand has so far documented clinical socio-demographic profile of COVID-19 patients. Thus, the present study not only helps in providing baseline data for a hilly state like Uttarakhand in conducting future studies but also guides general care physicians to design a prospective multi-centric study for better management of patients.

## Conclusion

This was one of the prime studies which was conducted during the first wave of COVID-19 in Uttarakhand, hilly north India. The study manifests clinicodemographic features and outcomes of the COVID-19 patients in tertiary care hospital. It concludes that males aged 40 years and above, and people with co-morbidities like diabetes and hypertension developed moderate-to-severe and severe category of illness and required hospitalisation. Among those one-fourth of them lately succumbed to death. Females, age <60 years, and absence of co-morbidities had overall high mean survival estimates from COVID. Thus, early proper screening of patients with respect to age, presence of co-morbidities, knowledge regarding factors affecting COVID-19 patients by general care providers and family physicians along with timely intervention to halt further progression of disease can serve as a guide for better and effective management of COVID-19 patients in future and will decrease the mortality rate from this disease as well.

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Conflicts of interest
There are no conflicts of interest.

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