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Original Research Article

Descriptive epidemiology of COVID-19 deaths in the North Indian district Kangra of Himachal Pradesh

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ABSTRACT

Background: COVID-19 first reported in January 2020 in China has turned into a pandemic the kind that occurs only once in a century, with high mortality rate due to an infectious disease considered once as a thing of past. Caused by SARS-CoV-2 (an RNA virus) COVID-19 has caused over 170 million cases worldwide and around 3.8 million deaths worldwide. India alone has suffered the wrath of this nasty virus with cases approaching 30 million and over 0.4 million deaths till date. Occurring in various waves, the pandemic situation remains dynamic and evolving even today.
Methods: We carried out retrospective analysis of all deaths due to COVID-19 occurring in district Kangra from March 2020 to June 2021. Descriptive data on all COVID-19 patients were collected and analysed including individuals who lost their life during the period.
Results: From 20 March 2020 to 30 June 2021, a total of 45,871 cases and 1037 deaths (2.2%) were reported in Kangra district-33.8% of 3463 deaths that occurred in the entire state. The death rate per million population in Kangra was 64 compared to 47 for Himachal Pradesh and 30 for India as a whole. The mean age was 62.5 years (range 01 to 102 years); males 62.7 years and female 62.2 years.
Conclusions: The biggest challenge for us as a country is that COVID-19 has penetrated into our densely placed population where practicing COVID-19 appropriate behaviour is merely an expectation that possibly can never be fulfilled despite most stringent of actions.

Keywords: Deceased, COVID-19, Kangra, HP

INTRODUCTION

COVID-19 first reported in January 2020 in China has turned into a pandemic the kind that occurs only once in a century, with high mortality rate due to an infectious disease considered once as a thing of past. Caused by SARS-CoV-2 (an RNA virus) COVID-19 has caused over 170 million cases worldwide and around 3.8 million deaths worldwide.[1] India alone has suffered the wrath of this nasty virus with cases approaching 30 million and over 0.4 million deaths till date.[2] Occurring in various waves, the pandemic situation remains dynamic and evolving even today. It has also been acknowledged that nearly half of the mortality in the country was below 60 years of age.[3]

Mortality from COVID-19 shows a strong relationship with age and pre-existing medical conditions, with increasing age as the major risk factor for all-cause mortality. A better understanding of its epidemiology can help in developing informed strategies to identify and protect those most at risk of poor outcomes during the pandemic.[4] While attempts to estimate total excess

mortality related to the COVID-19 are underway, as existing data probably underestimate true excess mortality by at least 20%, due, in part, to the indirect effects of the pandemic on non–COVID-19 deaths. Nearly 21 months into the pandemic, substantial data on the distribution of disease at district level and the risk factors associated with underlying co-morbidities in different population groups or settings and in different age groups are still not available.[7]

Nevertheless, descriptive epidemiology of COVID-19 as seen at ground level could provide useful indications that can guide policy and further areas for research. We carried out a study to look at epidemiological data pertaining to the pandemic in Kangra, the largest district in hill state of Himachal Pradesh (HP).

METHODS

We carried out retrospective analysis of all deaths due to COVID-19 occurring in district Kangra from March 2020 to June 2021. Descriptive data on all patients testing positive for COVID-19 illness were collected and analysed including on the individuals who lost their life during the period. COVID-19 death was defined as the death of an individual occurring in period of disease with no period of complete recovery between disease and death and all such individuals were included in the study. Deaths due to reasons other than COVID-19 were excluded from the study.

Data was abstracted from death records of COVID-19 patients from designated COVID-19 institutions and from health blocks in case of home isolated patients using a checklist. It was then cleaned, sorted and entered into Microsoft excel. Data was then analysed using Epi-info software version 7.2.2.6. Descriptive epidemiologic analysis was carried out and results were generated. Final draft was submitted before the chief medical officer of the district which was approved.

RESULTS

Kangra district of Himachal Pradesh had its first death due to COVID-19 reported on 23rd March 2020. A 69-year-old Tibetan monk who had travelled from United States to the Tibetan settlement in Mcleodganj, Dharamshala (HP) presented with Severe respiratory illness following which he was under treatment at Shree Balaji hospital, Kangra and his RTPCR sample was taken for confirmation. He was shifted to the Rajendra Prasad government medical college at Tanda post his confirmatory report where he succumbed to the illness. He had history of chronic obstructive pulmonary disease (COPD) and was symptomatic since his arrival in Dharamshala.

Thereafter from 20 March 2020 to 30 June 2021, a total of 45,871 cases and 1037 deaths (case fatality rate of 2.26%) were reported in Kangra district-33.8% of 3463 deaths that occurred in the entire state. The death rate per million population in Kangra was 64 compared to 47 for Himachal Pradesh and 30 for India as a whole. The mean age was 62.5 years (range 01 to 102 years); males 62.7 years and female 62.2 years.

Like cases, deaths too occurred in two peaks coinciding the two waves of the pandemic (Figure 1). The first wave began in March 2020 when the first case was diagnosed which was followed by death in the same month. Following a period of no deaths for the next three months, with the gradual increase in cases, the reporting of deaths showed a surge. The CFR among 65 and above was 10% compared to less than 0.1% among 0-17 age group ($p<0.005$). While the number of deaths were greater during the second wave, the case fatality rate did not differ between the two waves The case fatality rate from beginning of pandemic till March 2021 was 2.3%, it was 2.2% during the second wave. The peak case fatality rate of 3.9% in June 2021 which has been the highest ever for the district followed by 3.7% in the month of January 2021.

The highest proportion of COVID-19 deaths were recorded in persons aged 65 or above (48.3%), followed by those aged 50-64 years (33.6%), while number and proportion of deaths were the lowest among children below 17 years (Table 1). Males accounted for a highest proportion of deaths (58.9%), with a male to female ratio of 1.4:1.

Of the patients who died, 41.9% had comorbidities; 26.3% had one and 15.2% multiple morbidies along with being infected with COVID-19. The commonest comorbidity associated with COVID-19 patients was hypertension (cerebrovascular accidents and chronic artery disease). Hypertension remained the commonest comorbidity among all (104), followed by diabetes mellitus type 2 (102). Only 12 patients had respiratory illness as the comorbidity with 2 patients presenting with history of pulmonary tuberculosis, one with emphysema and 9 with history of COPD. Nearly, fourth of patients who died did not have any underlying health condition. Two died of complications like mucormycosis.

Nearly 85% of deaths occurred in health institutions such as referral hospitals which cater to the population of district Kangra, as well as the neighbouring districts like Una, Chamba, Hamirpur and the neighbouring states like Punjab and J and K. Of the total deceased who were hospitalized 43.3% cases died within 24 hours including the ones brought dead. Among the ones who died within 24 hours 196 were females and 227 were males. The p showed significant relation (0.003) which proves that females who contracted COVID-19 were at significantly higher risk of dying due to COVID-19. Of all the deceased only 9.06% were vaccinated (1.35% were fully vaccinated), while 91%) of them were non-vaccinated.

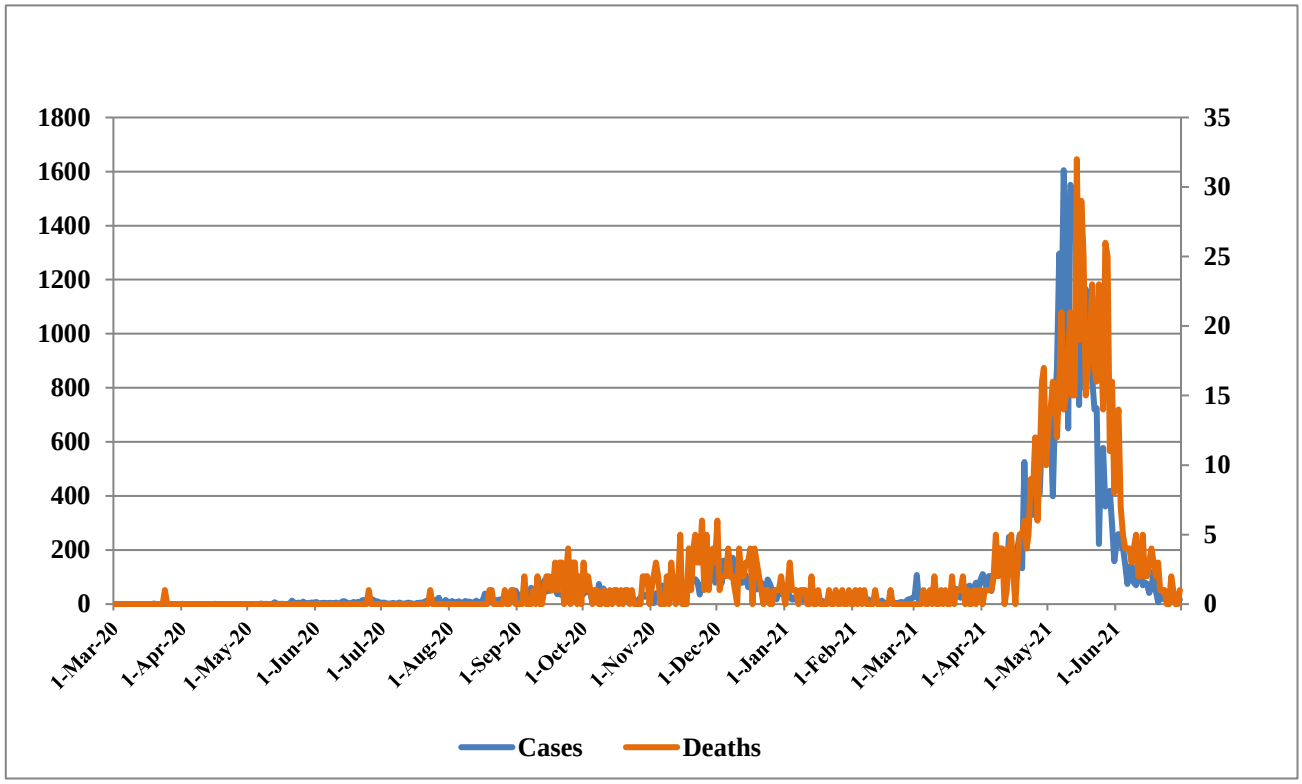

Figure 1: Distribution of COVID-19 cases and deaths from March 2020-30 June 2021, Kangra district, Himachal Pradesh.

Table 1: Age and sex distribution of COVID-19 cases and deaths reported from March 2020 to June 2021, Kangra district, Himachal Pradesh.

Age (years)	Total cases (%)	Total deaths (%)	Males (%)	Male's deaths (%)	Females (%)	Female death (%)
0-17	4605 (10.0)	3 (0.28)	2589 (10)	1 (0.01)	2016 (10.1)	2 (0.47)
18-29	8838 (19.2)	11 (1.06)	5160 (19.9)	6 (0.98)	3678 (18.5)	5 (1.17)
30-49	18509 (40.3)	173 (16.6)	10687 (41.2)	108 (17.6)	7822 (39.3)	65 (15.2)
50-64	8869 (19.3)	349 (33.6)	4688 (18)	197 (32.1)	4181 (21)	152 (35.7)
≥65	5050 (11.0)	501 (48.3)	2843 (10.9)	300 (49)	2207 (11.1)	201 (47.2)
Total	45871 (100)	1037 (100)	25967 (100)	612 (100)	19904 (100)	425 (100)

Table 2: Relation between age and death within 24 hours of admission in the hospital.

Age (years)	Yes (%)	No (%)	Total (%)
0-17	2 (0.47)	1 (0.16)	3 (0.28)
18-29	5 (1.1)	6 (0.97)	11 (1.06)
30-49	82 (19.3)	91 (14.8)	173 (16.6)
50-64	150 (35.4)	199 (32.4)	349 (33.6)
≥65	184 (43.4)	317 (51.6)	501 (48.31
Total	423 (40.79)	614 (59.21)	1037 (100)

Table 3: Co-morbidity status of deceased.

Co-morbid	Frequency	Percent (%)
No	602	58.05
Yes	435	41.95
Total	1037	100

Table 4: Underlying cause of death among deceased in district Kangra.

Underlying cause of death (Disorders)	Frequency	Percent (%)
Circulatory system disorders	123	11.9
Endocrinal, nutritional and metabolic	116	11.2
Infectious and parasitic	3	0.2
Injury, poison and external causes	5	0.4
Neoplasm	6	0.5
Peri-natal	6	0.5
Respiratory	12	1.2
Conditions not specified	5	0.4
COVID-19	603	58.2
Co-morbidity (≥2)	158	15.2
Total	1037	100.00

Table 5: Status at the time of death.

Place of death	Frequency	Percent (%)
Brought dead/transit in/ home deaths	159	15.33
Institutional deaths	878	84.67
Total	1037	100
Death within 24 hours of admission		
No	614	59.2
Yes	423	40.8
Total	1037	100

Table 6: Gender of COVID-19 cases.

Gender	Death within 24 hours of admission	Total
Females	196 (46.1)	425
Males	227 (37.09)	612
Total	423 (40.8)	1037

Table 7: Vaccination status of deceased.

Vaccination status	Frequency	Percent (%)
Not vaccinated	943	90.94
Vaccinated	94	9.06
Total	1037	100

DISCUSSION

Our retrospective study identified various risk factors for deaths occurring within the jurisdiction of District Kangra in the state of Himachal Pradesh who were initially tested positive for COVID-19 and later died due to COVID-19 related illness. It was revealed that COVID-19 deaths were not evenly distributed across months. The surge in cases was followed shortly by surge in death numbers. The perceptions in the past one year stated that co-morbidity majorly led to worsening health of COVID-19 patients but numbers revealed that around fourth of the individuals affected had no underlying disease but still succumbed to illness. Further, one third of total deaths occurred within 24 hours of hospital admission. Hiding of symptoms due to the fear of stigma, perception that over-the-counter medication will help get over the illness, denial to accept that they have been contracted with COVID-19 can be some of the reasons of such a high percentage of people dying within 24 hours.[8] The median age of deceased cases in our study corresponds to a study done in China with median age of 62 years in the deceased patients. Most of the deaths were that in septuagenarian category which showed similarity to the Chinese study with higher deaths reported among age 65 and more.[9] Also, according to the US centres for disease control and prevention, 8 out of 10 deaths reported in the USA occurred in adults 65 years old and above.[10]

It has been put into belief since the inception of the pandemic that COVID-19 mostly affects people of geriatric age group or individuals with co-morbidities. Our study showed striking dissimilarity with the findings of the multicenter cross-sectional study in China that the risk of dying due to COVID-19 was more in males and those who were com-morbid or in elderly age group.[11] However, our data goes in line with the evidence at national level in the second wave which mentioned that

the trend of mortality rate had varied in the second wave.[12]

Though the cause of death in majority of cases was cardiopulmonary arrest following COVID-19 associated pneumonia but the underlying cause presented a multifactorial picture. Multiple comorbidities are associated with the severity of COVID-19 disease progression. Many of the poorer outcomes for COVID-19 have been related to cardiovascular comorbid conditions corresponding to the result of our study.[13] Among the deceased 5 died due non-COVID-19 related illnesses with 6 perinatal deaths also. The 603 (58.2%) of all deaths had no underlying cause and COVID-19 related illness solely attributed to these deaths which questions the generally built-up notion that COVID-19 only affects the individuals with comorbidities and geriatric population.

The co-morbidity status of the affected population presented that among all deaths 434 patients were co-morbid which further reveals that a quarter of them had at least one associated co-morbidity which projects dissimilarity to the study done at China with 64.9% deceased patients with at least one co-morbidiy, 158 (15.2%) were multi-morbid.[9] Of the total, 58.1% had no underlying disease but still succumbed to illness. Further, 40.8% of total deaths happened to be within 24 hours. It is important to note that 84.6% of all deaths occurred in the hospital settings while 15.3% died while they were in home isolation or in transit or were brought dead. This shows that about 15% of the patients could not reach the facility for hospital care. The delay can be attributed to geographic terrain of the district, unavailability of transport at the right time, denial for movement to hospital by patient or the family, previous bad experience in the hospital settings etc. It is important to highlight that despite the best efforts of the government to organize the biggest and free vaccination drive across the country, in the early months people showed hesitancy in taking the vaccination for the general perceptions like if it is free, it might not be effective or considering it to be mere fear of the adverse events following immunization. The analysis revealed that trivial 1.3% of deceased were vaccinated which shows the lack of awareness among the general population regarding vaccination.

Limitation

The study was done based on demographic variables only whereas socio-economic and ethnic comparisons could not be drawn.

CONCLUSION

The fear of stigma and the discrimination might be the reason for death within 24 hours as delayed hospitalization might have attributed to high mortality.

The study reveals that co-morbidity affects the health status of the COVID-19 patients but nevertheless there has been substantial number of patients who died of only COVID-19 illness. Hence, mortality cannot be attributed only to co-morbids.

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