RESEARCH ARTICLE

PROFILING THE DEATH DUE TO COVID-19 PANDEMIC AT TERTIARY CARE DEDICATED COVID HOSPITAL IN SOUTHERN RAJASTHAN

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ABSTRACT

Background: The entire world is struggling with a pandemic caused due to novel corona virus (Covid-19) and this pandemic is still not under control. The present study was aimed to know various demographic factors, clinical features, co-morbidities and complication of COVID-19 deaths as well to determine case fatality rate of our institute. **Methodology:** We analyzed, Demographic, clinical, co-morbidities, complication and case fatality rate of all 22 RT-PCR confirmed COVID-19 deaths that occurred at Dedicated COVID Hospital, a tertiary care centre, attached to RNT Medical college Udaipur Rajasthan, over a period of four month from 15th March 2020 to 22th July 2020.**Result:** We found that the maximum patients were from age group 60 years (68.2%) followed by 40 to 59 years (27.3%) and predominantly seen in male sex (77.3%). The major clinical feature was shortness of breath (100%), fever (86.4%) and cough (81.8%) The most common co-morbidities was diabetes (54.5 %) and hypertension (50%).The major cause of death was bilateral pneumonia with ARDS (100%), septicaemia (27.3%), and MODS (18.2%) and case fatality rate was 2.1%. **Conclusion:** At present case fatality rate of our institute was 2.10%. We recommend early active intervention and various newer modalities of treatment such as anti viral therapy, convalescent plasma therapy will be further reduced case fatality rate and hopefully we will be able to control and manage this present pandemic.

INTRODUCTION

In Dec 2019, a new contagious COVID-19 pneumonia caused by a novel corona virus (SARS COV-2) immersed in Wuhan, Hubei, China (Imperial College London) (https://www.imperial.ac.uk/mrc-global infectiousdisease-analysis/news--wuhan-coronavirus.) and spread very rapidly all over the world both in developing and developed countries such as USA, Italy, Spain, UK as well in India. Corona virus is an enveloped, positive sense single strand RNA virus that broadly affects human, other mammals and birds ,causing respiratory, enteric, hepatic and neurological diseases in them (Weiss, 2011; Masters, 2013). Corona virus have the largest genome among all RNA viruses, typically ranging from 27 to 32 kb.

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The genome is packed inside a helical capsid formed by the nucleocapsid protein (N) and further surrounded by envelope. Viral envelope contains at least 3 structure proteins, membrane protein (M), envelope protein (E) and spike protein(S). The spike forms large protrusion from the virus surface, giving the appearance of having crowns (hence there name; corona in latin means crown) (Walls, 2016; Beniac, 2006). Six Corona virus species are known to cause human diseases. Out of which Four virus strain-229E, OC43, NL63 and HKU1 are prevalent and typically cause common cold symptoms in immune-competent individuals. Two other strains-severe acute respiratory syndrome corona virus (SARS-CoV) and Middle East respiratory syndrome corona virus (MERS-CoV) are zoonotic in origin and have been linked to cause sometime fatal illness (Cui 2019). SARS-CoV was the pathogen responsible for severe respiratory syndrome outbreaks in 2002 and 2003 in Guangdong

Province, China (Zhong, 2003; Ksiazek, 2003; Zaki, 2013). MERS-CoV was the pathogen responsible for severe respiratory disease outbreaks in 2012 in the middle-east11. By January 2020, Chinese scientist had isolated a Novel Corona virus (SARS COV-2) from the patient of pneumonia of unknown cause (Phelan, 2020; Gorbalenya, 2020). It was latter designated Corona Virus Disease-2019 (COVID-19) in February 2020 by WHO15.This disease is primarily transmitted human to human via droplets as well as contact with fomites (Guan, 2020). As an infection, COVID-19 has remained afascinating model of research for epidemiologist, physicians, molecular biologist and virologist. The signature of COVID-19 pandemic is usually expressed in the form of excess rate of pneumonia, progression to acute respiratory failure with resultant mortality and COVID-associated hospitalization. Around 14765256 laboratory confirmed cases of COVID-19 and 612054 confirmed death have been reported all over world as on 22th July 2020. India has reported 1192915 cases and 28732 death of COVID-19 till 22th July 2020 (Corona virus disease, 2020). A total 32334 laboratory confirmed cases of SARS CoV-2 were reported in the state of Rajasthan during the last 4 months period from 15th March to 22th July 2020, out of which a total of 594 deaths occurred due to the current pandemic in Rajasthan. The clinical spectrum of SARS- CoV2 infection appears to be wide, and variable encompassing asymptomatic infection, mild upper respiratory tract illness like mild fever ,throat pain, myalgia, cough and severe viral infection like atypical pneumonia, acute respiratory distress syndrome(ARDS), cardiac symptoms like hypotension, myocarditis, renal involvement inform acute kidney injury(AKI) and multiple organ dysfunction syndrome(MODS) and even deaths. There are a lot of factor which affect prognosis in COVID-19 patients in form recovery or death. The case fatality rate (CFR) which can be defined as the ratio of COVID-19 death by total number of COVID-19 positive patients. It varies country to country and state to state. In this recent pandemic highest case fatality rate were reported in United Kingdom followed by Belgium and Italy and it was 15.3%, 14.9% and 14.3% respectively[11]. India is much behind other developed country regarding case fatality rate and it is around 2.3%. In India CFR varies state to state and was observed highest from state of Gujarat followed by Maharashtra and West Bengal and it was 4.45% , 3.85%and 2.5% respectively. The CFR reported from Rajasthan is 1.83%. This variability in case fatality rate may be due to the fact that the infection occur from different strain such as L&S strain, age of affected population, sex ,status of heard immunity and co-morbidities etc among the affected population. Hence a study was planned over all RT-PCR confirmed patients who died in COVID-19 dedicated hospital, a tertiary care hospital of Southern Rajasthan, with aim to analyze demographic profile , clinical profile , complication , co-morbidities and CFR among COVID-19 death.

Aim and objective

⌡ To study demographic profile, clinical feature, co-morbidities and complication of RT-PCR confirmed COVID-19 patients.
⌡ To study case fatality rate among COVID-19 patients.

MATERIAL AND METHODS

The present study was a hospital based observational study done at Dedicated COVID Hospital, a tertiary care centre, attached to RNT Medical college Udaipur Rajasthan, over a period of four month from 15th March 2020 to 22th July 2020. Patients who were admitted with COVID-19 disease after RT-PCR confirmation and subsequently died were included in present study.

Methodology

All the patients who were died due to COVID-19 (RT-PCR confirmed) were analyzed regarding the their demographic profile, clinical feature, co-morbidities and complication. Case fatality rate was calculated by taking by total no. of death verses, COVID-19 positive patients reported by Microbiology Lab at RNT medical college, Udaipur, Rajasthan.

OBSERVATIONS AND RESULTS

Table 1 showing demographic profile in RT-PCR confirmed COVID-19 deaths. Most of the patients (68.2%) were in the group 60 years of age followed by(27.3%) between the age 40 to 59 years. Regarding the gender, male were predominantly involved (77.3%).The people died due to COVID-19 were mainly from urban areas(63.6%) and they were non health care worker from profession (100%) History of travel to and contact to confirmed case were present in 22.7% and 77.3% respectively. 18.2% cases were smoker who died due to COVID-19. Table 2 shows various clinical features in COVID-19 deaths. All the 22 COVID-19 positive patients who died were symptomatic (100%). The predominant symptom were shortness of breath (100%) , fever (86.4%), cough (81.8%), where less common symptom were hemoptysis (9.1%), diarrhoea (9.1%) and chest pain (4.5%). Two patients (9.2%) had loss of taste and smell sensation. Table 3 shows co-morbidities. Most common co-morbidity observed in these deceased was diabetes (54.5%) and hypertension (50.0%) which contributed maximum where coronary artery disease, carcinoma, cerebrovascular accident were the co-morbidities contributed minimally. Table 4 shows complication in COVID-19 deaths, It shows that the maximum complication was bilateral pneumonia with ARDS in 100%, septicemia in 27.3% and multi organ dysfunction in 18.2% were observed. Where as in few patients myocarditis and AKI were observed (13.6% each). Table 5 shows that all the deceased COVID-19 required ventilator support (100%). Table 6 shows case fatality rate 2.10%.

DISCUSSION

COVID-19 a pandemic, which started from China and very rapidly spread all over world and yet it is not under control and nobody is aware how long it will last and how many human being will be succumbed.COVID-19 is associated with a large number of morbidity and mortality among human being . Till date there are around 612054 deaths worldwide and from India 28732 deaths reported from India. The present study was carried out over COVID-19 deceased who were admitted in dedicated COVID hospital and found that the maximum patients were from age group above 60 years (68.2%) followed by 40 to 59 years (27.3%). The study done by Graziano Onder et al. found similar type of results and he observed that 96.43% death occurs in age 60 years. Paola Michelozzi *et al* also showed that 76% death occurred the above age 60 years. In all other study including present study the higher mortality rate in the 60 age group may be due to the fact low immunity, associated co-morbidities and

Table 1. Demographic profile of COVID-19 deaths

Parameter	Condition	No. Of patients(n=22)	Percentage (%)
Age	Upto 19 years	0	0
	20 -39	1	4.5
	40-59	6	27.3
	60	15	68.2
Sex	Male	17	77.3
	Female	5	22.7
Residence	Urban	14	63.6
	Rural	8	36.4
Occupation	Health care worker	0	0
	Non-Health care worker	22	100
History of travel		5	22.7
Contact to confirmed case		17	77.3
Smoking		4	18.2

Table 2. Clinical feature of COVID-19 death

Parameter		No. of patients	Percentage
Asymptomatic		0	0
Symptomatic	Fever	19	86.4
	Cough	18	81.8
	Myalgia	8	36.4
	Shortness of breath	22	100
	Sputum production	3	13.6
	Sore throat	4	18.2
	Chest pain	1	4.5
	Loss of taste sensation	2	9.1
	Loss of smell sensation	2	9.1
	Diarrhoea	2	9.1
	Hemoptysis	2	9.1
	Hypotension	5	22.7
	Hypoxia	16	72.7

Table 3. Co-morbid conditions in COVID-19 deaths

Co-morbid condition	No. of patients	Percentage (%)
Diabetes	12	54.5
Hypertension	11	50.0
COPD/Asthma/Tuberculosis	4	18.2
Coronary artery disease	3	13.6
Carcinoma	2	9.1
CVA	3	13.6
Chronic kidney disease	0	0
No co-morbid condition	1	4.5

Table 4: Complication in COVID-19 deaths

Complication	No. of patients	Percentage (%)
Bilateral pneumonia with ARDS	22	100
Multiple organ dysfunction (MODS)	4	18.2
Septicaemia	6	27.3
AKI (Acute kidney injury)	3	13.6
Myocarditis	3	13.6

Table 5. COVID-19 deceased required ventilator

	No. of patients	Percentage (%)
Non-invasive ventilation	6	27.3
Invasive ventilation	16	72.7

Table 6. Case fatality rate

Total Death due to COVID-19	Total RT-PCR confirmed case	Case Fatality Rate
22	1045	2.10

poor fighting capacity of body against these viral disease in above 60 years age group. In the present study COVID-19 mortality were predominantly seen in male sex (77.3%). A study done by Paola Michelozzi *et al.* also observed male preponderance and was 87%. The predominance of male sex may be due to there more outdoor activity and contact to asymptomatic and symptomatic COVID-19 carriers. In the present study maximum patients deceased were from urban area (63.6%). So many studies worldwide matches with present study. The higher incidences in urban population may be due to overcrowding, more outdoor activities, less social distancing and improper use of guideline suggested by ICMR. Health care workers are at high risk of COVID-19 disease, complication and deaths due to prolonged exposure and high viral load in them. In the present study we observed 0% mortality among health care workers which may be due to younger population without co-morbidity are working as frontline Corona warriors. In the present study traveling history were present only in 22.7% patients which means that now disease has spread all over country and hence they get infection from anywhere.

The present study conducted over all COVID-19 deaths and we found shortness of breath (100%), fever (86.4%), cough (81.8%) as common symptom where as the less common symptom were hemoptysis in 9.1%, diarrhea in 9.1%. Fei Zhou *et al*[14] from China studied and found fever (97%), cough (79%) and diarrhea (4%) of studied population. We also observed loss of taste and smell sensation (9.1%). Lot of studies done all over the world , suggested loss of taste and smell sensation are associated with better outcome in COVID-19 patients and hence in present study it was observed as less common clinical features. The most common co-morbidities observed in the present study was diabetes (54.5 %), hypertension (50%) followed by chronic respiratory illness , CVA and carcinoma in 13.6%, 13.6% and 9.1% respectively. A study done by Fei Zhou *et al*[14] also observed hypertension and diabetes as major co-morbidities among COVID-19 deaths and it was 48% and 31% respectively. We also observed one patients (4.5%) who had no co-morbidities. The cause of death is variable in COVID-19 patients .Lot of initial studies suggest that ARDS with respiratory failure, Myocarditis and microthrombus formation may be the important causes of deaths. In the present study we observed bilateral pneumonia with ARDS (100%), septicemia (27.3%), and MODS (18.2%) and only in few patients we observed myocarditis as complication and cause of death. Similar type of study done by Fei Zhou *et al*[14] from China reported similar type of result and he observed respiratory failure (98%), sepsis (100%) and myocarditis (59%). He also observed non invasive and invasive ventilator in 44% and 57% respectively where as in present study we observed 27.3 % and 72.7 % respectively. The case fatality rate is variable worldwide. It was observed highest in UK (15.3%)[14] and in India highest from Gujarat (4.45%). In our state Rajasthan case fatality rate was 1.83%. The present study case fatality rate observed was 2.1% which was slightly higher than our state CFR. The variation of case fatality rate may be contributed by lot of factors and it changes regularly as pandemic progresses. It was higher in the early phase of pandemic and gradually coming down due to improvement in test facility, early pick up of COVID-19 patients, establishment of dedicated covid hospital and use of new antiviral, IL-6 antagonist, plasma therapy and ventilator support .

Conclusions:

From the present study which was carried in the early phase of pandemic. We conclude that the maximum COVID-19 patients died were in the age group of above 60 years were male , non health care professional, from urban areas and only few of them having history of travelling but contact to COVID-19 positive patients were observed in significant deceased. Most common clinical feature and co-morbidity observed was shortness of breath, fever, diabetes and hypertension. All the deceased develop bilateral pneumonia , ARDS and required ventilator support. Myocarditis and acute kidney injury were also observed in few deceased .At present case fatality rate of our institute was 2.10% which matches with national case fatality rate and less than few state like Gujarat and Maharashtra and we recommended early active intervention and various newer modalities of treatment such as anti viral therapy, convalescent plasma therapy will be further reduced case fatality rate and hopefully we will be able to control and manage this present pandemic.

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