ORIGINAL ARTICLE

A Prospective Observational Study on Impact of Comorbidities in Patients with COVID-19 Infection

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ABSTRACT

A novel human Coronavirus severe acute respiratory syndrome Corona-virus 2 (SARS- Cov-2), pandemic has spread rapidly around the globe morbidity and mortality. Co-existence of Comorbidities with COVID-19 are more likely to develop a more severe cause and progression of the disease. **Objectives:** To asses the impact of Comorbidities in covid-19 infected patients. **Materials and Methods:** The study was carried at kR Hospital, Mysuru, Karnataka from April 2021 to June 2021. A total of 168 patients were enrolled in the study as and exclusion criteria. Patient's data were collected using data collection forms, Patient /patient take cares interview, treatment chart review. **Results:** Most of the cases were male (69.6%) and in the age group of 40-59 years (39.3%) with a median age of 48 years (IQR – 33.55), One thirty-four patients had at least one comorbidity and most common among them were Hypertension (23.2%) and Diabetes (9.5%), The mortality rate was 11.3% and significantly higher proportion of patients with comorbidities died compared to those with none. **Conclusion:** Presence of comorbidities is associated with a poor outcome and are at a greater risk of dying from COVID-19 when compared to that of patients without Comorbidities.

Keywords: Severe acute respiratory syndrome corona-virus 2 (SARS - COV-2), COVID-19, Comorbidities, Mortality, Hypertension, Diabetes.

Article Information

Received: 20-04-2022

Revised : 31-05-2022

Accepted: 02-06-2022

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INTRODUCTION

An ongoing public health emerging of international concern occurred due to an epidemic of COVID-19 which began in china in December 2019. The world health organization (WHO) declared a pandemic on 11 March 2020.[1] By 15 than 19 crore cases and 1 lakh 23 thousand deaths had been assumed worldwide.[2]

The clinical manifestations of COVID-19 are, according to the latest reports, heterogeneous. The clinical feature of COVID-19 are varied, including asymptomatic infection, mild upper respiratory tract infection, sever viral pneumonia complicated by respiratory failure, and even death. The most common clinical symptoms include fever, dry cough, fatigue, sputum production, dyspnea, sore throat. Some patients with covid-19 can rapidly progress to acute respiratory distress syndrome.[3] On admission 20-51% of patients reported as having at least one of the Comorbidity, such as diabetes (10-20%), HTN(10-15%) and other cardiovascular and cerebrovascular diseases (7-40%) being most common.[4] Previous studies have showed that the presence of any Comorbidity has been associated with a 3.4 fold increased risk of developing acute respiratory distress syndrome in infected patients.[5]

A recent meta-analysis reported that underlying disease, including hypertension, diabetes, respiratory and cardiovascular diseases[6] as well as obesity[7] may be risk factors for adverse outcomes. So further studies

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Website: www.jcramonline.com

DOI: 10.5530/jcram.2.1.3

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of Comorbidities as a risk of fatality at different communities are required.[8]

Although previous studies have shown that comorbidities are a risk factor for severity and mortality in patients with covid-19, the specific impact of each Comorbidities on patients with different types of COVID-19 had been rarely reported.

MATERIALS AND METHODS

This is a hospital based prospective observational study. It was conducted at KR Hospital, Mysore. The study duration was a period of three months from April 2021– June 2021. The data were collected from the patient case records and other relevant sources after getting informed consent. During the study period, we attended 179 patients out of which 11 patients dropped due to shifting of hospitals and incomplete data. Hence 168 patients of age group between 18-92 years old was included in the study. Inclusion criteria includes, Patients with positive COVID-19 report of either gender, patients with Comorbidities, Inpatients and willing to participate in the study. The patients who were pregnant, paediatrics, incomplete clinical data and not willing to participate were excluded from the study.

Ethical approval was obtained from the Institutional Ethical Committee with Certificate Number IN-KA256160552975821 of Mysore Medical College and Research Institute, K R Hospital; Mysuru.

Importance of the study was explained to the participants and informed consent was retrieved from all the subjects participated in the study. The data collected from the patients from questionnaire and data collection form. The collected data were tabulated, uploaded and statistically analyzed using IBM SPSS statistics software version 20.0 for easy accessibility, storage and analysis. The data was interpreted using basic descriptive statistics measures such as mean and analysed using the statistical like ANOVA and two-tailed *t*-test and the results were compared.

RESULTS

Out of 170 patients admitted into the facilities within the study period, all were laboratory confirmed COVID-19 cases. Off 170 patients, two participants was not willing to participate in the study hence a total of 168 COVID-19 positive patients were enrolled in the study.

Most of the confirmed COVID-19 cases in this study were male (69.6%) as shown in Figure 1 and in the age group of 40-59 years (39.3%). They ranged in age from

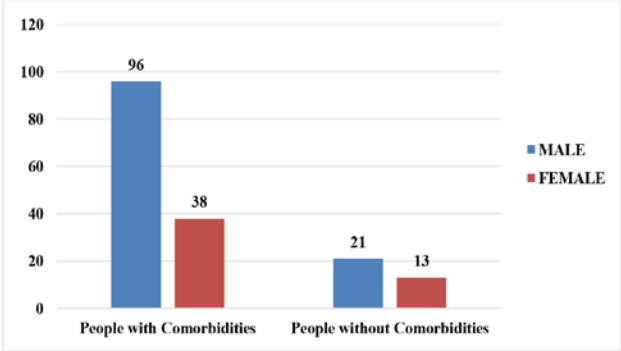

Figure 1: Gender distribution in the study population.

Table 1: Age group distribution in the study population.

AGE in years	People with Comorbidities	People without Comorbidities
18-39	18	29
40-59	64	02
60-79	40	03
≥80	12	00
Total (*n*= 168)	134	34

18-92 years with a median age of 48 years (IQR=33-55 years) and complete data is shown in Table 1.

Over one fourth 44 (26.2%) of them were admitted into ICU facilities in severe clinical conditions an over three fourth 124 (73.8%) of them were hospitalized to Ward with mild to moderate clinical conditions. Over half of the study population required the oxygen therapy 73 (43.5%). And the same is represented in Table 2 and Figure 2.

The Smoking index of the study population was categorized into 3 groups, None, Active and former smoker. Only 10.1% of the study samples were observed to be active smoker. The data is represented in Table 2.

The most common symptoms observed during the admission were Headache (87.5%), Cough (57.1%), Chest pain (51.8%), Fever (42.9%), Loss of taste(42.3%) and smell(38.1%)and fatigue (31.5%) and detailed information is shown in Table 3.

Among 168 patients, 134 patients had at least one Comorbidities. And 92 patients had more than one Comorbidities. More male than female patients with Comorbidities had HTN and DM. The most common ones were Cardiovascular (30.9%), Hypertension (20,2%), IHD (7.7%), Diabetes (9.51) and lower respiratory tract disorder (13.1%), 10.2% of endocrine related disorder and 10.2% of kidney disorder and 6.0% of liver disorder were observed. The detailed information about it is given in Figure 3.

Table 2: Baseline characteristics of the study population.

Variables	Number of samples n=168	Peoples with Comorbidities *n*=134	Peoples without Comorbidities *n*=34	*p*- value
Age (years) Med(IQR)	59 (43-65)	48 (33-55)	24 (22-33)	0.002
Gender				0.019
Male	117 (69.6%)	96	21	
Female	51 (30.4%)	38	13	
Smoking				
Active	17(10.1%)	7	10	-
Former	3(1.8%)	2	01	
None	148(88.1%)	125	23	
Length of stay in hospital (mean)in days	8.18	10.46	6.15	0.036
Hospitalization				0.005
ICU	44 (26.2%)	42	2	
WARD	124(73.8%)	92	32	
Oxygen Requirement				0.072
Yes	73(43.5%)	65	08	
No	95 (56.5%)	69	26	

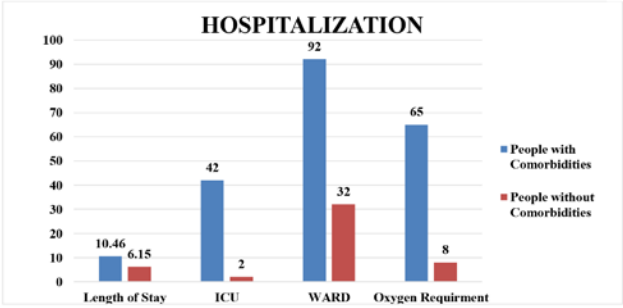

Figure 2: Hospitalization distribution in the study population.

The COVID-19 patients with comorbidities were identified as risk factors of death. 8.9 % of death was seen in patients with comorbidities whereas only 2.4% of death in without comorbidities in COVID-19 patients. The mortality and morbidity rate is given in below Table 4.

The presence of comorbidities is associated with poor outcome and are at greater risk of dying from COVID-19. The comorbidities that were identified as risk factor for death were Hypertension, Diabetes, IHD, Liver cirrhosis and CKD.

DISCUSSION

Multiple comorbidities are associated with COVID-19 disease and contribute to it's progression poor outcome.

Table 3: Symptoms at admission of the study population.

Symptoms at Admission	Number of samples	Peoples with comorbidities	Peoples without Comorbidities	*p*-value
General symptoms				
Fatigue	53(31.5%)	42	11	0.031
Joint Pain	41(24.4%)	29	13	0.060
Muscular Pain	34(20.2%)	13	21	0.054
Fever	72(42.9%)	48	24	0.042
Respiratory symptoms				
Dyspnoea	29(17.3%)	26	03	0.049
Cough	96(57.1%)	60	36	0.037
Cardiovascular symptoms				
Chest Pain	87(51.8%)	86	01	0.032
Palpitations	37(22%)	30	07	0.050
Neuropsychiatric symptoms				
Loss of taste	71(42.3%)	40	31	0.023
Loss of smell	64(38.1%)	28	36	0.026
Headache	147(87.5%)	69	79	0.018
Sleep disturbances	18(10.7%)	12	06	0.075
GIT symptoms				
Nausea /Vomiting	36(21.4%)	20	16	0.113
Diarrhoea	13(7.7%)	7	6	0.022

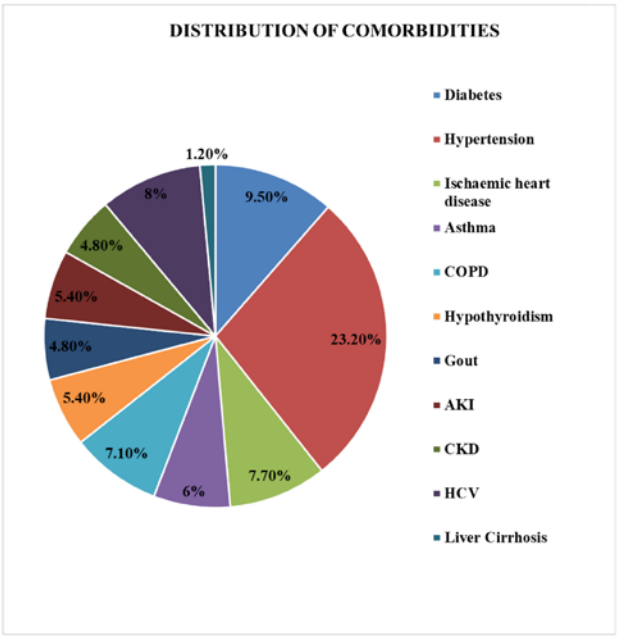

Figure 3: Distribution of comorbidities in study population.

Table 4: Death and recovery status in study population.

Variables	Number of samples	People with comorbidities	People without comorbidities	*p*-value
Death	19(11.3%)	15(8.9%)	04(2.4%)	0.006
Recovery	149 (88.6%)	119	30	0.002

This study is presently one of the few to determine the impact. comorbid conditions. among COVID-19 patients. And also the presenting symptoms at the time of admission to the hospital, K.R Hospital, Mysore and carried out for a period three months. Among 168 participants, we found that most of the cases were male (69.6%) and in age group of 40-59 years (39.3%) with median age of 48 years. One thirty-four patients had at least one comorbidities and most common amongst them were o HTN (23.2%) and Diabetes (9.5%) The mortality rate was 11.3% and a significantly higher proportion of patients with comorbidities (8.9%) died compared those with none (2.4%).

Despite considerable variations in the proportion in individual studies due to the limited sample size and the region where patients were managed, circulatory diseases (including HTN and IHD) remained the most common category of comorbidity.[9] Apart from the HTN and IHD, endocrine disease such as diabetes, Hypothyroidism were also common in COVID-19 patients.[10]

Notwithstanding the commonness of circulatory and endocrine comorbidities, patients with COVID-19 reported as having comorbid respiratory diseases (particularly Asthma, COPD) requiring ICU admission, increased need for oxygen therapy and the increased duration of hospitalization.

A number of existing literature reports to have documented the escalated risks of poorer clinical outcomes in patients with influenza,[11] SARS-CoV 19[12] and MERS-COV infections.[13] The most common comorbidities associated with poorer prognosis included HTN, Diabetes,[15] Cardiovascular diseases,[14] respiratory diseases,[16] renal diseases and Liver disorders. Our findings suggested that, similar with other severe acute respiratory outbreaks, comorbidities such as COPD, Diabetes, HTN, IHD and renal diseases.

The strength of association between different comorbidities and the prognosis however was less consistent, when compared with the other literature reports.[17-18] Our study suggested that patients with those without comorbidities. Regarding comorbidities that predict death, our study echoes previous ones in finding HTN, Diabetes and IHD as risk factors for mortality.[19] We also identified that renal disorders and liver diseases predicted death from COVID-19 with the odds of being 13 and 134 times higher than those without the conditions respectively. However, this study has some limitations, first, this is a single-center retrospective study, which may introduce selection bias; second, some patients included in this study did not test negative and transferred to other medical institutions to continue their treatment, so the clinical outcomes can not be fully reflected.

Additional findings in our study that male patients were twice as likely to die from COVID-19 than the female patients and risk of death was higher among patients that were older adult with multiple comorbidities. And the similar pattern was observed in a Southwest Nigerian study.[20]

CONCLUSION

SARS-CoV-2 affected globally a large population with pneumonia- like symptoms and the patients with comorbidities are utmost at the risk of infection. Association of cardiovascular comorbid conditions including HTN, IHD together with COVID-19 infection carrier higher risks of mortality. However other comorbidities such as Diabetes, lower respiratory tract disorders, liver and renal disorders may also contribute to increased COVID-19 severity. The comorbid individuals must undertake vigilant preventive measures to protect themselves during the pandemic.

ACKNOWLEDGEMENT

We sincerely thank our guide and friends for their assistance in editing the manuscript. No financial support was received for this study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Cite this Article : Nirosha MK, Navya L, Basavanna PL, Krishna GB. A Prospective Observational Study on Impact of Comorbidities in Patients with Covid-19 Infection. J. Clin. Res. Applied Med. 2022;2(1):7-11.