

Presentation, Comorbidities and Hospital Outcome of Covid-19 Disease: A Prospective Observational Study in a Tertiary Care Hospital

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Abstract

Background: A global pandemic Coronavirus disease (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was first started in Wuhan city, China, and spread globally, affect human being irrespective of age, sex and ethnicity. People affected by this virus had wide range of symptoms with multi-organ failure and even death. Presence of comorbidity along in COVID-19 disease increases morbidities and mortality.

Objective: This study was done to find out the characteristics and presenting features of COVID-19 disease as well as to assess the co-morbidities and its hospital outcome.

Methods: This prospective observational study was carried out in the COVID-19 dedicated ward in a tertiary hospital of Faridpur from November 2020 to March 2021 for a period of 05 month. Total 450 purposively selected Covid-19 positive patients (confirmed by RT PCR) were included in this study. Data were collected from patients or their relatives through a pretested questionnaire by face to face interview method. Then data were checked and analyze according to the objectives.

Results: Among all admitted patients 310(68.88%) were male and 140(31.10%) were female. Young adult patients (19 to 50 years) were more affected (55.44%) and people living in urban area were more affected (59.21%) than rural area (41.77%). Fever, cough and shortness of breath (67.78%, 46.67% and 43.33% respectively) were predominant symptoms. Around 44.0% patients have one or more comorbidities. Hypertension (19.11%) was the predominant comorbid condition followed by Diabetes (14.10%), COAD (5.33%), ischemic heart disease (3.55%), CKD (0.89%), CVD (0.67%), and Cancer (0.44%). Among the patients needed ICU support; most of them were elderly 45(75.0%). Regarding hospital outcome, 92.63% patients discharged uneventfully whereas 07.37% patients expired. Deaths were more in elderly patients (69.0%) and most of them have comorbidities (81.25%). Common co morbidities among the patients who expired were Hypertension, Diabetes and COAD (56.75%, 43.75% and 37.50% respectively).

Conclusion: In this study predominant number of patients presented with fever, cough and shortness of breath. Death remains high among elderly patients and those with one or more comorbid conditions. Therefore, elderly patients and those with comorbidities should take all necessary precautions to avoid getting infected with SARS CoV-2.

Keywords: Coronavirus, COVID-19, Clinical features, SARS-CoV-2.

Introduction

The virus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causes a clinical syndrome termed coronavirus disease 2019 (COVID-19). SARS-CoV-2 emerged in December 2019 in Wuhan of China has

led to a global pandemic, affecting around 250 countries across the globe. It predominantly spread by respiratory droplets and by contaminated fomites as well as by aerosols in certain circumstances.¹

The incubation period of this virus varies country to country, men to men and different age groups. Based on the experience in China, the typical incubation period of COVID-19 infection has been estimated to be a median of 5.1 days and the reported mean incubation period for COVID-19 varied from 4 days to 10.9 days. In symptomatic cases of any age group, about 95% will show symptoms within 14 days. This supports the currently practiced length of quarantine in many countries.^{2,3}

Although virus infects humans in all age groups, all ethnicities, both sexes. But older age, male sex, obesity, hypertension, diabetes, cardiovascular disease and chronic lung disease, Chronic kidney disease(CKD) have shown worse prognosis and are risk factors for COVID-19 mortality.^{4,5,6}

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Hypertension and diabetic patients have increased morbidity and mortality rates and have been linked to more hospitalization and ICU admissions.^{4,5} Pre-existing chronic lung disease is likely to worsen the progression and prognosis of COVID-19.⁷ Elderly population is more susceptible to this illness with a higher mortality rate. This due to age-related changes in the geriatric population in lung anatomy and muscle atrophy which results in changes in physiologic function, reduction of lung reserve, reduction of airway clearance, and reduction of the defense barrier function.⁸

COVID-19 infection has a broad spectrum of severity ranging from an asymptomatic form to a severe acute respiratory syndrome that requires mechanical ventilation. About 80% showed a mild clinical course characterized by a dry cough, sore throat, low-grade fever, or malaise; in 20% of cases, the general condition worsened in about seven days from the beginning of the symptoms, culminating in respiratory failure.⁹

Materials and Methods

This prospective observational study was carried out in the COVID-19 dedicated ward at Bangabandhu Sheikh Mujib Medical College Hospital, which is a tertiary teaching hospital of Faridpur for the period of 5 months from November 2020 to March 2021. All clinically suspected patients confirmed by RT PCR were included as cases and RT PCR negative cases were excluded from this study. Cases were selected purposively irrespective of age and sex. Data were collected only from hospitalized patients through a pretested semi structured questionnaire. Data were collected by face to face interview of patients or their relatives (In necessary cases). Then data were sorted, checked, cleaned and ready for analysis.

Results

After analysis results were present through following tables and figures

Table 1: Distribution of patients according to age, sex and residence (n= 450)

Features		Covid ward (n=390)		ICU (n=60)		Total (n=450)	
		f	%	f	%	f	%
Age group	<19 years	16	4.10	00	00	16	4.10
	19-50 years	230	51.11	15	3.33	245	55.44
	>50 years	144	32.00	45	10.00	189	42.00
Sex	Male	260	57.77	50	11.11	310	68.88
	Female	130	28.88	10	2.22	140	31.10
Residence	Urban	210	46.66	52	11.55	262	59.21
	Rural	180	40.00	8	1.77	188	41.77

Table 1 shows that among all admitted patients 310(68.88%) were male and 140(31.10%) were female. Young adult patients (19 to 50 years) were more affected

(55.44%) and people living in urban area were more affected (59.21%) than rural area (41.77%)

Table 2: Distribution of patients according to presentation (n=450*)

Presentation	Number	Percentage
Fever	305	67.78
Cough	210	46.67
Shortness of breath	195	43.33
Headache	45	10.00
Sore throat	30	6.67
Asymptomatic	25	5.55
Others	11	2.44
* Multiple response		

Table 2 shows that Fever (67.78%), cough (46.67%) and shortness of breath (43.33%) were predominant symptoms followed by headache (10.0%) and other (2.44%) symptoms.

Table 3: Distribution of patients according to comorbidities (n=450*)

Comorbidities	Number	Percentage
No comorbidities	252	56
Presence of comorbidities	198	44
a) Hypertension (HTN)	86	19.11
b) Diabetes Mellitus (DM)	63	14.10
c) Chronic Obstructive Airway Diseases (COAD)	24	5.33
d) Ischemic Heart Disease (IHD)	16	3.55
e) Chronic kidney disease (CKD)	04	0.89
f) Cerebrovascular disease (CVD)	03	0.67
g) Cancer	02	0.44
* Multiple response		

Table 3 shows that 198 (44.0%) patients have one or more comorbidities, whereas 252(56.0%) patients have no comorbidity. Hypertension (19.11%) was the predominant comorbid condition followed by diabetes (14.10%), COAD (5.33%), ischemic heart disease (3.55%), CKD (0.89%), CVD (0.67%) and Cancer (0.44%).

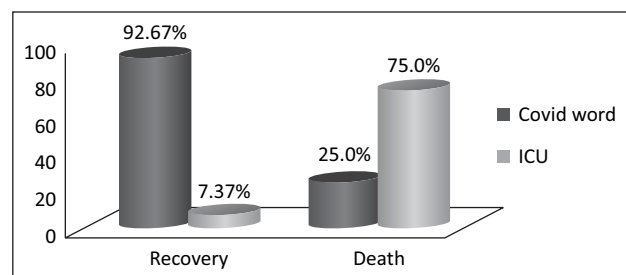


Figure 1: Distribution of patients according to hospital outcome (n=450)

Figure 1 shows that 92.63% patients admitted in covid ward were discharged uneventfully whereas 7.37% patients expired. On the other hand 75.0% patient were dead who were sent for ICU support.

Table 4: Distribution of mortality according to age, sex and co-morbidities (n=16)

Attributes		Number	Percentage
Age group	<50 years	5	31.00
	>50 years	11	69.00
Sex	Male	12	75.00
	Female	4	25.00
Comorbidities	Comorbidity present	13	81.25
	Comorbidity absent	3	18.75

Table 4 shows death rate was more in elderly patients 11 (69.0%). The male female ratio of death was 3:1. The mortality rate was higher in those with one or more comorbid conditions than no co-morbidity (81.25% vs 18.75%).

Table 5: Distribution of co-morbidities among death patients (n=16)

Co-morbidities	Number	Percentage
HTN	9	56.75
DM	7	43.75
COAD	6	37.50
IHD	4	31.25
CVD	3	18.75
CKD	2	12.50
Others	2	12.50
No co-morbidities	3	18.75

Table 5 shows that common comorbidities was found among the patients who expired were Hypertension, Diabetes and COAD (56.75%, 43.75% and 37.50% respectively).

Discussion

In this study, total of 450 patients were included (390 from Covid ward and 60 from ICU) and their demographic, clinical presentation as well as pertinent data regarding impact of comorbidities on COVID-19 disease outcome were collected.

In this study, adult patients especially the economically productive age group i.e.19-50 were mostly affected (55.44%) followed by elderly population (42.00%). The percentage of under 19 with confirmed COVID-19 cases is far lower (4.1%) than the standard population percentage. These findings were least related to a review done by Dominic Cortis, where three studies were included. Two

studies were from China by Zhang and Guan et al. and another one from South Korea by Korea Centers for Disease Control and Prevention. Those studies showed that the percentage of youths with confirmed COVID-19 cases is far lower than the standard population percentage. The proportion of COVID-19 confirmed cases for youths (age group 0-14 year:) is lower in China (1.55%, 0.89%) than South Korea (4.04%). The predominant population affected in all three studies were 15-64 year groups (76.93%, 83.98% in China and 78.60% in S.Korea) followed by elderly population (21.53%, 15.13% in China and 17.36% in S.Korea).¹⁰ A study conducted in China showed the age distribution for all patients where 61.5% were aged <60 years and the other cases were aged ≥60 years; this is consistent with this studies (59.54% in below 50 group vs 42.00% in above 50 group).¹¹ A study conducted in India showed that 21–50 age group, contributes to the maximum proportion (60%) of the total cases followed by those below 20 years of age constituting nearly 13% of the cases.¹² There is a deviation of this study with China and South Korean studies in respect of younger peoples Covid-19 positivity.

Regarding sex distribution, in a study that included a total of 5700 patients admitted into 12 different hospitals of USA found 39.7% female and 60.3% male as Covid 19 positive.¹³ In another study conducted in India males contribute to 66% of the total positive cases.¹² In a study in India, it is observed that women are half as likely to be infected by COVID-19 as men.¹⁴ These above-mentioned results almost matches with our study result (male 68.88% and female 31.10%). Because of female population are less exposure to outside environment.

This study revealed, urban population affected more (59.21%) than the rural population (41.77%). There may be some explanations linking urban areas and coronavirus, emphasizing densities; connectivity; crowded living conditions; and exposed occupations.

Regarding presentation, most of the patients presented with fever (67.78%), cough (46.67%) and shortness of breath (43.33%). The less predominant symptoms were sore throat (6.67%), headache (10.00%) followed by others like chest pain, abdominal pain, diarrhea, vomiting, bleeding manifestation and psychosis in a minor of patients. There were 5.55% of asymptomatic patients. In a meta-analysis that included seven articles published from 24th Jan to 16th March, 2020 revealed that fever was the predominant symptom (88.8%) followed by dry Cough (68%) fatigue (33%), productive cough (28.5%), muscle pains (14.4%), diarrhea (4.4%), nausea or vomiting (4.1%), rhinorrhea (3.2%), chest and abdominal pain (0.15%).¹⁵ Similarly, a study in a hospital of Wuhan, China found fever (98%), cough (76%), dyspnoea (55%), myalgia or fatigue (44%), sputum production (28%), headache (8%), haemoptysis (5%), and diarrhea (3%) as common

symptoms.¹⁶ In another meta-analysis, found similar result, where most prevalent clinical symptom was fever (91.3%), followed by cough (67.7%), fatigue (51.0%) and dyspnea (30.4%).¹⁷ These above-mentioned studies closely matched with the result of present study. Considering comorbidity, 44.00% patients had one or more comorbidities and 56.00% presented in isolation without any morbidity. Common comorbid conditions found were as follows: HTN (19.14%), DM (14.10%), COAD (5.33%), IHD (3.55%), followed by CKD (0.89%), CVD (0.67%), and Cancer (0.44%).

In a meta-analysis, as mentioned above revealed hypertension (15.8%) as the most common comorbidity followed by other cardiovascular and cerebrovascular conditions (11.7%), endocrine disorder primarily diabetes (9.4%), co-existing infection like HIV and Hepatitis B (1.5%), malignancy (1.5%), respiratory system disorder, e.g. COPD and others (1.4%), renal disorders (0.8%) and immunodeficiency states (0.01%).¹⁵ Almost similar results were found in another retrospective, multicenter cohort study, where 48% patients had comorbidities, with hypertension being the most common (30%), followed by diabetes (19%) and coronary heart disease (8%).¹⁸ In a population-based surveillance for laboratory-confirmed COVID-19-associated hospitalizations in the United States, among 1,482 patients, 12% adult patients had one or more underlying conditions; the most common were hypertension (49.7%), obesity (48.3%), chronic lung disease (34.6%), diabetes mellitus (28.3%), and cardiovascular disease (27.8%).¹⁹ The results of first two studies closely resemble with our study (Hypertension, Coronary artery disease and Diabetes as predominant comorbidities), but the third one revealed obesity as an important comorbidity which was not included in this study.

In present study, 96.45% patients discharged uneventfully whereas 03.55% patient's expired. This matches with the following two studies. Approximately 10% of the global population may have been infected by October 2020, with an estimated overall IFR of 0.15% to 0.2% (0.03% to 0.04% in those <70 years of age)²⁰. In another study, roughly 80% of COVID-19-positive cases result in full recovery from the illness without any hospitalizations or interventions.⁵

In this study, death were more in elderly patients (n=11; 69%). A total of 60 patients needed ICU support that was 13.33% of total cases; most of them were elderly patients (45 out of 60 i.e. 75%). Out of total mortality, death rate was much higher in ICU than in COVID ward (75% vs 25%). These results are coherent with the studies done in other centers.

COVID-19 can cause severe disease leading to hospitalization in ICU and potentially death, especially in the elderly with co morbidities. According to the CDC, 8 out of 10 deaths reported in the USA occurred in adults 65

years old and above.⁵ In the same report, COVID-19 cases in the United States, Overall, 31% of cases, 45% of hospitalizations, 53% of ICU admissions, and 80% of deaths associated with COVID-19 were among adults aged ≥ 65 years with the highest percentage of severe outcomes among persons aged ≥ 85 years.²¹ People <65 years of age have a very small risk of death even in pandemic epicenters, and deaths in people <65 years of age without any underlying conditions is rare.²² In this study, the mortality rate in ICU was higher in those with one or more comorbid conditions; the predominant comorbidities were hypertension (56.75%) and diabetes (43.75%) followed by COAD, IHD, CKD and CVD. No comorbidity was found in 18.75%. In Italy only 12% of death certificates reported direct causality from COVID-19, while 88% of patients who died had at least one comorbidity.^{23,24} In New York state, just over 86% of reported COVID-19 deaths involved at least one comorbidity, according to the state's department of health. The leading comorbidity, seen in 55.4% of all deaths, was hypertension. The rest of the 10 most common comorbidities in COVID-19 fatalities were diabetes (37.3%), hyperlipidemia (18.5%), coronary artery disease (12.4%), renal disease (11.0%), dementia (9.1%), chronic obstructive pulmonary disease (8.3%), cancer (8.1%), atrial fibrillation (7.1%), and heart failure (7.1%).²⁵ Current study, shows similarity to New York city study. Hyperlipidemia and Dementia were not included in this study.

Limitations

The study sample is relatively small in number. Most of the patients were either treated outside the hospital or were asymptomatic. Secondly, all possible co morbidities were not included in the study.

Conclusion

Most of the patients presented with fever, cough and respiratory distress. The elderly patients and those with one or more comorbid conditions reflected poor outcomes. The study highlights the importance of early identification of patients at risk of progression for optimized utilization of medical resource. There are still many facts to be elucidated, reflecting our uncertainty regarding this disease.

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