

Epidemiology and outcome of COVID-19: experience at a private set-up in Bangladesh

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has induced a sense of panic around the world. Bangladesh has also reported several hundred thousand COVID-19 patients with several thousands of deaths. SARS-CoV-2 infects people of all ages. This virus is very notorious in terms of varied presentations, severity and outcome. This observational study was done to evaluate the demography, presentation and outcome of COVID-19 patients admitted in a private hospital of Bangladesh.

Methods: This prospective observational study was conducted over a period of six months. All patients in this study were positive for SARS-CoV-2 by polymerase chain reaction (PCR) and admitted to the hospital with variable presentation ranged from cough and fever to respiratory distress and pneumonia, multiple organ failure. As per the protocol, the patients were regularly evaluated for several parameters of COVID-19 related pathology. The management strategy included standard of care (SoC) and administration of antiviral drugs as per national guideline on clinical management of COVID-19, Bangladesh (Version -7). Patients' outcome was also measured in term of recovery, transferred to higher center and death.

Results: Out of total 125 patients, 60% were male and 40% female. The average age of study population was 56.8±13.8 years. Diabetes mellitus (DM) was the most common co-morbidity (62.4%). Hypertension (HTN) was present in 57.6% and ischemic heart disease (IHD) in 15.2% cases. Regarding the presenting complaints, fever was the most common (94.4%), followed by cough (84.0%) and dyspnea (43.2%). Majority (43.2%) was moderate cases, followed by severe case (28.0%), mild case (21.6%) and critical case (4.8%). Three (2.4%) asymptomatic patients were also admitted. The minimum duration of hospital stay was 1 day with maximum of 27 days. The mean duration of hospital stay was 9.8±5.4 days. Recovery was observed in 111 (88.8%) patients. Four (4.8%) patients were transferred to higher center and 8 (6.4%) patients died.

Conclusion: It was observed that most of the COVID-19 patients can be adequately managed by SoC management with drug support. However, early diagnosis and hospitalization with adequate care may be important variables for better survival.

Key words: COVID 19, epidemiology, outcome.

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INTRODUCTION

In early December 2019, pneumonia cases of unknown origin were identified in Wuhan, the capital city of Hubei province in China.¹ The pathogen was identified as a novel enveloped RNA beta coronavirus², eventually named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The World Health Organization (WHO) has already declared coronavirus disease 2019 (COVID-19) a public health emergency of international concern.³

Globally, as of 10:28 am CET, 8 November 2020, there have been 49,242,837 confirmed cases of COVID-19, including 1,242,187 deaths, reported to WHO. In Bangladesh, first case of COVID-19 was detected on 8th March, 2020 and the first fatality was recorded on 18th March 2020. Up to 8 November 2020, there have been 418,764 confirmed cases of COVID-19 with 6,049 deaths (infection fatality rate 1.44%)⁴ in Bangladesh.

COVID-19 may exhibit a variety of clinical presentations. Some COVID-19 patients remain asymptomatic but they are capable of transmitting the virus.⁵ A second group of COVID-19 patients express mild symptoms, some of which are indistinguishable from normal flu and some of them develop moderate symptoms^{6,7} of considerable concern. Finally, some patients develop severe complications like respiratory distress and pneumonia resulting in death.⁸⁻¹⁰

As the novel coronavirus continues to evolve, there are still many limitations to our knowledge in that, who will be infected critically. Older adults and people of any age who have underlying medical conditions, such as hypertension (HTN) and diabetes mellitus (DM), have shown worse prognosis.¹¹ DM patients have increased morbidity and mortality rates and have been linked to more hospitalization and intensive care unit (ICU) admissions.¹¹ People with chronic obstructive pulmonary disease (COPD) or any respiratory illnesses are also at higher risk for severe illness from COVID-19.¹² The risk of contracting COVID-19 in patients with COPD is found to be 4-fold higher than patients without COPD.¹²

Although the etiological agent of COVID-19 is known, proper insights about its epidemiology, virology, pathogenesis and management strategy are yet to be developed; making it one of the most notorious public health issue. The pathological processes are possibly regulated by interactions of viruses with host immunity. The disease usually starts with mild symptoms such as

cough and fever with other allied symptoms of COVID-19. Some of the patients with mild symptoms experience a sudden deterioration of their condition either in the later stage of the disease or in the process of recovery. If the patients proceed to acute respiratory distress syndrome (ARDS) and multiple-organ failure rapidly, death becomes the usual outcome. Whether the patient is recovered or dead, host immunity to the virus seems to play a cardinal role with many other auxiliary factors.

Although SARS-CoV-2 is primarily considered as a respiratory virus, emerging data indicates that COVID-19 involve several body tissues and organs. Treatment is almost supportive and symptomatic. As of today, no antiviral drug effective for COVID-19 has been documented. Several investigators have used different antiviral drugs. For maintaining uniformity of treatment, Directorate General of Health Services (DGHS) of Government of People's Republic of Bangladesh has approved national guideline on clinical management of corona virus disease 2019 (COVID-19). The aim of the study was to update the knowledge of the clinicians and researchers thus helping in understanding the demography and formulation of best management guidelines.

METHODS

The prospective observational study was conducted at Health and Hope Hospital, a 100-bedded General Hospital with a dedicated COVID unit (outpatient department and 9-bedded in-patient services) situated at Panthopath, Dhaka, Bangladesh from 1st April, 2020 to 31st October, 2020. The study was approved by the hospital authority and informed consent was taken from all patients/attendants. All patients of this study were tested positive for SARS-CoV-2 from nasal swab and all of them were admitted to hospital.

The patients were properly assessed clinically about symptoms and vital signs and physical examination was done at admission. Also, all new symptoms and aggravation of pre-existing symptoms and comorbidities were monitored. Peripheral blood was taken from each patient to check complete blood picture, creatinine, bilirubin and alanine aminotransferase (ALT), C-reactive protein (CRP). X-ray of chest and electrocardiogram (ECG), computed tomography (CT) scan of chest were accomplished as and when necessary. Oxygen saturation was monitored regularly and all preparations were adopted to provide oxygen supply (nasal cannula, face mask, face mask with reservoir bag, high flow nasal cannula, non-invasive ventilator).

Patients were categorized as asymptomatic, mild, moderate, severe and critical group based on clinical condition, oxygen saturation, chest x-ray findings and others investigations as described by national guideline of Bangladesh.

Clinical case definition--

Asymptomatic

Patients who were tested for SARS CoV-2 positive without any symptoms.

Mild

The clinical symptoms are mild and there is no sign of pneumonia on imaging

Symptoms may be: fever, cough, sore throat, malaise, headache, muscle pain without shortness of breath or abnormal imaging.

Moderate

Fever and respiratory symptoms with radiological findings of pneumonia.

Respiratory distress with < 30 breaths /min.

Pulse oxymetry showing saturation >93% at ambient air.

Severe

Cases meeting any of the following criteria:

Respiratory distress (≥ 30 breaths/ min).

Finger oxygen saturation $\leq 93\%$ at rest.

Arterial partial pressure of oxygen (PaO₂)/fraction of inspired oxygen (FiO₂) ≤ 300 mm Hg.

Critical

Cases meeting any of the following criteria:

Respiratory failure and requiring mechanical ventilation.

Shock

With other organ failure that requires ICU care.

All patients received standard of care (SoC) management as per recommendation of the attending physician based on their clinical conditions and pathological evaluations. These included antipyretic drugs to control fever, pain killers for alleviating pain, oxygen for controlling respiratory distress and saline for maintaining proper hydration. Anti-viral medications (oral/IV), steroid, anticoagulants, antibiotics (in special cases) were given according to national guidelines of Bangladesh. Endotracheal intubation and invasive mechanical ventilator support were not available at this center, so patients requiring invasive ventilatory supports were referred to higher centers.

Patient's outcome was categorized by discharge (recovered), transfer to higher center (referred) and death. The criteria for discharge was being negative for SARS-CoV-2 in 2 consecutive assessments, usually 24 hours apart and /or with improvement of symptoms (eg, resolution of fever for 3 days without antipyretics) of COVID-19. Patients' information was collected in a preformed data sheet. All the available data were analyzed by SPSS version 23.

RESULTS

Total patients were 125 with a mean age of age of 56.8 (range 22 to 92) years and 75 (60%) were male. Age distribution is shown in Table I.

Table I Distribution of the study subjects according to age (N=125)

Age (years)	Frequency	Percentage
≤ 30	9	7.2
31 - 40	6	4.8
41 - 50	18	14.4
51 - 60	39	31.2
61 - 70	40	32.0
71 - 80	8	6.4
>80	5	4.0
Mean \pm SD	56.8 \pm 13.8	
Min - max	22 - 92	

Diabetes mellitus was the most common co-morbidity and others are shown in Table II.

Table II Co-morbidity of the study subjects (N=125)

Risk factors	Frequency	Percentage
DM	78	62.4
HTN	72	57.6
Ischemic heart disease	19	15.2
Bronchial asthma	15	12.0
COPD	5	4.0
Obesity	5	4.0
Chemotherapy /surgery	3	2.4
Stroke	3	2.4
CKD	2	1.6
CLD	2	1.6

*Multiple responses

[DM = diabetes mellitus, HTN = hypertension, COPD = chronic obstructive pulmonary disease, CKD = chronic kidney disease, CLD = chronic liver disease]

Fever was the predominant complaint (94.4%). Other common complaints were cough, dyspnea, headache and altered sense of smell (Table III).

Table III Presenting symptoms of the study subjects (N=125)

Presenting symptoms	Frequency	Percentage
Fever	118	94.4
Cough	105	84.0
Dyspnoea	54	43.2
Headache	21	16.8
Altered sense of smell	19	15.2
Fatigue	15	12.0
Altered sense of taste	10	8.0
Anorexia	8	6.4
Confusion	4	3.2
Diarrhoea	4	3.2
Chest pain	2	1.6
Conjunctivitis	1	0.8
Nasal congestion	1	0.8
Vomiting	1	0.8

*Multiple responses

Patients were classified according to the severity as asymptomatic, mild, moderate, severe and critical. Table IV shows the severity classification of the study subject. Mean hospital stay was 9.8 days (Table V).

Table IV Severity classification of the study subjects (N=125)

Diagnosis	Frequency	Percentage
Asymptomatic	3	2.4
Mild	27	21.6
Moderate	54	43.2
Severe	35	28.0
Critical	6	4.8

Table V Duration of hospital stay of the study subjects (N=125)

Duration of hospital stay (days)	Frequency	Percentage
1 - 5	29	23.2
6 - 10	51	40.8
11 - 15	28	22.4
16 - 20	12	9.6
>20	5	4.0
Mean \pm SD	9.8 \pm 5.4	
Min - max	1 - 27	

Patients were treated according to severity as described by national guideline of DGHS. Recovery was the most common outcome (88.8%) followed by referral to higher center (4.8%). Table VI shows the outcome distribution of the study subject

Table VI Treatment outcome of the study subjects (N=125)

Outcome	Frequency	Percentage
Recovered	111	88.8
Referred to higher center	6	4.8
Death	8	6.4

DISCUSSION

In this study, the age of the patients varied from 22 to 92 years with a mean age of 56.8 ± 13.8 years. This indicates that elderly persons are more prone to develop severe disease and require hospital admission. A retrospective study of middle-aged and elderly patients with COVID-19 found that the elderly population is more susceptible to this illness and is more likely to be admitted to the hospital, ICU with a higher mortality rate.¹³ The age-related changes in the geriatric population may be due to the changes 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.¹³ But the median age of the patients was 47 years (interquartile range, 35 to 58); 0.9% of the patients were younger than 15 years of age.¹⁴ The mean age was 36.36 ± 12.47 years in a study

conducted in a medical college hospital in Bangladesh.¹⁵ The average age of the patients in our study is higher than mentioned two. In our study, male sex was predominate which is also found in other studies.^{14,15}

Multiple co-morbidities 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.¹⁶ However, this may be a direct result of the cardiovascular condition itself or attributed to other comorbidities along with a cardiovascular condition.¹⁶ Patients with type 2 DM were also more likely to have increased severity of COVID-19.¹⁷ In our study, DM was the predominate co-morbidity present (62.4%) followed by hypertension (57.6%), ischemic heart disease (15.2%). Whereas DM is the fourth common co-morbidity (28.3%) after HTN (49.7%), obesity (48.3%) and chronic lung disease (34.6%) in a study done by Sanyaolu et al.¹⁸

Regarding the presenting symptoms, fever was the most common symptom (94.4%) in our study. Other symptoms were cough (84%), dyspnea (43.2%), headache (16.8%), altered sense of smell (15.2%). Fever was the commonest presentation of COVID patients in many other studies.^{14,15} Other presenting symptoms are almost similar in different studies involved.^{14,15} The least common symptom presented in this study were nasal congestion (0.8%), conjunctivitis (0.8%) and vomiting (0.8%). Most of the admitted patients of our study was in moderate case (43.2%) according to the severity, followed by severe case (28.0%) and mild case (21.6%). Mild cases were admitted to hospital, as they were elderly and most of them had multiple comorbidities. Three (2.4%) asymptomatic patients were admitted for the purpose of isolation as per their wishes.

The duration of hospital stay of the study population was 9.8 ± 5.4 days with the highest duration 27 days and minimum of 1 day. The median duration of hospitalization was 12.0 days (mean, 12.8) found by Guan et al.¹⁴

Majority (88%) of patient in our study were recovered after treatment. Six (4.8%) patients were transferred to higher center. Among them 4 patients were supposed to require endotracheal intubation and mechanical ventilator support. Other 2 patients were transferred as per desire of patient party. Death was observed in 8 (6.4%) patients which is higher than national fatality

rate of Bangladesh.⁴ All the death patients were above 70 years of age, having multiple co-morbidities. Among death patients, 3 were admitted in hospital lately in a very critical sate, died within hours of initial resuscitation.

Conclusion

COVID-19 is a dangerous disease and a little about it is known so far. It is associated with widely variable demographic characteristics, presentation and outcome. Early admission of patient with protocol based management guideline can help patients' treatment with favourable outcome. A large scale multicenter study may help better understanding of demography, clinical presentation and help to formulate the best management plan in near future.

Conflicts of interest: Nothing to declare.

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