

**ORIGINAL ARTICLE**DOI: <https://doi.org/10.3329/mediscope.v9i1.58521>**Epidemiologic and clinical characteristics of COVID-19 patients admitted in a tertiary care hospital in Khulna city*****SD Haque¹, MA Kabir², PS Biswas³, AMM Al Amin⁴, MB Ali⁵, B Islam⁶****Abstract**

Background & objective: The outbreak of coronavirus disease 2019 (COVID-19) has become a large threat to global health due to its high contagious nature and varied mortality. The number of infected cases and deaths are rising exponentially all over the world, including Bangladesh. This study aims to investigate the epidemiological and clinical features of COVID-19 patients admitted in Gazi Medical College Hospital (GMCH), Khulna, Bangladesh. **Methods:** In this study, we included 110 RT-PCR positive COVID-19 cases at GMCH, Khulna, Bangladesh from 1 July, 2021 to 31 August, 2021. Demographic, clinical, laboratory and radiological data of the patients were recorded and analyzed. **Results:** Among 110 study subjects, 51.8% were male. The mean age was 52.6 years, with majority (43.6%) belonging to the age group of 40-59 years. Upon admission, the most frequent symptoms were fever (94.5%), cough (86.4%) and dyspnea (79.1%). Diabetes mellitus (42.7%) and hypertension (33.6%) were the most common comorbidities. Regarding laboratory parameters, neutrophilia and lymphocytopenia were observed in 72.7% and 58.2% cases, respectively. The mean D-dimer (2.9 mg/l) and CRP (61.7 mg/l) levels were above their normal limits. In high resolution CT scan of the chest (HRCT chest), bilateral lung involvement was present in 85.5% cases. Ground-glass appearance was the most frequent (89.1%) radiologic pattern. Among the study subjects, empirical antibiotic, antiviral (remdesivir) drug, and systemic glucocorticoid were given to 97.3%, 83.6% and 56.4% patients, respectively. Total 15 (13.6%) patients were severely affected with COVID-19 and admitted to the ICU, requiring mechanical ventilation. During our study, 12 patients (10.9%) died either due to multiple organ dysfunction syndrome or cardio-respiratory failure. **Conclusion:** The study provides key information about clinical characteristics and general management of COVID-19 patients, which may help physicians to identify the factors associated with adverse outcomes in this disease.

Introduction

In late December 2019, cases of pneumonia of an unknown cause emerged in Wuhan and spread to most parts of China. The gene sequence of the virus obtained from these patients showed that the new virus is a member

of the Coronaviridae family; which was subsequently named "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)", and the disease caused by this virus was named as "coronavirus disease 2019" (COVID-19).¹ This disease already reached many countries

1. Dr. Syed Didarul Haque, Assistant Professor, Department of Pharmacology & Therapeutics, Gazi Medical College, Khulna.
Email: bappy.dmc.k64@gmail.com

2. Dr. Muhammad Ashraful Kabir, Associate Professor, Department of Respiratory Medicine, Gazi Medical College & Hospital, Khulna.

3. Dr. Prithwy Shankar Biswas, Assistant Professor, Department of Biochemistry, Gazi Medical College, Khulna.

4. Dr. Abu Md. Mayeenuddin Al Amin, Assistant Professor, Department of Microbiology, Gazi Medical College, Khulna.

5. Dr. Md. Barkot Ali, Associate Professor & Head, Department of Paediatrics, Gazi Medical College & Hospital, Khulna.

6. Dr. Baishakhi Islam, Associate Professor & Head Department of Pharmacology & Therapeutics, Gazi Medical College, Khulna.

worldwide since it was declared a pandemic by World Health Organization (WHO) in early March 2020.² Bangladesh is a middle-income country with per capita health expenditure among the lowest in the category.³ The care of COVID-19 patients is very challenging as the already limited health resources become quickly overwhelmed. The first three known cases were reported on 8 March 2020 by the country's epidemiology institute, IEDCR. Since then, the pandemic has spread gradually over the whole nation and the number of affected people has been increasing.⁴ In the past few months, the number of coronavirus cases have tripled in Bangladesh. All COVID-19 hospitals in the capital and other cities are completely full with patients; the dedicated beds in many other hospitals are also full.⁵ Until June, 2021, it is observed that Khulna division's confirmed cases rate has topped the list (19.94%) among all the eight divisions in Bangladesh, while Sylhet has the lowest confirmed cases rate of 9.75%.⁶

The prominent clinical manifestations of COVID-19 include fever, cough, dyspnea, fatigue, myalgia, and radiographic evidence of pneumonia. Shock, acute respiratory distress syndrome (ARDS), acute cardiac injury, acute kidney injury (AKI), and deaths were reported in severe cases. Early reports indicated that the infection occurs in clusters within groups in close contact, and severe cases are more common in the elderly as well as in patients with comorbidities.⁷

Additional information is needed to help clinicians understand the characteristics of this disease. In this study, we aimed to investigate the demographic profile and clinical characteristics of COVID-19 patients, admitted in Gazi Medical College Hospital, Khulna, Bangladesh.

Methodology

Study subjects:

For this study, we consecutively recruited 110 patients who were laboratory-confirmed and diagnosed as COVID-19 pneumonia from July 1, 2021 to August 31, 2021 at Gazi Medical College Hospital, Khulna, Bangladesh. This study was approved by the Ethical Review Committee of the concerned institute.

Laboratory confirmation:

The laboratory-confirmed case was defined as a case with a positive result on real-time reverse-transcriptase polymerase chain reaction (RT-PCR) for SARS-CoV-2 in nasopharyngeal swab specimens. The presence of SARS-CoV-2 in nasopharyngeal swab specimens was detected by RT-PCR using SARS-CoV-2 (RdRp and/or N gene) and E gene PCR kit (BioNEER, AccuPower® SARS-CoV-2 Multiplex Real-Time RT-PCR Kit, Daejeon, Republic of Korea).

Procedures and data collection:

We reviewed clinical charts, nursing records, laboratory findings, and HRCT chest report of all the study participants. The data of demographic, clinical, biochemical and radiological features, treatments, and outcomes were obtained from patients' case files and electronic medical records; and subsequently compiled in standardized data collection forms. For critically ill patients admitted to the intensive care unit (ICU), the Glasgow Coma Scale (GCS) and Sequential (sepsis-related) Organ Failure Assessment (SOFA) scores were monitored on the day of ICU admission. The clinical outcomes (i.e., discharges, mortality and readmission) were followed up to August 31, 2021.

Data analysis:

Patients' demographic information and clinical characteristics were tabulated for descriptive purposes. Continuous variables were presented as either the means \pm standard deviations (SDs) or the medians (with interquartile ranges, IQR), as appropriate. For categorical variables, we calculated the frequency rates and percentages of patients in each category. All analyses were performed using Microsoft Excel and SPSS Version 21.0 for Windows (SPSS Inc., Chicago, IL, USA).

Results

The demographic characteristics, clinical features and information about comorbidities of the 110 study subjects are described below and summarized in Table 01.

Demographic characteristics:

We included 110 patients in this study, with 57 (51.8%) male and 53 (48.2%) female. The mean age of the patients was 52.6±5.8 years. The frequencies of patients with COVID-19 between the age of 20 to 39 years, between 40 to 59 years, between 60 to 79 years, and above 80 years were 28 (25.5%), 48 (43.6%), 31 (28.2%), and 3 (2.7%) respectively. Among the study subjects, 70 (63.6%) came from urban areas and 40 (36.4%) came from rural areas.

Clinical features:

In general, the most common symptoms were fever (104 [94.5%]), followed by cough (95 [86.4%]), dyspnea (87 [79.1%]), sore throat (72 [65.5%]) and

anosmia [63 (57.3%)]. Less common symptoms included diarrhea (18 [16.4%]), headache (13 [11.8%]), and abdominal pain (7 [6.4%]). The median oxygen saturation level (SpO₂) was 87 (IQR, 72 to 97).

Comorbidities:

Among the study subjects, 105 patients had either one or more comorbidities. The most common comorbid condition was diabetes mellitus (DM) [47 (42.7%)], followed by hypertension (HTN) [37 (33.6%)], ischemic heart disease [9 (8.2%)], bronchial asthma [4 (3.6%)], cerebrovascular disease [4 (3.6%)], benign enlargement of prostate [2 (1.8%)], chronic kidney disease [1 (0.9%)] and chronic liver disease [1 (0.9%)].

Table 01: Demographic characteristics, clinical features and comorbidities of COVID-19 patients

Demographic characteristics	Patients (N = 110)
Sex	
Male	57 (51.8%)
Female	53 (48.2%)
Age (in years)	52.6±5.8 *
20-39	28 (25.5%)
40-59	48 (43.6%)
60-79	31 (28.2%)
≥ 80	3 (2.7%)
Locality	
Urban	70 (63.6%)
Rural	40 (36.4%)
Clinical features	Frequency (percentage)
Fever	104 (94.5%)
Cough	95 (86.4%)
Dyspnea	87 (79.1%)
Sore throat	72 (65.5%)
Anosmia	63 (57.3%)
Diarrhea	18 (16.4%)
Headache	13 (11.8%)
Abdominal pain	7 (6.4%)
Finger oxygen saturation level (SpO ₂)	87 (72 to 97) **
Comorbidities	Frequency (percentage) [N = 105]
Diabetes mellitus	47 (42.7%)
Hypertension	37 (33.6%)
Ischemic heart disease	9 (8.2%)
Bronchial asthma	4 (3.6%)
Cerebrovascular disease	4 (3.6%)
Benign enlargement of prostate	2 (1.8%)
Chronic kidney disease	1 (0.9%)
Chronic liver disease	1 (0.9%)

*Mean±SD

**Median (IQR)

Data on laboratory findings and HRCT Chest report of the patients are mentioned below and summarized in Table 02.

Laboratory findings:

The first results of the laboratory tests after admission were analyzed. The routine blood tests showed that, the mean Hb concentration of the study subjects was 11.2 ± 1.9 g/dl. The blood counts of 80 patients out of 110 (72.7%) showed neutrophilia (neutrophil count $>70\%$) and 64 patients (58.2%) showed lymphocytopenia (lymphocyte count $<20\%$). Also, 4 (3.6%) patients had thrombocytopenia (platelet count $<1,50,000/\text{cmm}$). The mean D-dimer level of the study subjects was 2.9 ± 4.1 mg/l. In addition, the

mean plasma CRP level and serum creatinine level were 61.7 ± 11.4 mg/l and 1.3 ± 0.9 mg/dl respectively.

HRCT of chest:

All the 110 patients had abnormal findings on HRCT; bilateral lung field involvement was observed in 94 (85.5%) and unilateral lung field involvement was observed in 16 (14.5%) patients. Ground-glass opacity, the predominant CT imaging pattern, was observed in 98 (89.1%) patients, followed by patchy consolidation shadow-in 47 (42.7%) patients. Interstitial abnormalities, including reticular appearance and interlobular septal thickening were found in 15 (13.6%) patients.

Table 02: Laboratory findings and HRCT chest reports of COVID-19 patients

Laboratory findings	Frequency (percentage)
Hb concentration (g/dl)	11.2 ± 1.9 *
Neutrophilia (neutrophil count $>70\%$)	80 (72.7%)
Lymphopenia (lymphocyte count $<20\%$)	64 (58.2%)
Thrombocytopenia (platelet count $<1,50,000/\text{cmm}$)	4 (3.6%)
D-dimer (mg/l)	2.9 ± 4.1 *
Plasma CRP (mg/l)	61.7 ± 11.4 *
Serum creatinine (mg/dl)	1.3 ± 0.9 *
HRCT of chest	Frequency (percentage)
Bilateral lung field involvement	94 (85.5%)
Unilateral lung field involvement	16 (14.5%)
Ground-glass opacity	98 (89.1%)
Patchy consolidation shadow	47 (42.7%)
Interstitial abnormalities	15 (13.6%)

*Mean \pm SD

Information about treatment of the patients, ICU admission and mortality are described below and summarized in Table 03.

Treatment:

A total of 87 (79.1%) patients received oxygen therapy. Regarding use of other drugs, 107 (97.3%) patients received empirical antibiotic therapy. A total of 92 (83.6%) patients got antiviral drug therapy (remdesivir). Systemic glucocorticoid was given to 62 (56.4%) patients and. Additional

immunomodulating therapy by tocilizumab and baricitinib was given to 15 (13.6%) patients and 9 (8.2%) patients respectively.

ICU admission and mortality:

Among the study subjects, 15 (13.6%) patients were severely affected with COVID-19 and admitted to the ICU due to moderate or severe ARDS, requiring noninvasive mechanical ventilation therapy. On the day of ICU admission, the median GCS and SOFA scores were 12 (11 to 15) and 5

(4 to 8) respectively indicating critical illness. The median PaO₂ level of ICU admitted patients was 72 mmHg (54 to 86). During the study period, 12

patients (10.9%) died either due to multiple organ dysfunction syndrome or cardio-respiratory failure.

Table 03: Treatment of COVID-19 patients, ICU admission and mortality

Treatment received	Frequency (percentage)
Oxygen therapy	87 (79.1%)
Empirical antibiotic therapy	107 (97.3%)
Antiviral drug (remdesivir) therapy	92 (83.6%)
Systemic glucocorticoid	62 (56.4%)
Additional immunomodulating therapy Tocilizumab	15 (13.6%)
Baricitinib	9 (8.2%)
Clinical outcome	Frequency (percentage)
ICU admission	15 (13.6%)
GCS score	12 (11 to 15) *
SOFA score	5 (4 to 8) *
PaO ₂ level (mmHg)	72 (54 to 86) *
Mortality	12 (10.9%)

*Median (IQR)

Discussion

The highly infectious COVID-19 is recognized as a global health hazard. It is believed that the infection is mainly transmitted by respiratory droplets when an infected person coughs, sneezes or talks. Transmission can also occur when a person touches contaminated surfaces with the hands and then, if the hands come in contact with mouth or nose. Hence, good respiratory and hand hygiene is of paramount importance.⁸ In this study, we analyzed the clinical symptoms, laboratory findings and treatment process of the COVID-19 patients admitted in Gazi Medical College Hospital, Khulna.

The patients in our study had a mean age of 52.6 years and were mostly male (51.8%). Majority of the patients (43.6%) belonged to the age group of 40-59 years. These results are slightly different from what Teich et al. reported in their study⁹, where mean age was 39.9 years and proportion of males was 56.9%. Another study showed different results where almost 92% of the cases were younger than 60 years old with a mean age of 39.9±14.2 years.²

The most common clinical symptoms of our patients were fever (94.5%), cough (86.4%) and

dyspnea (79.1%). Okay et al.¹⁰ also reported these symptoms to be found most frequently in their study. It should be noted that COVID-19 patients may also have gastrointestinal symptoms such as diarrhea and abdominal pain, which is evidenced by some previous studies.^{11,12} This information is consistent with our findings, where 16.4% patients had diarrhea.

Several studies have shown that the severity of COVID-19 is related to comorbid conditions including diabetes, hypertension, cardiovascular, cerebrovascular and respiratory diseases. In our study, the most common comorbid condition was DM (42.7%), followed by HTN (33.6%). Hafiz et al.¹³ also reported quite similar results, having found 46.6% and 33.3% patients with DM and HTN respectively. Another study reported HTN to be the most common comorbidity (12.3%) followed by pre-existing respiratory diseases (11.7%).¹⁴

In our study, 72.7% patients had neutrophilia and 58.2% patients had lymphocytopenia. Also, the mean plasma CRP and D-dimer levels were 61.7±11.4 mg/l and 2.9±4.1 mg/l respectively; which are well above the normal limits. These results are consistent with previous researches and indicate a stronger inflammatory response,

decreased cellular immunity and activation of coagulation cascade – all induced by viral infection.^{15,16}

Radiological evaluation of our patients was done by HRCT of chest, which showed presence of bilateral and unilateral lung involvement in 85.5% and 14.5% cases respectively. Another study¹⁷ reported almost similar findings, where bi- and unilateral lung involvement were evident respectively in 79.8% and 20.2% cases. Ground-glass opacity, the predominant CT imaging pattern in our study, was found in 89.1% cases; whereas report of Wang et al.¹ showed 73.1% of cases with this radiologic feature.

In our hospital, COVID-19 patients were treated in the isolation wards and separate ICUs. Almost all our patients (97.3%) received systemic antibiotic therapy, and a significant portion (83.6%) received antiviral therapy with remdesivir. These findings are different than the reports of Zhao et al.¹⁸, where antibiotic and antiviral treatment were given to 71.2% patients and 90.3% patients respectively. We found that, glucocorticoid therapy was given to 56.4% patients, which is contrary to the report of another study, where only 12.7% patients received glucocorticoid.¹⁹

During the course of our study, 13.6% (15/110) patients were either admitted or transferred to ICU, requiring noninvasive mechanical ventilation. A total of 12 patients out of 110 (10.9%) died during the study period. Previously, Olivares et al.²⁰ reported to have found 36.2% (17/47) ICU admission and 8.5% (4/47) death in their study which was conducted at a Chilean regional reference center.

Limitations and conclusion

Several limitations of the present study are worth considering. Firstly, our sample size was relatively small because we carried out the study at one institution. So, the current study does not reflect the actual burden of COVID-19 in Khulna region. Secondly, after receiving treatment, disease outcome in each patient was not possible to monitor. So, data regarding short and long-term complications could not be included in this study.

Despite these limitations we believe our study provides key information to better understand the clinical characteristics and general management of COVID-19 patients. Using clinical and laboratory parameters, this study may help physicians to identify the factors associated with adverse outcomes in patients hospitalized with COVID-19.

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Disclosure statement

The authors declare no conflict of interest.

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