



## Clinical Course, Risk Factors and Health Outcome of in patients with COVID-19: An Evidence from COVID-19 Dedicated Mugda Medical College and Hospital in Bangladesh

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### Abstract

The outbreak of the novel corona virus disease 2019 (COVID-19) began in Wuhan, China in December 2019. Since then, it has rapidly spread around the world. The clinical spectrum of COVID-19 pneumonia ranges from mild to critically ill cases. In this study, we tried to present details of patients admitted to the COVID-19 dedicated Mugda Medical College and Hospital in Dhaka, Bangladesh with laboratory-confirmed COVID-19 and a definite clinical outcome (death or discharge) as of June 30, 2020. We conducted a retro-prospective study of 384 patients admitted with COVID-19. Epidemiological, demographic, clinical, treatment, and outcome data were obtained from patient charts and the hospitals' admission records using a structured questionnaire. Among them 384 of the PCR confirmed COVID-19 cases had an outcome of death (25.5%), transfer to other facilities (3.1%), discharge through palliative purpose (1.6%) or live discharge (67.2%). Males accounted for 52.9% of the study subjects and 44.4% of the survivors. Survival was significantly higher in females than in males ( $p \leq 0.001$ ). The most common symptoms on admission were fever (21, 70.6%) and cough (229, 59.6%), followed by shortness of breath (200, 52.1%), fatigue (152, 39.6%) and sore throat (141, 36.7%). In-hospital death was higher in patients with diabetes or hypertension. Moving forward, we hope to continue to deliver early and optimal care, limit community transmission, and tying the case fatality to the lower end of the known range.

**Keywords:** Clinical Course, Risk Factors, Health Outcome, COVID-19 Pandemic.

### Introduction

The outbreak of the novel corona virus disease 2019 (COVID-19) began in Wuhan, China in December 2019<sup>1-7</sup>. Since then, it has rapidly spread around the world<sup>2-4</sup>. The clinical spectrum of COVID-19 pneumonia ranges from mild to critically ill cases<sup>3,4</sup>. Patients with mild disease present with symptoms of fever and cough, followed by sputum production and fatigue<sup>4</sup>. Sepsis, respiratory failure, acute

respiratory distress syndrome, heart failure, and septic shock are commonly observed in critically ill patients<sup>1-7</sup>. However, there are significant differences between Bangladesh, China and the US in population demographics,<sup>3</sup> smoking rates,<sup>4</sup> and prevalence of comorbidities.<sup>5-7</sup>

Although the outbreak is likely to have started from a zoonotic transmission event associated with a large seafood market that also traded in live wild

animals, it soon became clear that efficient person-to-person transmission was also occurring<sup>1-7</sup>. The clinical spectrum of SARS-CoV-2 infection appears to be wide, encompassing asymptomatic infection, mild upper respiratory tract illness<sup>6-8</sup>, and severe viral pneumonia with respiratory failure and even death, with many patients being hospitalised with pneumonia in Dhaka, Bangladesh<sup>9,10,11</sup>. To our knowledge, no previous studies have been done among patients with definite outcomes. The estimation of risk factors for severe disease and death in these earlier case series are therefore not very robust. Additionally, details of the clinical and virological course of illness have not yet been well described.

Here, we tried to present details of patients admitted to the COVID-19 dedicated Mugda Medical College and Hospital in Dhaka, Bangladesh with laboratory-confirmed COVID-19 and a definite clinical outcome (death or discharge) as of June 30, 2020.

## Materials and Methodology

### Study Population, Setting, and Design

We conducted a retro-prospective study of 384 patients admitted into the Mugda Medical College and Hospital, Dhaka, Bangladesh. All patients who were diagnosed with COVID-19 according to WHO interim guidance<sup>12</sup> were screened, and those who died or were discharged between May 1, 2020 and June 31, 2020, were included in this study.

### Data Collection

Epidemiological, demographic, clinical, treatment, and outcome data were obtained from patient charts and the hospitals' admission records using a structured questionnaire which was adopted from Novel Coronavirus (COVID-19 Rapid Version) by Global COVID-19 Clinical Platform which was previously used for same purpose in United Kingdom<sup>13</sup> and China<sup>14</sup>. All data were collected by expert physicians and public health specialist.

### Statistical Analysis

Continuous and categorical variables were presented as median (IQR-interquartile range) and n (%), respectively. We used the  $\chi^2$  test, or Fisher's

exact test to compare differences between survivors and non-survivors where appropriate. The level of significance was set at 0.05. SPSS 26.0 was used to analyse the data.

## Results

During the period May 1, 2020 to June 30, 2020, a total of 443 adult patients were hospitalised in Mugda Medical College with COVID-19. Among them 384 of the PCR confirmed COVID-19 cases had an outcome of death (25.5%), transfer to other facilities (3.1%), discharge through palliative purpose (1.6%) or live discharge (67.2%). The median age of the 384 patients was 46.0 (IQR 30.0) years, for non-survivors it was 60.0 (IQR 20.0) years and for survivors 40.0 (IQR 24.0) year (**table 1**).

Males accounted for 52.9% of the study subjects and 44.4% of the survivors. Survival was significantly higher in females than in males ( $p \leq 0.001$ ). A little more than 15% were smokers and smoking was more prevalent among non-survivors (19.4%) than survivors (13.6%). Comorbidities were present in nearly one third of patients, with diabetes (129, 33.6%) being the most common comorbidity, followed by hypertension (124, 32.3%), chronic kidney disease (53, 13.8%) and bronchial asthma (46, 12.0%) (**table 1**).

The most common symptoms on admission were fever (21, 70.6%) and cough (229, 59.6%), followed by shortness of breath (200, 52.1%), fatigue (152, 39.6%) and sore throat (141, 36.7%) (**table 1**).

Total 364 (94.8%) patients received antibiotics, 134 (34.9%) received parenteral anti-coagulant (Enoxaparin Sodium), 93 (24.2%) received anti-malarial drug (Hydroxychloroquine Sulphate), 16 (4.2%) received antivirals. Systematic corticosteroid (87, 22.7%) and angiotensin II receptor blockers (ARBs) (54, 14.1%) were also used in treatment purpose (**table 2**).

Among 384 patients about 34 (8.9%) were asymptomatic and in symptomatic patient the median time from illness onset (i.e., before admission) to discharge was 19.0 days (IQR 15.25–22.00), whereas the median time to death was 9.0

days (IQR 6.0–15.0). The median time from hospital admission to discharge alive was 14.0 days (IQR 11.00-17.00), whereas the median time to death was 3.0 days (IQR 1.00-9.00) (table 2).

16 patients required invasive mechanical ventilation, of whom 15 (93.75%) died. Acute respiratory distress syndrome (ARDS) was the most frequently observed complication (93, 24.2%), followed by pneumonia (89, 23.2%), septic shock (37, 9.6%), anaemia (21, 5.5%), and cardiac arrest (19, 4.9%) (table 2).

In-hospital death was higher in patients with diabetes or hypertension (table 2). Age, gender, pregnancy status, chest pain, shortness of breathing, chest in-drawing, altered consciousness, diarrhoea, nausea, necessity of oxygen therapy, ICU support, supportive treatment by prone position and inotropes/vasopressors, treatment by systemic corticosteroids, invasive ventilation was also associated with both survivor and non-survivor patients (table 1, 2).

**Table 1:** Demographic and clinical findings of patients on admission

Variables		Total (n=384)	Non-survivor (n=98)	Survivor (n=286)	p value
Age, years	50-69 years	139 (36.2%)	50-69 years	52 (53.1%)	0.000
	30-49 years			111 (43.0%)	
Gender	Female	181 (47.1%)	22 (22.4%)	142 (55.0%)	≤0.001
	Male	203 (52.9%)	76 (77.6%)	116 (45.0%)	
Current Smoker		58 (15.1%)	19 (19.4%)	39 (13.6%)	0.170
Comorbidity	Chronic Cardiac Disease	36 (9.4%)	16 (16.3%)	20 (7.0%)	0.006
	HTN	124 (32.3%)	55 (56.1%)	69(24.1%)	≤0.001
	Asthma	46 (12.0%)	11 (11.2%)	35 (12.2%)	0.790
	CKD	53 (13.8%)	29 (29.6%)	24 (8.4%)	≤0.001
	DM	129 (33.6%)	55 (56.1%)	74 (25.9%)	≤0.001
On admission records	Others	27 (7.0%)	13 (13.3%)	11 (4.3%)	0.184
	Respiratory rate >24 breaths per min	111 (28.9%)	69 (70.4%)	42 (14.7%)	≤0.001
	Pulse ≥125 beats per min	2 (0.5%)	2 (0.5%)	0 (0.0%)	0.065
	Fever (temperature ≥37.3°C)	165 (43.0%)	65 (66.3%)	100 (35.0%)	≤0.001
	Fever	271 (70.6%)	72 (73.5%)	184 (71.3%)	0.211
	Cough	229 (59.6%)	56 (57.1%)	156 (60.5%)	0.921
	Cough with sputum	40 (10.4%)	11 (11.2%)	24 (9.3%)	0.850
	Cough with haemoptysis	7 (1.8%)	3 (3.1%)	4 (1.6%)	0.998
	Sore throat	141 (36.7%)	39 (39.8%)	93 (36.0%)	0.830
	Runny nose	22 (5.7%)	3 (3.1%)	17 (6.6%)	0.848
Wheezing	24 (6.3%)	14 (14.3%)	9 (3.5%)	0.054	
Chest pain	52 (13.5%)	22 (22.4%)	21 (8.1%)	0.003	
Muscle ache	68 (17.7%)	20 (20.4%)	40 (15.5%)	0.493	
Joint pain	45 (11.7%)	9 (9.2%)	33 (12.8%)	0.854	
Fatigue	152 (39.6%)	50 (51.0%)	92 (35.7%)	0.105	
Shortness of breath	200 (52.1%)	90 (91.8%)	93 (36.0%)	0.000	
Inability to walk	88 (22.9%)	55 (56.1%)	29 (11.2%)	0.000	
Chest in-drawing	66 (17.2%)	48 (49.0%)	17 (6.6%)	0.000	
Headache	58 (15.1%)	7 (7.1%)	44 (17.1%)	0.257	
Altered consciousness	50 (13.0%)	31 (31.6%)	16 (6.2%)	0.000	
Abdominal pain	31 (8.1%)	4 (4.1%)	26 (10.1%)	0.031	
Nausea/Vomiting	70 (18.2%)	20 (20.4%)	46 (17.8%)	0.000	
Diarrhoea	56 (14.6%)	14 (14.3%)	40 (15.5%)	0.000	

**Table 2:** Treatments, complications and outcomes

Variables	Total ‡ n=384	Non-survivor‡ n=98 (25.5)	Survivor‡ n=286 (74.5)	p value
Oral fluids	82 (21.4)	14 (14.3)	68 (26.4)	0.072
Inter-venous fluid	47 (12.2)	21 (21.4)	24 (9.3)	0.148
Antiviral drugs	16 (4.2)	8 (8.2)	7 (2.7)	0.422
Antibiotic drugs	364 (94.8)	94 (95.9)	243 (94.2)	0.880
Systemic Corticosteroid therapy	87 (22.7)	54 (55.1)	27 (10.5)	0.000**
Anti-malarial drug	93 (24.2)	22 (22.4)	62 (24.0)	0.843
Parenteral anti-coagulant	134 (34.9)	52 (53.1)	77 (29.8)	0.004*
<b>Treatments</b> ACE Inhibitors	10 (2.6)	8 (8.2)	1 (0.4)	0.011**
ARBs	54 (14.1)	33 (33.7)	14 (5.4)	0.000**
Oxygen therapy	20. (52.9)	95 (96.9)	92 (35.7)	0.000**
ICU support	63 (16.4)	48 (49.0)	14 (5.4)	0.000**
Non-invasive ventilation	12 (3.1)	5 (5.1)	6 (2.3)	0.736
Invasive ventilation	16 (4.2)	15 (15.3)	1 (0.4)	0.000**
Inotropes/Vasopressors	21 (5.5)	15 918.4)	2 90.8)	0.000**
Prone position	147 (38.3)	16 (16.3)	119 (46.1)	0.001**
CRRT	36 (9.4)	18 (18.4)	16 (62)	0.015**
<b>Complications</b> Septic shock	37 (9.6)	33 (33.7)	4 (1.6)	0.000**
Anaemia	21 (5.5)	7 (7.1)	9 (3.5)	0.165
Cardiac arrest	19 (4.9)	19 (19.4)	0 (0.0)	0.000**
Pneumonia	89 (23.2)	43 (43.9)	40 (15.5)	0.000**
ARDS	93 (24.2)	85 (86.7)	7 (2.7)	0.000**
Acute kidney injury	16 (4.2)	12 (12.2)	3 (1.2)	0.002**
<b>Time from illness onset to death or discharge in days mean (range)</b>	17.0 (12.0-21.0)	9.0 (6.0-15.0)	19.0 (15.25-22.0)	0.000**
<b>ICU length of stay in days mean (range)</b>	3.0 (1.0-7.0)	7.0 (0.0-17.0)	5.0 (1.0-10.0)	0.004**
<b>Time from admission into hospital to death or discharge in days mean (range)</b>	13.0 (7.0-16.0)	14.0 (11.0-17.0)	3.0 (1.0-9.0)	0.015**

‡ Percentages in parentheses

\*\* Statistically significant

### Discussions

In our study population nearly one third patients who had at least one kind of coexisting chronic disease. Cardiovascular disease, endocrine system disease, and respiratory system disease were the three most common coexisting chronic diseases. There were 219 patients who had no fever at admission. Additionally, 34 of the included COVID-19 patients did not exhibit any symptoms and were found to be positive only via the results of the SARS-CoV-2 PCR test. Most patients had systemic, respiratory, and digestive symptoms. Fever, dry cough, and fatigue were the three most common symptoms. The mortality rate in our study was lower than that indicated in a previous report but higher than that reported in another study<sup>9,15</sup>. This heterogeneity is probably due to differences in the case inclusion criteria. However, our results

were closer to the mortality rate indicated by official national statistics in China<sup>15</sup>. Cumulative studies confirmed that older age was associated with poor outcomes in COVID-19 patients<sup>16</sup>. In our study, older patients were prone to have severe COVID-19 symptoms and un-improvement, and were more likely to die in hospital. In previous findings in animal studies, older animals were shown to have stronger host innate immune responses to SARS-CoV infection<sup>16</sup>. The unsatisfactory control of viral replication and more prolonged pro-inflammatory responses in older individuals due to age-dependent defects was found to lead to a marked decline in cell-mediated immune function and reduced humoral immune function, which potentially leads to poor outcomes<sup>14,17</sup>. Fever, dizziness, muscle ache, expectoration, dyspnoea, and chest tightness at admission were

also found to influence patients' improvement in hospital. Dyspnoea and unconsciousness were the only two symptoms which were associated with mortality<sup>18-24</sup>.

A recent study reported the presence of SARS-CoV-2 nucleic acid fragments in the stool samples of patients with abdominal symptoms and suggested that SARS-CoV-2 might also be transmitted via the faecal-oral route<sup>21</sup>. In our study, approximately one third COVID-19 patients had digestive symptoms, especially nausea/vomiting and diarrhoea, which is more than was reported in a previous study<sup>15</sup>. The digestive symptoms of most COVID-19 patients were mild, which seemed to be inconsistent with the pathogenicity of SARS-CoV-2. A possible explanation is that SARS-CoV-2 in the sputum of COVID-19 patients is transmitted to the digestive tract through swallowing. There, under the action of various digestive enzymes, the virulence of SARS-CoV-2 in the digestive tract is weakened and the virus is degraded into fragments that cause only mild digestive symptoms but not serious gastrointestinal damage.

### Conclusions

This retrospective study of 384 cases of COVID-19 in Mugda Medical College and Hospital, Dhaka found that the epidemic was imported and transmitted within clusters. The disease typically presented as a viral pneumonia involving both lungs, with half of cases requiring oxygen therapy. Time from onset to admission and the high proportion of mild illness suggested patients presented early in their disease course. Moving forward, we hope to continue to deliver early and optimal care, limit community transmission, and tying the case fatality to the lower end of the known range.

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### Limitations

We did not approach patients to obtain additional history or biologic samples for laboratory measurement.

### Declarations

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**Conflict of Interest:** No competing interests relevant to this study to disclose for all authors. Full forms submitted and on file for all authors.

**Ethical Approval:** All the procedures were conducted following the ethical guidelines of institution's ethical committee (Institutional Review Board) at Mugda Medical College Hospital, Bangladesh (Memo No/MUMC/2020/597). The ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards will be followed wherever applicable.

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