

Original Articles

An Epidemiological Study of Laboratory Confirmed COVID-19 Cases Admitted in Dhaka Medical College Hospital

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Abstract

Background: The objective of the study was to report the epidemiological characteristics of symptomatic laboratory confirmed COVID-19 patients seeking care from Dhaka Medical College Hospital (DMCH).

Methods: This observational study was conducted in department of Medicine, DMCH for the period of 2 months following ethical approval. Total 100 RT-PCR confirmed COVID-19 patients were included and interviewed. Informed written consent was ensured before participation. Collected data were entered in a predesigned case record form and subsequently analyzed by SPSS-20.

Results: Average age of presentation was 37.20 ± 10.02 (SD) years with male predominance (77%). Urban presence was in 90%. Thirty-two percent of the patients had comorbidities, with diabetes (16%) and hypertension (19%) being the most frequently observed. The most commonly observed symptoms was fever (65%), followed by cough (58%), breathlessness (42%), Dysgeusia (40%) and fatigue (33%). Mean duration of illness was 8.74 ± 4.8 (SD) days. Overall mortality was 9%. All patients were managed according to the national guidelines and only 7% required ICU support.

Conclusion: Patients were mostly middle-aged and male. Typical presentations were fever, cough, breathlessness and dysgeusia. Overall mortality was 9% among the admitted patients and requirement of ICU was 7%. Further study with large sample size is recommended to get a more precise picture.

Keywords: Symptomatic, Bangladesh, Coronavirus, COVID-19, Outbreak, Pandemic.



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Introduction

Since December, 2019, a new severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), with pneumonia like clinical presentations,¹ has emerged and progressed rapidly into a pandemic.² This novel strain was termed by world health organization (WHO) as Coronavirus Disease 2019 (COVID-19)³ with its usual presentation of severe acute

respiratory illness; fever and respiratory symptoms, such as cough, dyspnoea and shortness of breath,⁴ within close contact groups of health-care workers and family.¹ The virus can also present severe unusual manifestations as diarrhea, stroke, musculoskeletal⁴ or cardiac complications,⁵ leading to hospitalization or even death,⁶ mostly older men with comorbidities.⁷ Thus, regional clinical features are important to understand the short outcome of patient and their association with mortality, as asymptomatic and mild symptomatic cases are rising exponentially.⁸

Despite extensive efforts to prevent onward rapid spread, 213 countries and territories with 23,121,366 confirmed cases and 803,223 deaths till 22 August 2020 has been reported worldwide.⁹ In Bangladesh, from the first case identified on early march this year, 290,360 individuals have tested positive for COVID-19; 172,615 cured and 3,861 died with infection fatality rate of 1.32%, till August 22, 2020.¹⁰ Bangladesh has already entered into the community

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transmission stage as the 2nd highest of infected cases in South-east Asia after India¹¹ with an overall attack rate (AR) of 1,639 per 1 million and 100% (64/64) of districts as of 17 August, 2020. Dhaka, the capital of Bangladesh, has reported the highest number of cases with 4,147/1,000,000 AR and 1,728 deaths in Dhaka division. The 2nd highest COVID-19 AR is reported from Chattogram division (1,165/1,000,000), followed by other divisions where the lowest AR is reported from Mymensingh division (410/1,000,000).¹²

Patients of this life threatening infection were assessed through ascertainment and testing of broncho-alveolar lavage fluid utilizing whole genome sequencing, cell cultures and polymerase chain reaction (PCR).¹³ However, radiological changes with x-rays and CT scans showing multiple ground glass appearances,¹⁴ along with serological tests are needed to identify convalescent cases to aid investigations and containment efforts.¹⁵ Diagnosis might be particularly complicated in asymptomatic or pre-symptomatic young and children frequently having milder disease than adults with various co-morbidities as hypertension or diabetes.¹⁶

Unfortunately, the epidemic is still ongoing with little recent information about the epidemiology and laboratory profile of COVID-19 patients in Bangladesh. As epidemiological features vary from countries to countries, knowing the details in country scenario is utmost essential particularly for future planning and management. Therefore, the current study was designed to assess the clinical and epidemiological features of confirmed COVID-19 cases admitted in Dhaka Medical College hospital, Bangladesh. Hopefully, this present study will portraits the detailed and comprehensive scenario in this regard and will be helpful in near future.

Materials and methods

Study design, study site and selection of the patients: This observational study was conducted in Dhaka Medical College hospital (DMCH) for the period of June 01, 2020 to July 30, 2020. DMCH is a tertiary care hospital in Dhaka, Bangladesh which received patients from all over the countries irrespective of social context and has been designated for isolation and management of suspected cases of COVID-19 since April 02, 2020. The patients prom suffering from COVID-19 were primarily targeted for the study population. Patients aged >15 years, admitted into the DMCH and willing to participate of the study were included into the study. Under aged, asymptomatic RT-PCR positive cases or pregnant women were excluded from the study. Diagnosis of COVID-19 was based on the results of real-time RT-PCR using nasopharyngeal swab samples.⁷

Data collection methods: Data were collected either from patients or their attendants through direct interview by a semi-structured questionnaire. In all cases, informed written consent was ensured before participation. A preformed questionnaire was used for data collection. The questionnaire

consists of four parts: i) a brief introduction & consent statement, ii) demographic profile, iii) clinical and radiological information of the participants and iv) outcome. Initially, pretesting of the questionnaire was performed among 10 random participants, and the experience of the piloting was used to make a final adjustment before the final assessment. Hence, a total of 100 responders were finally included in the study. The date of disease onset was defined as the day when the symptom was noticed. The clinical parameters included age, sex, time and place from illness onset to hospital admission, co-morbidities (systemic hypertension, diabetes mellitus, heart disease, and chronic obstructive pulmonary disease, etc.), symptoms, clinical signs, laboratory findings and outcome were collected through the questionnaire and were evaluated by trained physicians. Outcome was designed as live or dead within the hospital admission. All collected data were recorded in structured case record form and later on accumulated and compiled.

Case definitions: Confirmed COVID-19 case was detected in according to the case definition of the National Guidelines on Clinical Management of Coronavirus Disease 2019 (Covid-19), Bangladesh.¹⁷ Here, a person with laboratory confirmation of COVID-19 infection (by RT-PCR from nasopharyngeal swab) with clinical signs and symptoms were included and interviewed.

Ethical statement: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional (Dhaka Medical College) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study formal consent was ensured. Ethical measures were taken throughout the study period to maintain a high standard of confidentiality and anonymity of the participants.

Data acquisition and statistical Analysis: The research team analyzed the medical records of patients, obtained with case record forms. The lead author reviewed the data. All of the data were then entered in to spreadsheet of the statistical software. Analysis was performed with statistical software, SPSS 20 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used during analysis, where continuous variables were expressed as the mean±standard deviation and categorical variables were expressed as count (percentage). In order to determine the association or difference independent sample t test or Chi-square test were used. To assess the factors responsible for outcome both univariate and multivariate analysis were done accordingly. All results were done with 95% CI and p value <0.05 considered statistically significant.

Results:

In this study, a total of 100 cases of RT-PCR confirmed COVID-19 were enrolled. The mean age of the respondents was 37.20±10.02 (SD). Most of the respondents were male (77%) and came from urban area (90%). Majority (34%) of

the patients had graduation and above in their education degree. Of all, 32% had one or more than one comorbidity where majority had Hypertension (HTN) (19%) and Diabetes (16%). More detailed are described in Table I.

Table 1. Socio-demographic profile of patients with COVID-19 (n=100)

Variables	Findings(n=100)
Age (Years)	37.20±10.02
15 to 20 years	3 (3)
21 to 30 years	28 (28)
31 to 40 years	30 (30)
41 to 50 years	34 (34)
51 to 60 years	3 (3)
>60 years	2 (2)
Sex	
Male	77 (77)
Female	23 (23)
Residence	
Urban	90 (90)
Rural	10 (10)
Education	
No formal education	14 (14)
Complete Primary education	20 (20)
S.S.C	18 (18)
H.S.C	14 (14)
Graduation and above	34 (34)
Occupation	
Employed	82 (82)
Unemployed	18 (18)
Income	
<25000 taka	33 (33)
25000 to 50000	46 (46)
50001 to 75000	7 (7)
>75000	14 (14)
Comorbidities*	
Absent	68 (68)
Present	32 (32)
HTN	19 (19)
Diabetes	16 (16)
Heart Disease	5 (5)
Renal disease	7 (7)
BA/COPD	5 (3.9)
Liver disease	4 (4)
Obesity	5 (5)
Hypothyroidism	3 (3)
Pregnancy	2 (2)
Cancer	1 (1)

Data is expressed mean±SD and frequency (percentage) and percentage expressed within available data.

BA- Bronchial asthma, HTN-Hypertension, DM=Diabetes Mellitus; * Multiple response

The majority had fever (65%) followed in decreasing order by cough (58%), breathlessness (46%), dysgeusia (40%), fatigue (33%), anosmia (23%), parosmia (24%), chest pain (19%), diarrhea (18%), sore throat (17%), body ache (15%), headache (13%), nausea and vomiting (10%), rhinitis (9%), shivering (8%), abdominal pain (3%) and hemoptysis (2%). The duration of symptoms was 1 to 3 weeks in 57% cases, <1 week in 38% cases, and > 3 weeks in 5% cases. Only 9% needed admission in ICU due to COVID-19 (Table II).

Table II. Clinical characteristics of patients (n=100)

Variables	Findings
Duration of illness	
Mean	8.74±4.8 days
<1 week	38 (38)
1 to 3 weeks	57 (57)
>3 weeks	5 (9)
Symptoms*	
Fever	65 (65)
Cough	58 (58)
Breathlessness	46 (46)
Dysgeusia	40 (40)
Fatigue	33 (33)
Anosmia	23 (23)
Parosmia	24 (24)
Chest pain	19 (19)
Diarrhea	18 (18)
Sore throat	17 (17)
Body ache	15 (15)
Headache	13 (13)
Nausea and/or vomiting	10 (10)
Rhinitis	9 (9)
Shivering	8 (8)
Abdominal pain	3 (3)
Hemoptysis	2 (2)
Requirement for ICU	
Yes	7 (7)
No	93 (93)

Data is expressed as frequency (percentage);

*Multiple response

Among 100 patients 91% were alive and only 9 patients (9%) died (**Figure 1**).

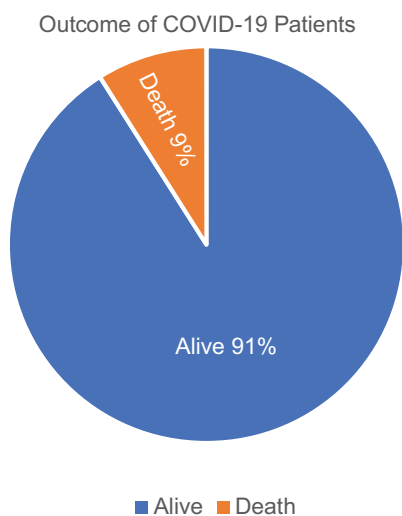


Figure 1. Outcome of COVID-19 patients (n=100)

Higher chronological age, presence of comorbidities and requirement of ICU are the factors associated with poor outcome of the COVID-19 positive patients (In all cases p value <0.01). More are described in table III.

Table 3. Factors associated with outcome of COVID-19 patients (n=100)

Factors	Outcome		P value
	Alive	Death	
Age	35.85±8.68	50.89±12.75	*<0.01
Sex			
Male	71	6	**0.341
Female	20	3	
Comorbidity			
Present	24	8	**<0.01
Absent	67	1	
ICU needed			
Yes	1	6	**<0.01
No	90	3	

Data is expressed mean±SD and frequency (percentage) and percentage expressed within available data.

*P value was determined by independent sample t test.

**P value was determined by Chi-square test.

Patients with higher age (≥37 years) (OR 5.34, 95% CI 1.051-27.02; p=0.04), presence of comorbidities (OR 22.33, 95% CI 2.65-188.03; p=0.004) and requirement of ICU (OR 720, 95% CI 41.04-12629.93; p<0.01) were associated with outcome (death) in univariate analysis but no factors were independently associated with predicting outcome (as p value >0.05 in multivariate analysis in all cases). More are described in Table IV.

Table-IV
Factors predicting outcome (Death)of the patients with COVID-19

Factors*	Univariate analysis			Multivariate analysis		
	OR	95% CI	P value	OR	95% CI	P value
Age						
> 37 years	1 (ref)			1 (ref)	0.076-	
<37 years	5.34	1.051-27.02	0.04§	0.642	5.44	0.685
Gender						
Male	1 (ref)			1 (ref)	0.001-	
Female	0.563	0.129-2.45	0.45	0.109	10.44	0.346
Occupation						
Employed	1 (ref)			1 (ref)	0.090-	
Unemployed	0.395	0.089-1.75	0.22	7.30	593.91	0.375
Education						
>SSC	1 (ref)			1 (ref)	0.147-	
<SSC	1.395	0.352-5.53	0.636	0.946	6.10	0.954
Comorbidity						
Present	1 (ref)			1 (ref)	0.072-	
Absent	22.33	2.65-188.03	0.004§	0.705	6.90	0.764
ICU needed						
Yes	1 (ref)	41.04-		1 (ref)	0.018-	
No	720	12629.93	<0.01§	0.191	2.07	0.174

* Factor analysis was done by logistic regression, §-Statistically significant (p<0.05). OD-Odds ratio CI-Confidence interval

Discussion:

Average age of the patients were 37 years. Age group distribution showed that the younger age groups were more affected than older age groups, majority (34%) of the patients were aged between 41 to 50 years. This is consistent with the data from the Institute of Epidemiology, Disease Control and Research (IEDCR), Bangladesh on COVID-19.¹⁸ Young people were more affected probably because they were in general unwilling to follow the movement restrictions by the government and maintain necessary preventive practices because they believe that precaution like hand-washing were sufficient enough to go out and ignore social distancing. This data was supported by the other study and showed that younger people are more emotionally negative, self-centered, and less concerned with family.¹⁹ Another likely reason is that our population is on average younger than that of other countries because of a lower life expectancy.²⁰ Most of the respondents were male (77%). Data from IEDCR, also revealed 71% male and 29% female.¹⁸ Being the sole bread-earner, males of a family in Bangladesh are more likely to go outside and contract the disease. This is also supported by the findings that the majority of the patients were probably affected in their workplace and market/ bazaar in our study. A study of Mowla et al. conducted in Bangladesh reported similar findings where 63% of patients were men.⁸ Another study conducted in Bangladesh by Islam et al. also observed 65.3% male.²¹ Other studies conducted in China also observed male predominance in their study.^{7, 22} Previously, during MERS-CoV and SARS-CoV outbreaks similar findings were reported.²³⁻²⁵ According to Philip Goulder theory the immune response throughout life to vaccines and infections is typically more aggressive and more effective in females compared to males and one reason is that females have two X chromosomes compared to one in males, and a number of critical immune genes are located on the X chromosome. In particular, the protein by which viruses such as coronavirus are sensed is encoded on the X chromosome. As a result, this protein is expressed at twice the dose on many immune cells in females compared to males, and the immune response to coronavirus is therefore amplified in females. Apart from the immune sex differences there are important behavioral differences between the sexes, for example in smoking, which affect the level of pre-existing disease such as heart disease, chronic lung disease and cancer. These have a huge impact on the outcome from infections such as coronavirus.²⁶

Among all, 32% had one or more than one comorbidity where majority had HTN (19%) and Diabetes (16%) followed by Heart disease (5%), Renal disease (7%) COPD/bronchial asthma (5%), Liver disease (4%), Obesity (5%),

Hypothyroidism (3%), Pregnancy (2%) and Cancer (1%). Similarly, in other studies conducted in Bangladesh and other countries, DM and HTN were found to be the two most common comorbidities among patients.^{19,20,8,27,28} Another study by Guan et al. also unveils that the most prevalent comorbidity was hypertension (16.9%), followed by diabetes (8.2%).²⁹

The majority had fever (65%) followed in decreasing order by cough (58%), breathlessness (46%), dysgeusia (40%), fatigue (33%), anosmia (23%), parosmia (24%), chest pain (19%), diarrhea (18%), sore throat (17%), body ache (15%), headache (13%), nausea and vomiting (10%), rhinitis (9%), shivering (8%), abdominal pain (3%), and hemoptysis (2%). This is consistent with findings of other studies conducted in Bangladesh also in India, Pakistan, and China.^{8, 7,22,24-27,28} Headache, fatigue, nausea and/or vomiting, diarrhea, runny nose, stuffy nose, conjunctivitis, and oral ulcer were also found in small proportions in this study. Headache, Nausea, vomiting and diarrhea were common in many other studies.^{22,24} Among 100 patients 91% were alive and only 9 patients (9%) died. Another study by Mowla et al. conducted in Bangladesh observed 10% death in the study.⁸ According to the Institute of Epidemiology, Disease Control and Research (IEDCR), between 9 March and 22 June 2020, there were fifteen thousand seven hundred and eighty six (115,876) COVID-19 confirmed by RT-PCR, including one-thousand five-hundred two (1,502) related death cases (CFR 1.30%).³⁰ India Govt. underlines recovery rate at 58%, mortality rate at 3% on 27th June 2020.³¹ Data from worldometer closed cases recovery rate was 92% and death 8%. Patients who were dead had a significantly higher mean age than that of patients who were alive (35.85±8.68 vs. 50.89±12.75 years respectively, p<0.01). Also, Death was associated with the presence of a significantly higher proportion of comorbidities (any) (24 VS 8 for alive and dead respectively, p<0.01). Overall recovery from ICU was poor and higher number of death counted in this group (1 VS 6 for alive and dead respectively p<0.01). On the other hand, death among the male are more common than female patients and it was not statistically significant. To assess the predictor of the death it was found that higher age, presence of comorbidities and requirement of ICU was significantly associated in univariate analysis but when adjusted with all factor no factors become significant. However, the result could be explained by the effect of the small size and further study with large sample size is therefore warranted before drawing any conclusion. Supporting the result, the study undertaken by Mowla et al. concluded that older age, male sex, and presence of comorbidities were significantly associated with mortality in his population.⁸ similar

phenomenon also revealed by Jain et al. He showed that elderly patients with comorbidity like COPD, cardiovascular disease, and hypertension were at higher risk of severe illness and subsequent mortality.³² Yung et al. also assessed the same issue and found that overall prevalence of comorbidities in the COVID-19 patients and found that underlying disease, including hypertension, respiratory system disease, and cardiovascular disease, could be significant risk factors for severe patients compared with non-severe patients.³³

Limitations: The study has several limitations including small sample size and data were not representative of all socioeconomic class of the country.

Conclusion:

In conclusion, it can be said that symptoms patterns are mostly dominated by fever, cough, breathlessness and alteration of smell in our population. Overall outcome is satisfactory. However, much attention should be given to the patients to provide the maximum care. Moreover, identifying asymptomatic patients are also crucial for the health system as well as for the country to reduce the transmission of SARS-CoV-2.

List of abbreviations:

COVID-Coronavirus Disease
 COVID-19-Coronavirus Disease 2019
 DMCH-Dhaka Medical College Hospital
 ERC-Ethical Review Committee
 ICU-Intensive Care Unit
 IEDCR-Institute of Epidemiology, Disease Control and Research
 PCR-Polymerase Chain Reaction
 SARS-CoV -Severe Acute Respiratory Syndrome Corona Virus
 SPSS- Statistical Software for Social Science
 SSC-Secondary School Certificate
 WHO-World Health Organization

Declarations:

Supplementary Materials: Available on request

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Conflict of Interests: None

Ethical consideration

Ethical measures were taken throughout the study period to maintain a high standard of confidentiality and anonymity of the participants. Formal ethical clearance was taken from the ethical review committee of the DMC.

Consent of Publication: All authors have agreed to publish the article by written consent.

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