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Clinico-epidemiological Characteristics of Acute Covid-19 Patients in a Tertiary Care Hospital of Dhaka, Bangladesh.

SZ HOSSAIN[a], M AKHTARUZZAMAN[b], S NUSRAT[c], S ISLAM[d], J HOQUE[e], A AHMED[f], MS ISLAM[g]

Abstract:

Background: *The COVID-19 pandemic is a catastrophe enormously affecting the whole world including Bangladesh. This disease caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) began in Wuhan, China, in December 2019, and since then has been spreading globally.*

Objectives: *To find out the sociodemographic, clinical characteristics and in-hospital outcome of patients of acute COVID-19 confirmed cases in a tertiary care hospital.*

Methodology: *It was a hospital based observational study. Consecutive samples were taken from RT-PCR positive cases (ranging from mild to severe form) admitted in COVID-19 unit of Shaheed Suhrawardy Medical College Hospital, Dhaka during the period of July 1st to August 31st 2020. Socio-demographic and clinical data were collected by using a pretested structured questionnaire. The severity of the COVID- cases was assessed based on the WHO interim guideline. Analysis was done with SPSS (Statistical Package for Social Science) version-23.*

Results: *Total 77 cases were found valid for study according to inclusion and exclusion criteria. Male patients were predominant which was 72.7%. Mean age was found 53.32±13.48 years. The mean age was significantly higher (58.82±11.74 years) in severe group. Fever, shortness of breath (SOB), cough and body ache were the most common presenting symptoms. Body ache was significantly higher in mild & moderate group than severe group. SOB and sore throat were significantly higher in severe group (53.5% vs 79.4%) and (9.3% vs 26.5%) respectively. Diabetes 29(37.7%), hypertension 18(23.4%), CKD 16(20.8%) and hypothyroidism 16(20.8%) were most frequent co-morbidities among the patients. Diabetes, CKD, hypothyroidism and COPD were significantly higher in severe group than mild & moderate group. The mean neutrophil lymphocyte ratio (NLR) was found 1.3±0.3 in mild & moderate group and 2.3±1.0 in severe group. Mean C-reactive protein was found 6.2±2.3 mg/L in mild & moderate group and 8.5±3.9 mg/L in severe group. The mean sodium was found 143.6±7.9 mEq/L in mild & moderate group and 136.5±9.8 mEq/L in severe group. The mean potassium was found 4.7±0.7 mEq/L in mild & moderate group and 3.9±1.2 mEq/L in severe group. Where X-ray chest (CXR) could reveal abnormalities only in 8 cases (10.4%); HRCT-chest was able to find out abnormalities in 56 cases (72.7%). Abnormal HRCT chest was found in 56 patients among them 48(87.3%) showed normal finding on chest x-ray. The difference was statistically significant between two groups. In HRCT chest abnormalities ground glass opacities (GGOs) was the most frequent observation in 33(58.93%) patients. GGOs was found 12(50.0%) in mild & moderate group and 21(65.63%) in severe group. Major complications were pneumonia 39(50.6%) and severe pneumonia 28(36.4%) respectively. Pneumonia was significant higher in mild & moderate group than severe group (76.7% vs 17.6%). Severe pneumonia was observed 27(79.4%) in severe group. The above-mentioned parameters were statistically significant ($p<0.05$) between two groups. 2 patients (2.6%) died among them both were in severe group and both were male.*

Conclusion: *Male sex and middle-aged population are mostly affected by the SARS-CoV-2. SOB and sore throat were significantly higher in severe group. Where facilities available strongly suspected individuals may go for HRCT-chest. High NLR and CRP as well as lower value of sodium and potassium are good predictors for the severe or critical form of disease spectrum.*

Keywords: **Clinicoepidemiological** ***characteristics, acute COVID-19.***

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a. Dr. Syed Zakir Hossain, Associate Professor, Department of Medicine, Shaheed Suhrawardy Medical College (ShSMC), Dhaka.
b. Dr. Md. Akhtaruzzaman, Registrar, Department of Medicine, Shaheed Suhrawardy Medical College Hospital (ShSMCH), Dhaka.
c. Dr. Sabiha Nusrat, IMO, Department of Medicine, ShSMCH
d. Dr. Saiful Islam, IMO, Department of Medicine, ShSMCH
e. Dr. Md. Jewel Hoque, IMO, Department of Medicine, ShSMCH
f. Dr. Akhlak Ahmed, Associate Physician, Department of Medicine, Shaheed Suhrawardy Medical College (ShSMC), Dhaka.
g. Dr. Mohammad Saiful Islam, Associate Professor, Department of Medicine, Shaheed Suhrawardy Medical College (ShSMC), Dhaka.

Address of Correspondence: Dr. Syed Zakir Hossain, Associate Professor, Department of Medicine, Shaheed Suhrawardy Medical College (ShSMC), Dhaka. Cell: 01712854764, E-mail: zakirsomc@yahoo.com

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Abbreviations: SOB: Shortness of Breath; CKD: Chronic Kidney Disease; COPD: Chronic Obstructive Pulmonary Disease; CXR:Chest X-Ray; HRCT:High Resolution Computed Tomography; GGO: Ground Glass Opacity; MOF: Multi Organ Failure; NLR: Neutrophil-to-Lymphocyte Ratio and C-RP: C-reactive protein.

Introduction:

Bangladesh is in the rising phase of the ongoing pandemic of the coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).[1]

Acute COVID-19 usually lasts until 4 weeks from the onset of symptoms, beyond which replication-competent SARS-CoV-2 has not been isolated. Post-acute COVID-19 is defined as persistent symptoms and/or delayed or long-term complications beyond 4 weeks from the onset of symptoms. [3]

The clinical presentation of COVID-19 infection varies from asymptomatic illness to severe respiratory distress and shock.[4-6] Symptomatic cases present primarily with fever and respiratory symptoms such as cough and shortness of breath and are associated with dyspnea, headache, myalgia, rhinorrhea, sore throat, nausea, and vomiting in varying proportions.[7,8] In addition, patients also exhibit neurological features, e.g. ataxia, convulsion[9] and other neurological manifestations, including ischaemic or haemorrhagic stroke, dizziness, altered mental state, Guillain-Barré syndrome, or acute necrotizing encephalopathy.[10]

Among confirmed cases of infection, 48.7% patients have required hospitalization mainly for pneumonia and adult respiratory distress syndrome (ARDS). Among patients with pneumonia- male sex, people older than 60 years, and people with CVD and/or DM are overrepresented.[11,12] Among Spanish patients the most frequent symptoms have been fever (75.7%), cough (75.5%) and dyspnoea (48.3%).[13] In 5% of hospitalized patients, the clinical course progressed to critical status requiring admission to the intensive care unit, and 2.3% have died.[14,15]

Radiographic findings in patients with pneumonia are highly variable depending on–the time elapsed since symptom onset and other factors like comorbidity.[16,17] However, the most frequent findings are bilateral lower lobe infiltrates with an interstitial or ground glass pattern, or bilateral alveolar opacities.[18,19] Alterations in laboratory values are also frequent and variable depending on disease severity. As for laboratory tests-anaemia, leucocytosis, neutrophilia, lymphopenia, and elevated creatinine, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), procalcitonin, lactate dehydrogenase (LDH), serum ferritin, troponins, and cytokines were observed.[20,21]

This study will help both the clinicians and epidemiologists to understand the magnitude and clinical spectrum of COVID- 19 patients in Bangladesh.

Methods:

It was an observational study. Consecutive samples were taken from patients (ranging from mild to severe form, as described in WHO interim guideline)[2] admitted in COVID-19 unit of Shaheed Suhrawardy Medical College Hospital, Dhaka during the period of July 1st to August 31st 2020. Medical records were obtained for hospitalized patients with laboratory-confirmed Covid-19. Covid-19 was diagnosed on the basis of the WHO interim guideline[2]. A confirmed case of Covid-19 was defined as a positive result on real-time reverse-transcriptase–polymerase-chain-reaction (RT-PCR) assay of nasal swab specimens.[1] Only laboratory-confirmed cases were included in the analysis. Socio-demographic and clinical data were collected by using a pretested structured questionnaire via face-to-face interview. 77 cases were observed for the study. The severity of the COVID- cases was assessed based on the WHO interim guideline. In this study patients were divided in two groups for making better comparison according to WHO interim guideline. One group consisted with mild and moderate cases and others with severe cases. Analysis was done with SPSS (Statistical Package for Social Science) version-23. Continuous scale data were presented as mean standard deviation and Categorical data were presented as number percentage.

Results:

Total 77 cases were studied. Fever, SOB, cough and body ache were the most common presenting symptoms. Body ache was significantly higher in mild & moderate group than severe group. SOB and sore throat were significantly higher in severe group (53.5% vs 79.4%) and (9.3% vs 26.5%) respectively. Others signs and symptoms were not statistically significant ($p>0.05$) between two groups (Table-1). Diabetes 29(37.7%),

hypertension 18(23.4%), CKD 16(20.8%) and hypothyroidism 16(20.8%) were most frequent co-morbidities among the patients. Diabetes, CKD, hypothyroidism and COPD were significantly higher in severe group than mild & moderate groups (Table-2). The mean neutrophil was found 55.1±4.5 percent in mild & moderate group and 66.6±9.3 percent in severe group. The mean lymphocyte was found 45.0±4.7 percent in mild & moderate group and 33.0±9.2 percent in severe group. The mean NLR was found 1.3±0.3 in mild & moderate group and 2.3±1.0 in severe group. The mean C-reactive protein was found 6.2±2.3 mg/L in mild & moderate group and 8.5±3.9 mg/L in severe group. The mean sodium was found 143.6±7.9 mEq/L in mild & moderate group and 136.5±9.8 mEq/L in severe group. The mean potassium was found 4.7±0.7 mEq/L in mild & moderate group and 3.9±1.2 mEq/L in severe group. The mean calcium was found 9.6±0.5 mEq/L in mild & moderate group and 9.2±0.7 mEq/L in severe group. The mean SGPT was found 29.6±3.8 U/L in mild & moderate group and 33.1±5.4 U/L in severe group. The mean D-dimer was found 0.39±0.08 ìg/mL in mild & moderate group and 0.47±0.07 ìg/mL in severe group. The mean ferritin was found 187.1±65.7 mg/mL in mild & moderate group and 221.7±64.8 mg/mL in severe group. Which were statistically significant ($p<0.05$) between two groups (Table-3). Total 56 patients had abnormal HR-CT chest findings. In HR-CT chest abnormalities GGOs was the most frequent observation in 33(58.93%) patients. GGOs was found 12(50.0%) in mild & moderate group and 21(65.63%) in severe group. That was significant between two groups (Table-4. Major complications were pneumonia 39(50.6%) and severe pneumonia 28(36.4%) respectively. Pneumonia was significant higher in mild & moderate group than severe group (76.7% vs 17.6%). Severe pneumonia was observed 27(79.4%) in severe group. That was statistically significant (Table-5).

Table-I

Signs and symptoms of the study patients (n=77)

Signs and symptoms	Total(n=77)		Mild & Moderate (n=43)		Severe (n=34)		p value
	n	%	n	%	n	%	
Fever	69	89.6	40	93.0	29	85.3	0.269
SOB	50	64.9	23	53.5	27	79.4	0.017
Cough	48	62.3	25	58.1	23	67.6	0.392
Body ache	34	44.2	25	58.1	9	26.5	0.005
Fatigue	19	24.7	8	18.6	11	32.4	0.164
Taste loss	15	19.5	7	16.3	8	23.5	0.425
Sore throat	13	16.9	4	9.3	9	26.5	0.045
Anorexia	13	16.9	6	14.0	7	20.6	0.291
Diarrhea	6	7.8	2	4.7	4	11.8	0.247
Headache	6	7.8	4	9.3	2	5.9	0.578
Palpitation	5	6.5	1	2.3	4	11.8	0.095
Sputum	5	6.5	3	7.0	2	5.9	0.846
Smell loss	5	6.5	3	7.0	2	5.9	0.846
Sweating	5	6.5	3	7.0	2	5.9	0.846
Rhinorrhoea	4	5.2	2	4.7	2	5.9	0.809
Nausea	4	5.2	3	7.0	1	2.9	0.428
Vomiting	4	5.2	4	9.3	0	0.0	0.068
Confusion	3	3.9	1	2.3	2	5.9	0.423

P value reached from Chi square

Table-II

Co-morbidities of the patients (n=77)

Co-morbidities	Total(n=77)		Mild & Moderate (n=43)		Severe (n=34)		p value
	n	%	n	%	n	%	
Diabetes	29	37.7	10	23.3	19	55.9	0.003
Hypertension	18	23.4	7	16.3	11	32.4	0.098
CKD	16	20.8	4	9.3	12	35.3	0.005
Hypothyroidism	16	20.8	5	11.6	11	32.4	0.026
COPD	13	16.9	4	9.3	9	26.5	0.045
Heart disease	12	15.6	4	9.3	8	23.5	0.087
Hypocalcemia	3	3.9	0	0.0	3	8.8	0.081

P value reached from Chi square

Table-III

Investigation profile of the patients (n=77)

Investigations	Mild & Moderate (n=43) Mean±SD	Severe (n=34) Mean±SD	P value
Neutrophil (%)	55.1±4.5	66.6±9.3	0.001
Lymphocyte (%)	45.0±4.7	33.0±9.2	0.001
Neutrophil-to-lymphocyte ratio	1.3±0.3	2.3±1.0	0.001
C-reactive protein (mg/L)	6.2±2.3	8.5±3.9	0.003
Sodium (mEq/L)	143.6±7.9	136.5±9.8	0.001
Potassium (mEq/L)	4.7±0.7	3.9±1.2	0.001
Chloride (mEq/L)	99.6±1.8	99.0±2.1	0.166
Calcium (mg/dL)	9.6±0.5	9.2±0.7	0.010
SGPT (U/L)	29.6±3.8	33.1±5.4	0.001
D-dimer (ig/mL)	0.39±0.08	0.47±0.07	0.001
Ferritin (mg/mL)	187.1±65.7	221.7±64.8	0.027

P value reached from unpaired t-test

Table-IV

Abnormalities of HR-CT chest findings of the study patients (n=56)

Abnormalities	Total(n=56)		Mild & Moderate(n=24)		Severe (n=32)		p value
	n	%	n	%	n	%	
Consolidation	16	28.57	11	45.83	5	15.63	
Crazy paving appearance	7	12.50	1	4.17	6	18.75	
GGOs	33	58.93	112	50.00	21	65.63	0.026

P value reached from Chi square

Table-V

Complication of the patients (n=77)

Complication	Total(n=77)		Mild & Moderate (n=43)		Severe (n=34)		p value
	n	%	n	%	n	%	
Pneumonia	39	50.6	33	76.7	6	17.6	0.001
Severe pneumonia	28	36.4	1	2.3	27	79.4	0.001
Organ failure	2	2.6	0	0.0	2	5.9	0.107
MOF	1	1.3	0	0.0	1	2.9	0.257
Sepsis	1	1.3	0	0.0	1	2.9	0.257

P value reached from Chi square

Discussion:

In current study male patients were predominant comprising 72.7%. Ahmed et al.[22] revealed that male was 180 (90%) and female were 21 (10%). Mowla et al.[23] also revealed 63% were male and 37% were female. Mean age was (48.97±11.74) years in mild & moderate group and (58.82±11.74) years in severe group. The mean age was significantly higher in severe group. Similar observation was found by Yang et al.[21] they reported the mean age (42.1±18.6) years in non-severe and (57.9±11.8) years in severe group. The difference was statistically significant in between two groups. Ahmed et al.[22] also revealed that 54 (27%) were in 16-25 years, 71 (35.5%) were in 26-35 years, 49 (24.5%) were in 35-45 years, 9 (4.5%) were in 46-55 years, 10 (5%) were in 56-65 years age group. Mowla et al.[23] revealed that mean age of participants was (41.7±16.3) years. The mean (±SD) age was (61.9±18.1) years and (39.42±14.49) years in dead and alive cases respectively and age was significantly ($p<0.001$) higher in dead cases. China[11] (median age: 47 years; 41.9% female), India[24] (mean age 40.3 years, 66.7% male) and other reports from Bangladesh[25] (43% were in the age range of 21 to 40 years, female: male ratio 1:2.33) revealed nearly same results. Mean age of critically ill patients was 63.8 years whereas that of non-critically ill patients was 42.5 years.[26] This difference was statistically highly significant (p value <0.001). Elderly patients with significant cardiovascular disease were prone to develop critical illness and had extremely high mortality rates.[5]

This study showed that fever, SOB, cough and ache were common presenting symptoms. Ache was significantly higher in mild & moderate group. SOB and sore throat were significantly higher in severe group (53.5% vs 79.4%) and (9.3% vs 26.5%) respectively. Others signs and symptoms were not statistically significant ($p>0.05$) in between two groups. Yang et al.[21] reported that fever (83.8%) and cough (70.9%) were the two most common symptoms. Ahmed et al.[22] showed symptoms of fever (154), cough (71), headache (27, sore throat (25), myalgia (25), respiratory distress (11), nasal discharge (11), anorexia (7), nasal blockage (10), backache (7) and diarrhoea (6). Mowla et al.[23] reported that patients got admitted predominantly with fever (69%), cough (54%), breathlessness (41%), fatigue (40%), anorexia (26%) and diarrhea (19%). Less frequent symptoms included headache, palpitation, sweating, diarrhea, nasal congestion/rhinorrhoea, anosmia, and nausea/vomiting. Breathlessness was significantly ($p<0.001$) associated with death. Other symptoms were not significantly ($p>0.05$) associated with death.

In this study we observed diabetes 29(37.7%), hypertension 18(23.4%), CKD 16(20.8%) and hypothyroidism 16(20.8%) were frequent co-morbidities. Diabetes, CKD, hypothyroidism and COPD were significantly higher in severe group than in mild & moderate groups. Yang et al.[21] reported severe cases were associated with hypertension (66.8%), diabetes (54.2%), heart failure (37.5%) and renal insufficiency (33.3%). The severe case patients showed significantly higher frequencies in the occurrence of diabetes ($p < 0.01$), hypertension ($p <0.01$) and renal dysfunction ($p <0.01$). Mowla et al.[23] showed total 51 patients (51.0%) had comorbidities namely hypertension (21%), diabetes mellitus (16%), heart diseases (8%) and renal diseases (8%) which were significantly ($p<0.001$) associated with

mortality. Hypertension and diabetes were found as most common comorbidities in our patients like the world.[33,34]

Our study showed that mean neutrophil, NLR, C-reactive protein, SGPT, D-dimer, ferritin were significantly higher ($p<0.05$) in severe group than mild and moderate group. On the other hand, mean lymphocyte, sodium, potassium & calcium were significantly lower ($p<0.05$) in severe group than mild and moderate group. Ahmed et al.[22] reported blood picture showing mean Hb (14.20±1.46) gm/dl, Total Leukocyte Count ($5.09\pm1.59\times10^9$), mean neutrophil count (54.94±10.34) $\times10^9$, mean lymphocyte count $36.29\pm9.68\times10^9$ and mean platelet count (229.22±184.47) $\times10^9$. Leucopenia was presented by 12 patients while 12 had lymphopenia. 18 patients had mild thrombocytopenia. Yang et al.[21] observed the WBC count, neutrophil-to-lymphocyte ratio, lymphocyte-to-monocyte ratio, platelet-to-lymphocyte ratio, C-reactive protein and derived neutrophil-to-lymphocyte ratio of severe patients were significantly higher than those of non-severe patients. Luo et al.[35] reported that people with low serum sodium (hyponatremia) are in an increased susceptibility to development of SARS-CoV-2 infection and the development of severe disease. In terms of white blood cells, neutrophils, lymphocytes, C-reactive protein, CK-MB, NT-ProBNP, PT, FDP, D-Dimer – it was observed a very significant difference in between critically ill and non-critically ill patients[36]. In present study 2 male patients (2.6%) died and both of them were in severe group. Ahmed et al.[21] reported that ICU support was needed in 2.5 % cases and death rate was 1% which was associated with comorbidity of CKD. Mowla et al. reported death rate was 10%.[23]

In this study 8 patients had positive x-ray findings among them 1(2.3%) in mild and moderate groups and 7(20.6%) in severe group. There was significant difference in between two groups. This study depicted total 56 patients had abnormal HR-CT chest findings. Surprisingly among them 48 (87.3%) had normal chest X-ray. Patients having abnormal HR-CT chest findings-24(55.8%) were in mild & moderate groups and 32(94.1%) were in severe group. It was statistically significant in between two groups. Li et al.[28] observed that the CT images of lungs were more serious in death cases than in patients who recovered. After treatment, lung inflammation in the recovery group was significantly improved.

In HR-CT chest abnormalities GGOs was the most frequent observation 33(58.93%) patients. Other findings were consolidation in 16 (28.57%) and crazy paving appearance in 7 (12.50%). GGOs was found 12(50.0%) in mild & moderate group and 21(65.63%) in severe group.

Major complications revealed in the present study were pneumonia 39(50.6%) and severe pneumonia 28(36.4%). Pneumonia was significantly higher in mild & moderate groups than in severe group (76.7% vs 17.6%) but severe pneumonia was observed more 27(79.4%) in severe group. Those were statistically significant. Yang et al.[21] reported that patients who exhibited mild symptoms, later few of them exhibited worse prognosis. Among them, only a few COVID-19 patients developed severe pneumonia, pulmonary edema, acute respiratory distress syndrome.[29,30] or multiple organ failure and eventually death. According to imaging findings, Zheng et al.[32] reported 79 (80%) patients who had interstitial pneumonia; 15 (15%) patients who developed acute respiratory distress syndrome. Among them, 3 (3%) patients' condition worsened within a short period of time and later died of multiple organ failure.

Conclusion:

In this series, patients were mostly middle aged and male. Fever, SOB, cough and body ache were the cardinal presenting symptoms. Body ache was significantly higher in mild & moderate group. Whereas SOB and sore throat were significantly higher in severe group. HRCT-Chest was found to be more sensitive tool of investigation than chest X-ray. So, where facilities available strongly suspected individuals may go for HRCT-chest. High NLR (Neutrophil-to-Lymphocyte Ratio) and C-reactive protein (CRP) as well as lower value of sodium and potassium are good predictors for the severe form of disease spectrum. The data in this study permit an early assessment of the epidemiological and clinical characteristics of acute COVID-19 cases of Bangladesh. Further large-scale studies are needed to obtain a full picture of the spectrum of clinical severity.

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