Original Article

Clinico-demoghraphic Profile and Outcome of Critically Ill COVID 19 Patient Admitted in the ICU of a Tertiary Care Government Hospital in Dhaka, Bangladesh

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Abstract

Background & objectives: First outbreak of corona virus disease (COVID-19) started in Wuhan, China at December 2019and since then, it spread globally but information about critically ill patients with COVID-19 is still limited. The characteristic clinical observations and outcomes of this disease (COVID-19) have been reported from different countries. So, it is important to know the demographic profile and overall outcome of COVID-19 patients. We aimed to describe the clinic-demographic characteristics and outcome of critically ill COVID-19 patients admitted into the intensive care unit of Dhaka Medical College Hospital.

Methods: This prospective observational study was carried out in the COVID non-surgical Intensive Care Unit (ICU) of Dhaka Medical College Hospital, Dhaka, Bangladesh from 2nd May to 31st December2020.Out of 549 suspected cases, 392 patients were found RT-PCR for COVID-19 positive and 157 were diagnosed as COVID patients clinically and from HRCT of chest but RT-PCR negative included in this study. After admission in ICU, all patients had been treated according to ICU protocol. Duration of ICU stay, data collection regarding demographic, clinical and laboratory parameters, management and outcome of COVID-19 patients admitted in the ICU were done. Patient outcomes were recorded as death or survival (transferred or discharged).

Results:A total of 549 patients (male 415, female 134, mean age 57.10 years) with RT-PCR for COVID-19 positive 392 and 199 clinically diagnosed covid-19 but RT-PCR negative were enrolled in this study. Regarding COVI-19 related symptoms, 98.54%(541) respiratory distress, 79.96 % (n=439) cough, 62.84% (n=345) history of fever,10.2 % (n=56) anosmia and 5.28% (n=29), lose motion. Diabetes mellitus (DM) and Hypertension was the most common co-morbidity (64.89%), Hypertension(HTN)56.46% was the second most common co-morbidity..For improvementof oxygenation of COVID patient, we treated 5.46% (n=30) by Non Re-breather Mask, 51.91% (n= 285) by High Flow Nasal Cannula (HFNC),14.20%(n=78)by non invasive mechanical ventilation(BiPAP) and28.41% (n= 156) by Invasive Mechanical Ventilation. Mean duration of ICU stay were 12.33days and range of ICU staywere 1-30 days. Among 549 COVID patient,36.24% (n=199) were transferred to the isolation ward or discharged at home and 63.75 % (n=350) were died.

Conclusion: *This study showed the overall demographic and clinical features of critically ill COVID-19 patients, admitted in the covid non-surgical ICU of Dhaka Medical College Hospital, the largest tertiary care hospital in Bangladesh. As it was a single centered study, we need more study with multi center approach to know the detail demographic profile and outcome of COVID-19 patients.*

Key words: *COVID-19, critically ill, RT-PCR, HRCT,demographic profile,co-morbidity, mechanical ventilation, outcome.*

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Introduction:

COVID-19 pandemic caused by the novel coronavirus (SARS-CoV-2), is an emerging rapidly evolving situation. At the end of 2019, a novel coronavirus was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei Province of China. The disease is designated as COVID-19, which stands for coronavirus disease 2019.[1]The virus that causes COVID-19 is mentioned severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2); previously, it was referred to as 2019-nCoV.As,this virus spread rapidly across the globe, and the WHO subsequently declared COVID-19 (Coronavirus disease 2019) as a pandemic on March 11, 2020.[2]The virus was confirmed to have spread to Bangladesh in March 2020. The first three known cases were reported on 8th March 2020,that wasconfirmed by the Institute of Epidemiology, Disease Control and Research (IEDCR) at a pressconference.Since then, the pandemic has spread day by day over the whole nation and the number of affected people has been increasing.[3]21 February 2021, there have been 110,749,023 confirmed cases of COVID-19, including 2,455,131 deaths in the world. In Bangladesh, there were 543,351 COVID-19 confirmed by rRTPCR, GeneXpert and Rapid Antigen tests including 8,349 related death supto 22 February 2021 [4].Bangladesh is 33rd most affected country in the world and accounts for 0.49% of the COVID-19 disease burden of the world.[4] During the period of national crisis, Dhaka medical College Hospital started to admit COVID-19 cases in ICU from 2ndMay, 2020. From 2nd May to 31st December, 2020, a total of 549 suspected COVID 19 cases, were admitted,who were critically ill. Among them total 392 patients were found to be RT-PCR positive and 157 were clinically covid but RT-PCR negative. In this study, the demographic profile and outcome of critically ill COVID-19 patients were evaluated. The clinical presentation and outcome of patients with COVID-19 have been variable in different countries.[5-8] Therefore, it is important to analyze and document the demographic profile and their outcome in our population. In this study we observed 549 COVID-19 patients, admitted to our ICU from this given time period.

Methods:

This prospective observational study was carried out in the non-surgicalCovid Intensive Care Unit (ICU) of Dhaka Medical College Hospital, Dhaka, Bangladesh from 1st May to 31st December, 2020. During this period, a total of 549 critically ill patients were admitted as a suspected case of COVID-19 on the basis of clinical symptoms (Respiratory distress, fever, cough,anosmia and loose motion etc). Patients are selected as confirmed covid 19 (RT-PCR positive) and Clinically covid-19i.e. symptoms of covid 19 infection with X-ray / CT chest showed covid-19 related features but PT-PCR negative. Among them 392 patients were found to be RT-PCR positive and 157 were clinically covid-19 but RT-PCR negative. Both RT-PCR positive and clinically COVID-19 patients were included in this study.Sample were collected from nasopharyngeal swab or blind tracheal aspirate(who were on mechanical ventilation). Data collection included demographics, symptoms on presentation, initial laboratory test, treatment course, length of ICU stay and outcome. The outcome was defined as survival (transferred or discharged) and death at ICU. The co-morbidities included DM, HTN, Asthma, COPD, IHD, CKD, ESRD,Parkinson's disease, SLE, GBS, Cancer, Stroke, Hypothyroidism, Dengue, CLD and obstetric complications.

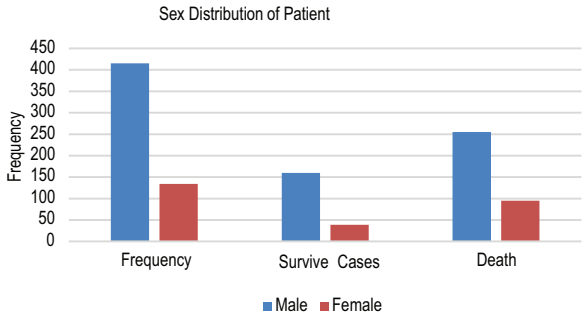
After admission to ICU, all patients were resuscitated according to ICU protocol. Here patients were treated by Injection Remdesivir, Dexamethasone, Tociluzumab, Low molecular weight heparin and by convalescent plasma. To improve oxygenation, we used Non Rebreather Mask, HFNC (High Flow Nasal Cannula),BiPAP and Mechanical Ventilation.Treatment of pre existing diseases were continued. Patients were discharged or transferred to the wardafter symptomatic, clinical and radiological improvement. Data were recorded in pretested structured data sheet and analyzed by using Statistical Package for Social Sciences (SPSS) software (version 18).

Results:

Total patients: 549
Male: 415(75.59%)
Female: 134(24.40%)
Survive : 199 (36.24%)
Death : 350 (63.75%)

Table I *Sex distribution of patient:*

Sex	Frequency	Percentage(%)	Survive	Percentage(%)	Death	Percentage(%)
Male	415	75.59%	160	38.55%	255	61.44%
Female	134	24.40%	39	29.10%	95	70.00%



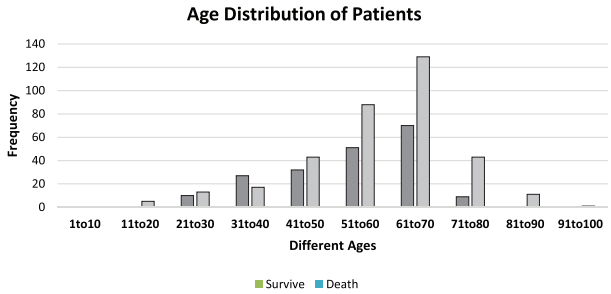


Table II *Age distributions of patients:*

Age (year)	Number of patient	Percentage (%)	Mean Age	Survive	Percentage (%)	Death	Percentage (%)
1 - 10	0			0	0	0	0
11 - 20	5	0.91		0	0	5	100.00
21 - 30	23	4.18		10	43.47	13	56.52
31 - 40	44	8.01		27	61.36	17	38.63
41 - 50	75	13.66	57.10	32	42.66	43	57.33
51 - 60	139	25.31		51	36.69	88	63.30
61 - 70	199	36.24		70	35.17	129	64.82
71 - 80	52	9.47		9	17.30	43	82.69
81 - 90	11	2.00		0	0	11	100.00
91 - 100	1	0.18		0	0	1	100.00

Table III *Catagories of covid patients*

	Frequency	Percentage
Confirmed Covid (RT-PCR positive)	392	71.40 %
Clinically Covid (RT-PCR negative)	157	28.59 %

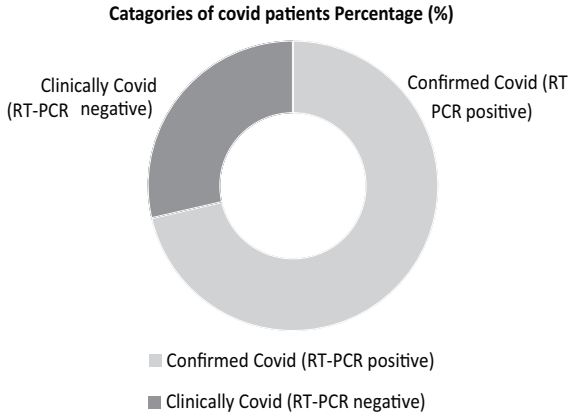


Table IV Covid related symptoms:

Symptoms	Frequency	Percentage (%)
Respiratory distress	541	98.54
Cough	439	79.96
Fever	345	62.84
Anosmia	56	10.20
Loose motion	29	5.28

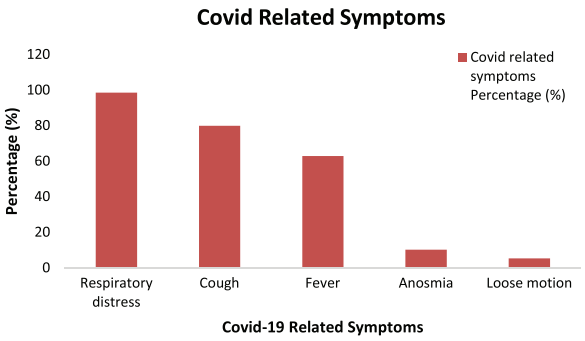


Table V
Co-morbidity of patients

Co morbidity	Frequency	Percentage(%)	Survive	Percentage (%)	Death	Percentage(%)
DM & HTN	255	46.44	60	23.52	195	76.47
DM	101	18.39	47	46.53	54	53.46%
HTN & IHD	35	6.37	27	77.14	8	22.85
HTN	20	3.64	15	75.00	5	20.00
CKD	35	6.37	6	17.14	29	82.85
ESRD	10	1.82	0	0	10	100.00%
COPD	15	2.73	3	20.00	12	80.00
Br Asthma	4	0.72	2	50.00	2	50.00%
Cancer	3	0.54	0	0	3	100.00%
Stroke	6	1.09	0	0	6	100.00%
Parkinson's disease	10	1.82	0	0	10	100.00%
GBS	1	0.18	0	0	1	100.00%
Obstetric Complication	3	0.54	0	0	3	100.00%
Hypothyroidism	2	0.36	0	0	2	100.00%
CLD	2	0.36	1	50.00	1	50.00%
Dengue	1	0.18	0	0	1	100.00%
SLE	1	0.18	0	0	1	100.00%
NO comobidity	45	8.18	38	84.44	7	15.00%

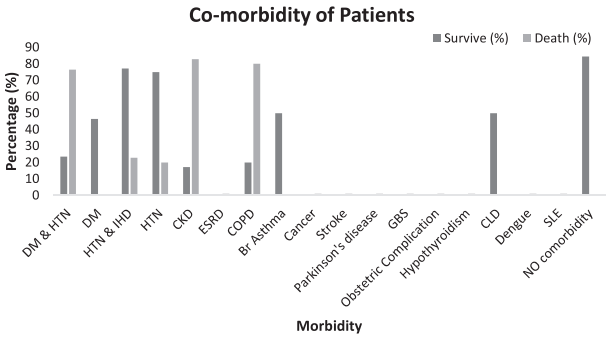


Table VI *Treatment given in ICU*

Treatment	Frequency	Percentage
Inj. Remdesivir	215	39.16
Inj. Tocilizumab	26	4.73
Plasma therapy	41	7.46
Inj. Dexamethason	525	95.62
Low molecular weight heparin	495	90.16

Table VII *Mode of oxygen delivery*

Mode	Frequency	Percentage(%)	Survive	Percentage (%)	Death	Percentage (%)
Non rebreathing Mask	30	5.46	20	66.66	10	33.33
High Flow Nasal Cannula	285	51.91	151	52.98	134	47.01
BiPAP	78	14.20	20	25.64	58	74.35
Invasive Mechanical Ventilation	156	28.41	8	5.12	148	94.87

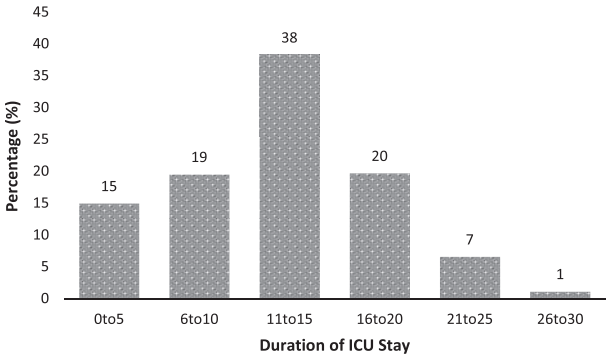


Table VIII *Dialysis required:*

Number of patient	Survive	Percentage (%)	Death	Percentage (%)
54	5	9.25	49	90.74

Table IX *Duration of ICU Stay:*

Days	Frequency	Percentage	Mean duration (Days)
0 - 5	82	14.93	
6 - 10	107	19.48	
11 - 15	210	38.25	12.33
16 - 20	108	19.67	
21 - 25	36	06.55	
26 - 30	6	01.09	

Discussion

In this study a total 392 RT-PCR positive critically ill patients and 157 clinically covid-19 were included. Among them 75.59 % (n=415) were male and 24.40 % (n= 134) were female. In our study there was significant difference in the proportion of male and female patients, which was consistent with the results of a study performed by Gaung et al inChina.Their results showed that males were more likely to be infected than females (58.1% male and 41.9% female).[9] In our study, the mostly affected aage group was 61–70 years (n=199, 36.24 %) and Mean age was 57 year. Shah P et.al shows the median age was 63 years and interquartile range, (50-72 years).[10] Regarding clinical symptoms, in our study 98.54% patientpresented with respiratory distress. In a study in Bangladesh by Ahmed NU et.al showed fever was the dominantsymptoms (n=154, 77%).[11] Fever also a dominant symptom seen by Guan et al,[9] Wang et al12,Zangh etal.[13]Ahmed N U et.al also showed 35.5% patient presented with cough. [11]In another study Xie J et alshowed the most common presenting symptoms werefever [630 (85.9%)],dry cough [550 (75%)], anddyspnoea [444 (60.7%)].[14] Ahsan ASMA et al , showed respiratory distress96.50% is the most common symptoms [16].A systematic review byRodriguez-Morales et al 25 ofdata on 656 casespublished in January and February2020 reported feverin 88.7%, cough in 57.6%, dyspnoeain 45.6%,diarrhoeain 6.1%.[15]In this study 46.44% had DM& HTN, 18.39% only DM, 6.37% HTN& IHD, 3.64% only HTN,6.37%CKD, 1.82% ESRD, 2.73% COPD, 0.72% Asthma, o.54% Cancer,1.09% Stroke, 1.82% Parkinson's disease,5.34% obstetric complications, 0.36% hypothyroidism, 0.36% CLD, 0.18% SLE,0.18% dengue and8.18% no co-morbidity. Shah Pet.al showed in their study, the most common comorbidities were HTN (n=416, 79.7%), obesity(n=347,66.5%) and DM (n=221, 42.3%). Morbidobesity were present in 25.6% of patients.[10] In anotherstudy byXie J et al showed among 733 critically illpatients, 454 had one or more co morbidities, withhypertension (42%) as the most common co morbidity,followed by diabetes (18.8%) and coronary heart disease(12.7%).[14]In this study most patient got oxygen through HFNC(51.91%) and 24.41% patient was on invasive mechanical ventilator . On invasive mechanical ventilator the survival rate was 5.12 % and mortality rate was 94.87%.Richardson, et. al. on the Northwell Health System in New York, showed,1151 patients required IMV and the reported mortality rate for patients requiring IMV is 88.1%[20]. Data from Wuhan, China reported by Zhou and colleagues found that 31 out of 32 patients (96.8%) treated with IMV died [21].Here, the maximum length of stay (LOS) inICU were 11 -15 days (38.25%) and Mean duration of ICUstay was 12.33 days. the length of ICU stay was more for those patient who survived.In a study, Shah P et.al shows Median LOS was 6 days (IQR, 4–11 days.[10]In this study, 36.24% (n=199) patients were transferredto the isolation ward or discharged at home who wereconsidered as survival and 63.75% (n=350) patients weredied, among 549 cases.In these study,100% mortality found those patient who had any of this co-morbidity ESRD,Cancer,Stroke, Parkinson's disease, GBS, Hypothyroidism,

Dengue, SLE, Obstetric complications and patient who had no co-morbidity, death rate was 15%. In this study,Young patient who died, had serous co-morbidity like obstetric complications, GBS, Dengue, SLE. Otherwise death rate increased with age.Xie J et al showed 53.8%mortality in 733 critically ill patients with COVID 19in their study.[14] Inthis study 54 patient needed haemodialysis and death rate was 90.74%.Ng *et al*.describes the experience of a health system in New York at the height of the first COVID-19 surge, noting that among 419 patients receiving maintenance dialysis who were hospitalized with COVID-19, 32% died[22].

Limitation

In this study has certain limitations like any other study.The study was short period of time. Not all laboratorytests were performed in all patients, and we were not able to include biomarkers IL-6 in our analysis. We were unable to report the initial severity of illness of our patients,.This study was limited by small sample size; with a larger sample size was needed to determine. additional associations between patient characteristics and mortalityin patients requiring an ICU admission.

Conclusion

This study described the demographics, co-morbiditiesand outcome of critically ill COVID 19 patients in theICU of a largest tertiary care government hospital, Dhaka, Bangladesh. It showed males weremore likely to be infected than females, age group were199mostly affected in this study, were 61–70 years, DM& HTN was the most common co-morbidities and Mean durationof ICU stay were 10.33 days. The overall mortalityin this study was 63.75%. As, this is a new era ofclinical study, we need more data in multicenterapproach and long term follow up to know the actualoutcome of critically ill COVID 19 patients.

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