Comorbidities and Outcome of Geriatric COVID-19 Patients Admitted to Chittagong Medical College Hospital

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Abstract

Background: The 2019 Corona Virus illness (COVID-19) is a novel disease with a notable mortality risk, and it has been noted that older adults have a higher death risk from COVID-19.There was a scarcity of studies on comorbidity patterns and outcomes of COVID-19 in Bangladeshi geriatric patients. The study aimed to investigate the comorbidities and outcomes of geriatric COVID-19 patients admitted to a tertiary hospital in Bangladesh.

Materials and methods: This prospective observational study was carried out at Chittagong Medical College Hospital (CMCH) in Six months' timeduration from 01/07/2021 to 31/12/2021. 110 RT-PCR COVID-19-positive geriatric patients admitted to CMCH during the study period were included in the study. Consecutive sampling was followed in the study. The data collected included the patient's age, sex, comorbidities, severity of illness, and outcome.

Results: The mean age was 60.0±7.4 years with a male-to-female ratio of 1.6:1. The most frequent comorbidity was hypertension (75.5%), followed by DM (68.2%), IHD (26.4%), COPD (18.2%), CKD (18.2%) and stroke (6.4%). Out of 110patients, only 5 (4.5%) patients were free from any comorbidity, 31 (28.18%) patients had single comorbidity, 40 (36.4%) patients reported having two comorbidities, and another 34 (30.9%) had 3 comorbidities. Thirty-seven (33.6%) patients expired, and seventy-three (66.4%) patients were recovered and discharged. Higher age, unvaccinated status, and higher number of comorbidities were significantly associated with mortality.

Conclusion: The current investigation verified that in older COVID-19 patients, more comorbidities and age were linked to a higher risk of death.

Key words: COVID-19; Comorbidity; Elderly; Outcome.

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Introduction

The global population is currently underwent a demographic transition, characterized by a significant increase in the proportion of older individuals. This phenomenon, known as population aging, is being observed in the majority of countries around the globe.[1] The life expectancy at birth in Bangladesh has witnessed significant growth over the years. In 1960, the average life expectancy was recorded at 47 years. However, by 2018, this figure had risen to 71 years for males and 74 years for females.[2] The rise in life expectancy has led to a corresponding increase in the senior population, hence presenting numerous issues for the nation.[3] The elderly population in Bangladesh is commonly seen as vulnerable due to their reliance on family support, disadvantaged socio-economic circumstances, limited educational attainment, inadequate access to healthcare facilities, presence of multiple health issues and absence of comprehensive social security initiatives.[4,5] Recent research has provided a comprehensive analysis of the impact of COVID-19 on older persons with Non-Communicable Diseases (NCDs), shedding light on the significant disruption of crucial public health services in Bangladesh.[6] The issue of healthcare accessibility for elderly individuals with non-communicable chronic illnesses has been a longstanding concern within Bangladeshi culture, predating the COVID-19 epidemic. Regrettably, the current global health crisis has further exacerbated this predicament.[7] Approximately 6.7% of the overall COVID-19 patient population in Bangladesh consisted of older individuals, with fatalities within this age cohort being nearly 39% of the total number of deaths.[8] As the progression of the pandemic has unfolded, there has been a notable surge in the availability of clinical data originating from Bangladesh. The objective of this study was to provide current data regarding the co morbidity profile and prognosis of COVID-19 among elderly individuals in Bangladesh. Furthermore, this study

also aimed to examine the impact of several clinical and laboratory indicators, as well as co-morbidities, on the prognosis of COVID-19 in elderly individuals.

Materials and methods

This prospective observational study was carried out at Chittagong Medical College Hospital (CMCH) in Six months' time duration from 01/07/2021 to 31/12/2021. 110 RT-PCR COVID-19 positive geriatric patients admitted to CMCH during the study period was included in the study. Consecutive sampling was followed in the study. Patients admitted to the COVID block with confirmed COVID-19 (Positive RT-PCR of a nasopharyngeal swab and age: 60 years or more were included in this study.

Study was conducted after getting approvals from the Ethical Review Committee of Chittagong Medical College. Participation was voluntary. Written informed consent was obtained from the patients or care givers of the patients after a full explanation of the study procedure and purposes. All measures were taken to maintain data confidentiality.

Results

In the study, 130 patients were screened for the eligibility in the study. Twenty of them were excluded for not meeting the eligibility criteria, and the rest 110 were included in the study.

The most frequent co morbidity in the studied patients was hypertension (75.5%), followed by DM (68.2%), IHD (26.4%), COPD (18.2%), CKD (18.2%), and stroke (6.4%) (Table I).

Table I Co morbidity pattern among the study patients (n=110)

Co morbiditypatterns	Frequency	Percentage
Hypertension	83	75.5
Diabetes mellitus	75	68.2
Ischaemic heart disease	29	26.4
Chronic obstructive pulmonary disease	20	18.2
Chronic kidney disease	13	11.8
Stoke	7	6.4
Malignancy	1	0.9
Tuberculosis	1	0.9
Chronicliver disease	1	0.9

During admission, majority of the patients were either in moderate (56/110, 50.9%) or in severe (51/110, 46.4%) clinical stage of the diseases. Only, 3 (2.7%) of the patients were in critical stage (Figure 1).

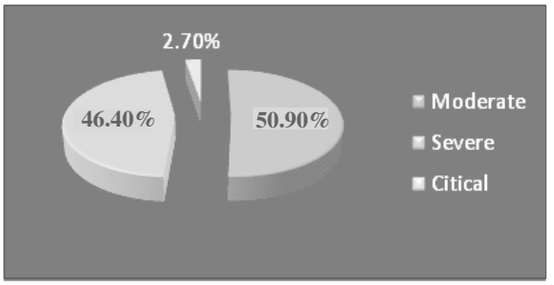

Figure 1 Clinical severity grading of the patients (n=110)

The most frequent complications were respiratory failure, ARDS, and MOF/Shock in the studied patients and 30 (27.3%) patients needed ICU support.

Table II In-hospital complications of the patients (n=110)

Variables	Frequency	Percentage
Complications		
Respiratory failure	43	39.1
ARDS	29	26.4
AMI/HF	2	1.8
AKI	9	8.2
MOF/Shock	27	25.5
ICU requirement	30	27.3

Out of 110 included patients 37 expired in hospital giving a mortality rate of 33.6%. 73 (66.4%) patients were discharged after recovery, among them 44 patients (40%) were discharged after recovery without in-hospital complications and 29 patients (26.4%) were discharged after recovery with in-hospital complications.

Table III In-hospital outcome of the patients (n=110)

Variables	Frequency	Percentage
Finaloutcome		
Recovered and discharged (With or without complications)	73 (29+44)	66.4
Deceased	37	33.6
Referral	00	00

Age played an important role as shown by the significant difference between survived and deceased patients in Table III. The difference in the proportion between the two groups varied as age increased. The proportion of deceased patients aged 60 69 was significantly smaller than that of surviving patients whereas the proportion of deceased patients aged 80 or above was significantly larger than that of surviving patients ($p = 0.016$). Sex did not appear to be a mortality risk factor as demonstrated by the insignificant

difference in the male proportion between the deceased and surviving group. None of the fully vaccinated patients died in the hospital compared to the 30 (81.1%) deceased patients who were unvaccinated. Smoking behavior did not appear to be a mortality risk factor as demonstrated by the insignificant difference in the smokers' proportion between the deceased and surviving group (p=0.847).

Table IV Demographic characteristics, vaccination status, and Smoking behavior between survived and deceased patients (n=110)

Variables	In-hospital outcome		
	Survived (n=73)	Deceased (n=37)	p value
Age groups			
60-69 years	57 (78.1)	19 (51.4)	
70-79 years	11 (15.1)	12 (32.4)	0.016
≥80 years	5 (6.8)	6 (16.2)	
Sex			
Male	46 (63.0)	22 (59.5)	
Female	27 (37.0)	15 (40.5)	0.717
accination status			
Complete	21 (28.0)	0 (0)	
Incomplete	50 (68.5)	7 (18.9)	
Unvaccinated	2 (2.7)	30 (81.1)	<0.001
Smoking status			
Non-smoker	31 (42.5)	15 (40.5)	
Ex or current smoker	42 (27.2)	22 (59.5)	0.847

The difference in the proportion between the two groups varied as the presence of hypertension and DM. The proportion of deceased patients with HTN and DM age was higher than that of surviving patients, but the difference reached statistical significance only for the presence of DM. Other individual comorbidity did not appear to be a mortality risk factor as demonstrated by the insignificant difference in the diseased proportion between the deceased and survived group. The difference in the proportion between the two groups varied as the total number of comorbidities increased. The proportion of deceased patients with ≤1 comorbidity was significantly smaller than that of surviving patients whereas the proportion of deceased patients with ≥ 3 comorbidity was significantly larger than that of surviving patients (p = 0.008).

Table V Co-morbidity pattern between survived and deceased patients (n=110)

Variables	In-hospitaloutcome		p value*
	Survived (n=73)	Deceased (n=37)	
Individual comorbidity			
Hypertension	51 (69.9)	32 (86.5)	0.056
Diabetes mellitus	44 (60.3)	31 (83.8)	0.012
Ischaemic heart disease	17 (23.3)	12 (32.4)	0.304
COPD	14 (19.2)	6 (16.2)	0.704
Chronic kidney disease	7 (9.6)	6 (16.2)	0.309
Total number of comorbidity			
≤1 comorbidity	31 (42.5)	5 (13.5)	
2 comorbidity	24 (32.9)	16 (43.2)	0.008
≥3 comorbidity	18 (24.7)	16 (43.2)	

Table 6shows that the mean pulse rate, temperature, respiratory rate, and neutrophil percentage were significantly higher among the deceased group than the surviving group. Similarly, the median CRP, serum ferritin, D-dimer, RBS and creatinine levels were significantly higher among the deceased group than the surviving group. The mean lymphocyte percentage was lower in the deceased group than in the surviving group.

Table VI shows that among the complicated cases, cardiac involvement (AMI / HF) resulted the highest (100%) death followed by MOF/shock (96.4%), and then, respiratory failure cases (69.7%). Patients with AKI were the largest (44.44%) group alive, followed by ARDS (37.9%). However, there are% cases with multiple complications

Table VI Outcome of the complicated patients (n=110)

Complication	Total (n)	Alive (n)	Alive (%)	Death	Death (%)
Respiratory failure	43	13	30.23%	30	69.77%
ARDS	29	11	37.93%	18	62.07%
AMI/HF	2	0	0%	2	100%
AKI	9	4	44.44%	5	55.56%
MOF/ Shock	28	1	3.58%	27	96.42%
Total					

*Multiple complications observed.

Discussion

In the present study, the most frequent comorbidity was hypertension present in three-quarters of the patients, followed by DM, IHD, COPD, CKD and stroke. Other chronic illnesses like malignancy, chronic liver diseases and tuberculosis were reported less frequently by the

study patients. Among the older COVID-19 patients, hypertension, heart and cerebrovascular diseases, and diabetes were the most prevalent comorbidities.[9] The infrequent comorbidities were coexisting infection with HIV and hepatitis B, malignancy, respiratory illnesses, renal disorders, and immune deficiencies.[10] However, estimations of cardiovascular, diabetes, and hypertension showed significant variation in the number of comorbidities, but not respiratory system disease in this study.[11] Hypertension, diabetes, and cardiovascular diseases were the most prevalent comorbidities among patients infected with COVID-19, according to a nationwide study conducted in Bangladesh that thoroughly examines the relationship and influence of concurrent illnesses and health ailments on the severity, hospitalization and outcome in older individuals with the virus.[12]

In global public health, the simultaneous presence of chronic diseases in older people is a common issue.[13] An individual suffering from at least three illnesses with distinct pathologies and no mutual reliance at the same time is said to have more than three chronic diseases, accounting for over half of older people in developed nations.[14] Studies in Bangladesh suggest that more than 50 percent of hospitalized older adults have two or more chronic diseases. Present study findings confirmed these pictures of high burden of comorbidity in hospitalized elderly COVID-19 patients. Out of 110 patients, only 5 (4.5%) patients were free from any comorbidity in the present study. Forty (36.4%) patients reported having twocomorbidities, another 34 (30.9%) had three or more comorbidities and 31 (28.18%) patients had single comorbidity. 68.8% of participants in the Li et al. research 26 had one or more comorbidities.The study found that COPD, diabetes, hypertension and cardiovascular disease were the most often occurring comorbid illnesses.[15]

During admission, the majority of the patients were either in moderate (50.9%) or in the severe (46.4%) clinical stage of the diseases, and only, 2.7% of the patients were in the critical stage.[16] The admission staging of the patients depends on the hospital policy. According to Liu et al. study, the majority of cases (64.7%) had been categorized as mild at admission, 33 percent as severe and 2% as critical.[17]

The current study's heightened death rate of 33.6% (37/110) is in keeping with other earlier studies on COVID-19 patients, which highlight the significant influence of age on death and fatality ratios across the lifetime, leading to much higher death rates in the elderly.[18-20]

The present investigation improved our knowledge of mortality in elderly patients based on age stratification. The percentage of patients who passed away between the ages of 60 and 69 was considerably lower than the percentage of patients who survived, whereas the percentage of patients who passed away at the age of 80 or beyond was significantly higher.According to a new study, morality was considerably higher among unvaccinated COVID-19 study participants than among vaccinated participants (11.17% vs. 1.53%), which examined hospitalization and mortality rates among COVID-19 patients in Bangladesh based on vaccination status.[21] The current investigation emphasized the significance of COVID-19 vaccinations in lowering mortality and validated these findings in elderly patients. The negligible difference in the number of ex- or current smokers between the death and surviving group suggests that smoking habit was not found to be a risk factor for mortality.The available data point to a potential negative effect of smoking on hospitalized COVID-19 patients' illness severity and mortality, which is especially noticeable in younger individuals without diabetes.The results of this study, which lacked a control group, may provide some insight into the relationship between comorbidities and mortality among COVID-19 patients 60 years of age or older. The current investigation found that COVID-19 elderly people with comorbidities had a dismal prognosis, in line with the research that is currently accessible.[22-23] Compared to the number of patients who survived, the percentage of DM patients who died was noticeably greater.In comparison to surviving patients, the share of deceased patients with 1 comorbidity was considerably lower, while the number of deceased patients with 3 comorbidity was substantially greater.

Limitations

The major limitation of this study lies in its descriptive design, It would be better if we could do an analytical study from the geriatric

population with COVID-19. Another limitation of this study was small sample size. However, we believe that this study will enrich our knowledge on the effects of COVID-19 among the neglected older adults and will guide us to prepare a strategy to improve thecare of the elderly in any future epidemic condition.

Conclusion

In conclusion, the study confirmed that elderly patients of COVID-19 have a high comorbidity burden and higher mortality rate. The most frequent comorbidities were hypertension, diabetes, and IHD. Higher age, unvaccinated status, higher number of comorbidities, elevated pulse rate, temperature, respiratory rate, neutrophil percentage, CRP, serum ferritin, D-dimer, RBS and creatinine levels were risk factors for mortality for the elderly patients of COVID-19.

Recommendation

Further analytical studies on large populations from differient centres are recommended for actual picture of the country.

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Contribution of authors

MHA-Conception, acquisition of data, drafting & final approval.

RC-Data analysis, critical revision & final approval.

TT-Interpretation of data, drafting & final approval.

MAH-Design, interpretation of data, critical revision & final approval.

Disclosure

All the authors declared no competing interest.

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