Impact of Comorbidities on Covid-19 Positive Cases Admitted in ICU at Shaheed Sheikh Abu Naser Specialized Hospital, Khulna, Bangladesh

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Abstract

Background: The ongoing pandemic COVID-19 is more serious for people with comorbidities and the elderly people. Comorbidities such as hypertension, diabetes, cardiovascular disease, and chronic liver disease affect the majority of COVID-19 patients. COVID-19 affected patients having comorbidities are often admitted to ICU for proper treatment. The aim of this study was to evaluate the impact of co-morbidities on Covid-19 Positive Cases Admitted to ICU. **Material & Methods:** This cross-sectional study was conducted in the Department of Anesthesia and ICU, Shaheed Sheikh Abu Naser Specialized Hospital, Khulna, Bangladesh, during the period from June 2020 to July 2021. A total of 87 patients with covid-19 positive admitted to ICU were included in this study. **Results:** The majority of the study people were in the age group of 60-69. Most of the study people were male in with co-morbidities group (52.87%) and were female in without co-morbidities group (5.75%). Among 87 patients, 78 (89.6%) had different types of co-morbidities. More than half of the study people (64.37%) had diabetes. We found that the majority of the patients (77.30%) stayed in ICU for less than 15 days. 80.95% of patients with hypertension had to stay in ICU for less than 15 days. Among the patients with diabetes, 73.21% stayed in ICU for less than 15 days. About 8.97% of patients with diabetes were discharged from the hospital. 2.56% of patients with hypertension and diabetes were referred to another hospital. Among the death patients, 58.97% had diabetes and 43.59% had hypertension. **Conclusions:** Patients with comorbidities were more severely affected and had a higher mortality rate. Age, diabetes mellitus, and hypertension were the main factors affecting the survival of patients.

INTRODUCTION

The seventh human coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was found in Wuhan, Hubei Province, China, during a recent pneumonia outbreak in January 2020.[1,2] Since then, the virus has spread over the world, with 528,816,317 confirmed

cases of COVID-19 and 6,294,969 fatalities as of 3 June 2022.[3] Comorbidities such as hypertension, diabetes, cardiovascular disease, and chronic liver disease affect the majority of COVID-19 patients.[4,5,6] In hospitalized patients with the Middle East respiratory syndrome coronavirus (MERS-CoV) infection, the presence of comorbidities has been linked to a significant fatality rate.[7,8] Comorbidities were found to be strong predictors of poor outcome in H7N patients.[9,10] Several clinical investigations on individuals with influenza or severe acute respiratory syndrome coronavirus (SARS-CoV) infections have reached similar conclusions.[11,12,13] Elderly persons are more prone to get infected, and many of them suffer from chronic illnesses.[14] While they have a low level of illness resistance, they are more likely to acquire major cases and have negative consequences.[15,16] Diabetic patients have higher rates of morbidity and death, as well as hospitalization and intensive care unit (ICU) admissions.[17] COVID-19 was used to study 344 patients in the ICU in China. With a median survival of 25 days, 133 of the 344 patients died on the 28th day.[18] There were a lot of comorbidities among these individuals, with 141 of them having hypertension. The median length of stay in the hospital for a negative test result was 12 days among survivors. Furthermore, another research done in China looked at 633 COVID-19 patients, 247 of whom had at least one comorbidity, and found that those over the age of 60 were more likely to have a more severe type of COVID-19 disease.[19] During the trial, 25 patients with a median age of 69.3 years died, resulting in a 3.77 percent effective fatality rate. Multiple studies have found that advanced age (>65 years), male sex, and comorbidities are all independent risk

factors for the severity of COVID-19 illness and death.[20,21,22] According to other research, 20 percent to 51 percent of COVID-19 patients had at least one comorbidity, with hypertension (21.1%) and diabetes (9.7%) being the most frequent, followed by cardiovascular disease (8.4%) and respiratory disorders (8.4%). (1.5 percent).[22,23] Hypertension, diabetes, chronic obstructive pulmonary disease (COPD), and malignant tumors were found to be risk variables for COVID-19 severity (ICU transfer and endotracheal intubation) and mortality in a recent study.[24] Given COVID-19's rapid spread and high mortality, it's critical to comprehend the potential risk factors influencing its advancement. This study was aimed to evaluate the impact of co-morbidities on Covid-19 Positive Cases Admitted in ICU.

MATERIAL AND METHODS

This cross-sectional study was conducted in the Department of Anesthesia and ICU, Shaheed Sheikh Abu Naser Specialized Hospital, Khulna, Bangladesh, during the period from June 2020 to July 2021. Total 87 patients with covid-19 positive admitted in ICU were included in this study. Total 87 patients with covid-19 positive admitted in ICU were included in this study. Among 87 patients, 78 had different types of co-morbidities. Consent of the patients and guardians were taken before collecting data. After the collection of data, all data were checked and cleaned. After cleaning, the data were entered into the computer and statistical analysis of the results being obtained by using windows-based computer software devised with Statistical Packages for Social Sciences version 22. After compilation, data were presented in the form of tables, figures and charts, as necessary. Numerical variables were

expressed as mean and standard deviation, whereas categorical variables were counted with percentages The correlations and significance were calculated as a Chi-square test. P-value of less than 0.05 was considered statistically significant.

Inclusion criteria:

- All individuals diagnosed with covid-19 and transferred to ICU
- Age group <30 to >90

Exclusion criteria:

- Individuals with a negative in the diagnosis of covid-19
- Patients who were not transferred to ICU

RESULTS

This study was conducted on 87 patients with covid-19 positive admitted in ICU were included in this study. The majority of the study people were in the age group of 60-69 (Table-I). Most of the study people were male in with co-morbidities group (52.87%) and were female in without co-morbidities group (5.75%) (Table-I). Among 87 patients, 78 (89.6%) had different types of co-morbidities (Figure-1). Table II shows that more than half of the study people (64.37%) had diabetes followed by hypertension (48.28%). Initial vital signs are shown in Table III. Table-IV shows the co-relation of co-

morbidities with ICU length of stay. We found that the majority of the patients (77.30%) stayed in ICU for less than 15 days. 80.95% of patients with hypertension had to stay in ICU for less than 15 days. Among the patients with diabetes, 73.21% stayed in ICU for less than 15 days. Table V shows the impact of co-morbidities on ICU outcomes. About 8.97% of patients with diabetes were discharged from the hospital. 2.56% of patients with hypertension and diabetes were referred to another hospital. Among the death patients, 58.97% had diabetes and 43.59% had hypertension. Table-VI shows the Covid-19 therapy given to the study people with co-morbidities. Most of the patients with chronic cardiac disease (12.82%) were treated with remdesivir. More than half of the people with hypertension (53.85%) were treated with anticoagulants. Around 7.69% of patients with asthma were treated with remdesivir. More than half of the study people with chronic kidney disease (67.95%) were treated with remdesivir. More than two-thirds of patients with diabetes (70.51%) were given an anticoagulant. Patients with malignancy were mostly treated with corticosteroids and anticoagulants. About half of the study people with hypothyroidism (48.72%) were given remdesivir. Patients with CVD were mostly torn with corticosteroidand anticoagulantst. In this study, no value was statistically significant.

Table 1: Demographic characteristics (n=87)

Characteristics		Comorbidities				P-value
		Yes		No		
		n	%	n	%	
Age	<30	0	0.00	1	1.15	0.046
	30-39	6	6.90	0	0.00	
	40-49	6	6.90	0	0.00	

	50-59	11	12.64	3	3.45	
	60-69	28	32.18	5	5.75	
	70-79	19	21.84	0	0.00	
	80-89	5	5.75	0	0.00	
	≥90	3	3.45	0	0.00	
Sex	Male	46	52.87	4	4.60	0.486
	Female	32	36.78	5	5.75	
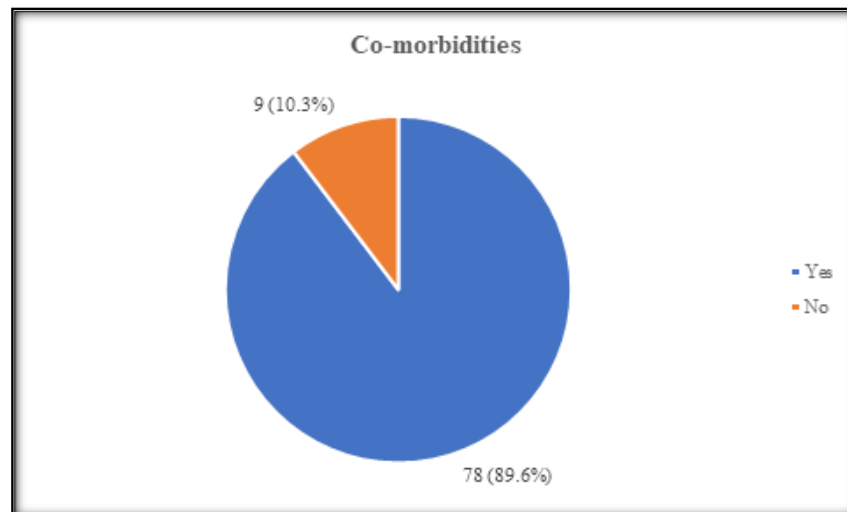
Figure 1: Co-morbidities among the study people

Table 2: Types of comorbidities (n=78)

Comorbidities	n	%
Chronic cardiac disease	3	3.45
Hypertension	42	48.28
Asthma	5	5.75
Chronic kidney disease	11	12.64
Diabetes	56	64.37
Malignancy	6	6.90
Hypothyroidism	5	5.75
CVD	10	11.49

Table 3: Initial vital signs (n=87)

Initial vital signs	Mean±SD	Range
Temperature (f°)	98.22±2.23	88-100.4
O2 saturation (%)	81.23±18.42	0.98-99
Respiratory rate	31.1±8.13	5-50
Pulse	105±8.12	40-165
Systolic BP	119.71±16.23	80-170
Diastolic BP	78.35±11.11	60-110

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Table 4: Co-relation of co-morbidities with ICU length of stay (n=78)

Co-morbidities	ICU length of stay						P-value
	<15		15-30		>30		
	n	%	n	%	n	%	
Chronic cardiac disease	5	100.00	0	0.00	0	0.00	0.489
Hypertension	34	80.95	6	14.29	2	4.76	0.335
Asthma	5	100.00	0	0.00	0	0.00	0.489
Chronic kidney disease	7	63.64	2	18.18	2	18.18	0.095
Diabetes	41	73.21	11	19.64	4	7.14	0.382
Malignancy	3	50.00	3	50.00	0	0.00	0.122
Hypotyroidism	4	80.00	1	20.00	0	0.00	1
CVD	10	90.91	1	9.09	0	0.00	0.405
Total	109	77.30	24	17.02	8	5.67	

Table 5: Impact of co-morbidities on ICU outcome (n=78)

Comorbidities	ICU outcome (n=78)								
	Discharge		P-value	Refer to another hospital		P-value	Death		P-value
	n	%		n	%		n	%	
Chronic cardiac disease	1	1.28	1.000	0	0.00	1.000	4	5.13	1.000
Hypertension	6	7.69	1.000	2	2.56	0.608	34	43.59	1.000
Asthma	2	2.56	0.138	0	0.00	1.000	3	3.85	0.227
Chronic kidney disease	3	3.85	0.349	1	1.28	0.337	7	8.97	0.204
Diabetes	7	8.97	0.748	2	2.56	1.000	46	58.97	1.000
Malignancy	0	0.00	0.590	0	0.00	1.000	6	7.69	0.357
Hypotyroidism	1	1.28	1.000	0	0.00	1.000	4	5.13	1.000
CVD	1	1.28	0.704	0	0.00	1.000	10	12.82	0.468

Table 6: Covid-19 therapy given to the study people with co-morbidities (n=78)

Co-morbidities	Therapy											
	Hydroxy Cloroquine		P-value	Remdesivir		P-value	Corticosteroid		P-value	Anticoagulant		P-value
	n	%		n	%		n	%		n	%	
Chronic cardiac disease	0	0.00	-	10	12.82	1.000	5	6.41	1.000	5	6.41	1.000
Hypertension	0	0.00	-	4	5.13	0.307	42	53.85	0.495	42	53.85	0.495
Asthma	1	1.28	0.057	6	7.69	1.000	5	6.41	1.000	5	6.41	1.000
Chronic kidney disease	0	0.00	-	53	67.95	0.662	11	14.10	1.000	11	14.10	1.000
Diabetes	1	1.28	1.000	10	12.82	1.000	55	70.51	1.000	55	70.51	1.000
Malignancy	0	0.00	-	4	5.13	0.307	6	7.69	1.000	6	7.69	1.000
Hypotyroidism	0	0.00	-	38	48.72	0.423	5	6.41	1.000	5	6.41	1.000
CVD	0	0.00	-	4	5.13	0.307	11	14.10	1.000	11	14.10	1.000

DISCUSSION

This study was conducted on 87 patients with covid-19 positive admitted in ICU were included in this study. Majority of the study people were in the age group of 60-69. The study of Zhang J et al.[19] supports the findings of our study. In another study of Dong D.[25] the median age was significantly higher in the comorbidity group (67 years; range, 58–73) than in the non-comorbidity group {56 [42–64] years, P=0.000}. Most of the study people were male in with co-morbidities group (52.87%) and were female in without co-morbidities groups (5.75%). Similar results found in the study of Ye C et al.[26] where among 856 patients, 417 (48.7%) were female and 439 were (51.3%) male. This finding shows that male people are more prone to co-morbidities. Among 87 patients, 78 (89.6%) had different types of co-morbidities. Among them, diabetes was the commonest (64.37%) followed by hypertension (48.28%). Patients with type 2 diabetes were also more likely to have increased severity of COVID-19.[27] The study of Ye C et al.[26] show different findings from our study. In their study, the commonest co-morbidity was hypertension followed by diabetes. In some studies, approximately 30% to 50% of the patients were reported to have one or more comorbidities, the most common being hypertension (30%-50%), diabetes (8%-20%), cardiovascular disease (5%-20%), chronic liver disease (1%-5%), and chronic kidney disease (1%-4%).[6,28,29,30] We found that majority of the patients (77.30%) stayed in ICU for less than 15 days. 80.95% patients with hypertension had to stay in ICU for less than 15 days. Among the patients with diabetes 73.21% stayed in ICU for less than 15 days. In the study of Dong G et al.[25] the length of hospital stay was longer in the comorbidity group than in the non-comorbidity group (P<0.05). About 8.97% patients with diabetes were discharged from hospital. 2.56% patients with hypertension and diabetes were referred to another hospital. Among the death patients, 58.97% had diabetes and 43.59% had hypertension. The study of Dong G et al.[25] shows that 27 (23.89%) patients with hypertension, 18 (31.58%) patients with diabetes 19(35.85%) with cardiovascular disease and 11(44%) with obstructive pulmonary disease died. Most of the patients with chronic cardiac disease (12.82%) were treated with remdesivir. More than half of the people with hypertension (53.85%) were treated with anticoagulant. Around 7.69% patients with asthma were treated with remdesivir. More than half of the study people with chronic kidney disease (67.95%) were treated with remdesivir. More than two third patients with diabetes (70.51%) were given anticoagulant. Patients with malignancy were mostly treated with corticosteroid and anticoagulant. About half of the study people with hypotyroidism (48.72%) were given remdesivir. Patients with CVD were mostly teared with corticosteroid and anticoagulant. In this study, no value was statistically significant.

Limitations of the study:

In our study, there was a small sample size and an absence of control for comparison. The study population was selected from one center in Khulna, so may not represent a wider population. The study was conducted over a short period of time. The sampling was retrospective and there was no random allocation, so there is a risk of selection bias.

CONCLUSIONS

Patients with comorbidities were more severely affected and had a higher mortality rate. Age, diabetes mellitus and hypertension were the main factors affecting the survival of patients.

Strengthening the management of the comorbidities and the risk factors can be effective in reducing the severity of COVID-19 as well as the future incidence of severe cases and the death rate of COVID-19.

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