



Risk Factors Associated with Severity of COVID-19 Infections Among Older Patients – A Prospective Study

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Abstract

Background: The coronavirus disease 2019 (COVID-19) is a novel coronavirus infection disease causing respiratory failure and a high death rate in vulnerable populations. Prior studies have identified age, male sex, and metabolic comorbidities, such as hypertension and diabetes as risk factors for poor outcomes in patients with COVID-19. These comorbidities are more common among older age groups, and overwhelming evidence from around the world suggests that age itself is the most significant risk factor for severe disease and death from COVID-19. The aim of this study was to determine the associated risk factors of severe COVID-19 infections among older patients. **Material & Methods:** This was a prospective study and was conducted in the Department of Pharmacology of Shaheed Syed Nazrul Islam Medical College Hospital, Kishoreganj, Bangladesh during the period from March, 2021 to March, 2022. In this study, we took 80 confirmed cases of COVID 19 positive who attended and took admission in Shaheed Syed Nazrul Islam Medical College Hospital, Kishoreganj, Bangladesh. **Results:** In our study we found majority (48.75%) of our study patients were aged between 65-74 years old, most of our patients were male (61.25%). The mean age of our patients was 76.54 ± 21.04 years. Among all patients, 89% had respiratory difficulty, 86% came with nausea & vomiting, 83% came with fever, 74% had ache all over body, 76% & 64% came with chest pain & running nose respectively. We found 51% patients with DM, 80% with CKD, 70% with respiratory failure, 49% with arrhythmia, 74% with IHD, 46% with Sepsis, 55% with acute liver injury, 26% with coagulopathy. Some risk factors co-exist among our patients. **Conclusion:** In our study, we included the elderly patients with COVID 19 associated with severe illness who had a high mortality rate. We found aged above 80 years, male gender, DM, CKD, respiratory failure, arrhythmia, IHD, Sepsis, acute liver injury are most common risk factors that triggers the severity of COVID 19 infections.

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) is a novel coronavirus infection disease causing respiratory failure and a high death rate in

vulnerable populations.^[1] COVID-19 had become a global pandemic, exhibiting as a respiratory tract illness with a high case fatality, and was initially diagnosed in December 2019 in Wuhan, China.^[2] The first case of COVID 19



in Bangladesh was detected on 8th March, 2020 and the first death due to this disease was reported on March 18, 2020.^[3] Around 539 million infected cases with 6.32 million attributed death has been reported worldwide.^[4] In Bangladesh, 1.96 million infected cases with nearly 30 thousand deaths has been reported due to this disease.^[5] COVID 19 is infectious in nature which primarily spreads through respiratory droplets through close contact.^[6] The affected person commonly exhibited symptoms like cough, sore throat, rhinorrhea, fever, shortness of breath, loss of sense of smell, dyspnea, headache; in severe cases it appears with pneumonia like symptoms which can aggravate to fibrosis of lung, respiratory failure and ultimately can cause death due to multi-organ collapse.^[7] Prior studies have identified greater age, male sex, and metabolic comorbidities, such as hypertension and diabetes as risk factors for poor outcomes in patients with COVID-19.^[8,9] These comorbidities are more common among older age groups, and overwhelming evidence from around the world suggests that age itself is the most significant risk factor for severe disease and death from COVID-19.^[9]

COVID patients can be asymptomatic carrier or symptomatic. Analysis of the symptoms showed that, nearly 80% of the patients complain cough, sore throat, fever, body ache and exhibits milder signs of pneumonia. Nearly 14% of the cases show serious symptoms such as, severe pneumonia, dyspnea, and oxygen saturation of blood below $\leq 94\%$ And around 5% of the patients show critical symptoms, such as respiratory failure, multi-organ collapse.^[10] Advanced age and comorbidities have been found to be important predictors of disease

severity, hospitalization and death of the COVID infected cases.^[11] The elderly population exhibited similar rate of infection as their younger counterpart, although, the rate of hospitalization and fatality found to be significantly higher with the advancement of age.^[11,12] Continued research attempts are striving for ascertaining the comorbidities those are more threatening to cause exacerbation of the symptoms. It had been found that, nearly half of the infected cases and three fourth of the intensive care required cases had preexistent comorbid conditions.^[10] Among these comorbidities, uncontrolled diabetes, hypertension, COPD (chronic obstructive pulmonary disease) and cardiovascular diseases found to be the commonly contributing comorbidities associated with worsened outcomes.^[12,13,14] Despite the growing of clinical experience and a rapid expansion of literature on various aspects of COVID-19, the relationship between common risk factors and COVID-19 mortality remains unknown. Hence, in this study we aimed to determine the risk factors associated with severity of COVID-19 infections among older patients.

Objective of the study

The main objective of the study was to determine the associated risk factors of severe COVID-19 infections among older patients in a tertiary care hospital.

MATERIAL AND METHODS

This was a prospective study and was conducted in the Department of Pharmacology of Shaheed Syed Nazrul Islam Medical College Hospital, Kishoreganj, Bangladesh during the period from March, 2021 to March, 2022. In this

study, we took 80 confirmed cases of COVID 19 positive who attended and took admission in Shaheed Syed Nazrul Islam Medical College Hospital, Kishoreganj, Bangladesh.

These are the following criteria to be eligible for the enrollment as our study participants: a) Patients who were aged above 65 years old; b) Patients confirmed with COVID 19 positive; c) Patients showed mild to moderate symptoms of the disease; d) Patients who were willing to participate in the study And a) Patients with incomplete clinic data b) Patients with uncontrolled DM; c) Patients with previous surgical history were excluded from our study. Statistical Analysis: All data were recorded systematically in preformed data collection form and quantitative data was expressed as mean and standard deviation and qualitative data was expressed as frequency distribution and percentage. Statistical analysis was performed by using SPSS 23 (Statistical Package for Social Sciences) for windows version 10. Probability value <0.05 was considered as level of significance.

RESULTS

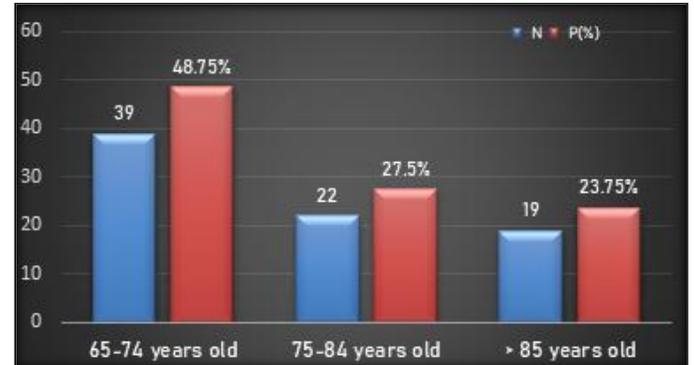


Figure 1: Age distribution of our study subjects

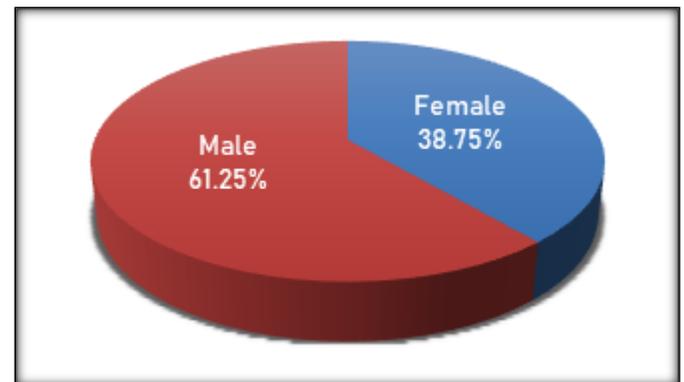


Figure 2: Gender distribution of our study population

Table 1: Baseline characteristic of our study patients.

Baseline characteristic	N	P(%)	P-value
Age (Years)			
Mean ± SD	76.54 ± 21.04		0.010
Severity at presentation			
Mild	12	15	
Moderate	19	23.75	
Severe	49	61.25	
Co-morbidities			
DM	29	36.25	
HTN	34	42.5	
Cardiac disease	21	26.25	
Renal disease	19	23.75	
COPD	16	20	
Asthma	36	45	



Auto-immune disease	31	38.75	
Neurological disease	19	23.75	
Musculoskeletal disease	14	17.5	
Clinical presentation			
Pulse	98.74 ± 29.34		0.002
Systolic blood pressure	121.39 ± 22.85		0.000
Diastolic blood pressure	89.31 ± 20.65		0.000
SPO2	67.86 ± 22.33		0.010

Table 2: Distribution of our study patients based on chief complaints.

Complaints	N	P(%)
Anorexia	35	43.75
Body ache	59	73.75
Unconsciousness / Dizziness	31	38.75
Neurological problems	24	30
GIT disturbance	22	27.5
Respiratory difficulty	71	88.75
Cough	54	67.5
Fever	67	83.75
Fatigue	62	77.5
Nausea & vomiting	69	86.25
Chest pain	61	76.25
Running nose	51	63.75

Table 3: Risk factors associated with severity of COVID 19 infections.

Risk factors	N	P(%)
ARDS	20	25
DM	41	51.25
Obesity	29	36.25
Respiratory failure	56	70
Acute myocardial infarction	31	38.75
Chronic heart failure	20	25
Arrhythmia	39	48.75
Chronic kidney disease	64	80
Acute liver injury	44	55
Gastrointestinal bleeding	29	36.25
Ischemic Heart Disease	59	73.75
Sepsis	37	46.25
Coagulopathy	21	26.25

In [Figure 1] we showed the age distribution of our patients. Majority (48.75%) of our study patients were aged between 65-74 years old, followed by 27.5% & 23.75% were aged between 75-84 & more than 85 years old respectively.

In [Figure 2] we found that majority of our patients were male (61.25%) compared to female (38.75%).

In [Table 1] we showed the baseline characteristics of our patients. The mean age of our patients was 76.54 ± 21.04 years. We found majority (61.25%) of our patients had severe infection and most of our patients had asthma(45%), HTN (42.5%), DM(36.25%) as a common co-morbidity. The mean of pulse rate, systolic blood pressure & diastolic blood pressure was found 98.74 ± 29.34 , 121.39 ± 22.85 & 89.31 ± 20.65 respectively. The mean of the blood oxygen saturation (SpO₂) was 67.86 ± 22.33 among our patients.

In [Table 2] we summarized the chief complaints of our patients. Among all patients, 89% had respiratory difficulty, 86% came with nausea & vomiting, 83% came with fever, 74% had ache all over body, 76% & 64% came with chest pain & running nose respectively.

In [Table 3] we showed the risk factors among patients with severe COVID 19 infections. We found 51% patients with DM, 80% with CKD, 70% with respiratory failure, 49% with arrhythmia, 74% with IHD, 46% with Sepsis, 55% with acute liver injury, 26% with coagulopathy. Some risk factors co-exist among our patients.

DISCUSSION

In our study we found majority (48.75%) of our study patients were aged between 65-74 years old, followed by 27.5% & 23.75% were aged between 75-84 & more than 85 years old respectively. [Figure 1]

Al Bari et al. found that COVID-19 patients who are aged above 60 years had 50.0% of mortality rate.^[15] CDC also claimed that, according to their observation, COVID infected people who are aged over 65 years, more than 81% of this disease attributed deaths occurred among them.^[16] Across the globe, the trend of the infection spreading showed to have an increase with age along with the findings that male had higher risks. The CDC surveillance data suggests that the hospitalization rate of the patients above 60 years of age is nearly 3 times more than the age group of 18 to 29 years. Additionally, the death rate also found to be nearly 25 times elevated among the age group of above 60 years than the reference group.^[11]

In this study we found that majority of our patients were male (61.25%) compared to female (38.75%). [Figure 2]

A study by Al Bari et al., reported that, case fatality is nearly 80% of the total death among male compared to nearly 20% among female.^[15]

In our study the mean age of our patients was 76.54 ± 21.04 years. We found majority (61.25%) of our patients had severe infection and most of our patients had asthma(45%), HTN (42.5%), DM(36.25%) as most common co-morbidity. The mean of pulse rate, systolic blood pressure & diastolic blood pressure was found 98.74 ± 29.34 , 121.39 ± 22.85 & 89.31 ± 20.65 respectively. The mean of the blood oxygen saturation

(SPO₂) was 67.86 ± 22.33 among our patients. [Table 1] Other research evidence showed that, people with various health conditions, such as, kidney disease, diabetes, cardiovascular disease, immunodeficiency showed conserves increased risks of being infected with aggravated symptoms.^[17,18,19,20]

In this study among all patients, 89% had respiratory difficulty, 86% came with nausea & vomiting, 83% came with fever, 74% had ache all over body, 76% & 64% came with chest pain & running nose respectively. [Table 2] The presenting was similar to that have been described CDC, that is, common symptoms of COVID 19 infection include fever, cough, and shortness of breath. Body ache and respiratory distress also could have happened.^[21] Severe symptoms of the disease include difficulty breathing, neurological phenomenon, like, loss of speech or mobility, or confusion along with chest pain.^[22]

In our study we found DM, CKD, respiratory failure, arrhythmia, IHD, Sepsis, acute liver injury as a most common risk factor that may increase severity among COVID 19 patients including age, male gender. [Table 3] Zhang et al found that patients aged 40–80 years whose risk factors for death were mainly metabolic comorbidities and reported that age, male gender were the main risk factors for death in patients aged >80 years.^[23]

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Limitations of The Study

Our study was a single centre study. We studied a few risk factors because of our limited resource and short study period. There are more prognostic factors that are associated with the severity of COVID 19 infections like cancer, CRF etc needs to be evaluated. After evaluating once those patients we did not follow-up for a long period and have not known other possible interference that may happen in the long term with these patients.

CONCLUSIONS

In our study, we included the elderly patients with COVID 19 associated with severe illness who had a high mortality rate. We tried to determine the risk factors associated with severity of COVID-19 infections among those patients. We found aged above 80 years, male gender, DM, CKD, respiratory failure, arrhythmia, IHD, Sepsis, acute liver injury are most common risk factors that triggers the severity of COVID 19 infections.

So further study with a longitudinal study design and long term follow-up including larger sample size needs to be done to identify more prognostic factors and complications to evaluate the pattern of the disease thus to get a perspective on required actions and preparations to be undertaken for any future outbreak situation.

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