Risk Factors for In-hospital Mortality from COVID-19 Infection among Black Patients – An Urban Center Experience

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Summary:

Among 419 black patients, independent risk factors for mortality were age ≥ 60 yrs., admission from a nursing facility, higher Charlson score, altered mentation, elevated C-reactive protein on admission, mechanical ventilation, and development of shock and acute respiratory distress syndrome.

Abstract

Background

Racial disparities are central in the national conversation about Covid-19. Black/African Americans are contracting and dying from COVID-19 disproportionately. We assessed risk factors for death from COVID-19 among black inpatients at an urban center in Detroit, MI.

Methods

This was a retrospective, single-center cohort study. We reviewed the electronic medical records of patients positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2, the virus that causes COVID-19) on qualitative polymerase-chain-reaction assay, who were admitted between 3/8-5/6/2020. The primary outcome was in-hospital mortality.

Results

The case fatality rate was 29.1% (122/419). The mean duration of symptoms prior to hospitalization was 5.3 (3.9) days. Patients who died were older (mean [SD] age, 68.7 [14.8] years vs 60.3 [16.0] years; p <0.0001), had dementia (35 [28.7%] vs 34 [11.4%]; p <0.0001), hemiplegia (14 [11.5%] vs 12 [4.0%]; p=0.004), malignancy (11 [9.0%] vs 12 [4.0%]; p=0.04), and moderate-severe liver disease (4 [3.3%] vs 1 [0.3%]; p=0.01). The incidence of AMS on presentation was higher among patients who died than those who survived, 43% vs. 20.0%, respectively (p<0.0001). From multivariable analysis, the odds of death increased with age (≥60 yrs.), admission from a nursing facility, Charlson score, altered mental status, higher C-reactive protein on admission, need for mechanical ventilation, presence of shock, and acute respiratory distress syndrome.

Conclusions

These demographic, clinical and laboratory factors should help healthcare providers identify black patients at highest risk for severe COVID-19-associated outcomes. Early and aggressive interventions among this at-risk population can help mitigate adverse outcomes.

Keywords: Risk factors, Predictors, mortality, COVID-19

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a novel coronavirus causing coronavirus disease 2019 (COVID-19), was first detected in the United States during January 2020.[1] As of August 7, 2020, this pandemic has caused 18,908,111 cases worldwide, including approximately 4,864,151 cases in the United States.[2] Racial disparities have become central in the national conversation about COVID-19.[3] Preliminary data from the Johns Hopkins University and American Community Survey found a 3-fold higher infection rate and 6-fold higher death rate among 131 predominantly black counties compared to 2879 predominantly white counties in the US.[4] In Michigan, 33% of COVID-19 cases and 40% of deaths have occurred among black individuals, who represent 14% of the population.[5] The Detroit area, part of Wayne county in southeast Michigan, was among the earlier metro locations to experience a sudden and rapid rise in cases. City hospitals became overwhelmed with an influx of patients from nursing facilities and the community at a time when personal protective equipment (PPE) was limited and a substantial strain on Emergency department and Intensive Care Units. This pandemic has brought health disparities into the limelight and created an opportunity to address the causes underlying these inequities.[6]

The Centers for Disease Control and Preventions (CDC) aligns underlying causes of health disparities that include social determinants of health, racism and discrimination, economic and educational disadvantages, health care access and quality, and occupation.[7] Miller et al reported significantly higher rates of COVID-19 diagnosis and death in disproportionately black counties which also had a greater incidence of diabetes, heart disease deaths and cerebrovascular deaths.[8] They also reported that 91% of disproportionately black counties in their analyses also ranked highest in unemployment, uninsured, and limited health system capacity. Because many black Americans work in service jobs (e.g., grocery store clerks), transportation (e.g., bus drivers), and health care (e.g., nurses, home health-care workers),

they are at increased risks for COVID-19 virus.[9] Only one in five black Americans have an occupation that permits working from home.[10] The Bronx, with the highest black population, lowest level of education and household median income despite the lowest proportion of older adults (aged ≥65 years) reported higher rates of hospitalization and death related to COVID-19 than the other New York boroughs.[11]

Understanding the clinical risk factors and laboratory biomarkers associated with severe and fatal COVID-19 among the black population in a community setting will allow early interventions to help mitigate adverse outcomes. Our study aims to identify risk factors for death from the COVID-19 infection among hospitalized black patients at Ascension St. John Hospital in Detroit, Michigan.

Methods

We conducted a single-center, retrospective cohort study at a 776-bed tertiary care academic medical center. The study was approved by the Ascension St John Hospital Institutional Review Board. Adult inpatients with confirmed COVID-19 (nasopharyngeal swab testing positive by real-time reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay) from March 8th to May 6th, 2020 were included.

Electronic medical records (EMR) were reviewed for all the patients meeting inclusion criteria. Data were collected on demographic factors such as age, sex, and residential nine-digit zip code. Clinical information including the presence of comorbid conditions (according to the Charlson Comorbidity Index),[12] initial vital signs, admission laboratory markers and management data were collected. The outcome analyzed was the case fatality rate (CFR) among hospitalized black patients.

Definitions:

Age was assessed as a continuous variable and then categorized both as quartiles and as < 60 years ≥ 60. Obesity and severe obesity were defined according to the CDC definitions.[13] Pre-existing renal disease was defined as chronic dialysis, history of renal transplant, uremic syndrome, or a creatinine > 3mg/dL on prior admissions. Malignancy was included if active or treated in the last five years. Fever was defined as an oral temperature of 37.8°C or higher. Acute renal injury was defined as an increase in serum creatinine by ≥0.3mg/dL (≥26.5 micromol/L) within 48 hours or an increase in serum creatinine to ≥1.5 times baseline, known or presumed to have occurred within the prior seven days.[14] COVID-19 pneumonia was defined as an acute respiratory disorder meeting at least three out of four criteria: respiratory signs/symptoms (cough/ dyspnea/ tachypnea), fever, oxygen saturation below 94%, and abnormal chest x-ray at the time of hospital admission. Uncomplicated illness, severe pneumonia, acute respiratory distress syndrome (ARDS) and shock were defined according to the World Health Organization (WHO) definitions.[15] The five-digit ZIP code was also used to collect median income from 2017 United States census data.

Statistical Analysis:

Statistical analysis was performed using SPSS v. 27.0 (Armonk, NY). Descriptive statistics were generated to characterize the study group. Continuous variables were described as the mean with standard deviation or median with interquartile range; categorical variables were described as frequency distributions. Univariable analysis was done using Student's t-test, the Mann-Whitney U test and chi-squared analysis. Variables that were found to be significant or near-significant ($p<0.09$) predictors of mortality were then entered a multivariable logistic regression model using a forward likelihood ratio algorithm. For comorbidities, we included the CWIC score instead of individual comorbidities. We separated the components of the quick sepsis related organ failure assessment (qSOFA)

because respiratory rate and mechanical intubation were highly correlated. When two variables were measuring the same underlying factor, the variable with the highest univariable measure of association was used in the model. Results from the regression are reported as odds ratios with 95% confidence intervals. All reported *p* values are two-sided.

Results:

A total of 419 hospitalized black patients with confirmed SARS-CoV-2 infections were included. The mean (SD) age of the cohort was 62.7 (16.1) years, and 211 (50.4%) were male. The mean (SD) body mass index (BMI) of the cohort was 32.7 (9.38) kg/m^2. This cohort of patients had Medicare (55.4%), Medicaid (21.5%) and commercial type (23.2%) insurances. At least one comorbidity was present in 406 (96.9%) of patients. The most common co-morbidities were hypertension (319, 76.1%), obesity (239, 57.0%), and diabetes (169, 40.3%). The mean duration of symptoms prior to hospitalization was 5.3 (3.9) days. Shortness of breath (71.6%), cough (65.6%), and fever (58.9%) were common documented symptoms at the time of admission followed by loss of appetite (26.5%), diarrhea (24.1%), nausea/ vomiting (17.1%), and loss of taste (10.2%). Pneumonia was diagnosed in 236 (56.3%) patients. ICU care was required for 101 (24.1%) patients and mechanical ventilation for 99 (23.6%). Overall, 297 (70.9%) improved clinically and survived to discharge.

The in-hospital CFR among black patients was 29.1% (122/419). Patients who died were older (mean [SD] age, 68.7 [14.8] years vs 60.3 [16.0] years; $p<0.0001$) than patients who survived. The chi-squared test for trend showed a linear trend of increasing mortality by increase in age group. (Table 1). Higher fatality was seen among patients admitted from nursing homes compared to those admitted from home 43.1% vs 24.2%; $p<0.0001$. The mean (SD) number of co-morbidities among those black patients who died was significantly higher compared to those who survived, 3.4 [1.7] vs 2.9 [1.8] years; $p=0.008$)

Patients who died were significantly more likely to have dementia, hemiplegia, moderate-severe liver disease and malignancy. The mean duration of symptoms prior to the hospitalization was shorter for patients who died compared to those survived (4.6 ± 3.8 vs 5.8 ± 4.1, respectively; p=0.002). Among patients who died, 43% had altered mental status (AMS) on presentation compared to 20.0% of those who survived (p<0.0001). Black patients who died had higher rates of severe pneumonia. Use of azithromycin, hydroxychloroquine and steroids was significantly higher among patients who died than survived. Patients who died were intubated sooner (Median [IQR] 22.8 [102.8] vs 48.4 [68.2] hours; p=0.6) than who survived. Forty-six patients (37.7%) were enrolled in hospice care.

Patients who died from COVID-19 infection had higher mean white blood cell counts (WBC) (× 10^9 per L [SD] 8.3 [4.0] vs 7.3 [3.4]; p=0.02), higher absolute neutrophil counts (ANC) (× 10^9 per L [SD] 6.7 [4.0] vs 5.5 [3.2]; p=0.004), and a lower lymphocyte counts (× 10^9 per L [SD] 1.0 [0.8] vs 1.2 [0.7]; p=0.01). Patients who died had significantly elevated procalcitonin and troponin levels on admission; however, these patients also had significantly more acute renal injury on admission which may explain these findings. Increased inflammatory response with significantly elevated C-reactive protein (CRP) levels (mean [SD] 133.7 [97.3] vs 91.2[72.3]; p <0.0001), d-dimer (Median[IQR] 2990 [15180] vs 1820 [2880]; p =0.004), and serum ferritin (Median [IQR] 818 [1162] vs 640.0 [1031.0]; p=0.015) were noted at the time of hospital admission among patients who died compared to patients who survived.

For multivariable logistic regression, variables initially entered the model included age ≥ 60 yrs., CWIC, obesity, hospital admission source, systolic blood pressure at admission, oxygen saturation on admission, maximum temperature in the first 24hours of admission, AMS, WBC counts, ANC, thrombocytopenia and lymphocytopenia on admission, creatinine on

admission, CRP on admission, total protein on admission, albumin on admission, mechanical intubation, shock, and ARDS. After nine iterations, the model with the lowest -2 log likelihood value included nine variables that were associated with increased odds of death from the COVID-19 infection, including patient age (≥60 yrs.), admission from a nursing facility, Charlson score, AMS, lymphocyte counts and CRP on admission, need for mechanical ventilation, presence of shock, and development of ARDS (Table 2).

Discussion:

In our study, the CFR among black patients was 29.1% compared to 21.6% reported from Louisiana (U.S.).[16] In comparison to that study, our cohort had older patients with mean (SD) age of 62.7 (16.1) vs 60.5 (14.8), had a higher mean Charlson Comorbidity Index score (1.6±2.1 vs 1.3±2.2) and higher proportions of Medicare and Medicaid patients (55.4% vs 43.1% and 21.5% vs 11.7%) respectively. Also, as cases increased exponentially particularly in Wayne county, available testing to confirm COVID-19 was limited with results often delayed while state health departments were serving as the only approved labs early in the pandemic. This may have led to sicker patients presenting prior to hospitalization that were not readily identified as COVID-19 positive. This likely had an impact on outcomes early in the pandemic, with black residents from the metro area most at risk due to existing racial/ethnic disparities.[17]

Among demographic factors, older age and admission from nursing home were independent risk factors associated with mortality among our black cohort. In our study, mortality was associated with older age, 74.6% patients who died were ≥60 years compared to 25.4% of patients who were <60 years. These findings agree with other studies that have reported increased in COVID-19 mortality with increasing age.[18-20] Our study also showed that patients admitted from nursing homes/ other facilities were a vulnerable population for severe

COVID-19 disease and poor outcome. In our study, 109 (26%) patients were admitted from nursing homes/ other facilities and 47 (43.1%) patients died. The early COVID-19 CFR reported from the nursing homes was as high as 33%.[21] It was suspected that 40% COVID-19 related deaths in 34/40 states have occurred in these long-term care facilities.[22]

In our cohort, clinical predictors associated with higher deaths among blacks were Charlson comorbidity index, presentation with AMS, requirement for intubation, development of shock and ARDS. The effect of multiple comorbidities (≥2) had shown to be synergistic, with a mortality of 15.4% compared to 5.6% in patients with one comorbidity.[23] In our study, the mean (SD) for number of comorbidities was 3 (1.7) and was higher among black patients who died compared to those who survived. Altered mental status on hospital admission was present in 42.6% of our patients who died in comparison to 19.9% who survived. Chen et al reported "disorders of consciousness" were more frequent in patients who died vs survived from the COVID-19 infection (20% versus 1%, respectively).[24] We hypothesized that several individual and local factors may have also influenced the observed outcomes. In additions to the reduced odds of survival because of common co-morbidities, lack of adequate healthcare and insurance along with the impact of poverty or general living conditions might have led to malnourishment and delayed presentation with severe illness.

Need for mechanical ventilation (MV) was the strongest predictor for mortality in our study. We noted that, 74 intubated patients died with a mortality rate of 60.7 % which was higher compared to 24.5%, and 35.7% reported from New York and Georgia respectively.[25, 20] Death rates in our study were comparable to 56.8% reported from the United Kingdom among those who required advanced respiratory support.[26] We also noted higher mortality among black patients who developed ARDS (78.6%) and shock requiring pressors (87.5%). This contrasts with a study of critically ill patients where mortality among patients requiring vasopressors was 71% and those who developed ARDS was 75%.[27] Our institution noted an early surge of

COVID-19 cases like New York, when ventilator and other pulmonary interventions were evolving. Also, the cohort was predominantly older and nearly 40% of studied patients were transitioned to comfort care, which may help to explain the high mortality seen in our study. Use of hydroxychloroquine, azithromycin, and steroids were strongly associated with MV so we were unable to analyze the attributable effects of these treatment modalities towards mortality.

Among laboratory biomarkers, elevated CRP on admission was associated with higher risk of death. After controlling for other variables, every unit increase in CRP increased the risk of death by 0.4% among admitted black patients. Earlier studies have shown a positive association of CRP levels with the lung lesions and severity of illness.[28, 29] Sahu et al recorded higher CRP concentrations among patients who died of COVID-19 infection compared to survivors.[30]

Our study has several limitations. This was a single institution study of admitted patients which makes generalization difficult. Because of the retrospective design, certain laboratory results were sometimes unavailable, including lactate dehydrogenase, d dimer, and serum ferritin. Patients with chronic lung disease and conditions associated with immunosuppression were only a small percentage among hospitalized patients. Therefore, the role of some of these variables in predicting the mortality from the COVID-19 infection could have been underestimated. Though data on concurrent infections was not available but our findings of significantly elevated procalcitonin and troponin levels among patients who died can be explained by significantly more acute renal injury on admission among these patients. Nonetheless, our study involved a black patient population from Detroit MI, a state with the highest case-fatality rate in the United States and can provide valuable information on the mortality factors in this population. Many unfortunate circumstances likely combined

to contribute to worse outcomes for metro Detroit residents, comprised of a higher black population at greater risk both socially and due to coexisting health conditions.

Conclusions:

Our study showed a mortality of 29.1% among hospitalized black patients resulting from COVID-19 infection. High mortality in our cohort was attributed to an older population with chronic comorbidities, higher number of patients admitted from nursing facilities, an inflammatory state with elevated CRP on admission, severe disease as evident from altered mentation on presentation, need for mechanical ventilation and presence of shock and ARDS during their illness. These demographic, clinical and laboratory findings should alert healthcare providers to identify black patients at highest risk for severe COVID-19 associated outcomes. Subsequent research with a larger database may validate our findings and aid early clinical decision making.

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Table 1. Univariable Analysis of Predictors for Death from COVID-19 Infection among black patients

Characteristic	**Total (*n*=419)**	**Survivors (*n*=297) (%)**	**Died (*n*=122) (%)**	**OR (95% CI)**	**p value**
Age groups, years					
<60	174	143 (48.1)	31 (25.4)	2.7 (1.7, 4.4)	<0.0001
≥60	245	154 (51.9)	91 (74.6)		
Age quartiles, years, *n* (%)					
<53	113	95 (32.0)	18 (14.8)		<0.0001
53-65.9	109	83 (27.9)	26 (21.3)		
66-74.9	102	67 (22.6)	35 (28.7)		
≥ 75	95	52 (17.5)	43 (35.2)		
Sex, *n* (%)					
Male	211	145 (48.8)	66 (54.1)	1.2 (0.8, 1.9)	0.33
Female	208	152 (51.2)	56 (45.9)		
Insurance, *n* (%)					
Commercial	97	84 (28.3)	13 (10.7)	3.3 (1.8, 6.2)	<0.0001
Medicare	232	150 (50.5)	82 (67.2)		
Medicaid	90	63 (21.2)	27 (22.1)		
BMI, Mean ± SD	32.7 ± 9.4	33.2 ± 8.7	31.5 ± 10.8		0.14
Median Income, Mean ±	33721.4	33316.6 ±	34709.6 ±		0.3

SD	± 12421.5	12314.4	12676.8		
Admission source					
Home	310	235 (79.1)	75 (61.5)	2.4 (1.5, 3.8)	<0.0001
Nursing facility	109	62 (20.9)	47 (38.5)		
Comorbidities, *n* (%)					
At least one comorbidity	406	287 (96.6)	119 (97.5)	1.4 (0.4, 5.1)	0.63
Myocardial infarction	34	22 (7.4)	12 (9.8)	1.4 (0.7, 2.8)	0.41
Congestive heart failure	61	37 (12.5)	24 (19.7)	1.7 (1.0, 3.0)	0.06
Peripheral vascular disease	32	23 (7.7)	9 (7.4)	0.95 (0.4, 2.1)	0.90
Cerebrovascular disease	64	47 (15.9)	17 (13.9)	0.9 (0.5, 1.6)	0.62
Dementia	69	34 (11.4)	35 (28.7)	3.1 (1.8, 5.3)	<0.0001
Chronic pulmonary disease	103	71 (23.9)	32 (26.2)	1.1 (0.7, 1.8)	0.62
Connective tissue disease	6	3 (1.0)	3 (2.5)	2.5 (0.5, 12.4)	0.26
Peptic ulcer disease	15	10 (3.4)	5 (4.1)	1.2 (0.4, 3.7)	0.72
Diabetes	169	119 (40.1)	50 (41.0)	1.0 (0.7, 1.6)	0.66
Hemiplegia	26	12 (4.0)	14 (11.5)	3.1 (1.4, 6.9)	0.004
Renal disease	77	48 (16.2)	29 (23.8)	1.6 (1.0, 2.7)	0.07
Malignancy	23	12 (4.0)	11 (9.0)	2.4 (1.0, 5.5)	0.04
Metastatic solid tumor	8	6 (2.0)	2 (1.6)	0.8 (0.2, 4.1)	0.80
Mild liver disease	7	4 (1.3)	3 (2.5)	1.8 (0.4, 8.4)	0.42
Moderate-severe liver	5	1 (0.3)	4 (3.3)	10.0 (1.1, 90.7)	0.01

disease					
AIDS	3	3 (0.8)	0 (0.0)	- -	- -
Median CWIC (25th, 75th)	1 (0,3)	1 (0,2)	2 (1,3)		<0.0001
Hypertension	319	222 (74.7)	97 (79.5)	1.3 (0.8, 2.2)	0.30
Current tobacco smoker	28	20 (6.8)	8 (6.7)	1.0 (0.4, 2.3)	0.97
Obesity	239	177 (60.6)	62 (50.8)	0.7 (0.4, 1.0)	0.07
Morbid obesity	89	66 (22.6)	23 (18.9)	0.8 (0.5, 1.4)	0.40
Home medications, *n* (%)					
Either ACEIs or ARBs	135	91 (30.6)	44 (36.1)	1.3 (0.8, 2.0)	0.28
Steroids	22	15 (5.1)	7 (5.7)	1.1 (0.5, 2.9)	0.77
History of sick contact	152	107 (38.2)	45 (39.8)	1.1 (0.7, 1.7)	0.77
Symptoms, *n* (%)					
Fever	247	182 (62.1)	65 (53.7)	0.7 (0.5, 1.1)	0.11
Shortness of breath	300	210 (71.7)	90 (75.0)	1.2 (0.7, 1.9)	0.49
Altered mental status	111	59 (19.9)	52 (42.6)	3.0 (2.0, 4.8)	<0.0001
Vitals on admission					
Systolic BP, Mean ± SD	133.0 ± 25.6	133.4 ± 24.2	132.1 ± 28.9		0.68
Systolic BP on admission					
>100 mm Hg	378	276 (92.9)	102	2.6 (1.3, 5.0)	0.004

			(83.6)		
<100 mm Hg	41	21 (7.1)	20 (16.4)		
Diastolic BP, Mean ± SD	74.0 ± 17.0	74.5 ± 16.7	72.9 ± 17.6		0.38
Heart rate, Mean ± SD	102.1 + 21.9	100.5 ± 21.8	105.9 ± 21.7		0.02
Respiratory rate, Mean ± SD	24.6 ± 7.9	23.3 ± 6.9	27.7 ± 9.0		<0.0001
Fever, *n* (%)	170	114 (38.4)	56 (45.9)	1.4 (0.9. 2.1)	0.16
Oxygen saturation, Mean ± SD	0.94 ± 0.08	0.94 ± 0.07	0.92 ± 0.09		0.006
Vitals within first 24 hours					
Temperature, Mean ± SD	38.0 ± 0.93	37.9 ± 0.92	38.1 ± 0.96		0.05
Fever, *n* (%)	226	155 (52.2)	71 (58.2)	1.3 (0.8, 2.0)	0.26
Abnormal Chest x-ray on admission, *n* (%)	331	229 (77.1)	102 (83.6)	1.5 (0.9, 2.6)	0.14
Laboratory Findings on admission, *n* (%)					
Leucopenia	45	34 (11.4)	11 (9.0)	0.8 (0.4, 1.6)	0.47

Lymphocytopenia	204	132 (44.7)	72 (59.0)	1.8 (1.2, 2.7)	0.008
Thrombocytopenia	78	47 (16.0)	31 (25.6)	1.8 (1.1, 3.0)	0.02
Elevated AST (>40 U/L)	231	152 (55.1)	79 (69.3)	1.8 (1.2, 2.9)	0.009
Elevated ALT (>40 U/L)	131	100 (35.0)	31 (26.3)	0.7 (0.4, 1.1)	0.09
Low serum protein (<6.2 gm/dl)	26	14 (4.9)	12 (10.0)	2.2 (1.0, 4.9)	0.05
Low serum albumin (<3.5 gm/dl)	186	109 (37.7)	77 (64.2)	3.0 (1.9, 4.6)	<0.0001
Elevated Serum LDH (>500 U/L)	63	37 (20.9)	26 (37.7)	2.3 (1.2, 4.2)	0.007
Elevated Serum Ferritin (>1000 ng/ml)	102	66 (35.1)	36 (45.6)	1.5 (0.9, 2.6)	0.11
Elevated D dimer (>1500 ng/ml)	90	54 (57.4)	36 (75.0)	2.2 (1.03, 4.8)	0.04
Elevated troponin (>0.05 ng/ml)	69	38 (18.9)	31 (40.8)	3.0 (1.7, 5.3)	<0.0001
CRP value at admission	103.4 ± 82.4	91.2 ± 72.4	133.7 ± 97.3		<0.0001
Elevated CRP (>10 mg/L)	361	256 (92.8)	105 (94.6)	1.4 (0.5, 3.5)	0.51
Elevated Procalcitonin (>0.10 ng/dl)	284	187 (73.0)	97 (89.0)	3.0 (1.5, 5.8)	0.001
Elevated Creatinine (from baseline)	173	106 (36.8)	67 (59.8)	2.6 (1.6, 4.0)	<0.0001

Clinical Diagnosis, *n* (%)					
Mild infection, No pneumonia	183	141 (47.5)	42 (34.4)		<0.0001
Moderate Infection, (Mild Pneumonia)	151	111 (37.4z)	40 (32.8)		
Severe Infection (Severe Pneumonia)	85	45 (15.2)	40 (32.8)		
Complications, *n* (%)					
Mechanical Intubation	99	25 (8.4)	74 (60.7)	16.8 (9.7, 29.0)	<0.0001
Time to Intubation					
<24 hrs. from hospital admission	50	12 (48.0)	38 (51.4)	0.9 (0.4, 2.2)	0.77
>24 hrs. from hospital admission	49	13 (52.0)	36 (48.6)		
ICU admission	101	26 (8.8)	75 (61.5)	16.6 (9.7, 28.6)	<0.0001
Shock requiring pressors	48	6 (2.0)	42 (34.4)	25.4 (10.4, 61.8)	<0.0001
ARDS	42	9 (3.0)	33 (27.0)	11.9 (5.5, 25.7)	<0.0001
Acute renal injury	175	95 (32.0)	80 (65.6)	4.1 (2.6, 6.3)	<0.0001
DIC	3	0 (0)	3 (2.5)		
Rhabdomyolysis	13	8 (2.7)	5 (4.1)	1.5 (0.5, 4.8)	0.47
Need for RRT	21	5 (1.7)	16 (13.2)	8.9 (3.2, 24.8)	<0.0001

Azithromycin given	273	186 (62.6)	87 (71.3)	1.5 (0.9, 2.3)	0.09
Hydroxychloroquine	285	186 (62.6)	99 (81.1)	2.6 (1.5, 4.3)	<0.0001
Steroids	213	121 (40.7)	92 (75.4)	4.5 (2.8, 7.2)	<0.0001
Mean qSOFA score	0.91 ± 0.78	0.76 ± 0.70	1.3 ± 0.82		<0.0001

Abbreviations: *n*: Number, OR: Odds ratio, CI: Confidence interval, BMI: Body mass index, SD: Standard deviation, AIDS: Acquired immunodeficiency syndrome, CWIC: Charlson weighted index of comorbidity, BP: Blood pressure, ACEI: Angiotensin converting enzyme inhibitor, ARBs: Angiotensin II receptor blockers, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase LDH: Lactate dehydrogenase, CRP: C-reactive protein, ICU: Intensive care unit, ARDS: Acute respiratory distress syndrome, DIC: Disseminated intravascular coagulation, RRT: Renal replacement therapies , qSOFA: Quick sepsis related organ failure assessment

Table 2. Multivariable analysis of Predictors for Death from COVID-19 Infection among black patients

Variables	OR (95% CI)	*p* value
Age ≥ 60 yrs.	4.2 (1.8, 9.4)	0.001
Admission from nursing facility	2.3 (1.2, 4.4)	0.02
CWIC at hospital admission	1.2 (1.04, 1.4)	0.01
C-reactive protein on hospital admission	1.004 (1.001, 1.007)	0.02
Lymphocyte counts on hospital admission	0.7 (0.4, 1.02)	0.06
Altered mental status on hospital admission	2.4 (1.3, 4.6)	0.008
Need for mechanical Intubation during the hospital course	15.5 (6.6, 36.2)	<0.0001
Shock requiring pressors during the hospital course	6.2 (2.0, 19.6)	0.002
Development of ARDS	3.2 (1.1, 8.9)	0.03

Abbreviations: OR: Odds ratio, CI: Confidence interval, CWIC: Charlson weighted index of comorbidity, ARDS: Acute respiratory distress syndrome