Clinical characteristics and predictors of mortality in African-Americans with COVID-19 from an inner-city community teaching hospital in New York

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Abstract
There is limited data on the clinical presentation and predictors of mortality in the African-American (AA) patients hospitalized with coronavirus disease 2019 (COVID-19) despite the disproportionately higher burden and mortality. The aim of this study is to report on the clinical characteristics and the predictors of mortality in hospitalized AA patients with COVID-19 infection. In this retrospective cohort review, we included all AA patients with confirmed COVID-19 infection admitted to an inner-city teaching community hospital in New York city. Demographics, clinical presentation, baseline co-morbidities, and laboratory data were compared between survivors and non-survivors. The predictors of mortality were assessed using multivariate logistic regression analysis. Of the 408 (median age, 67 years) patients included, 276 (66.65%, median age 63 years) survived while 132 (33.35%, median age 71 years) died. The most common presenting symptoms were cough, myalgia, fever/chills, shortness of breath, and gastrointestinal symptoms (nausea, vomiting, diarrhea, and abdominal pain), with a prevalence of 62.50%, 43.87%, 53.68%, and 27.21%, respectively. Age (odds ratio [OR], 1.06; confidence interval [CI], 1.04-1.08; P < .001), body mass index (OR, 1.07; CI, 1.04-1.11; P < .001), elevated serum ferritin (OR, 1.99; CI, 1.08-3.66; P < .02), C-reactive protein (OR, 2.42; CI, 1.36-4.33; P < .01), and D-dimers (OR, 3.79; CI, 2.21-6.50; P < .001) at the time of presentation were identified as the independent predictors of mortality. Cough, shortness of breath, fever/chills, gastrointestinal symptoms, and myalgia were the predominant presentation among AAs hospitalized with COVID-19 infection. Advanced age, higher body mass index, elevated serum ferritin, C-reactive protein, and D-dimers are independent predictors of mortality among hospitalized AAs with COVID-19 infection.

KEYWORDS
blood, coronavirus, pandemics
INTRODUCTION

1
The coronavirus disease 2019 (COVID-19) pandemic remains a serious threat to human life. The cause of this pneumonia has since been identified and named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which has a phylogenetic similarity to SARS-CoV.1 Though the origin of the SARS-CoV-2 is strongly believed to be zoonotic, propagation in communities and around the globe has been mainly facilitated by humans.2 Though the world ramped up efforts to contain the virus, limit its spread and curb morbidity and mortality, propagation and mortality continued at exponential rates and now officially recognized as a pandemic.3 The global mortality is reported as about 2.5%,4 but mortality among hospitalized patients is significantly higher, with preliminary reports of death rates as high as 24.5% among intubated patients in New York.5

African-Americans have been disproportionately affected in terms of incidence and mortality. The attack rate and fatality rates are disproportionately higher compared with other racial groups.6-8 Though it is highly speculated that the prevailing relatively poor health is the primary driver, evidence remains sparse and constitutes an area of ongoing research. Generally speaking, predictors of death among patients with COVID-19 remain poorly understood and elucidated. It is in this light that we set out to establish the clinical characteristics and predictors of mortality among African Americans with COVID-19 managed at an inner-city community teaching hospital in New York.

STUDY DESIGN

2
We conducted a retrospective cohort study among patients hospitalized and managed for the COVID-19 infection at an inner-city teaching hospital located in Downtown Brooklyn, New York. Our hospital serves a predominantly African-American population. At least 90% of all patients seen at our main hospital and clinics are African-Americans. Included in our study were all African-American patients admitted and managed for laboratory-confirmed COVID-19 infection with a definitive outcome (discharged or deceased) at the end of data collection.

2.1 Ethical considerations

Ethical clearance was obtained from the hospital’s IRB committee. Because our study was limited to chart review with no patient interactions, the requirement for informed consent was waived.

2.2 Data collection

Recruitment was systematic over the entire data collection period from 1st March to 9th April 2020. Demographic, social, clinical, laboratory, and radiologic data were extracted from electronic medical records and entered on an excel data collection sheet. The data collection sheet had inbuilt checks to flag probably incorrectly entered or inappropriate data prompting immediate corrective actions to limit inaccuracies. To further ensure data extraction was accurate and complete, 10% of all cases (approximately 40) were randomly assessed for validity and consistency by an independent evaluator (part of the research team) and found to be accurate.

2.3 Laboratory procedures

Nasopharyngeal swabs were obtained at the time of admission, and COVID-19 was confirmed by the qualitative SARS-CoV-2 real-time polymerase chain reaction. All laboratory methods were in accordance with prescribed standards by regulations. Laboratory tests included blood gases, lactic acid, complete blood count, coagulation profile including d-dimers, serum biochemical tests (including renal and liver function, creatine kinase, lactate dehydrogenase, and electrolytes), troponin I, interleukin-6 (IL-6), serum ferritin, and procalcitonin among others. Chest radiographs, as well as electrocardiograms, were obtained for all patients at the time of presentation. Inpatient management was mainly supportive with respiratory assistance and management of associated morbidities as directed by the treating physicians. Patients were either discharged when clinically stable or if they died during the course of hospitalization. Negative virologic results were not a pre-requisite for discharge.

STATISTICAL ANALYSIS

3
Continuous and categorical variables are presented as median (interquartile range) and frequency (%), respectively. We used the Mann-Whitney U test, χ² test, or Fisher’s exact test to compare differences between survivors and non-survivors where appropriate. To identify predictors of in-hospital mortality, univariable and multivariable binary logistic regression were sequentially applied. We adopted a stepwise approach in building the ultimate multivariate model for identifying predictors of mortality. First, from univariate analysis, we retained for multivariate models all variables with P values of ≤.10. We then proceeded to establishing an intermediate “mini” multivariable model consisting of demographic data and comorbidities, symptoms at presentation and triage vitals, and finally, laboratory data. Because of wide variations in laboratory variables, with most values above the upper limit of normal, categorizing them by normal or abnormal following laboratory reference ranges would have produced unequal groups with major implications for analysis. Also, this will be less informative as we believe that not just the abnormal value is worrisome but the degree of abnormality, too. To address this, we transformed all laboratory variables into categorical variables with two categories: one category consisting of patients with values less than the 75th percentile and the second category...
consisting of patients with values >75th percentile. We, therefore, compared outcomes between patients with values in the fourth quartile to those patients with values <75th percentile. The final model consisted of all variables with P values <.10 from the three “mini” intermediate models mentioned above and presented using forest plots for easy visualization. All data analysis was done using STATA-16 with two-sided P values less than .05 considered statistically significant.

4 | RESULTS

4.1 | Sociodemographic characteristics and comorbidities

In all, 408 African-Americans were admitted and managed at our hospital through the conclusion of the data collection period with an inpatient mortality rate of 33.35%. About 57% of all study participants were men with no gender differences in mortality. The median age of participants was 67 years with non-survivors with a median age of 71 years being significantly older than survivors with a median age of 63 years, P < .001. The main co-morbidities were hypertension, diabetes, chronic kidney disease, and dyslipidemia, with a prevalence of 66.42%, 43.24%, 16.90%, and 16.18%, respectively. Persons with hypertension, diabetes, cerebrovascular accident, and chronic kidney disease were more likely to die compared with those without. Detail characteristics and co-morbidities among study participants are shown in Table 1.

4.2 | Signs and symptoms at presentation

The most prevalent symptoms on presentation were cough, fever/chills, myalgia, shortness of breath, and gastrointestinal symptoms (nausea/vomiting/diarrhea/abdominal pain) with a prevalence of 62.50%, 53.68%, 43.87%, and 27.21%, respectively. Persons who reported shortness of breath and myalgia were more likely to die, comparatively. Also, persons with lower oxygen saturation increased respiratory rate, and increased systolic blood pressure was more likely to die than their respective counterparts. Table 2 shows more details of symptoms and triage vitals at the time of presentation.

4.3 | Laboratory parameters

There was a statistically significant difference in several laboratory markers, such as serum ferritin, C-reactive protein (CRP), IL-6, white blood cells, and lactate dehydrogenase between survivors and non-survivors. Other markers, such as troponin, B-type natriuretic peptide, D-dimers, lactic acid, and plasma glucose were also significantly different between survivors and non-survivors. Table 3 shows detailed distributions of laboratory parameters in our study population and by subgroups of the deceased and survived.

4.4 | Predictors of mortality

Age and body mass index (BMI) were independent predictors for mortality. In fact, for each unit increase in age and each unit increase in BMI, the odds of dying were 1.06 (95% confidence interval [CI], 1.04-1.08; P < .001) and 1.07 (95% CI, 1.04-1.11; P < .001) times higher, respectively. Serum ferritin, C-reactive protein, and D-dimers were predictive of death with odds of 1.99 (95% CI, 1.08-3.66; P = .028), 2.42 (95% CI, 1.36-4.33; P = .018), and 3.79 (95% CI, 2.21-6.50; P < .001) times higher, respectively when persons in greater than fourth quartile are compared with those below the fourth quartile. (Figure 1)

5 | DISCUSSION

Cough, shortness of breath, fever/chills, digestive symptoms, and myalgia were the predominant presentation among African-Americans hospitalized with COVID-19 infection. Advanced age, higher BMI, elevated ferritin, CRP, and D-dimers at the time of presentation are independent predictors of mortality among hospitalized African-Americans with COVID-19 infection. To the best of our knowledge, this is the first comprehensive study to report exclusively on the clinical characteristic among African-Americans and predictors of mortality among African-Americans admitted and managed for COVID-19 infection in the USA.

Predominant symptoms of fever/chills, asthenia, cough, and shortness of breath are similar to those widely reported in other populations, suggesting there is no discrepancy in clinical presentation with other races. Consistent with prior studies, hypertension was the main co-morbidity among African-Americans hospitalized with COVID-19. Though hypertension remains the most commonly reported co-morbidity, its prevalence is, however, not different from that in the general population. There is, therefore, no evidence at this time to suggest that patients with hypertension are at increased risk of contracting and dying from COVID-19.

Our inpatient mortality rate of about 70% among intubated patients, though higher than that reported by Safiya et. al, is similar to that reported by Arentz et. al among intensive care unit treated patients in Washington. The observed difference with that of Safiya may be explained by the fact that their results were based on preliminary reports, and most intubated patients had no definitive outcome at the time of reporting. The high death rates among intubated patients either suggest we may not have mastered how well to safely managed patients with COVID-19 on ventilators or that by the time the need for intubation is evident, irreparable damages might have been suffered by the body. We, however, think future death rates would be at least lower than current estimates as we learn on the job on how to best manage these patients. Also, we are a population being exclusively African-American, which has been reported to have higher mortality rates compared with other races.
Consistent with prior authors, age was an independent predictor of mortality even after adjusting for several known confounders. This might suggest that the virus takes advantage of the natural decline in health state with increasing age to cause a severe and deadly infection. Most persons with severe disease requiring admission were the elderly, and deaths in persons less than 50 years were not common. This warrants aggressive protective strategies for all elderly persons to limit exposure as

| Variable                  | Category         | All (N = 408) | Non-survivors (N = 132) | Survivors (N = 276) | P value |
|---------------------------|------------------|---------------|--------------------------|---------------------|---------|
| Age, y                    | Continuous       | 67 (56-76)    | 71 (62-80)               | 63 (53-73)          | <.001   |
| BMI, Kg/m²                | Continuous       | 29.1 (25.25-35) | 31.8 (26.5-37)          | 28.3 (25.0-33.6)    | .002    |
| Gender                    | Male             | 231 (56.62)   | 76 (32.90)               | 155 (67.10)         | .787    |
|                           | Female           | 177 (43.38)   | 56 (31.64)               | 121 (68.36)         |         |
| Origin                    | Home             | 344 (84.08)   | 106 (30.81)              | 239 (69.18)         | .009    |
|                           | NH               | 36 (8.82)     | 21 (5.83)                | 15 (99.42)          |         |
|                           | Shelter          | 29 (7.10)     | 7 (21.14)                | 22 (75.86)          |         |
| Smoking status            | Active           | 36 (8.85)     | 8 (22.22)                | 28 (77.78)          | .170    |
|                           | Nonsmokers       | 371 (91.15)   | 124 (33.42)              | 247 (66.58)         |         |
| Hypertension              | Yes              | 271 (66.42)   | 105 (38.75)              | 166 (61.25)         | <.001   |
|                           | No               | 137 (33.58)   | 27 (19.71)               | 110 (80.29)         |         |
| Heart Failure             | Yes              | 45 (11.03)    | 20 (44.44)               | 25 (55.56)          | .066    |
|                           | No               | 363 (88.97)   | 112 (30.85)              | 251 (69.15)         |         |
| Diabetes                  | Yes              | 176 (43.24)   | 72 (40.91)               | 104 (59.09)         | .001    |
|                           | No               | 231 (56.76)   | 60 (25.97)               | 171 (74.03)         |         |
| Asthma                    | Yes              | 54 (13.24%)   | 16 (29.63)               | 38 (70.37)          | .163    |
|                           | No               | 354 (86.76)   | 116 (32.77)              | 238 (67.23)         |         |
| COPD                      | Yes              | 43 (10.57)    | 18 (41.86)               | 25 (58.14)          | .43     |
|                           | No               | 364 (89.43)   | 114 (31.32)              | 250 (68.68)         |         |
| Coronary artery disease   | Yes              | 54 (13.24)    | 20 (37.04)               | 34 (62.96)          | .295    |
|                           | No               | 354 (86.76)   | 112 (31.64)              | 242 (68.36)         |         |
| Dyslipidemia              | Yes              | 66 (16.18)    | 107 (31.29)              | 235 (68.71)         | .15     |
|                           | No               | 342 (83.82)   | 25 (37.88)               | 41 (62.12)          |         |
| CVA                       | Yes              | 26 (6.37)     | 14 (53.85)               | 12 (46.15)          |         |
|                           | No               | 382 (93.63)   | 118 (30.89)              | 264 (69.11)         | .15     |
| CKD                       | Yes              | 69 (16.91)    | 33 (47.83)               | 36 (52.17)          |         |
|                           | No               | 339 (83.01)   | 99 (29.20)               | 240 (70.80)         | .003    |
| Psychiatric disorders     | Yes              | 73 (17.89)    | 19 (26.03)               | 54 (73.97)          |         |
|                           | No               | 335 (82.11)   | 113 (33.73)              | 222 (66.27)         | .202    |
| Use of ACEI/ARBs          | Yes              | 32 (7.86)     | 12 (9.09)                | 120 (90.91)         | .615    |
|                           | No               | 375 (92.14)   | 21 (7.64)                | 254 (92.36)         |         |
| Mechanical ventilation    | Yes              | 117 (28.75)   | 92 (69.7)                | 25 (9.06)           | <.001   |
|                           | No               | 291 (71.32)   | 40 (30.30)               | 251 (90.94)         |         |
| ICU care                  | Yes              | 117 (28.75)   | 78 (59.09)               | 39 (41.89)          | <.001   |
|                           | No               | 290 (71.25)   | 54 (40.9)                | 236 (58.12)         |         |
| Length of stay (days)     | 4 (7-11)         | 5 (3-9.5)     | 8 (5-11)                 | 8 (8-11)            | <.001   |

Note: Psychiatric disorder (schizophrenia, schizoaffective disorder, major depressive disorder, bipolar disorder, and anxiety disorder). Age, BMI, and length of stay are presented as median (interquartile range). All other values represent frequency (%). Abbreviations: ACEI, angiotensin-converting enzyme inhibitors; ARB, angiotensin receptor blockers; BMI, body mass index (Kg/m²); COPD, chronic obstructive pulmonary disease; CKD, chronic kidney disease; CVA, cerebrovascular accident; ICU, intensive care unit.

*P values were obtained from Mann-Whitney U test, χ² test, or Fisher’s exact test as appropriate were not retained for use in building multivariate models.
active infection in the elderly carries a very poor prognosis, at least for now, until better management strategies are developed. This observation poses a severe threat to the survival of the rapidly expanding elderly population. There is, therefore, a need for aggressive research on prevention and management strategies to adequately address this infection and curb the unacceptable toll on the aging American population. Consistent with other authors, BMI was also an independent predictor of mortality. This highlights the fragile nature of health among patients with elevated BMIs, through both identified and yet to be identified pathways. This is all the more concerning as obesity prevalence continues rising at faster rates in the general population if COVID-19 were to be around for a longer duration.

Severely elevated serum ferritin and CRP, which are markers of acute inflammation from various causes: Infection (bacterial/viral), injury, trauma), were independent predictors of mortality. This suggests that the pathophysiologic pathway may involve acute severe inflammatory response, as noted by markedly elevated levels of proinflammatory markers. This is consistent with other reports suggesting a cytokine storm as a possible pathophysiologic mechanism for COVID-19. Whether suppressing this acute inflammation by way of immunosuppressants and corticosteroids would impact the outcome remains unknown and constitutes an area for future research. The observation that severe inflammation may contribute to increased mortality is consistent with the recent change in clinical practice in which earlier debates on the usefulness of steroids and anti-inflammatory agents at the onset of the epidemic to predominant and aggressive early use of steroids and other immunosuppressive drugs. Most significantly, a recent clinical trial from has report increased survival in patients treated with dexamethasone.

Finally, elevated levels of D-dimers, markers of vascular clots and its burden as well as disseminated intravascular coagulation, were the strongest predictor of mortality among our patients, consistent with previous reports by Weiss et al. This lends support to the strongly held belief of widespread microthrombi and increased incidence of deep venous thromboses with consequent multiorgan failure, including respiratory failure, acute myocardial injury, among others, and death. It is therefore not surprising that there is increasing call for measured use of anticoagulants in the management of COVID-19 patients with significantly elevated D-dimers. Preliminary reports have also shown reduced mortality among patients treated with therapeutic doses of anticoagulants. Whether large scale use of anticoagulants in patients with COVID-19 patients would translate into improved outcomes remains to be further evaluated.

### Table 2 Clinical presentation on admission and triage vitals

| Variable                        | Categories | All (N = 408) | Non-survivors (N = 132) | Survivors (N = 276) | P value
|---------------------------------|------------|---------------|-------------------------|---------------------|---------|
| **Vitals on presentation**      |            |               |                         |                     |         |
| Oxygen saturation (%)           |            | 95 (92.98)    | 94 (89.97)              | 96 (93.98)          | <.001   |
| Temperature (°F)                |            | 99.7 (98.2-101.1) | 100 (98.2-100.8)     | 99.5 (98.2-101.4)   | .29     |
| Respiratory rate (cycles/min)   |            | 20 (19-22)    | 20 (20-22)              | 20 (19-21)          | .006    |
| Pulse (beats/min)               |            | 99 (87-111)   | 100 (99-114)            | 98 (86-110)         | .259    |
| Systolic blood pressure, mm Hg  |            | 128 (112-142) | 131 (115-144)           | 126 (111-142)       | .048    |
| Diastolic blood pressure, mm Hg |            | 75 (66-82)    | 75 (65-82)              | 76 (67-83)          | .732    |
| **Symptoms on arrival**         |            |               |                         |                     |         |
| Cough                           | Yes        | 255 (62.50)   | 81 (31.76)              | 174 (68.24)         | .743    |
|                                | No         | 153 (37.50)   | 51 (33.33)              | 102 (66.67)         |         |
| Myalgia                         | Yes        | 179 (43.87)   | 46 (25.70)              | 133 (74.30)         | .011    |
|                                | No         | 229 (56.13)   | 86 (37.55)              | 143 (62.45)         |         |
| Fever/chills                    | Yes        | 219 (53.68)   | 153 (69.86)             | 66 (30.14)          | .303    |
|                                | No         | 189 (46.32)   | 66 (34.92)              | 123 (65.08)         |         |
| Shortness of breath             | Yes        | 273 (66.91)   | 99 (36.26)              | 174 (63.74)         | .016    |
|                                | No         | 135 (33.09)   | 33 (24.44)              | 102 (75.56)         |         |
| Fatigue                         | Yes        | 143 (35.22)   | 50 (34.97)              | 93 (65.03)          | .391    |
|                                | No         | 263 (64.78)   | 81 (30.80)              | 182 (69.20)         |         |
| Gastrointestinal (GI) symptoms  | Yes        | 111 (27.21)   | 36 (32.43)              | 75 (67.75)          | .983    |
|                                | No         | 297 (72.79)   | 96 (32.32)              | 201 (67.68)         |         |

aContinuous variables, presented as median (interquartile range).
bCategorical variables displayed as frequency (percentage).
cGI symptoms (nausea, vomiting, diarrhea and abdominal pain).
dCompares differences in a respective variable between survivors and non-survivors, values less than 0.05 are considered statistically significant.

6 STRENGTHS AND LIMITATIONS

Data recruitment was done at a single hospital and focused exclusively on African-Americans and thus makes the generalization of our findings difficult. However, recruitment at a single-center ensures that there are no considerable discrepancies in management strategies that could have...
| Variable                        | All (N = 408) | Non-survivor (N = 132) | Survivors (N = 276) | P value | Normal range |
|--------------------------------|---------------|------------------------|---------------------|---------|--------------|
| Hemoglobin, g/dL               | 12.9 (11.1-14.0) | 12.75 (10.95-14.1) | 12.9 (11.3-13.9) | .544    | 12-14        |
| Platelets, *10^9*/μL           | 220 (167-283) | 199 (168-279) | 226 (166-286) | .305    | 150-450      |
| ESR, mm/Hr                     | 73 (51-100)   | 83 (51-109)  | 71 (52-97)   | .400    | 0-22         |
| C-reactive protein, mg/L       | 106 (55-180)  | 148 (93-230)  | 88 (44-167)  | <.001   | 0-10         |
| Troponin, ng/mL                | 0.03 (0.03-0.08) | 0.065 (0.03-0.155) | 0.03 (0.03-0.05) | <.001  | 0-0.03       |
| Brain natriuretic peptide, pg/mL | 57.57 (16.81-184.26) | 103.76 (39.67-355.83) | 43.4 (10.83-132.45) | .001   | 0-100        |
| Interleukin-6, pg/mL           | 64.7 (33-133) | 84.5 (53.3-205) | 53.1 (23.9-97.4) | <.001   | 0-15.5       |
| Serum ferritin, ng/dL          | 872 (500-1522) | 999 (742-1888) | 704 (434-1235) | <.001   | 15-150       |
| Procalcitonin, ng/mL           | 0.89 (0.2-2)  | 1.57 (0.37-3.3) | 0.58 (0.15-1.3) | .002    | 0.00-0.08    |
| Serum sodium, mmol/L           | 138 (135-141) | 139 (135-144) | 138 (135-141) | .09     | 135-145      |
| Serum potassium, mmol/L        | 4.5 (4-5.1)   | 4.5 (4.1-5.3)  | 4.4 (4-5)   | .402    | 3.5-5.5      |
| Serum bicarbonate, meq/L       | 23 (19-26)    | 21 (18-25)    | 23 (20-26)  | .030    | 22-26        |
| Blood urea nitrogen, mg/dL     | 22.8 (13.3-44.2) | 28 (20-56.7)  | 18.5 (11.9-40.8) | <.001  | 10-20        |
| Serum creatinine, mg/dL        | 1.42 (1.01-2.38) | 1.77 (1.18-2.585) | 1.27 (0.94-2.23) | <.001  | 0.57-1.11    |
| Plasma glucose, mg/dL          | 137 (107-221) | 162 (116-286.5) | 129 (90-212) | .005    | 80-115       |
| Magnesium, mg/dL               | 2.1 (1.9-2.4) | 2.3 (2-2.7)    | 2.1 (1.9-2.3) | .059    | 1.6-2.6      |
| APTT, s                        | 31.3 (28.7-34.3) | 31 (28.45-34.8) | 31.35 (28.8-34.1) | .363    | 25-36        |
| INR                            | 1.16 (1.01-1.27) | 1.17 (1.07-1.31) | 1.15 (1.09-1.27) | .695    | 0.85-1.15    |
| Fibrinogen, mg/dL              | 498 (444-692) | 498 (424-545) | 494 (466-725) | .810    | 193-507      |
| Lactic acid, mmol/L            | 1.7 (1.3-2.4) | 2.2 (1.5-3.4)  | 1.6 (1.2-2.1) | <.001   | 0.5-1.9      |
| White blood cells (*1000/μL)   | 7.8 (5.5-10.9) | 8.8 (6.2-12.1) | 7.1 (5.3-10.2) | .006    | 4.5-11       |
| Neutrophils (*1000/μL)         | 5.9 (4.2-9.4) | 7.2 (4.7-10.35) | 5.6 (3.9-8.4) | .001    | 2.0-7.9      |
| Lymphocytes (*1000/μL)         | 0.9 (0.6-1.3) | 0.9 (0.6-1.3)  | 0.9 (0.6-1.3) | .088    | 10-4.8       |
| Aspartate aminotransferase, U/L | 45 (28-78)   | 57.5 (36.5-86.5) | 41 (26-68)  | <.001   | 5-34         |
| Alanine aminotransferase, U/L  | 30 (17-49)   | 31.5 (20-51)   | 26 (15-47)  | .026    | 10-55        |
| Alkaline phosphatase, U/L      | 73 (58-94)   | 76 (62-96)    | 71 (56-91)  | .098    | 40-150       |
| Creatinine, kinase, U/L        | 260 (107-645) | 318 (107-907) | 238 (113-443) | .082    | 29-168       |
| Lactate dehydrogenase, U/L     | 479 (337-479) | 582 (473-817) | 398 (302-534) | <.001   | 125-220      |
| D-dimers, ng/mL                | 2069 (1193-4491) | 3847 (1765-9840) | 1833 (1040-3078) | <.001   | 0-500        |
| Arterial oxygen saturation (%) | 61.4 (45-81.8) | 59.15 (48.75-73) | 65 (45-89) | .150    | 75-100       |
| Blood PH                       | 7.408 (7.348-7.454) | 7.395 (7.344-7.458) | 7.425 (7.354-7.452) | .195    | 7.35-7.45    |
| PaCO₂ saturation (%)           | 37.4 (31.6-44.05) | 35.3 (30.4-43.7) | 38 (32.9-44.5) | .25     | 35-45        |
| Abnormal chest X-ray           | 392 (96.08)  | 129 (97.73)   | 263 (95.29) | .236    | NA           |
| PR interval, ms                | 148 (132-164) | 146 (130-164) | 148 (134-166) | .797    | 120-200      |
| QTc duration, ms               | 453 (431-477) | 454 (430-477) | 452 (432-477) | .75     | <460         |
| QRS duration, ms               | 84 (76-92)   | 84 (76-94)    | 84 (76-92)  | .925    | 60-100       |

**Abbreviations:** APTT, activated partial thromboplastin time; COVID-19, coronavirus disease 2019; ESR, erythrocyte sedimentation rate; INR, international normalised ratio. *Multiplied by.*
FIGURE 1  Forest plot showing predictors of mortality. Age, body mass index, and oxygen saturations are modeled as continuous variables and odds ratio (OR) represent the odds of dying for every unit increase in respective parameter. Shortness of breath and myalgia are modeled as continuous variables. OR represent the odds of dying in those who had the respective symptom compared with those who did not. All other variables were transformed from continuous to categorical and modeled as categorical variables. OR represents odds of dying in those with values in the fourth quartile compared with those in lower quartiles (first, second, and third quartiles). CI, confidence interval

influenced outcomes as there is no universally agreed standard of care for these patients at this time with substantial interhospital differences in management. Second, data was obtained from charts with inherent shortcomings as validity and accuracy of information are based on recorded data. However, thorough chart review and validation by an independent reviewer ensured that obtained information was accurate and complete. Notwithstanding these shortcomings, our study is the first to provide an exclusive report on the clinical characteristics of African-Americans hospitalized and managed for COVID-19 infection in the USA. Also, though exclusively focused on African-American, our studies provide insights into predictors of mortality among hospitalized patients with COVID-19, paving the way for future research as we commit to unraveling the mystery associated with COVID-19 infection.

7 | CONCLUSION

Cough, shortness of breath, fever/chills, gastrointestinal symptoms, and myalgia were the predominant presentation among African-Americans hospitalized with COVID-19 infection. Advanced age, higher BMI, elevated serum ferritin, CRP, and D-dimers at the time of presentation are independent predictors of mortality among hospitalized Africa-Americans with COVID-19 infection.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

Dr. Gayam proposed the concept, designed the study, wrote the protocol, and managed the study. Dr. Chobufo, Dr. Garlapati, and Dr. Gayam performed the statistics, interpreted the data, and wrote the manuscript. Dr. Lamichhane and Dr. Merghani, was involved in collecting the data. Dr. Adler performed a critical review of the manuscript. All authors provided inputs for revision of the manuscript. Dr. Gayam communicated with the journal and addressed comments from reviewers. All the authors vouch for the integrity and completeness of the data presented and agreed to submit the manuscript for publication.

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