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Hispanic Patients Hospitalized with COVID-19 Disease-Characteristics and Clinical Outcomes at a Tertiary Care Center in New York City

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Authors' contributions

This work was carried out in collaboration among all authors. Author GRRM conception/study design of the manuscript. Authors MAW, AMM, MK, ATH, SE, AA, DS, SS, SS, YM, NC, BADG, CJMG, IA, AT, SS, KP and NS data collection of the manuscript. Author JF data analysis and authors MAW, AMM drafting of the manuscript. GRRM, HR, JP, JS, JF critical manuscript review. Authors All authors read and approved the final manuscript.

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ABSTRACT

Background: COVID-19 disease has disproportionately affected ethnic minorities in the US.
Objective: To describe the characteristics and predictors of mortality and length of hospital stay (LOS) in patients of Hispanic ethnicity hospitalized for COVID-19 disease.
Design: Retrospective cohort study of 162 patients.
Setting: Tertiary care teaching hospital in Brooklyn, NY.
Patients: Hispanic patients hospitalized with principal diagnosis of COVID-19 disease between March 8, and April 25, 2020.
Methods: Patients were classified into mild/moderate, severe/very severe, and critical disease (intubated) based on oxygen requirements. The primary endpoint was overall mortality rate and the secondary endpoint was LOS.
Results: Mean age was 55.6 years and 40.1% had critical disease. The overall mortality was 35.8%. Increasing age (OR:1.09, 95% CI:1.04, 1.13, p<0.001) and vasopressor use (OR:198.55, 95% CI:15.89, 2480.66, p<0.001) were each independently associated with increased odds for mortality. Steroid use was significantly associated with decreased odds for mortality (OR:0.05, 95% CI:0.004, 0.61, p<0.05). Mean LOS was 14 days. Severe/very severe disease was significantly associated with increased LOS while critical disease was significantly associated with decreased LOS. The use of hydroxychloroquine, steroids, antibiotics, vasopressor, blood transfusion, and diagnosis of bacteremia/fungemia were each significantly associated with increased LOS. Spanish-speaking patients were older than English-speaking ones, however, there was no difference in mortality or LOS between the groups.
Conclusion: Age and vasopressor use was associated with increased mortality in Hispanics. Steroid use was associated with decreased mortality but increased LOS. No difference in outcomes was observed between English- and Spanish-speaking Hispanics.

Keywords: Hispanics; latino; Covid-19 disease; ethnicity; race; public health; Spanish.

1. INTRODUCTION

The novel coronavirus disease 2019 (COVID 19) is the most devastating public health emergency of this century. In the United States, even though the disease has affected millions of people of different ages, races, and socioeconomic status, certain minorities have been affected at a disproportionate rate [1,2].

Forty-nine states have reported COVID-19 related data based on race or ethnicity. In at least 21 (43%) of these states, the percentage of COVID-19 related deaths notably exceed the proportion of Hispanics in the state population [3]. Additionally, when compared to other ethnicities, COVID-19 associated mortality was found to be higher in Hispanics in some states [4]. The Coronavirus Disease 2019 (COVID-19)-Associated Hospitalization Surveillance Network (COVID-NET) reported that among all the cases of COVID-19, 14% of patients were of Hispanic origin [1]. Rural counties have reported average daily increases in COVID-19 mortality rates to be significantly higher in counties with larger Black and Hispanic populations; thus, further emphasizing the disproportionate burden of COVID-19 among these groups [5].

While Hispanics constitute approximately 18.5% of the total US population [6], this group accounted for 21.3% of the cumulative COVID-19 related deaths as of October 14th, 2020 [4,7]. When applying a weighted population distribution, this number rises to 32.4%, which is higher than the 26.7% reported in May of 2020 [4,7]. Comparisons of COVID-19 related deaths in Hispanics based on age found that the highest distribution (49.1%) of deaths was in the age group of 35-44 years [4].

Given the high proportion of COVID-19 disease burden as well as the high mortality in Hispanics, a more in-depth analysis is needed. Our study aimed to assess baseline characteristics and outcomes as well as predictors of mortality in patients of Hispanic ethnicity hospitalized for COVID-19 at a tertiary care center in New York City.

2. METHODS

2.1 Study Design and Setting

We conducted a retrospective, single-center study on Hispanic patients hospitalized with a principal diagnosis of COVID-19 disease. The

study was conducted at Maimonides Medical Center, a 711-bed tertiary care teaching hospital in Brooklyn, NY, USA. The Maimonides Medical Center institutional review board approved the study. The need for informed consent was waived based on the study's retrospective nature.

2.2 Patient Selection and Data Collection

We included the data of adult Hispanic patients hospitalized with SARS-CoV-2 infection (COVID-19) between March 8 and April 25, 2020. Patients with visits to outpatient clinics only or the emergency department were excluded. Additionally, we excluded patients who died or were discharged within one day of hospital admission. The method for diagnosis of COVID-19 was polymerase chain reaction (PCR) testing of a nasopharyngeal sample. Disease severity was defined based on the amount of oxygen supplementation required. Mild disease was defined as patients with oxygen saturation of 95% or higher on room air. Moderate disease was defined as patients who required oxygen supplementation via nasal cannula with up to five liters per minute to maintain an oxygen saturation of at least 95%. Severe disease was defined as requirement of oxygen via facemask up to ten liters per minute to maintain an oxygen saturation of at least 95%. Very severe disease was defined in those patients requiring non-rebreather mask or high flow oxygen to maintain an oxygen saturation of at least 95%. Critical disease was defined as the need for intubation and mechanical ventilation. All interventions were done as part of regular patient care.

Data were collected from the hospital's electronic medical records. To ensure quality control, we performed manual data entry. In addition to disease severity, information collected included patients' demographics, presenting symptoms, comorbidities, laboratory values, treatments for COVID-19, complications, and outcomes of mortality and length of hospital stay. A comorbidity score was calculated based on the specific conditions of coronary artery disease, heart failure, cerebrovascular disease, chronic kidney disease, chronic obstructive pulmonary disease, hypertension, diabetes mellitus, and atrial fibrillation. Each condition was assigned one point and the mean number was used in each patient as the comorbidity score. The primary endpoint was the overall mortality rate. The secondary endpoint was length of hospital stay.

2.3 Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 26.0 (IBM Corporation, Armonk, NY, USA). Descriptive statistics were provided for all variables and presented as mean ± standard deviation for continuous variables and as number and percentage for categorical variables. Statistical tests of significance (analysis of variance for continuous variables and the χ^2 test or Fischer's exact test for categorical variables) were conducted to assess differences between the ethnic groups. A two-tailed p-value <0.05 was regarded as statistically significant.

3. RESULTS

3.1 Baseline Characteristics

A total of 162 patients were included in the study. The mean age was 55.6 years. One-third of participants were female and 61.7% reported Spanish as their primary language. There were 38.3% of patients that were obese and the mean co-morbidity score was 1.2. See Table 1 for the baseline characteristics.

3.2 Presenting Symptoms and Management

The mean time to symptom onset was 6.7 days with common presenting symptoms including shortness of breath (79.0%), cough (72.2%), fever (69.1%), and diarrhea (14.8). There were 39.5% of patients who had mild/moderate disease, 20.4% had severe/very severe disease, and 40.1% had critical disease (intubated). More than 80% of patients received hydroxychloroquine and azithromycin, 21.6% received steroids, and 34.0 used vasopressors. There were 19.1% who required hemodialysis and 41.8% received a blood transfusion. See Table 1 for the laboratory values.

3.3 Outcomes

The overall mortality was 35.8%. Table 2 shows logistic regression analyses for mortality. In the multivariate analysis, increased age (OR:1.09, 95% CI:1.04, 1.13, p<0.001) and vasopressor use (OR:198.55, 95% CI:15.89, 2,480.66, p<0.001) were each significantly associated with increased odds for mortality. Steroid use was significantly associated with decreased odds for mortality (OR:0.05, 95% CI:0.004-0.61, p<0.05).

The mean length of stay was 14.0 days. Table 3 shows linear regression analyses for length of stay. In the multivariate analysis, severe/very severe disease was significantly associated with increased length of stay (B=0.15, SE=0.07, p<0.05) while critical disease was significantly associated with decreased length of stay (B=-0.23, SE=0.10, p<0.05). In addition, hydroxychloroquine, steroids, antibiotics for suspected bacterial infection, vasopressor, blood transfusion, and diagnosis of bacteremia/fungemia were each significantly associated with increased length of stay.

Table 4 shows Hispanic patient characteristic comparisons for primary spoken language reported as English (n=62, 38.3%) versus Spanish (n=100, 61.7%). The English-language group had a significantly lower mean age than the Spanish-language group (M=51.5 vs M=58.2, p=0.01). There was a trend towards a higher percentage of obesity in the English-language group (60.4% vs 42.9%, p= 0.06). There was no difference in mortality between the English-language and Spanish-language groups (37.1% vs 35.0%, p= 0.79) or in mean length of stay (M=15.3 vs M=13.1, p=0.69).

4. DISCUSSION

We found that older age was significantly associated with higher mortality in Hispanics hospitalized with COVID-19 disease. This is consistent with a report from New York City that showed that older age in Hispanic patients was associated with increased mortality [8]. We also found that patients presented after about a week of symptom onset (mean 6.7 days) as reported in Table 1. Studies with other racial groups have also consistently shown that older age is associated with worse outcomes [9,10,11]. Increasing susceptibility to Covid-19 disease with age can be attributed to the immunosenescence of the aging immune system [12]. It has been proposed that older people have increased epigenetic dysregulation of ACE2 which can result in increased viral load of SARS-CoV-2 resulting in severe disease presentations [12].

We found an overall mortality rate of 35.8%. A survival analysis from Brazil found that being of mixed ethnicity (pardo) was the second most important risk factor for death after age [13]. Similarly, findings from the American Heart Association's COVID-19 registry point towards a greater burden of morbidity and mortality among Black and Hispanic patients [14]. However, a study from New York City including 5,902 patients who tested positive for COVID-19, found that after controlling for age, sex, and comorbidities, non-Hispanic Black and Hispanic patients had similar survival outcomes as non-Hispanic whites [8].

The use of vasopressors in critically ill patients with COVID-19 disease has been previously reported [15,16,17]. In our study, 34% of patients had hemodynamic instability requiring treatment with vasopressors. One study conducted in Belgium with COVID-19 patients in the ICU setting reported that 56% of patients required vasopressor support [18]. We found that vasopressor use was significantly associated with higher mortality and increased length of stay. Higher mortality in patients who required these agents could be explained by higher disease severity and longer time to recovery.

We found that treatment with steroids was significantly associated with lower mortality. Similarly, in the RECOVERY trial, hospitalized patients with COVID-19 disease who were receiving mechanical ventilation had a lower 28-day mortality if treated with dexamethasone as compared with patients in the standard group not receiving steroids [19]. Patients in the dexamethasone group also had a shorter duration of hospitalization as compared to the standard group [19]. The study showed no benefit in patients who were not receiving respiratory support [19]. In another study, patients with moderate to severe COVID-19 disease treated with dexamethasone plus standard care had significantly higher number of ventilator-free days as compared with standard therapy alone [20]. Additionally, in a recent meta-analysis of 7 randomized clinical trials that included 1,703 critically ill patients with COVID-19 disease, administration of corticosteroids was associated with lower all-cause mortality at 28 days [21]. The use of glucocorticoids has been employed in treating numerous respiratory illness such as community acquired pneumonia, SARS, MERS as well as severe influenza, due to their role in decreasing inflammatory response. One author suggests that the beneficial effect of glucocorticoids in severe viral infections is interdependent on the selection of the "right dose, right time, and right patient" as high doses can have detrimental side effects [22].

Table 1. Sample characteristics of 162 COVID-19 hispanic patients

Variable	M (SD) or Frequency (%) Whole Sample (n=162)
Demographics	
Age (years) [mean]	55.6 (16.60)
Female gender	55 (34.0)
Spanish language	100 (61.7)
Comorbidities	
Obesity	62 (38.3)
Comorbidity score [mean]	1.2 (1.32)
Presenting symptoms	
Start of symptoms (days) [mean]	6.7 (4.23)
Fever	112 (69.1)
Cough	117 (72.2)
Shortness of breath	128 (79.0)
Diarrhea	24 (14.8)
Laboratory values ^[mean]	
White blood cell K/UL	9.3 (4.43)
Platelets K/UL	238.6 (97.44)
Creatinine mg/dL	1.4 (1.93)
Creatinine mg/dL (highest)	2.7 (3.28)
Serum sodium mmol/L	134.3 (6.20)
Serum sodium mmol/L (lowest)	132.3 (6.02)
Serum sodium mmol/L (highest)	142.2 (6.69)
Blood urea nitrogen mg/dL (day 6-10)	35.6 (35.14)
Lactic acid (highest)	4.1 (4.02)
C-reactive protein mg/dL	51.7 (322.18)
C-reactive protein mg/dL (highest)	64.2 (359.39)
Ferritin ng/mL	803.3 (828.14)
Ferritin ng/mL (highest)	1,289.3 (1,736.87)
D-dimer ng/mL	3,033.4 (7,216.37)
D-dimer ng/mL (highest)	5,948.1 (9,608.34)
Lactate dehydrogenase IU/L	476.2 (239.61)
Lactate dehydrogenase IU/L (highest)	746.5 (1,713.40)
Glomerular filtration rate	53.3 (15.58)
Aspartate transaminase IU/L	63.3 (72.58)
Alanine transaminase IU/L	49.9 (43.95)
Troponin ng/mL	0.2 (0.91)
Troponin ng/mL (highest)	0.3 (1.12)
Disease severity	
Oxygen requirement	
Mild/Moderate	64 (39.5)
Severe/Very Severe	33 (20.4)
Critical	65 (40.1)
Treatment management	
Hydroxychloroquine	133 (82.1)
Azithromycin	142 (87.7)
Steroids	35 (21.6)
Therapeutic anticoagulation	51 (31.5)
Convalescent plasma	5 (3.1)
Remdesivir	11 (6.8)
Antibiotics for suspected bacterial infection	123 (75.9)
Vasopressor	55 (34.0)

Variable	M (SD) or Frequency (%) Whole Sample (n=162)
Complications	
Dialysis	31 (19.1)
ECMO	4 (2.5)
Blood transfusion	24 (41.8)
Bacteremia/fungemia	23 (14.2)
Outcomes	
Mortality	58 (35.8)
Length of stay (days) [mean]	14.0 (19.72)

Note: M=mean, SD=standard deviation. Comorbidity score included hypertension, diabetes mellitus, heart failure, asthma/chronic obstructive pulmonary disease, coronary artery disease, cerebrovascular accident, and chronic kidney disease. Sample size for continuous variables less than 162 are: Obesity (n=125), Start of symptoms (n=161), Creatinine (highest) (n=159), Serum sodium (lowest) (n=160), Serum sodium (highest) (n=160), Blood urea nitrogen (day 6-10) (n=111), Lactic acid (n=153), C-reactive protein (admission) (n=137), C-reactive protein (highest) (n=147), Ferritin (admission) (n=138), Ferritin (highest) (n=143), D-dimer (admission) (n=68), D-dimer (highest) (n=81), Lactate dehydrogenase (admission) (n=144), Lactate dehydrogenase (highest) (n=143), Aspartate transaminase (n=152), Alanine transaminase (n=151), Troponin (admission) (n=137), and Troponin (highest) (n=139).

^ = Laboratory values reported are on admission unless otherwise specified.

Table 2. Logistic regression analyses for mortality

Variable	Univariate OR (95% CI)	Multivariate OR (95% CI)
Demographics		
Age (years)	1.06 (1.04, 1.09)***	1.09 (1.04, 1.13)***
Female gender	1.17 (0.60, 2.29)	---
Spanish language	0.91 (0.47, 1.77)	---
Comorbidities		
Obesity	1.03 (0.50, 2.11)	---
Comorbidity score	1.74 (1.32, 2.30)***	1.15 (0.69, 1.93)
Presenting symptoms		
Start of symptoms (days)	0.94 (0.87, 1.02)	---
Fever	0.77 (0.39, 1.53)	---
Cough	0.89 (0.44, 1.81)	---
Shortness of breath	4.10 (1.49, 11.28)**	5.04 (0.70, 36.08)
Diarrhea	1.09 (0.44, 2.67)	---
Laboratory values ^		
White blood cell K/UL	1.03 (0.96, 1.11)	---
Platelet K/UL	1.00 (0.995, 1.002)	---
Creatinine mg/dL	3.67 (1.20, 11.26)*	3.35 (0.02, 624.97)
Creatinine mg/dL (highest)	23.31 (8.19, 66.31)***	---
Serum sodium mmol/L	1.03 (0.98, 1.09)	---
Serum sodium mmol/L (lowest)	1.02 (0.97, 1.08)	---
Serum sodium mmol/L (highest)	1.17 (1.09, 1.25)***	---
Blood urea nitrogen mg/dL (day 6-10)	60.88 (13.53, 273.93)***	---
Lactic acid (highest)	199.35 (35.11, 1,131.86)***	---
C-reactive protein mg/dL	1.74 (0.80, 3.79)	---
C-reactive protein mg/dL (highest)	7.03 (2.00, 24.68)**	---
Ferritin ng/mL	1.21 (0.58, 2.51)	---
Ferritin ng/mL (highest)	2.62 (1.28, 5.37)**	---
D-dimer ng/mL	13.32 (3.70, 47.96)***	---
D-dimer ng/mL (highest)	6.20 (2.59, 14.83)***	---
Lactate dehydrogenase IU/L	22.09 (2.96, 164.97)**	---
Lactate dehydrogenase IU/L (highest)	33.66 (5.61, 202.13)***	---

Variable	Univariate OR (95% CI)	Multivariate OR (95% CI)
Glomerular filtration rate	0.98 (0.96, 0.996)*	1.00 (0.92, 1.10)
Aspartate transaminase IU/L	0.93 (0.28, 3.03)	---
Alanine transaminase IU/L	0.38 (0.14, 1.02)	---
Troponin ng/mL	24.66 (2.78, 218.78)**	---
Troponin ng/mL (highest)	43.11 (7.95, 233.81)***	---
Disease severity		
Oxygen requirement		---
Mild/Moderate	1.00	
Severe/Very Severe	2.88×10^8 (<0.001, ---)	
Critical	7.14×10^9 (<0.001, ---)	
Treatment management		
Hydroxychloroquine	6.11 (1.76, 21.20)**	8.31 (0.39, 177.52)
Azithromycin	1.79 (0.61, 5.20)	---
Steroids	3.12 (1.45, 6.74)**	0.05 (0.004, 0.61)*
Therapeutic anticoagulation	4.82 (2.37, 9.81)***	3.44 (0.91, 13.06)
Convalescent plasma	2.78 (0.45, 17.15)	---
Remdesivir	3.43 (0.96, 12.27)	---
Antibiotics for suspected bacterial infection	5.15 (1.89, 14.06)**	2.04 (0.42, 9.89)
Vasopressor	26.57 (11.16, 63.25)***	198.55 (15.89, 2,480.66)***
Complications		
Dialysis	5.34 (2.30, 14.40)***	0.74 (0.13, 4.26)
ECMO	0.59 (0.06, 5.81)	---
Blood transfusion	2.44 (1.02, 5.88)*	0.19 (0.03, 1.39)
Bacteremia/fungemia	4.19 (1.65, 10.61)**	6.00 (0.90, 40.02)

*Note: OR=odds ratio, CI=confidence interval. *p<0.05, **p<0.01, ***p<0.001.*
^ = Laboratory values are on admission unless otherwise specified.

Table 3. Linear regression analyses for length of stay

Variable	Univariate B (SE)	Multivariate B (SE)
Demographics		
Age (years)	0.002 (0.002)	---
Female gender	0.02 (0.07)	---
Spanish language	0.002 (0.07)	---
Comorbidities		
Obesity	-0.15 (0.08)	---
Comorbidity score	0.01 (0.03)	---
Presenting symptoms		
Start of symptoms (days)	-0.01 (0.01)	---
Fever	0.04 (0.08)	---
Cough	0.12 (0.08)	---
Shortness of breath	0.26 (0.09)**	0.06 (0.07)
Diarrhea	0.12 (0.10)	---
Laboratory values ^		
White blood cell K/UL	0.01 (0.01)	---
Platelets K/UL	<0.001 (<0.001)	---
Creatinine mg/dL	-0.05 (0.12)	-0.03 (0.22)
Creatinine mg/dL (highest)	0.23 (0.08)	---
Serum sodium mmol/L	-0.01 (0.01)	---
Serum sodium mmol/L (lowest)	-0.02 (0.01)**	---
Serum sodium mmol/L (highest)	0.03 (0.01)***	---
Blood urea nitrogen mg/dL (day 6-10)	0.11 (0.08)	---
Lactic acid (highest)	0.35 (0.10)**	---

Variable	Univariate B (SE)	Multivariate B (SE)
C-reactive protein mg/dL	0.09 (0.08)	---
C-reactive protein mg/dL (highest)	0.29 (0.08)***	---
Ferritin ng/mL	0.09 (0.08)	---
Ferritin ng/mL (highest)	0.19 (0.07)**	---
D-dimer ng/mL	0.16 (0.10)	---
D-dimer ng/mL (highest)	0.26 (0.07)****	---
Lactate dehydrogenase IU/L	0.32 (0.20)	---
Lactate dehydrogenase IU/L (highest)	0.40 (0.13)**	---
Glomerular filtration rate	0.001 (0.002)	<0.001 (0.004)
Aspartate transaminase IU/L	0.33 (0.13)*	---
Alanine transaminase IU/L	0.17 (0.11)	---
Troponin ng/mL	-0.01 (0.14)	---
Troponin ng/mL (highest)	0.13 (0.10)	---
Disease severity		
Oxygen requirement		
Mild/Moderate	Reference	Reference
Severe/Very Severe	0.29 (0.09)**	0.15 (0.07)*
Critical	0.43 (0.07)***	-0.23 (0.10)*
Treatment management		
Hydroxychloroquine	0.40 (0.09)***	0.20 (0.10)*
Azithromycin	0.38 (0.10)***	-0.001 (0.11)
Steroids	0.57 (0.07)***	0.23 (0.08)**
Therapeutic anticoagulation	0.33 (0.07)***	0.02 (0.07)
Convalescent plasma	0.65 (0.22)**	0.10 (0.17)
Remdesivir	0.57 (0.14)***	0.20 (0.11)
Antibiotics for suspected bacterial infection	0.43 (0.08)***	0.19 (0.06)**
Vasopressor	0.47 (0.07)***	0.30 (0.10)**
Complications		
Dialysis	0.33 (0.09)***	0.03 (0.08)
ECMO	0.78 (0.25)**	0.13 (0.19)
Blood transfusion	0.61 (0.09)***	0.23 (0.09)*
Bacteremia/fungemia	0.60 (0.09)***	0.25 (0.09)**
Constant	---	0.38 (0.23)

*Note: B=unstandardized beta, SE=standard error. Analyses excluded 2 patients still hospitalized. *p<0.05, **p<0.01, ***p<0.001.*

^ = Laboratory values are on admission unless otherwise specified.

Table 4. Sample Characteristics Comparisons for Language

Variable	English M (SD) or Frequency (%) (n=62)	Spanish M (SD) or Frequency (%) (n=100)	p-value
Demographics			
Age (years) [mean]	51.5 (17.78)	58.2 (15.37)	0.01
Female gender	20 (32.3)	35 (35.0)	0.72
Comorbidities			
Obesity	29 (60.4)	33 (42.9)	0.06
Comorbidity score [mean]	1.2 (1.42)	1.1 (1.27)	0.68
Presenting symptoms			
Start of symptoms (days) [mean]	6.5 (4.32)	6.8 (4.19)	0.62
Fever	43 (69.4)	69 (69.0)	0.96
Cough	46 (74.2)	71 (71.0)	0.66
Shortness of breath	52 (83.9)	76 (76.0)	0.23
Diarrhea	9 (14.5)	15 (15.0)	0.93

Variable	English M (SD) or Frequency (%) (n=62)	Spanish M (SD) or Frequency (%) (n=100)	p-value
Disease severity			
Oxygen requirement			0.88
Mild/Moderate	23 (37.1)	41 (41.0)	
Severe/Very Severe	13 (21.0)	20 (20.0)	
Critical	26 (41.9)	39 (39.0)	
Treatment management			
Hydroxychloroquine	56 (90.3)	77 (77.0)	0.03
Azithromycin	58 (93.5)	84 (84.0)	0.07
Steroids	12 (19.4)	23 (23.0)	0.58
Therapeutic anticoagulation	23 (37.1)	28 (28.0)	0.23
Convalescent plasma	4 (6.5)	1 (1.0)	0.07
Remdesivir	6 (9.7)	5 (5.0)	0.34
Antibiotics for suspected bacterial infection	50 (80.6)	73 (73.0)	0.27
Vasopressor	21 (33.9)	34 (34.0)	0.99
Complications			
Dialysis	13 (21.0)	18 (18.0)	0.64
ECMO	3 (4.8)	1 (1.0)	0.16
Blood transfusion	10 (16.1)	14 (14.0)	0.71
Bacteremia/fungemia	11 (17.7)	12 (12)	0.31

Note: M=mean, SD=standard deviation. D-dimer (admission) with a sample of only 68 people significantly differed (p=0.048): English (M=1,387.4, SD=2,224.42, n=28), Spanish (M=4,185.7, SD=9095.67, n=40). No other laboratory values significantly differed between the language groups.

We did not find any association between cardiovascular comorbidities and mortality or length of stay, however this may be due to small sample size. In contrast to our findings, a meta-analysis of 6 studies of COVID-19 patients from China found that hypertension, diabetes, chronic obstructive pulmonary disease, cardiovascular disease, and cerebrovascular disease were significant risk factors associated with more severe disease and poor outcomes [23]. The fatality rate in patients without comorbidities was 1.4% as compared to 13.2% for patients with cardiovascular comorbidities. The mean age of participants from the 6 studies included in the meta-analysis was 48 years. The authors did not discuss how differences in age could have affected the results. In our study, the mean number of comorbidities (comorbidity score) was 1.2, which is relatively low and could explain the lack of association with adverse outcomes.

More than 1 in 10 US residents speak Spanish at home [24]. Patients with English as a second language may be managed differently and receive fewer recommended health care services than native English speakers, regardless of their level of fluency [25,26]. Language barriers have also been found to prolong the length of hospital stay or increase readmissions [27,28]. In our study 38.3% (n=62) of patients reported English as their primary language. Our study found that English-speaking patients were younger than Spanish-speaking ones. There was a trend towards a higher obesity rate (although not statistically significant) in the English-speaking patients. Despite the statistically significant higher age in the Spanish-speaking group, there was no difference in the overall mortality or length of stay between the groups.

Our study has several limitations. First, we did not compare disease severity or mortality burden with other ethnic groups. Second, we did not include patients with asymptomatic or mild disease who were seen in outpatient clinics or discharged from the emergency department. Rather, we focused on describing outcomes in hospitalized patients who are high risk. Third, our patients had a relatively low co-morbidity score of 1.2, which could account for the lack of association between comorbidity and overall mortality.

5. CONCLUSION

A wavier for informed consent was obtained from hospital institution review board due to the retrospective nature of study.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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