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Research Article

A Comparison by Ethnicity of Usage of Medication, Intubation Use, and Mortality Rates of COVID-19 Patients in an Urban Hospital

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Abstract

Objectives: The purpose of this study was focused on answering three principal research questions concerning evidence at one hospital of differences in medication used, whether intubation was used, and mortality by ethnicity for those treated for COVID-19 while controlling for age, gender, and co-morbidities. **Methods**: Data was collected from 1188 patient charts from January 1, 2020 to January 1, 2021, and binary logistic regression was used to test hypotheses. **Results**: There were no statistically significant differences in medication use, intubations, or mortality outcomes by ethnicity. The p-values for all the ethnic groups was far greater than 0.05 which indicated that there is no statistically significant difference in medication use, ventilator use, or survival for all ethnicities thus the null hypothesis must be considered. **Conclusions:** Ethnicity had no bearing on treatment modalities or mortality among patients admitted and diagnosed with COVID-19 symptoms. Patients at this hospital received equitable care despite ethnic differences that can help alleviate the ill effects of treatment disparities.

Keywords: COVID-19; Intubation use; Medication use; Mortality; Urban Hospital

Introduction

The study had a total of 3 research questions. Research question 1 determined whether there was an association between ethnic minority status and medication use. Research question 2 looked to see if there was an association between ethnic minority status and ventilator use. Research question 3 examined if there was an association between ethnic minority status and mortality. The variables controlled for in the study were age, gender, comorbidities, length of hospital stay, and hospital floor level among patients admitted to a central Queens hospital for COVID-19.

The study demonstrated that people who identified as minorities received lower-quality treatment compared with White people and that White individuals received preferential or better treatment than non-Caucasians [1]. The purpose of the research study was to explain why ethnic minorities had the worst health outcomes with COVID-19 [2]. Patients of a specific age, gender, or ethnicity with underlying medical conditions received different treatment modalities at the central Queens hospital. The aim was to determine if non-Caucasians received different treatment regimens compared with Caucasians and if they did respond to various treatments and whether this was based on their age, gender, ethnicity, comorbidities, and the length of stay in the central Queens hospital.

A central Queens hospital was selected for the study because COVID-19 was a serious concern for a diverse patient population—African Americans or Blacks, Asians, and those with multiethnic backgrounds—with underlying health conditions [3]. The number of patients dying from COVID-19 increased each week at the hospital, contributing to the increased overall death toll [4]. In this study, the association between several risk factors (i.e., age, gender, ethnicity, comorbidities, and geographic location) that contributed to the treatment modality used and the fatality rate

were explored.

The study period of this dissertation was from January 1, 2020, to January 1, 2021, which was the peak and the initial stages of the COVID-19 crisis [5]. During this time period the disease spread throughout the world. As a result, it caused many people to become ill, and it increased the mortality rate [5]. According to the statistics, within this length of time during the COVID-19 crisis, 5,657,529 cases of COVID-19 were recorded, and 356,254 deaths were confirmed globally [5]. Throughout the initial phase of the COVID-19 crisis, the WHO said that the pandemic was an infectious disease outbreak. Disease preparedness strategies and an emergency management plan were carried out to help mitigate the impact of the disaster [5].

The novel coronavirus disease in 2019 was named SARS-CoV-2 by the World Health Organization (WHO). Coronavirus was identified through its transmission, certain signs and symptoms, and the ways people avoided contact with an infectious person. The disease was spread through respiratory droplets (i.e., being coughed or sneezed at), which contaminate the environment [2]. Since the novel coronavirus disease was identified in Wuhan, China in 2019, it has become a global threat to the general population and especially to critically ill patients in Intensive Care Units (ICUs) of medical facilities [6]. Patients in these units needed medications and respiratory support strategies to manage their clinical conditions. Furthermore, given the severity and spread of COVID-19, some interventions were implemented to control the effects of the epidemic [6].

Methods

The study adopted a quantitative approach to examine modalities based on outcomes and their relation to certain factors among patients with COVID-19 [7]. The study had a secondary dataset that was created by conducting a chart review at a central Queens hospital. The data was obtained from the patient's electronic medical records.

Setting and Study Population

The present study took place at a central Queens hospital, where participants in the age range of 18 to 65 years and over were treated for COVID-19 in the emergency department, ICU, and different hospital floor levels. The study period ran from January 1, 2020 to January 1, 2021, and involved patients who were put on a ventilator or administered medications at the central Queens hospital due to a COVID-19 diagnosis [8]. The bulk of the hospital's patient population comprised of 13.3% African Americans or Blacks, 34.3% Whites, 9.3% Asians, and 0.7% Native Americans or Alaskans, and 42.4% had diverse multiethnic backgrounds. The estimated size of the target population was 1,188. Compared with other hospitals, this medical facility had an ethnically diverse patient population.

Variables

The covariates which acted as independent variables were age, gender, comorbidities, and hospital floor level. The primary independent variable was ethnic minority status. The predictor or explanatory independent variable was the patient's length of hospital stay, and the dependent outcome variables were treatment modalities and the survival of the patient.

Data and Statistical Analysis

The present study used a binary logistic regression to determine the association of various treatment approaches, which included the administration of medications or placing the patient on a ventilator and the mortality of the patient and ethnic minority status where multiple covariates, such as age, gender, comorbidities, length of hospital stay, and hospital floor level where COVID-19-positive patients were treated were examined in terms of a binary outcome variable [9]. The binary logistic regression method was used in this study to analyze the risk factors related to a COVID-19-positive patient's length of hospital stay. The study's statistical procedure examined factors, such as patient age, gender, COVID-19 signs and symptoms, the severity of the disease, and comorbidities, to help predict whether a COVID-19-positive patient would survive [9]. The Hosmer Lemeshow test statistic was used to test for goodness of fit for the model, and the logistic regression model was used to aid in predicting the patient's mortality. The adjusted odds ratios were used to examine the effects of the independent variables, which were the covariates on the outcome variable of the research [9]. A p-value of 0.05 indicated that the independent predictor variables were significantly associated with a high risk for mortality after controlling for confounders [9].

Results

The results have "variables in the equation tables" which reflects representative ethnicities as a (sig.) category with p-values greater than 0.05. This clearly shows for each research question that there is no statistically significant difference between the ethnic groups i.e., Caucasians when compared with minorities for each research question. Research questions 1, 2, and 3 were taking into account age, gender, comorbidities, length of hospital stay, and the hospital floor levels.

To address research question 1, a binary logistic regression was performed to investigate the relationship between ethnic minority status and medication use.

In Table 1 the White (Caucasian) (p value= 0.272) was used as the reference category. The other ethnic categories (1-4) which included African American or Black (0.985) (cat 1), Multiethnic (0.111) (cat 2), Asian (0.418) (cat 3) and Native American or Alaskan (0.129) (cat 4) have (sig.) p-values far greater than 0.05

which indicated that there is no statistically significant difference in medication given to all ethnicities thus the null hypothesis must be considered.

A binary logistic regression method was carried out, and the overall model with all the predictor variables was shown to be statistically significant. According to the Wald test, the variables age (p=0.003), hospital floors (p=<0.001), length of hospital stay (p=<0.001), and the comorbidities pneumonia (p=0.001) and respiratory failure (p=<0.001) added significantly to the model but gender (p=0.303), and all the ethnic groups which included White (p=0.272), African American or Black (p=0.985), Multiethnic (p=0.111), Asian (p=0.418), and Native American or Alaskan (p=0.129) did not add significantly to the model.

	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP(B)	
							Lower	Upper
Age Groups	−0.437	0.147	8.892	1	0.003	0.646	0.484	0.861
Sex	0.139	0.135	1.059	1	0.303	1.149	0.882	1.497
Comorbidity	0.446	0.281	2.517	1	0.113	1.562	0.9	2.711
Diabetes	0.009	0.144	0.004	1	0.951	1.009	0.761	1.338
Hypertension	0.181	0.146	1.543	1	0.214	1.199	0.9	1.597
Obesity	−0.257	0.59	0.19	1	0.663	0.773	0.243	2.457
Heart Disease	19.734	40192.969	0	1	1	371709	0	.
Hyperlipidemia	0.083	0.194	0.183	1	0.669	1.087	0.743	1.59
Pulmonary Embolism	−0.648	0.334	3.772	1	0.052	0.523	0.272	1.006
DVT	−0.465	0.442	1.11	1	0.292	0.628	0.264	1.492
Atrial Fibrillation	−0.332	0.211	2.48	1	0.115	0.718	0.475	1.085
Pneumonia	0.449	0.138	10.54	1	0.001	1.567	1.195	2.056
Dyspnea	−0.553	0.532	1.082	1	0.298	0.575	0.203	1.631
Kidney Disease	−0.424	0.247	2.934	1	0.087	0.655	0.403	1.063
CAD	−0.050	0.247	0.04	1	0.841	0.951	0.586	1.545
Anemia	−0.279	0.182	2.357	1	0.125	0.757	0.53	1.08
Asthma	0.209	0.279	0.563	1	0.453	1.233	0.714	2.129
COPD	0.086	0.313	0.075	1	0.784	1.09	0.59	2.013
Respiratory Failure	1.198	0.138	75.079	1	< 0.001	3.315	2.528	4.347
Hospital Floors	0.17	0.034	24.393	1	< 0.001	1.185	1.108	1.267
LOS_IN_DAYS	0.027	0.008	12.147	1	< 0.001	1.027	1.012	1.043
Ethnicity			5.148	4	0.272			
Ethnicity (1)	0.004	0.213	0	1	0.985	1.004	0.662	1.523
Ethnicity (2)	0.245	0.154	2.543	1	0.111	1.277	0.945	1.726
Ethnicity (3)	0.197	0.243	0.656	1	0.418	1.217	0.756	1.96
Ethnicity (4)	1.673	1.102	2.302	1	0.129	5.326	0.614	46.204
Constant	−1.592	0.302	27.779	1	< 0.001	0.204		
[a]Variable (s) entered on step 1: Ethnicity.								

Table 1: Variables in the Equation.

To address research question 2, a binary logistic regression was performed to examine the relationship between ethnic minority status and being placed on a mechanical ventilator.

In Table 2, the White (Caucasian) (p value= 0.784) was used as the reference category. The other ethnic categories (1-4) which included African American or Black (0.236) (cat 1), Multiethnic (0.836) (cat 2), Asian (0.502) (cat 3) and Native American or Alaskan (0.999) (cat 4) have (sig.) p-values far greater than 0.05 which indicated that there is no statistically significant difference in ventilator use for all ethnicities thus the null hypothesis must be considered.

A binary logistic regression method was carried out, and the overall model with all the predictor variables was statistically significant. According to the Wald test, the variables hospital floors (p=<0.001), length of hospital stay (p=<0.001), and the comorbidities hypertension (p=<0.001) and respiratory failure (p=<0.001) added significantly to the model, but age groups (p=0.249), gender (p=0.572), and all the ethnic groups which included White (p=0.784), African American or Black (p=0.236), Multiethnic (p=0.836), Asian (p=0.502), and Native American or Alaskan (p=0.999), did not add significantly to the model.

	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP(B)	
							Lower	Upper
Age Groups	−0.224	0.194	1.332	1	0.249	0.799	0.546	1.169
Sex	0.108	0.191	0.32	1	0.572	1.114	0.766	1.621
Comorbidity	−0.544	0.382	2.027	1	0.155	0.581	0.275	1.227
Diabetes	−0.005	0.201	0.001	1	0.98	0.995	0.671	1.476
Hypertension	−0.751	0.204	13.601	1	< 0.001	0.472	0.317	0.703
Obesity	0.241	0.829	0.085	1	0.771	1.273	0.251	6.462
Heart Disease	−19.732	40192.97	0	1	1	0	0	.
Hyperlipidemia	−0.361	0.317	1.298	1	0.255	0.697	0.374	1.297
Pulmonary Embolism	−0.767	0.641	1.431	1	0.232	0.464	0.132	1.632
DVT	−0.787	0.793	0.983	1	0.321	0.455	0.096	2.156
Atrial Fibrillation	−0.197	0.334	0.349	1	0.555	0.821	0.427	1.58
Pneumonia	−0.103	0.193	0.283	1	0.595	0.903	0.618	1.317
Dyspnea	−0.598	0.846	0.501	1	0.479	0.55	0.105	2.883
Kidney Disease	0.224	0.353	0.402	1	0.526	1.25	0.626	2.496
CAD	−0.509	0.428	1.417	1	0.234	0.601	0.26	1.39
Anemia	−0.290	0.286	1.026	1	0.311	0.749	0.427	1.311
Asthma	0.19	0.38	0.25	1	0.617	1.209	0.574	2.546
COPD	−0.025	0.442	0.003	1	0.955	0.976	0.41	2.321
Respiratory Failure	1.533	0.211	52.681	1	< 0.001	4.634	3.063	7.01
Hospital Floors	0.377	0.046	65.973	1	< 0.001	1.458	1.331	1.597
LOS_IN_DAYS	0.051	0.009	33.533	1	< 0.001	1.052	1.034	1.071
Ethnicity			1.737	4	0.784			
Ethnicity (1)	0.357	0.302	1.403	1	0.236	1.43	0.791	2.583

Ethnicity (2)	0.044	0.213	0.043	1	0.836	1.045	0.689	1.586
Ethnicity (3)	0.222	0.33	0.451	1	0.502	1.248	0.653	2.385
Ethnicity (4)	−19.204	13790.922	0	1	0.999	0	0	.
Constant	−3.351	0.413	65.913	1	< 0.001	0.035		
Variable(s) entered on step 1: Ethnicity.								

Table 2: Variables in the Equation.

To address research question 3, a binary logistic regression was performed to explore the relationship between ethnic minority status and mortality.

In Table 3, the White (Caucasian) (p value= 0.855) was used as the reference category. The other ethnic categories (1-4) which included African American or Black (0.512) (cat 1), Multiethnic (0.689) (cat 2), Asian (0.587) (cat 3) and Native American or Alaskan (0.603) (cat 4) have (sig.) p-values far greater than 0.05 which indicated that there is no statistically significant difference in mortality for all ethnicities thus the null hypothesis must be considered.

A binary logistic regression method was carried out, and the overall model with all the predictor variables was shown to be statistically significant. According to the Wald test, the variables age (p=<0.001), hospital floors (p=<0.001), length of hospital stay (p=0.008), and the comorbidities anemia (p=0.004), asthma (p=0.009), and respiratory failure (p=<0.001) added significantly to the model, but all the ethnic groups which included White (p=0.855), African American or Black (p=0.512), Multiethnic (p=0.689), Asian (p=0.587), and Native American or Alaskan (p=0.603), did not add significantly to the model.

	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp (B)**	**95% C.I. for EXP (B)**	
							Lower	**Upper**
Age Groups	0.957	0.183	27.484	1	< 0.001	2.604	1.821	3.725
Sex	−0.144	0.163	0.787	1	0.375	0.866	0.63	1.191
Comorbidity	−0.311	0.347	0.801	1	0.371	0.733	0.371	1.447
Diabetes	−0.336	0.176	3.636	1	0.057	0.715	0.506	1.009
Hypertension	−0.266	0.173	2.353	1	0.125	0.767	0.546	1.077
Obesity	−19.316	10116.925	0	1	0.998	0	0	.
Heart Disease	21.485	40192.969	0	1	1	21422620	0	.
Hyperlipidemia	−0.473	0.256	3.426	1	0.064	0.623	0.377	1.028
Pulmonary Embolism	−0.337	0.474	0.507	1	0.477	0.714	0.282	1.807
DVT	−0.598	0.661	0.82	1	0.365	0.55	0.151	2.007
Atrial Fibrillation	−0.029	0.244	0.015	1	0.904	0.971	0.602	1.567
Pneumonia	−0.132	0.165	0.64	1	0.424	0.876	0.634	1.211
Dyspnea	−0.499	0.824	0.367	1	0.545	0.607	0.121	3.053
Kidney Disease	0.113	0.304	0.137	1	0.711	1.119	0.617	2.033
CAD	0.26	0.281	0.858	1	0.354	1.298	0.748	2.252
Anemia	−0.714	0.251	8.079	1	0.004	0.49	0.299	0.801
Asthma	−1.135	0.437	6.757	1	0.009	0.321	0.137	0.756

COPD	0.514	0.333	2.383	1	0.123	1.671	0.871	3.208
Respiratory Failure	1.364	0.172	62.64	1	< 0.001	3.913	2.791	5.487
Hospital Floors	0.169	0.039	18.595	1	< 0.001	1.184	1.096	1.278
LOS_IN_DAYS	0.021	0.008	7.046	1	0.008	1.021	1.006	1.037
Ethnicity			1.335	4	0.855			
Ethnicity (1)	−0.177	0.27	0.431	1	0.512	0.838	0.494	1.421
Ethnicity (2)	−0.072	0.181	0.161	1	0.689	0.93	0.653	1.325
Ethnicity (3)	0.154	0.284	0.295	1	0.587	1.167	0.669	2.035
Ethnicity (4)	−0.585	1.125	0.271	1	0.603	0.557	0.061	5.049
Constant	−2.479	0.364	46.355	1	< 0.001	0.084		
[a]Variable (s) entered on step 1: Ethnicity.								

Table 3: Variables in the Equation.

Discussion

The discharge records for adults 18 years to 65 years and older were searched for patients admitted to the hospital from January 1, 2020 to January 1, 2021, who had COVID-19 confirmed by a positive COVID-19 test. Different risk factors were examined, including the patient's age, gender, ethnicity, comorbidities, and length of hospital stay on a primary outcome, in-hospital mortality. The research goal was to examine patient characteristics and outcomes among those treated for COVID-19 at a central Queens hospital medical center and analyze the mortality of the COVID-19-positive patient over the specified period of the pandemic [10].

The study's findings revealed that those older than 65 with comorbidities, such as heart disease, diabetes, hypertension, obesity, hyperlipidemia, clotting disorders (e.g., pulmonary embolism and DVT), atrial fibrillation, pneumonia, respiratory failure, dyspnea, kidney disease, COPD, CAD, anemia, and asthma had the most significant in-hospital mortality associated with increasing age. The results also showed that patients older than 65 years had a higher rate of dying than younger adults. Furthermore, the death rate was not statistically significant for the various ethnic groups: African Americans or Blacks, Asians, Native Americans or Alaskans, multiethnic, and White patients treated for COVID-19. The data in the study indicated that the mortality rate differed based on age patterns; however, gender had no bearing on the number of patients dying of the disease. Older age, one or more comorbidities, and a long hospital stay had more severe COVID-19 disease outcomes.

The research showed no differences in treatments and non-statistical differences in survival rates. Comorbidities were diversified and included heart disease, diabetes, hypertension, obesity, hyperlipidemia, clotting disorders (e.g., pulmonary embolism and DVT), atrial fibrillation, pneumonia, respiratory failure, dyspnea, kidney disease, COPD, CAD, anemia, asthma, and patients without any existing medical conditions. The confounding factors were similar in the cross-section of patients being of Caucasian and non-Caucasian backgrounds and were therefore non-contributory after using a binary logistic regression method. The study's p value was greater than 0.05, showing no statistical difference between the two groups of Caucasians and non-Caucasians in treatment modalities used nor in death or discharge outcomes. Therefore, no bias was found in treating patients at the central Queens hospital for the given period nor were any modalities held back from specific groups based on their minority status.

Limitations

The study has several limitations. The study included only hospitalized patients with COVID-19 at the central Queens hospital [11]. The study evaluated demographic and clinical data in the patient's electronic medical records instead of conducting a comprehensive chart review for each COVID-19-positive patient. The study could not gather enough detail on each hospitalized infected person's individual demographic and clinical characteristics [11]. The study focused mainly on COVID-19-positive adult patients, and minimal data were available on pediatric patients from labor and delivery; therefore, the study results could be biased because of the age groups in the investigated research [12]. During the early phase of the COVID-19 crisis, methods to test COVID-19 were not fully established but became readily available during the later stages of the pandemic [10]. The downside of testing was that the COVID-19 test method gave false positives in which they classified vulnerable people as having the disease when they did not have the illness. The ethnic categories

of the hospital only applied to this single location but lacked consideration of the vast heterogeneity within ethnic groups [13]. Further studies are needed to examine the association between COVID-19, ethnicity, and specific clinical outcomes for patients admitted to a medical facility [14].

Conclusions

At the central Queens hospital, African Americans or Blacks and multiethnic people were more likely to be hospitalized. No statistically significant difference was found between African American or Black patients and patients of other ethnic groups, such as Whites, among those receiving a medication or on ventilator support. African Americans or Blacks were no more likely than Whites to have the worst survival rates once hospitalized at the hospital located in Forest Hills, Queens. Being African American or Black was not associated with an increase in mortality compared with White patients. No differences were observed in the death rate among various ethnic groups of patients hospitalized at the central Queens hospital. All drugs used to treat COVID-19 signs and symptoms were given equally to all ethnic groups of patients at the medical facility. No differences were found in treatments received for ethnic groups of Asians, Hispanics, African Americans or Blacks, and Whites. Since the p-value for the ethnic groups was greater than 0.05, the null hypothesis was not defeated and was not statistically significant. Therefore, no bias occurred in ethnicity of who received what treatment, and no differences were found between the various groups in the COVID-19-positive patient's survival. The hospital treated the patient's the same way, and a patient's ethnicity did not affect treatment.

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Conflicts of Interest

The author declares that there are no conflicts of interest.

Human Participant Protection

The study was approved by the ethics committee at Walden University and at the central Queens hospital. There was no need for written informed consent because the study was a chart review. The study followed the guidelines for a cross-sectional study.

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