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The African-American Experience in United States Emergency Departments

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The African-American Experience in United States Emergency Departments

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ABSTRACT

The research presented addresses the following question: Are African American patients more likely to have a negative experience and outcome than White patients in United States emergency departments? This research was completed using the National Hospital Ambulatory Medical Care Survey dataset from the Centers for Disease Control and Prevention.. This collection of data, most recently gathered in 2019, contains over 900 variables documented about patient visits in 24-hour emergency departments around the United States. A select number of variables were isolated and analyzed within the context of race to identify if Black patients fared worse than White patients in terms of key characteristics of visit outcomes such as appropriate allocation of diagnostics services, procedures, and medications. The study demonstrated that Black patients consistently receive fewer diagnostic tests and ordered treatment procedures than their White counterparts.

INTRODUCTION

At the core of medicine lies the principles of justice, beneficence, non-maleficence, and autonomy. These ideals are taught and demonstrated during medical training, practiced by health professionals in all fields, and sworn on by physicians when they take the Hippocratic Oath. Despite this, racial biases continue to be observed in the healthcare system (Chapman, et al., 2013). The foundations of modern healthcare are the result of illegal experiments on Black slaves and clinical trials with unknowing participants. However, as society has evolved, so has this penetrating evil. In today's medical climate, most acts of racism are not outright, but are instead the result of implicit bias as well as healthcare policy that promotes discrimination and disparity.

Some practitioners are entirely unaware how their behavior affects their patients, but there is evidence to show that many parts of routine patient-provider interactions can be influenced by implicit bias and racial factors. The study was implemented to study if African American patients were more likely to have a negative experience and outcome than White patients in United States emergency departments (ED).

IMPLICIT BIAS

Implicit bias can be defined as the manner in which a person's perceptions, influences, and lived experiences influence their behavior. Oftentimes, this occurs in ways that the individual is not consciously aware of, making it even harder to address. There is significant evidence in the scientific community that implicit bias in physicians influences their decision making, thus influencing patient care and potentially perpetuating preexisting healthcare disparities (Chapman, et al., 2013). Combating implicit bias is potentially even more difficult in the field of medicine, as physicians are often taught to operate in a 'group mentality', analyzing a patient for common risk factors and comorbidities in the patient's population (Chapman, et al., 2013). While this can be a useful diagnostic tool, generalization such as this can lead to stereotyping and potential diagnostic errors. Physician implicit bias can be found in different manifestations during the patient experience, such as medication management, diagnostics, and much more. Documented disparities amongst racial and ethnic groups can be found in most aspects of a patient's healthcare experience, whether the result of implicit or explicit bias (Chapman, et al., 2013).

PAIN MANAGEMENT

Pain management is a potentially difficult aspect of medical care to navigate due to the addictive and potentially harmful nature of many analgesic options. Many physicians are hesitant to prescribe potent drugs, such as opioids, for pain management. However, there is evidence that this hesitancy could be due to implicit bias instead of general concern for public wellbeing. A 2015 study looks at the prescription of both opioid and nonopioid pain medications for children with appendicitis in the ED (Goyal, et al., 2015). While the pediatric population might seem like an unusual source to study general trends, providers generally hesitate to prescribe opioids to children in general, so this data will likely only reflect instances where pain medication is absolutely medically necessary. The study found that Black pediatric patients were less likely to receive opioid analgesics than White pediatric patients, even when adjusting for confounders (Goyal, et al., 2015). This suggests a different threshold for treatment by race for a painful condition that is commonly treated with opioid analgesics. More research is necessary to see if these trends persist in adult populations, as well as with medication prescribing, when pain management is not the pain goal.

DIAGNOSTIC IMAGING

Diagnostic imaging can play a crucial role in the formation of a diagnosis and treatment plan for a patient in the ED. Diagnostic imaging can be expensive, time-consuming, and carries potential risks such as radiation exposure (Marin, et al., 2021). Nonetheless, it is a diagnostic tool in the ED. A study of pediatric ED patients spanning from 2016 to 2019 pursued the possibility of a disparity in diagnostic imaging

amongst racial and ethnic groups (Marin, et al., 2021). Once again, pediatric patients are an advantageous population to examine for this disparity, as providers tend to be wary of subjecting a child to a potentially harmful test. The study found that when considering radiography, computerized tomography, ultrasonography, and magnetic resonance imaging, Black patients were significantly less likely to receive diagnostic imaging than White patients. Even when researchers attempted to account for a large difference in visits amongst White, Black, and Latino patients, there was still strong evidence that a disparity existed for Black patients (Marin, et al., 2021).

END OF LIFE CARE

In recent years, there has been an increase in end of life care and emergency care. Due to rising costs of insurance and healthcare in the U.S., many Americans use their local ED like a primary care facility. This sentiment rings true for end of life care as well, despite the fact that trends show the use of hospice care is increasing in the U.S. (Ornstein, et al. 2020). A study from 2020 determined that Black patients had a significantly higher rate of hospitalization and ED visits during their last 6 months of life, with 59.3% of Black patients visiting the ED more than once in those 6 months (Ornstein, et al. 2020). Researchers from this study speculate that many Black patients seek more intense care and greater life-saving measures towards the end of life due to a lack of trust in the healthcare system, which could partially explain the difference (Ornstein, et al. 2020). In addition to a sense of mistrust, the article also mentioned many sociocultural factors such as education, health literacy, and access to care as reasons why this disparity exists (Ornstein, et al. 2020). This trend may be relevant in the following data analysis, as

it could mean that more terminally-ill Black patients are visiting the ED than White patients of a similar status.

METHODS

Study Design

This study was a retrospective analysis of a pre-existing data set known as the National Hospital Ambulatory Medical Care Survey, or NHAMCS (NCHS, 2021). The specific data used in this analysis was from the 2019 NHAMCS, the most recent collection available at the time of the study. Evaluation from the Butler University institutional review board was deemed unnecessary as there was no new interaction with human subjects, and all IRB regulations were followed in the original data collection by the Centers for Disease Control and Prevention and the National Center for Health Statistics (NCHS, 2021).

Data Source

The 2019 National Hospital Ambulatory Medical Care Survey contains data from ambulatory ED visits in the United States. Hospitals identified in the study included short-stay and general noninstitutional hospitals. Federal, military, and VA hospitals were excluded from participation (NCHS, 2021). Participation in this study is done on a voluntary basis by willing hospitals that meet the criteria, and participating hospitals are randomly chosen from the volunteer pool (NCHS, 2021). Each ED was randomly assigned a four-week period for data collection, and that data was only reported from a systematic random sample of patient visits to the ED (NCHS, 2021). This survey was

conducted by the Centers for Disease Control and Prevention and the National Center for Health Statistics, as well as assistance from the U.S. Census Bureau and hospital staff in manual data collection.

Study Population

The population of this study are patients who presented to a participating ED during the four-week reporting period and were randomly selected to have their visit demographics documented. Informed consent and patient permission is not required for their participation in the survey per the National Center for Health Statistics Ethics Review Board due to this being a matter of public health (NCHS, 2021). Notices of this requirement to disclose information regarding public health measures to the CDC or other agencies are often highlighted in a hospital's "Privacy Practices", and therefore, no additional permissions are required (NCHS, 2021).

The specific study population in question is African American or Black patients, as compared to White patients. Therefore, it was necessary to isolate those two populations, which was done using the variables "RACER" and "RACERETH". Patients coded as a 3- "other" in the "RACER" variable were cleared from the data, as well any patient coded as 3-"Hispanic" and 4-"Non-Hispanic Other" from the "RACERETH' variable. While there are hypothesized and observed disparities within and between these racial and ethnic groups, they were not the focus or the comparison in this study. The use of two variables was essential to fully isolate the patient population, as only cleaning the data through the variable "RACER" would have resulted in a large sample of white

Hispanic and black Hispanic patients remaining in the data set. It would be impossible to decipher which aspect of the patient's race and ethnicity impacts healthcare outcomes.

Variables

The independent variable in this study is race. The two variables “RACER” and “RACERETH” were used to create the independent variable. “RACER” is the imputed race, either determined from the patient’s response to another variable or the data collector’s determination of the patient’s race. “RACERETH” is a combination of the patient’s imputed race and imputed ethnicity, meaning it accounts for Hispanic ethnicity.

This study analyzes the relationship of race to multiple dependent variables, all of which were expected to demonstrate a relationship with the independent variable. The list of dependent variables analyzed is as follows (NCHS, 2021):

- RACER: White/Black/Other imputed race
    - 1 = White
    - 2 = Black
- RACERETH: Imputed race and imputed ethnicity combination
    - 1 = Non-Hispanic White
    - 2 = Non-Hispanic Black
- DIAGSCRN: Were diagnostic services ordered or provided?
    - 0 = No
    - 1 = Yes
- ANYIMAGE: Any imaging
    - 0 = No

    - 1 = Yes
- TOTDIAG: Total number of diagnostic services ordered or provided
    - Value label indicates total number of diagnostic services ordered or provided
    - EX: 1 = 1 diagnostic service
- PROC: Were procedures provided at this visit?
    - 0 = No
    - 1 = Yes
- TOTPROC: Total number of procedures provided
    - Value label indicates total number of procedures provided
    - EX: 1 = 1 procedure provided
- MED: Were medications given at this visit or prescribed at ED discharge?
    - 0 = No
    - 1 = Yes
- NUMGIV: Number of medications given in ED
    - 0 = None listed/listed drug Rx at discharge only or unknown
    - Other value labels indicate number of medications given in ED
    - EX: 1 = 1 medication given in ED
- NUMDIS: Number of medications prescribed at discharge
    - 0 = None listed/listed drug given at ED only or unknown
    - Other value labels indicate number of medications prescribed at discharge
    - EX: 1 = 1 medication prescribed at discharge
- NUMMED: Number of medications

- Value label indicates total number of medications
- EX: 1 = 1 medication

Statistical Analysis

The IBM SPSS Statistics software was used to run analysis and discover relationships between variables. For continuous variables, an Independent-Samples Kruskal Wallis Test was performed. This analysis searches for statistically significant differences in the median data point and distribution of the data set between two independent populations. This is a non-parametric test, meaning the data set does not have to meet as many inclusion criteria. While parametric tests produce stronger evidence, the data set in this study did not follow a normal distribution and therefore violated the criteria for the appropriate parametric test.

To analyze the categorical variables, a Chi-Square Test of Independence, better known as Crosstabs in SPSS, was performed. This determines whether there is an statistically significant association between categorical variables, so in this instance race and the categorical dependent variables of interest. This is a non-parametric test as well, producing evidence of a similar magnitude to that of the Kruskal-Wallis test. While the Chi-Square Test can only prove an association between the variables, further claims can be made from the observed and expected values. From these values, you can determine whether there is an direct or inverse association between variables.

All test statistics were performed after filtering the data set to only include the correct racial and ethnic populations, as well as cleaning the dependent variables to remove miscellaneous errors.

RESULTS

Demographics

There were a total of 14877 patients.. The Black patient population was n = 4652 and the White patient population was n = 10225. The average age of patients in this data set were 25 - 44 years old.

Diagnostics

Statistically significant differences were found between Black and White patients in regard to diagnostic services. Diagnostic services were ordered or provided for 78.2% of White patients, but the same tests were only ordered for 71.3% of Black patients. The association between race and the administration of diagnostic services was found to be statistically significant with a p-value = < 0.001 (Figure 1). Similar trends were observed in the amount of diagnostic services provided, as there was a significant difference in the number of tests ordered for White and Black patients. The median number of tests for White patients was 3.00, while the median number for Black patients was 2.00 (Figure 2). Statistically significant differences were found in whether imaging was performed as well with 55.6% of White patients receiving imaging in the ED, compared to 43% of Black patients receiving the same services (p-value = < 0.001) (Figure 3).

Procedures

There were differences in the proportion of patients who were treated with procedures in the ED with 51.0% of White patients being treated with procedures during their visit compared to 39.1% of Black patients who were offered the same. The

difference in the administration of these procedures was found to be statistically significant with a p-value = <0.001 (Figure 4). There was also a statistically significant difference in the number of procedures performed for these patients. The median number of procedures provided to White patients was 1.00, while the median number of procedures for Black patients was 0.00 (p-value = < 0.001) (Figure 5).

Medication Administration

White patients were given medication during the ED visit and/or prescribed medication at discharge (79.6%) with a higher frequency than Black patients (77.9%) (p-value = 0.021) (Figure 6). There was also a statistically significant difference in the amount of medication prescribed to these patients in the ED, upon discharge, and in total. There were similar median numbers of medications given to patients in these three variables; however, there were differences in the maximum values of medications prescribed. White patients receive higher maximum amounts of medication in the ED and in general, while Black patients receive higher maximum amounts of medication upon discharge (Figure 6-8).

DISCUSSION

Conclusions

According to the results produced from two types of non-parametric statistical analyses, Black patients consistently receive less-quality care than their White counterparts. These claims are supported by the fact that diagnostic testing and treatment procedures were ordered for Black patients less often than White patients (Figure 1, 3-4);

and even when they were ordered, Black patients received less of these services (Figure 2, 5). Black patients were also prescribed medication less often and given less medication in total (Figure 6-7). The only variable in which Black patients were favored over White patients was in terms of the number of medications prescribed at discharge. This statistic has two-fold implications, as medications prescribed at discharge might not be filled by the patient or have higher out-of-pocket cost and could negatively affect treatment adherence.

While diagnostic services and treatment procedures are not the only indicators of a positive medical experience or visit outcome, there can still be problematic effects for patients as a result of this disparity. If patients are not being screened or treated properly when presenting to the ED, there is a potential for a misdiagnosis, treatment error, or even harm to the patient. Additionally, these quantitative values are likely the best indication of disparity in such a qualitative field like medicine. If there are differences in the allocation of these resources, there is the possibility that inequity is occurring in the qualitative aspects of healthcare. Disparities between races may also include differences in levels of empathy and understanding shown to patients, time and effort put into diagnosing and treating cases, and more. It is important for medical providers and those in the healthcare field to be aware that such disparities are occurring in order to begin to change them.

Limitations

There are limitations to the results of this research. If the data set would have followed a normal distribution, parametric tests could have been performed which

produce more reliable results. While the results from the non-parametric tests in this study are reliable, a parametric analysis could have concluded that there was a stronger relationship between race and any of the dependent variables. Additionally, there was not a method to account for the potential effects of covariates using the Chi-Square test and the Kruskal Wallis test. Both age and sex of the patient have potentially confounding effects on these outcomes, so it is hard to say with certainty that race is the only factor at play.

Future Directions

There are many directions to take this research with more time and resources. First and foremost, finding a method to account for potential confounding factors is crucial to apply the results of this study. It would also be of interest to explore these same results with other racial and ethnic groups that are prevalent in the United States, which would be much larger of an undertaking.

Acknowledgments

I would like to thank my thesis advisor, Dr. Krista Cline, as well as my secondary reader, Dr. Jane Gervasio, for their support and feedback during this process, as well as Dr. Oscar Perez-Beltran in the College of Pharmacy & Health Sciences for his advice in data analysis. I would also like to thank Izabella Jordan and Cassidy Spencer for their assistance, guidance, and support throughout this experience.

Appendix

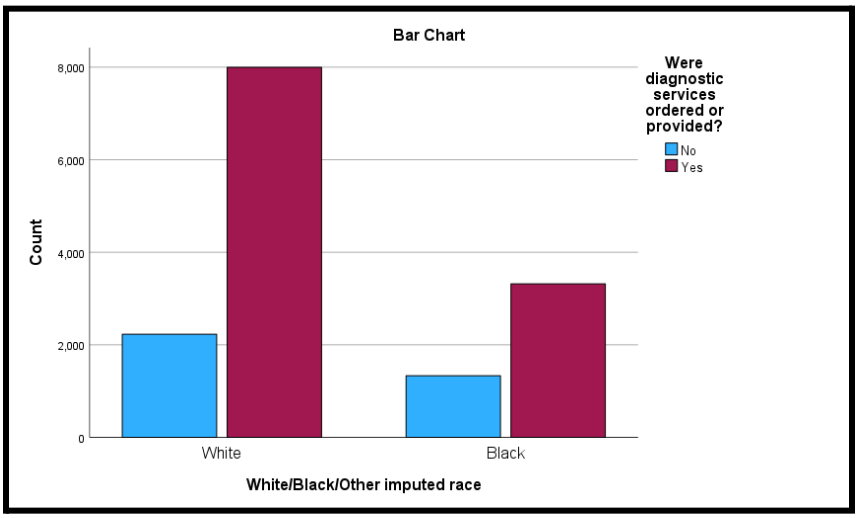

Figure 1. Bar chart depicting the number of patients who did or did not receive diagnostic services, separated by race. Diagnostic services were ordered or provided for 78.2% of White patients, and these services were ordered or provided for 71.3% of Black patients. The association between race and whether diagnostic services were ordered or provided is very statistically significant at an alpha level of 0.05 (p-value = <.001).

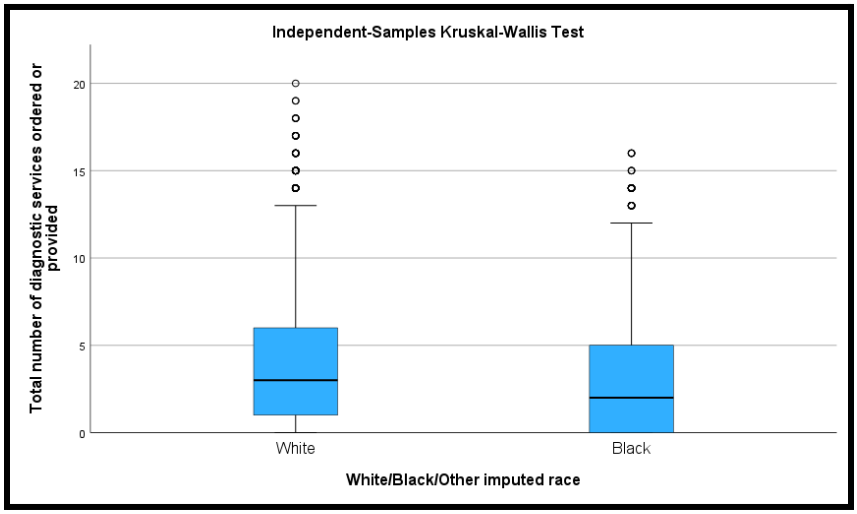

Figure 2. Box and whisker plot depicting the range of values corresponding to the total number of diagnostic services ordered or provided, separated by race. The median total of diagnostic services for White patients was 3.00. The median total of diagnostic services for Black patients was 2.00. According to the Kruskal-Wallis test, there is a very statistically significant difference in the number of diagnostic tests ordered or provided by race (p-value = <.001).

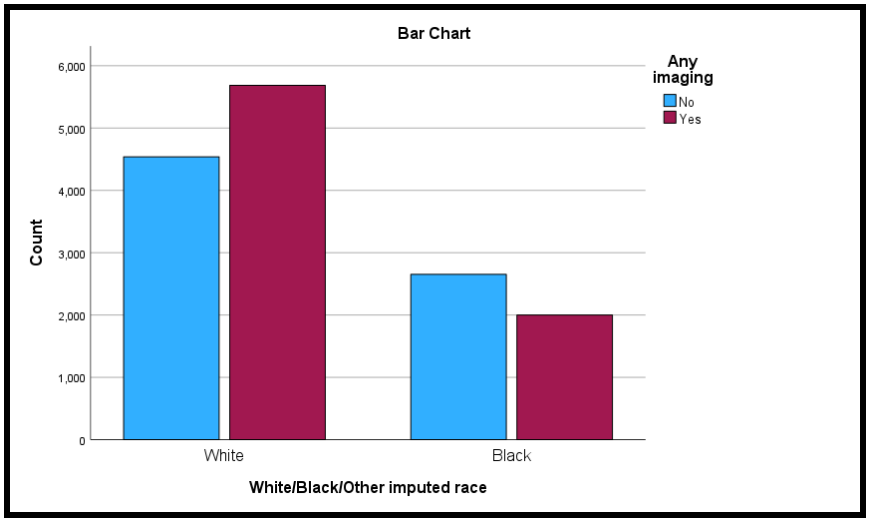

Figure 3. Bar chart depicting the number of patients who received any imaging while in the ED, separated by race. 55.6% of White patients received imaging in the ED, while 43% of Black patients received imaging. The association between race and whether a patient receives diagnostic imaging was very statistically significant at an alpha level of 0.05 (p-value = <.001).

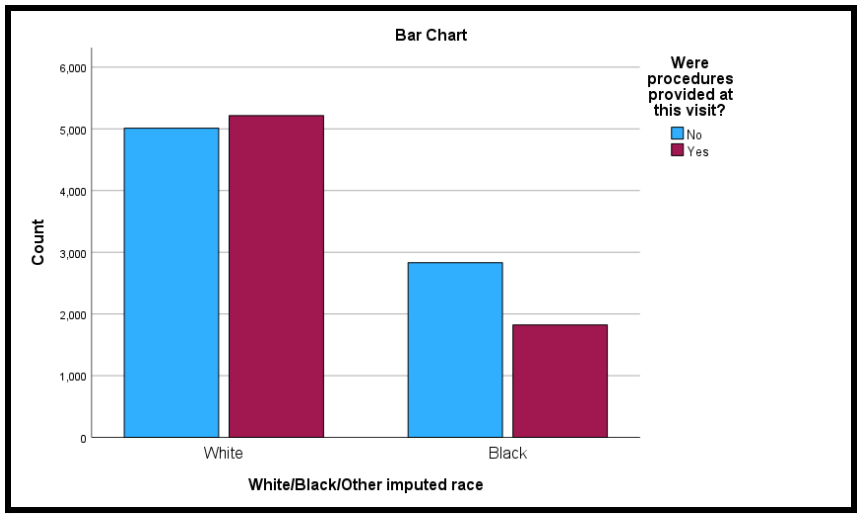

Figure 4. Bar chart depicting the number of patients who were provided procedures during their visit to the ED, separated by race. 51.0% of White patients were provided procedures during their visit, while 39.1% of Black patients were provided procedures during their visit. The association between race and whether patients were provided procedures during their visit to the ED was very statistically significant at an alpha level of 0.05 (p-value = <.001).

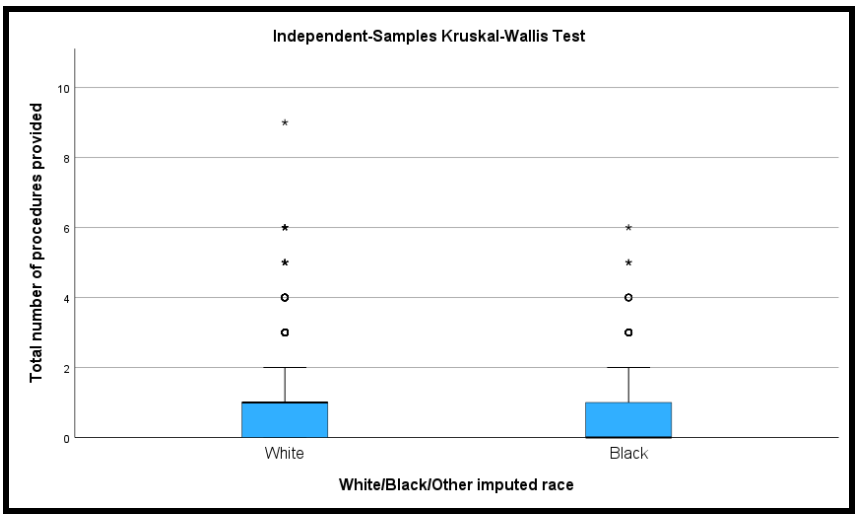

Figure 5. Box and whisker plot depicting the range of values corresponding to the total number of procedures provided, separated by race. The median total of procedures provided for White patients was 1.00. The median total of procedures provided for Black patients was 0.00. According to the Kruskal-Wallis test, there is a very statistically significant difference in the number of procedures provided by race (p-value = <.001).

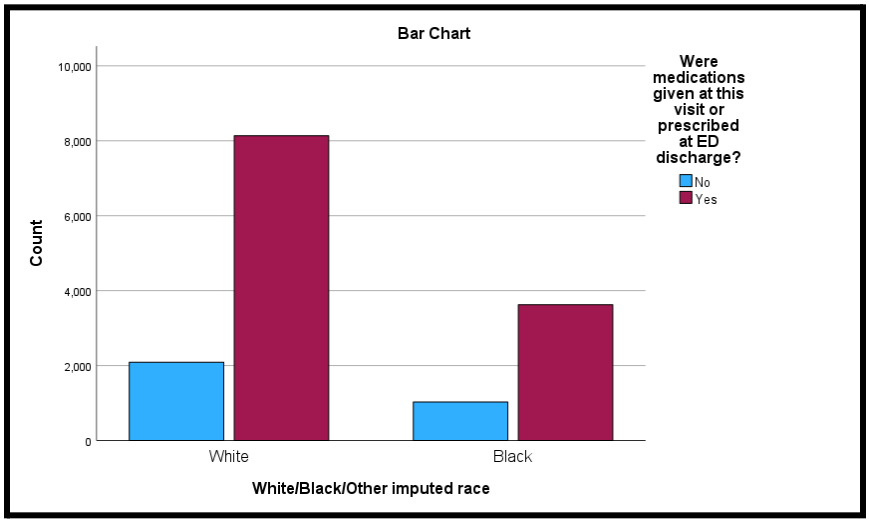

Figure 6. Bar chart depicting the number of patients who were given medication during their ED visit or prescribed one to take home, separated by race. 79.6% of White patients were given medications during their visit or upon discharge from the ED, while 77.9% of Black patients were given medications during their visit or upon discharge from the ED. The association between race and the likelihood of being prescribed medication during a visit or upon discharge from the ED was found to be statistically significant at an alpha level of 0.05 (p-value = 0.021).

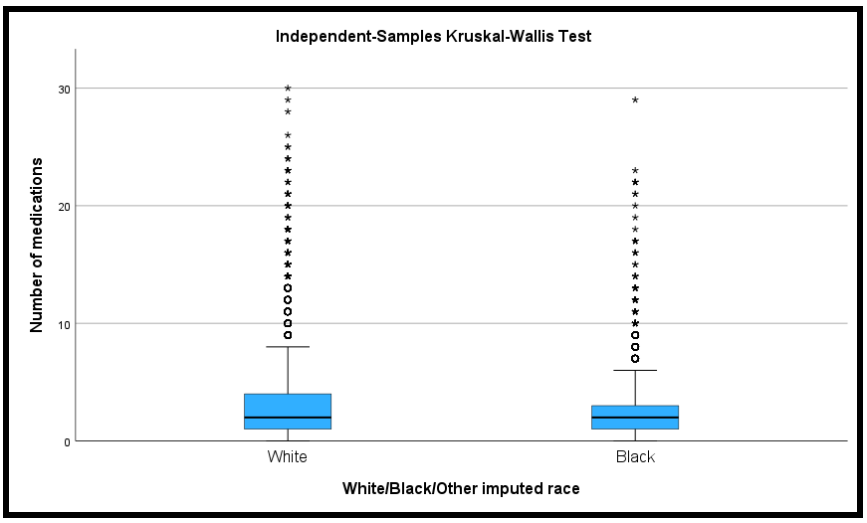

Figure 7. Box and whisker plot depicting the range of values corresponding to the total number of medications provided, separated by race. The median number of medications provided for White patients was 2.00. The median number of medications provided for Black patients was 2.00. According to the Kruskal-Wallis test, there is a very statistically significant difference in the number of medications provided by race (p-value = <.001).

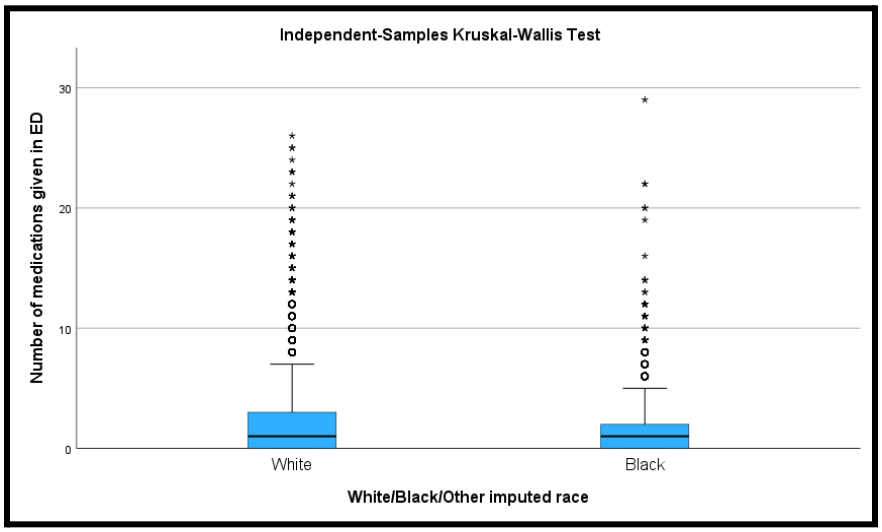

Figure 8. Box and whisker plot depicting the range of values corresponding to the total number of medications given in the ED, separated by race. The median number of medications given in the ED for White patients was 1.00. The median number of medications given in the ED for Black patients was 1.00 According to the Kruskal-Wallis test, there is a very statistically significant difference in the number of medications given in the ED by race (p-value = <.001).

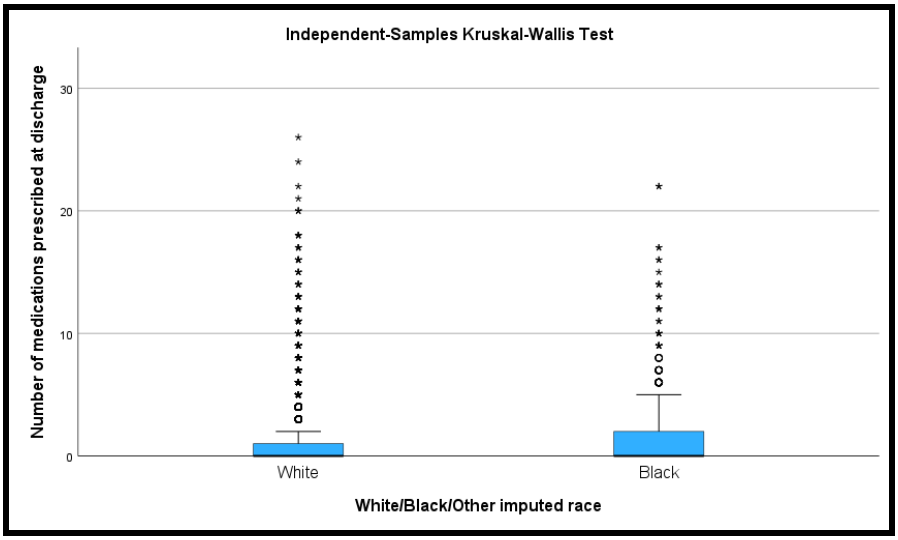

Figure 9. Box and whisker plot depicting the range of values corresponding to the total number of medications prescribed at discharge, separated by race. The median number of medications prescribed at discharge for White patients was 0.00. The median number of medications prescribed at discharge for Black patients was 0.00. According to the Kruskal-Wallis test, there is a very statistically significant difference in the number of medications prescribed at discharge by race (p-value = <.001).

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