Racial Disparities in Coronary Artery Disease Treatment in the US

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ABSTRACT:

Background

Coronary artery disease (CAD) is a leading cause of death worldwide. Unfortunately, racial and ethnic disparities in the diagnosis and treatment of the disease worsens the outcome for non-White individuals.

Methods

Used PubMed and Google Scholar with Boolean operators and search terms such as “race”. “ethnicity”, “access to care”, and “coronary artery disease”. Original research written in English and published after 2000 was included.

Results

African American patients were 24% less likely to receive Coronary Artery Bypass Grafting (CABG) and 30% more likely to undergo Percutaneous Coronary Intervention (PCI) than White patients in one study, while another found they were 36% less likely to undergo PCI. The hazard ratio (HR) for one-year Major Adverse Cardiac Events (MACE) was 1.27 ($p=0.032$) for African Americans. Black and Hispanic patients had higher in-hospital mortality than White patients.

Discussion

Racial disparity continues in CAD treatment, potentially due to integrated inequities in the system. Future campaigns that wish to address this should address procedural access and systemic barriers to reduce the differences in CAD treatment.

INTRODUCTION:

Significance of the Problem

Coronary artery disease (CAD) is a prevalent disease with 7 million deaths attributed to it each year, making it the leading cause of death globally, with CAD affecting developing countries excessively [1]. CAD occurs when arteries–blood vessels that deliver blood for the heart to pump–become narrowed due to a buildup of plaque (typically made of cholesterol, calcium, or fatty substances, known as atherosclerosis). This plaque buildup can reduce oxygen supply, increasing risk of myocardial infarction (MI) (known as heart attack) and heart failure. In fact,

you have a higher risk of repeating MIs with CAD and a mortality rate five to six times more than an individual without CAD [2].

While CAD is dangerous, it has its warning signs known as risk factors. In the US, African Americans have earlier onset symptoms and a higher prevalence of hypertension, one very common risk factor [3]. Despite the increase in risk factors, according to a study by Kovesdy et al., African Americans have a lower rate of incidence for CAD [4]. This difference between presenting risk factors and rate of CAD in African Americans could be due to lack of health care access rather than true lower disease rates, which this paper aims to resolve.

Risk factors of CAD include high cholesterol, obesity, and lack of physical activity [5], which could be changed through diet and exercise [6]. Disparities due to lack of access due to an individual's race or ethnicity could include delayed diagnosis, lack of guideline-recommended treatments (like aspiring, beta-blockers, or statins), or even risk of mortality post-MI due to less timely intervention [7].

While many programs have tried to amend the gap, they tend to improve numbers in the short term, failing to reduce the long term impacts. They also overlook provider bias and underrepresentation in clinical trials, causing efforts to fall short of their intended goal.

Objectives

This review aims to assess if race or ethnicity affect the quality of care an individual receives, specifically looking at differences in individuals that suffer from CAD.

METHODS:

Throughout the course of writing this paper, I used Pubmed and Google Scholar to find relevant research. I used search terms such as “race”, “ethnicity”, “prejudice”, “hypertension”, “access to care”, and “stroke”, combining the various search terms with Boolean operators to limit the search for original research. Exclusion criteria include: reviews, non-English articles, pre-2000 articles. Inclusion criteria consists of original research and related to hypertension.

RESULTS:

Procedural Utilization

African American patients are 24% less likely to get a coronary artery bypass graft (CABG) procedure done, and are 30% more likely to undergo a percutaneous coronary intervention (PCI) procedure, compared to white patients [8, 9, 10, 11]. While the numbers may fluctuate across papers, the literature supports the trend. However a different study found that African American patients are 36% less likely to get a PCI in comparison to white patients [12], highlighting inconsistencies.

Despite declining CABG and PCI mortality rates during 1999-2014, black patients consistently have higher mortality rates than white patients for both procedures [13]. In contrast, recent research has seen a decrease in the disparity of PCI procedures for Black and White patients [14]. Black patients still have higher rates of pre-existing comorbidities [11].

Clinical Outcomes

The hazard ratio for one-year major adverse cardiovascular events (MACE) was 1.27 (p=0.032) [15]. Another study concluded that Black and Hispanic patients had higher in-hospital mortality rates compared to White patients [16], supported with an additional study comparing mortality rates for black (2.5%) and white (1.8%) patients [12]. The adjusted outcome ratio (AOR) for black patient mortality is 1.17 (95% CI: 1.00-1.36) [12], while the AOR for major morbidity for black patients is 1.26 (95% CI: 1.19-1.34), [12] further illustrating this disparity in mortality rates. Despite PCI and CABG outcomes improving [13], black patients still have higher mortality rates for both procedures [9, 10], as well as MACE and repeat revascularization [11]. However, five-year survival rates seem to be comparable between black and white patients [11].

Process Measures

Black patients have lower odds of prehospital electrocardiogram (ECG), a test that measures electrical activity in the heart, or receiving an ECG within 10 minutes of arrival (known as door-to-ECG time) [17]. Additionally, Black patients have also reported longer waiting times for treatment compared to White patients [10, 12]. These statistics highlight the delays in care for Black patients, despite urgent cardiac issues.

Procedural Representation and Complications

One study that analyzed hospitalizations for percutaneous left atrial appendage closure (pLAAC) procedures found that 4.1% of pLAAC recipients were African American, and that these patients had higher rates of post-procedure complications listed in the table below [18]. Not only in procedural outcomes, Black patients are also underrepresented in clinical trials [12, 9, 10]. However, more recent research seems to suggest that representation is increasing [13]. Despite these efforts in research and trials, Black patients continue to have higher stroke rates after revascularization procedures [11].

Table 1. Post-procedure Complications

Complication	Black Patients	White Patients
Postoperative stroke	0.7%	0.2%
Acute kidney injury	4.5%	2.1%
Bleeding requiring transfusion	4.5%	1.4%
Venous thromboembolism	0.7%	0.1%

Table 2. Results summarized

Measure	Black Patients	White Patients	Reference
CABG likelihood	24% less likely	Baseline	[8]
PCI Likelihood	30% more likely	Baseline	[8][12]
Pre-existing comorbidities	Higher rates	Lower Rates	[11]
One-year MACE	HR 1.27	Reference	[10]
In-hospital mortality	2.5%	1.8%	[12]
Mortality (AOR)	1.17 (95% CI: 1.00-1.36)	Reference	[12]
Major morbidity (AOR)	1.26 (95% CI: 1.19-1.34)	Reference	[12]
Door-to-ECG time	Lower odds	Reference	[13]
Prehospital ECG	Lower odds	Reference	[13]
pLAAC representation	4.1% recipients	Reference	[14]
Post-procedure complication	Higher rates	Lower rates	[14] (See Table 1)
Clinical trial representation	Underrepresented	Reference	[9][10][12]

DISCUSSION:

The results of this review found racial disparities in CAD treatment and outcomes, specifically when comparing African Americans with those who identify as White. African American patients were less likely to receive CABG procedures, and had higher rates for MAC events as well as increased in-hospital mortality rates. The HR for one year MACE increased (HR-1.27) and AOR showed higher mortality (AOR =1.17) and morbidity (AOR =1.26) for Black patients, in comparison to White patients. The AOR continues its trend despite improved outcomes for CABG and PCI procedures.

One statistic that was inconsistent was the PCI rates. Multiple studies seemed to support the general trend of Black patients getting PCI over CABG, but one study found the opposite. This difference was unexpected after the various papers supporting the trend, but could reflect the differences in hospital guidelines, decisions by doctors, or even patient insurance status. Higher mortality and delayed care for Black patients, however, was consistent across the literature, meaning that the inequalities in healthcare are supported in research.

Results that confirmed my hypothesis of bias against Black patients was expected when I started this paper due to how much literature documents the racial disparities. Even though newer research shows that the gap between Black and White patients in trends like increased mortality is starting to close, it also shows that Black patients tend to receive the poorer outcome, emphasizing how these disparities start in access to care and reach into quality of care. It could also show inequality in other fields of medicine, which leads me to ask researchers to make clinical trials more representative of the population and include Black patients, so that studies can truly be generalizable.

The information collected in this review can be used for policy and clinical guideline reforms to help close that gap in access and treatment between Black and White patients and ensure comparable quality of care for both, regardless of race. This information also stresses how important it is to address other disparities in healthcare, to ensure that patient treatment and post-operation survival rate isn't affected because of the race of a patient.

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