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Addressing Health Care Disparities

William S. Weintraub *

MedStar Heart & Vascular Institute

* Corresponding author at: MedStar Heart & Vascular Institute, MedStar Washington Hospital Center, 110 Irving Street NW, Washington, DC 20010.

The issue of health care disparities is an issue of considerable importance in the United States [1]. There are clear disparities in longevity, favoring Americans of European ancestry over African Americans and Hispanics [2]. Compared to whites, blacks have higher incidences of hypertension, diabetes, and perinatal mortality, and worse prenatal care [3,4]. The most salient and, probably, most important reason for these disparities lies in socioeconomic factors favoring the most advantaged groups in our society [5]. Living in poorer neighborhoods, with less access to healthy food, more environmental exposure to pollutants, and poorer educational opportunities may contribute to these disparities. In addition, there may be some contribution of genetic predisposition to certain conditions such as hypertension [6]. In addition, there are problems with the health care system as a whole [7]. Based on long experience, disadvantaged communities may, with good reason, distrust the health care system to provide appropriate care [8]. There are also problems of access, with disadvantaged communities suffering more from inadequate insurance, transportation, and institutional resources to receive medical care [9]. Patients from disadvantaged communities may present later in the course of critical medical conditions such as acute myocardial infarction (MI), leading to worse outcomes [10].

Within the medical care system, there may still be disparities in outcome for specific cardiovascular diagnoses and procedures. For instance, survival after acute MI and coronary artery bypass surgery does, while percutaneous coronary intervention (PCI) does not, clearly vary by racial group over follow-up of several months [2,11–13]. The relationship of ethnic group to severity of coronary artery disease was assessed in this issue of the journal by Elbadawi et al. [14] The investigators studied the relationship of racial group to SYNTAX score [15], as a measure of severity of anatomic extent of coronary artery disease, in 260 patients who presented with ST-elevation myocardial infarction (STEMI). The study group was composed of 201 (77.3%) whites, 24 (9.2%) African Americans, 19 (7.3%) Hispanics, and 15 (5.8%) other. The mean SYNTAX score was 13.8±7.7, with no significant difference between the groups. The four groups were compared on a number of other variables, and this comparison revealed nominal p-values below 0.05 for several, suggesting lower age, more frequent hypertension, and higher rate of prior stroke in African Americans, as well as variation in MI location across the groups. The only statistically significant corollate of higher SYXTAX score was the presence of chronic kidney disease. Increased six-month mortality was associated with higher SYNTAX score and increased door-to-balloon time.

This study raised interesting questions about racial group and anatomic extent of coronary artery disease. However, there are significant limitations, of which the authors are well aware. The study is small in scale and from a single institution. The numbers of patients in the African American, Hispanic, and other groups are small. These issues limit generalizability. The variation between groups for a number of covariates must also be considered hypothesis generating as there are multiple comparisons, with the p-values apparently not corrected for multiplicity [16]. The population is too small, and we expect the number of outcome events to be too small to meaningfully look at whether specific racial groups were associated with increased mortality. The issue of whether racial group is associated with higher mortality after STEMI would be of particular interest, and if so, whether it is mediated by SYNTAX score or other covariates such as those measured in this study would require a much larger sample size.

The study varies somewhat from that of Gijsbert et al. [17], who studied 1000 patients of European, Chinese, Malay, or South Asian origin undergoing PCI. These investigators found higher SYNTAX scores in stable South Asian and Malay patients undergoing PCI than in European whites, and Chinese and Malay STEMI patients had higher SYNTAX scores than South Asians or European whites. Over a two-year follow-up period, in the STEMI subgroup, the SYNTAX score predicted mortality ($p<0.001$, HR 2.5 per 10-point increase in score). Also, mortality was higher in South Asian and Malay patients than in European whites, ($p=0.02$, HR 7.2 and 5.8, respectively). The key point in agreement is that SYNTAX score predicted mortality over the

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medium (months) to long (years) term. Another study to evaluate racial differences in the extent of coronary disease was published by Jiang et al. [18] These investigators studied 3021 Chinese and 3230 Australian patients who underwent coronary arteriography. The Australians had more severe anatomic coronary disease than the Chinese.

Stepping back from the catheterization laboratory, we can consider the relationship between racial group and extent of atherosclerosis in relatively large, community-based, epidemiologic cohorts using non-invasive approaches. Budoff et al. [19] evaluated the presence of coronary calcium in 16,560 men and women referred for risk evaluation. Adjusted relative risk compared to whites in men was 0.64 for African Americans, 0.88 in Hispanics, and 0.66 in Asians, and in women, 1.58 for African Americans, 0.84 in Hispanics, and 0.71 in Asians. Using data from 6814 patients in the Multi-Ethnic Study of Atherosclerosis (MESA), Bild et al. [20] found that compared to whites, the relative risk of having coronary calcium was 0.78 in African Americans, 0.85 in Hispanics, and 0.92 in Chinese. Building upon this in the MESA study, Detrano et al. [21] found that in 6722 patients with 162 cardiovascular events, that compared to patients with no calcium, patients with scores of 101 to 300 had a hazard ratio of 7.73 for future events and, for scores over 300, a hazard ratio of 9.67. However, there was no major difference between groups in the risk associated with the calcium score. In 1289 men and women from the Dallas Heart Study, Jain et al. [22] found that the presence of coronary calcium varied slightly in black and white men (37% and 41%, respectively, $p=0.036$) and women (29% and 23%, respectively, $p=0.021$). However, the point estimates from the Dallas Heart Study were at least directionally similar to those of Budoff et al. In the South Bay Heart Watch study of extent of progression of coronary calcium in 1289 patients, Kawakubo et al. [23] found that compared to whites, African Americans and Hispanics had lower prevalence of coronary calcium and less progression. In contrast, no differences were noted between whites and Asian/Pacific Islanders. On balance, these studies do suggest lower prevalence of coronary atherosclerosis in African American and Hispanic men than in white men. The results in women appear less certain. However, all these studies, even the most rigorous at establishing a valid, representative epidemiologic cohort, may suffer from selection bias. What does seem most likely, even if the data are limited, is that atherosclerosis predicts events to a similar degree across racial groups.

The issues of racial, ethnic, and gender disparities in health care are complex and vexing. While there may be some genetic variability in risk factors, most disparities appear to be related to socioeconomic factors, with variations in risk factors, access, care, and outcomes. Prevalence of coronary disease varies less consistently. However, access to care favors the wealthy. In addition, the outcome of cardiovascular disease, especially after acute MI, does vary by racial group. All of this represents a substantial problem for disadvantaged communities and society in general. An equitable society requires equitable care and equitable outcomes for all.

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