

Racial Disparities in Cardiac Rehabilitation Initiation and the Effect on Survival

David Z. Prince, MD, Maria Sobolev, MD, Ju Gao, MD, Cynthia C. Taub, MD

Objectives: To examine predictors of initiation and adherence, identify racial disparities, and compare the survival benefit of cardiac rehabilitation between a white and a unique predominantly non-white minority in an urban environment.

Design: A retrospective cohort study.

Setting: The outpatient cardiac rehabilitation program at Montefiore Medical Center, Bronx, New York.

Patients: Consecutive patients (n = 822) referred to outpatient cardiac rehabilitation were evaluated.

Methods: Baseline characteristics and outcomes were ascertained from medical records. Multivariate logistic regression was used to examine the association among initiation, age, gender, race, reason for referral, and copayment. Kaplan-Meier analysis was performed to evaluate mortality outcomes.

Main Outcome Measurements: Racial disparities in rates of initiation, adherence and completion, and survival benefit associated with cardiac rehabilitation.

Results: Among 822 patients referred (51.5% non-white minorities, 61.1% male), 59.4% initiated cardiac rehabilitation. Non-white minorities initiated cardiac rehabilitation less often than did white patients (54.4% versus 65.2%, $P = .003$). After adjustment, white patients were 77.5% more likely to initiate cardiac rehabilitation (odds ratio 1.78; 95% confidence interval 1.13-2.80). Both white populations and non-white minorities who participated in cardiac rehabilitation had a lower risk of death ($P = .0022$).

Conclusions: In a predominantly minority population, racial disparities exist among cardiac rehabilitation participants. Minorities were less likely to initiate cardiac rehabilitation. Gender, referral patterns, and the presence of copayment did not influence initiation. Cardiac rehabilitation initiation was associated with decreased mortality.

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INTRODUCTION

Racial and ethnic disparities in health care continue to be an area of great interest in the United States for compelling ethical and economic reasons. They exist within the entire continuum of health care, extending to cardiac care and including cardiac rehabilitation (CR) [1-6]. Even within populations that have access to CR, racial and ethnic disparities exist for referral to an intervention that consistently demonstrates a reduction in mortality [7-9].

In 2011, the year this study was conducted, the benefit of CR was unquestioned, and referral for CR remains a class I indication (useful and effective), independent of which population or program is studied and which organization conducts a review of the medical literature [10-13].

Previous studies on disparity have focused on racial disparities in CR referral in predominately white populations [14]. To date, a study has not been performed to investigate the effects of race, gender, and age on mortality in an urban, mostly non-white minority population already referred for CR. This study was undertaken to investigate the predictors of initiation, adherence, and completion of CR and to determine whether racial disparities exist between white and non-white minority populations. In addition, we evaluated for a survival benefit in a population already referred to an outpatient CR program.

D.Z.P. The Arthur S. Abramson Department of Rehabilitation Medicine, Einstein Division/Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY

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M.S. Division of Cardiology, Department of Medicine, Einstein Division/Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY

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J.G. Division of Cardiology, Department of Medicine, Einstein Division/Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY

Disclosure: nothing to disclose

C.C.T. Division of Cardiology, Department of Medicine, Einstein Division/Montefiore Medical Center, Albert Einstein College of Medicine, 1825 Eastchester Road, Room WT120, Bronx, NY 10461. Address correspondence to: C.C.T.; e-mail: ctaub@montefiore.org

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D.Z.P and M.S. are co-first authors.

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METHODS

Data Source

We included all patients referred to the outpatient CR program at Montefiore Medical Center, which is the only CR program in the Bronx, New York (42 square miles). The majority of referrals were by primary care providers, private cardiology practices, academic practice cardiologists, and cardiothoracic surgeons at Montefiore Medical Center (Moses, Einstein, and Wakefield campuses) and Jacobi Medical Center. Patients who were referred lived within a 10-mile radius of the CR center. Referral resulted in the creation of a basic patient contact profile. Profiles were maintained even if patients did not initiate CR, and they provided the control cohort.

Initiation of CR required a provider referral, insurance authorization, and the scheduling of a preliminary medical visit. During this appointment a comprehensive patient assessment was performed that included the reason for referral, a physical examination, depression (mood disorder) screening, a review of social and family resources, assessment of medication compliance, and smoking-cessation counseling. An exercise prescription, with variable intensity customized for each patient, was drafted for the subsequent visit. Communication with the referring providers occurred frequently.

Study Population

The catchment area for the CR program at Montefiore Medical Center represents one of the most diverse populations of all 5 New York City boroughs and the nation. According to the U.S. Census Bureau, in 2011, white persons comprised 45.9% and black persons comprised 43.4% of the population in Bronx County. Those who identified their origin as Hispanic, Latino, or Spanish could be of any race and comprised 53.8%. White persons alone (not Hispanic or Latino) comprised 10.8% of the population [15].

In our study group, patients were racially classified as white, black, Asian, Hispanic, multiracial, and Hawaiian/other Pacific Islander. We divided these racial and ethnic populations into strict racial groups, namely, white and non-white minorities, to demonstrate racial disparities between the 2 racial groups. Patients who classified themselves as solely white were placed in the white group. Patients who were designated as black, Hispanic, Asian, multiracial, and Hawaiian/other Pacific Islander were classified as the non-white minority group. Unlike the U.S. Census Bureau Demographics, our white group did not include the Hispanic or Latino population.

Study Design

We constructed a database of patients referred to CR between May 1, 2001, and January 31, 2011. The records were

obtained from the Montefiore Medical Center electronic records and the Social Security Death Index database [16]. Data were collected regarding gender, race, age, specialty of referring physician, copayment, reason for referral, and CR attendance. Racial groups were classified as white or non-white minorities. Reasons for referral included acute myocardial infarction (AMI, including patients who underwent coronary artery bypass graft and percutaneous intervention), stable angina/coronary artery disease, congestive heart failure, and valvular heart disease. Patient information was de-identified in accordance with the Health Insurance Portability and Accountability Act.

Initiation was designated as attending at least one supervised exercise session of the 36 total sessions included in CR and did not include the preliminary medical evaluation. Attendance of 5, 10, 18, and 36 sessions was analyzed. Adherence was defined as attending at least 50% of exercise sessions (at least 18 sessions). Completion of CR was designated as attending 36 sessions. Patients referred to CR who came for a preliminary medical evaluation but subsequently failed to start the prescribed exercise sessions were designated as nonattendees because therapy was not started during this appointment at the time of the medical evaluation.

Follow-Up

All-cause mortality data were collected through use of hospital medical records and the Social Security Death Index through June 30, 2011, which was the closing date for events. The date of death was noted, but the reason for death was not obtained.

Outcomes

The outcomes assessed were predictors of CR initiation, adherence, and completion and the effect of CR on all-cause mortality.

Statistical Analysis

Bivariate associations were made between the initiation and noninitiation groups for selected baseline characteristics using a *t* test for continuous variables and χ^2 tests for categorical variables. Variables examined included age, gender, race, reason for referral, copayment, number of exercise sessions, and specialty of the referring physician. Similar analysis was performed for adherence and completion of CR.

We constructed a logistic regression model that predicted CR initiation as a function of 5 variables, including age, gender, race, copayment, and type of referral. Results were reported as odds ratios (ORs) with 95% confidence intervals (95% CIs).

Survival was analyzed with the Kaplan-Meier estimation. Overall survival was compared between initiators and

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