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Racial Disparity in Time Between First Diagnosis and Initial Treatment of Prostate Cancer

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Abstract

Background: Disparities among patients with prostate cancer exist across the continuum of care. The interval of time that lapses between first diagnosis and treatment is another disparity that may exist but has not been fully explored.

Methods: Our study looked at the data of 749 men (353 black and 396 white) who were 40 to 81 years of age when they entered the North Carolina Central Cancer Registry during the years 2007 and 2008. Our dependent variable was the amount of months that had passed between first

diagnosis and treatment. Our main independent variable was self-reported race. Covariates included age, income, level of education, insurance status, treatment received, Gleason score, and level of medical mistrust. We used negative binomial regression analysis to determine the association between the amount of time that lapsed between a diagnosis of prostate cancer and treatment by race.

Results: Compared with white men, black men were more likely to experience a longer wait time between diagnosis and treatment of prostate cancer (incidence rate ratio [IRR] 1.19; 95% confidence interval [CI], 1.04–1.36). Controls for demographical, clinical, and psychosocial variables (IRR 1.24; 95% CI, 1.04–1.43) did not explain this difference between the races.

Conclusions: These results suggest that the amount of time that lapses between first diagnosis and treatment of prostate cancer is longer for black men compared with white men. Our findings have identified an underreported racial disparity in the disease continuum of prostate cancer.

Introduction

In the United States, an estimated 180,890 new cases of prostate cancer will be diagnosed and 26,120 men will die from the disease in 2016; indeed, prostate cancer is one of the most common forms of cancer affecting American men, with black men being disproportionately affected.^{1,2} From 2007 to 2011, black Americans represented 224 cases per 100,000 new cases of prostate cancer compared with 139.9 cases in white Americans.¹ The death rate for prostate cancer is twice as high in black Americans than any other group, and blacks have a 70% higher risk of developing prostate cancer than their white counterparts.^{1,2} Although the etiology of prostate cancer remains elusive, age, ethnicity, and family history have all been identified as risk factors associated with the likelihood of developing prostate cancer.³ Prostate cancer is more likely to occur in older men and in men with a family history of prostate cancer.² Moreover, men whose fathers or brothers have been diagnosed have twice the risk of developing prostate cancer.⁴

Prostate cancer disparities are known to exist at multiple levels, including stage of presentation, diagnosis, treatment modality selected, quality of life, and mortality rate, with black men experiencing the greatest burden at all levels of the prostate cancer care continuum.⁵ Another disparity not yet well characterized is the amount of time that lapses between first diagnosis and treatment of prostate cancer. The literature focusing on the consequences of delayed treatment of prostate cancer are mixed, but some reports have linked a longer wait time from diagnosis to treatment to higher biochemical recurrence, disease upgrading, and mortality.⁶⁻⁹ Studies examining the length of time between diagnosis and initial treatment that have compared blacks and whites have also yielded varying results.^{6,10-12}

Abern et al⁶ reported that African American men might have a longer wait time until treatment once diagnosed with prostate cancer. However, using data from Veteran Affairs health care systems, Banez et al¹⁰ found no significant difference between racial groups. By contrast to the findings of Banez et al,¹⁰ Stokes et al¹¹ concluded that black men did have longer wait times between diagnosis and treatment. However, their sample was obtained using data from Medicare and the Surveillance, Epidemiology, and End Results Program,

which meant that the data the researchers used were from men 65 years of age or older.¹¹ When considering men aged 45 years and older, Porter et al¹² suggested that minimal racial/ethnic differences exist in the time to treatment. The study sample consisted of a cohort of men taking part in a southern California managed care, equal-access health care system; thus, these patient data are not indicative of the health care experience of most Americans.¹²

Lack of consensus among previous reports as well as lack of the generalizability of previous studies served as an impetus for our study. Our objective was to determine if differences were present in the amount of time between first diagnosis and initial treatment among black and white men with prostate cancer using a sample that reflected the variety of care systems representing the range of experiences to which most Americans are exposed.

Methods

The Diagnosis and Decisions in Prostate Cancer Treatment Outcomes trial is a cross-sectional study designed to examine factors that influence the selection of treatment modality for prostate cancer, to explore racial differences in disease burden, and to examine quality of life among men with prostate cancer.

Using a rapid case ascertainment procedure, we retrospectively recruited 877 men (415 black and 462 white) between the ages of 40 and 81 years who had entered the North Carolina Central Cancer Registry (NCCCR) between the years 2007 and 2008. Of the 877 men originally recruited, 749 men (353 black and 396 white) who provided complete information on time to treatment and treatment modality were eligible for this study. Eligibility criteria included age 35 years or older, a diagnosis of prostate cancer, treatment for prostate cancer, and self-identification as either white or black.

Recruitment began in October 2009 and ended in December 2011. On a monthly basis, NCCCR staff contacted the primary research network hospitals to request reports identifying patients meeting the eligibility criteria. The NCCCR mailed prospective study participants a pamphlet describing the study and informing them that they may be contacted in the future to participate in a study.

After our study team confirmed the eligibility of the patients, the NCCCR mailed the physician of record of each eligible patient a notification of intent to contact the prospective participant about enrolling in the study. Physicians were given 3 weeks to object to our request to contact their patients. If the physician did not refuse patient contact within 3 weeks, then we mailed the eligible patient a packet containing a recruitment letter describing the study, an NCCCR brochure, and a copy of the Institutional Review Board–approved consent and Health Insurance Portability and Accountability Act forms. In the letter, a phone number was provided that prospective participants could call for questions or to decline inclusion.

Interviewers then contacted prospective study participants by telephone, screened them for study eligibility, explained the study, answered questions, and sought their participation. If the candidate agreed to participate, then the interviewer reviewed the consent form, obtained verbal consent, and proceeded with the survey questionnaire.

The survey consisted of a series of questions related to prostate cancer, the process of care, and their quality of life following treatment. The study was approved by the Institutional Review Boards of the Johns Hopkins Bloomberg School of Public Health, US Department of Defense, and NCCCR.

Measures

The dependent variable was the amount of months that passed between first diagnosis and initial treatment. Respondents were asked, “In what month and year were you diagnosed with prostate cancer?” They were also asked, “In what month and year did you receive your first treatment?” Subtracting the months that lapsed between the first diagnosis and initial treatment for each man created a continuous variable that represented the time between first diagnosis and initial treatment. The main independent variable was self-reported race. A dichotomous variable was derived, where 0 represented white men and 1 represented black men.

Covariates included demographic, psychosocial, and clinical variables. Demographic variables included age, marital status, level of education, annual household income, and health insurance coverage (no insurance, private health insurance, Medicare, Medicaid, Civilian Health and Medical Program of the Uniformed Services, or Civilian Health and Medical Program of the Department of Veterans Affairs). Those who responded “yes” to having any of the health insurances were considered insured, and those who did not have any health insurance were considered uninsured.

Our psychosocial measure was level of medical mistrust, which was assessed using the 7-item Medical Mistrust Index.¹³ The scale employs 1 to 4 Likert responses ranging from “strongly disagree” to “strongly agree.” Examples of items in the mistrust scale included: “Sometimes I wonder if hospital staffs really know what they are doing,” “Patients have sometimes been deceived or misled by hospitals,” and, “When dealing with hospitals, one better be cautious.” The mean across all the measures for each respondent is a reliable score of their trust in the health care system, with higher mean scores reflecting greater levels of medical mistrust.¹³

Clinical variables included treatment modality and Gleason score. Gleason scores were obtained from the pathology reports and were separated into 3 different categories (low-, medium, and high-grade cancer).

Analysis

We used the student *t* test for continuous variables and the chi-square test for categorical variables to compare select demographic, clinical, and psychosocial variables by race. Negative binomial regression models were specified to examine the association between race and time between first diagnosis and initial treatment controlling for covariates. The negative binomial regression model, rather than the Poisson regression model, was selected to account for the overdispersion of the outcome variable.¹⁴⁻¹⁷

Incidence rate ratios (IRRs) and corresponding 95% confidence intervals (CIs) were used to present findings from the 4 negative binomial models. The first model tested the bivariate

association between race and the length of time between first diagnosis and initial treatment. The second model tested the association between race and length of time between first diagnosis and initial treatment after accounting for demographic variables. The third model tested the association after adjusting for both demographic and clinical variables. The fourth model tested the association after adjusting for demographic variables, clinical variables, and medical mistrust.

White men were the reference group for all of our analysis. *P* values less than .05 were considered to be significant. All statistical procedures were performed using Stata, version 13.1 (StataCorp LP, College Station, Texas).

Results

Table 1 shows the distribution of demographic, psychosocial, and clinical variables for the study participants by race.

Overall, 749 participants were included in our analyses; of those, 47.3% were black. Compared with white men, black men had significantly lower levels of income, were younger, were less likely to be insured, and were less likely to be married. In terms of level of education, a lower percentage of black men (15.0%) had a bachelor degree compared with white men (30.7%). Black men (2.7 ± 0.3) reported a higher level of medical mistrust on average compared with white men (2.4 ± 0.4). Although a higher percentage of white men (79.5%) underwent prostatectomy than black men (69.4%), prostatectomy was the most common form of treatment for men from both groups. A higher percentage of black men (22.6%) received radiotherapy compared with white men (16.1%). Although differences were seen in the treatments received, no differences were present in the prostate cancer grade as indicated by the Gleason scores (see Table 1).

Table 2 contains data from the 4 negative binomial regression models designed to examine the association between race and time between first diagnosis and initial treatment of prostate cancer.

In model 1, the length of time between first diagnosis and initial treatment was regressed on race. The data revealed that black men (IRR 1.19; 95% CI, 1.04–1.36) had a higher likelihood of experiencing a longer wait time between diagnosis and treatment than their white counterparts. The second model showed that the likelihood of black men experiencing a longer wait time between first diagnosis and initial treatment remained, even after accounting for age, marital status, annual household income, level of education, and health insurance status (IRR 1.24; 95% CI, 1.06–1.45). After accounting for the demographic variables used in model 2 along with the Gleason scores and type of treatment received, model 3 revealed that black men had a higher likelihood of experiencing a longer wait time until treatment (IRR 1.19; 95% CI, 1.02–1.39).

Medical mistrust was introduced into the analysis in model 4. Black race remained a significant predictor of having a higher likelihood of experiencing a longer wait time between first diagnosis and initial treatment after controlling for demographic variables,

clinical variables, and the medical mistrust psychosocial variable (IRR 1.22; 95% CI, 1.04–1.43).

Discussion

Racial disparities in prostate cancer exist at multiple levels across the treatment continuum and have been well documented.⁵ The results of our study provide additional evidence that demonstrates yet another level at which racial disparities exist in prostate cancer care for an outcome not well characterized in the literature. After being first diagnosed with prostate cancer, the amount of time that lapses until initial treatment is longer for black men compared with white men. Therefore, health care professionals should place special emphasis on educating black men about their treatment options and following-up with them to ensure that they are beginning treatment in a timely manner.

In general, prostate cancer is a slow, progressing tumor, so it is feasible that health care professionals might be hesitant to rush their patients into treatment, giving them time to contemplate the number of treatment options available to them after being diagnosed. However, extended treatment delays for prostate cancer in black men may have subsequent consequences and, thus, contribute to higher rates of mortality and worse quality of life following treatment. Some reports have linked a longer wait time from first diagnosis to initial treatment to higher biochemical recurrence, disease upgrading, and mortality, while others fail to find that association.⁶⁻⁹ Biochemical recurrence and mortality rates notwithstanding, reports have suggested that a delay in radical prostatectomy could lead to erectile dysfunction and urinary incontinence, both of which can affect patient quality of life.¹⁸

Gleason scores also served as a predictor of the length of time between first diagnosis and initial treatment (see Table 2). The length of time that lapsed between first diagnosis and initial treatment decreases as one goes from a low to a high Gleason score, meaning those with more aggressive tumors are treated the fastest (see Table 2). This finding is not surprising as one can imagine that a more severe diagnosis might create a sense of urgency.

An obvious limitation to our study is the omission of other racial/ethnic groups. Another shortcoming is that men who received orchiectomy, hormone therapy, cryotherapy, chemotherapy, and other treatments were all placed into the “other” category due to the small sample size for each; thus, we were unable to analyze wait time based on each individual treatment choice. We were also not able to determine if the delays were due to the physician, patient, or other factors, nor were we able to determine with certainty whether there was mutual agreement on the delays.

However, our study has several strengths. First, our participants comprised men with prostate cancer of differing ages (< and ≥ 65 years), a study cohort not typical of other prior studies involving samples of Medicare recipients alone (≥ 65 years of age). Our study also looked at data from men with varying forms of health insurance, which is representative of the general population. An additional strength to this study is that we incorporated the

Medical Mistrust Index to determine whether the longer wait time until initial treatment among blacks is a response to their well-documented mistrust of the health care system.^{19,20}

Conclusions

All factors associated with disparities in the prostate cancer care continuum, from time of first diagnosis to treatment, must be identified to make a better attempt at addressing and eliminating the disparities. Our work demonstrates that a racial disparity exists in the time interval between first diagnosis and initial treatment of men with prostate cancer. However, more work is warranted to pinpoint the exact proximal as well as distal factors that may be responsible for this disparity.

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Table 1. —

Distributions of Select Characteristics of Study Participants for Total Sample by Race

Variable	Total (N = 749)	Black (n = 353)	White (n = 396)	P Value
Race, %		47.3	52.8	
Age (mean ± SD), y	62.8 ± 7.7	61.9 ± 7.5	63.6 ± 7.7	.003
Married, %	76.6	67.4	84.8	< .001
Annual household income (\$), %				< .001
<25,000	5.4	11.0	0.5	
25,000–49,999	36.3	49.0	25.0	
50,000–74,999	17.6	17.2	17.9	
75,000	40.5	22.6	56.5	
Level of education, %				.001
Less than high school	11.9	18.9	5.6	
High school/general educational development degree	24.9	34.2	16.5	
Some college/associate degree	23.1	22.6	23.6	
Bachelor degree	23.3	15.0	30.7	
Master/doctorate	16.6	9.0	23.4	
Health insurance, %	93.7	89.8	97.1	< .001
Medical mistrust (mean ± SD)	2.6 ± 0.1	2.7 ± 0.3	2.4 ± 0.4	< .001
Gleason score, %				.532
Low-grade cancer(6)	49.0	47.4	50.5	
Medium-grade cancer(7)	43.0	45.1	41.1	
High-grade cancer (8–10)	7.8	7.3	8.3	
Treatment received, %				.005
Prostatectomy	74.7	69.4	79.5	
Radiation	19.2	22.6	16.1	
Other	6.0	7.9	4.2	

SD = standard deviation.

Table 2. —
Associations Between Race and Time Lapse After Diagnosis Until Treatment in Study Participants

Variable	Model 1 IRR (95% CI)	Model 2 IRR (95% CI)	Model 3 IRR (95% CI)	Model 4 IRR (95% CI)
Race ^a	1.19 (1.04–1.36) ^f	1.24 (1.06–1.45) ^f	1.19 (1.02–1.39) ^f	1.22 (1.04–1.43) ^f
Age	—	1.01 (1.00–1.02) ^f	1.01 (1.00–1.02) ^f	1.01 (1.00–1.02) ^f
Married	—	1.06 (0.89–1.26)	1.08 (0.91–1.29)	1.09 (0.91–1.30)
Annual household income ^b , \$				
25,000–49,999	—	1.06 (0.72–1.54)	1.11 (0.76–1.62)	1.10 (0.75–1.63)
50,000–74,999	—	0.97 (0.64–1.47)	1.01 (0.66–1.52)	0.99 (0.64–1.52)
75,000	—	0.99 (0.65–1.52)	1.06 (0.69–1.63)	1.05 (0.67–1.62)
Level of education ^c				
High school/general educational development degree	—	1.47 (1.11–1.94) ^f	1.48 (1.12–1.95) ^f	1.47 (1.11–1.96) ^f
Some college/associate degree	—	1.32 (0.99–1.77)	1.31 (0.99–1.75)	1.31 (0.98–1.76)
Bachelor degree	—	1.35 (0.99–1.77)	1.33 (0.98–1.81)	1.30 (0.95–1.78)
Master/doctorate degree	—	1.59 (1.16–2.19) ^f	1.55 (1.12–2.12) ^f	1.53 (1.10–2.12) ^f
Health insurance, %	—	1.11 (0.83–1.14)	1.18 (0.89–1.14)	1.19 (0.88–1.15)
Gleason score ^d				
Medium-grade cancer (7)	—	—	0.92 (0.80–1.07)	0.92 (0.79–1.06)
High-grade cancer (8–10)	—	—	0.68 (0.54–0.91) ^f	0.67 (0.50–0.89) ^f
Treatment received ^e				
Radiation	—	—	1.19 (0.99–1.44)	1.20 (0.99–1.46)
Other	—	—	0.86 (0.61–1.20)	0.85 (0.60–1.20)
Medical mistrust	—	—	—	0.92 (0.78–1.09)

^aWhite men.

^b< \$25,000.

^cLess than high school.

^dLow-grade cancer (6).

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^e Prostatectomy.

^f Statistically significant.

CI = confidence interval, IRR = incidence rate ratio.

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