Racial Differences in Quality of Life following Prostate Cancer Diagnosis

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Abstract

Objectives—Although racial differences in quality of life have been examined between African American and white prostate cancer patients, it is not known if differences exist while adjusting for psychological and cultural factors. Therefore, we evaluated the effects of race on quality of life while adjusting for subjective stress and religiosity among African American and white prostate cancer patients. We predicted that African American men would report poorer emotional and physical functioning after adjusting for these factors and that greater subjective stress and lower levels of religiosity would be associated with poorer well-being.

Methods—We conducted an observational study of QOL among 194 African American and white men who were recruited from February 2003 through March 2008.

Results—Race had a significant effect on emotional functioning after adjusting for perceptions of stress and religiosity. Compared to white men, African American men (p=0.03) reported significantly greater emotional well-being. Greater subjective stress was associated significantly with poorer emotional functioning (p=0.0001) and physical well-being (p=0.0001). There were no racial differences in physical functioning (p=0.76).

Conclusions—The results of this study highlight the importance of developing a better understanding of the context within which racial differences in QOL occur and translating this information into support programs for prostate cancer survivors.

Keywords

Race; disparities; prostate cancer; quality of life; stress

Introduction

Each year thousands of men are diagnosed with prostate cancer; it is estimated that about 192,280 men will be diagnosed with this disease in 2009.(1) African American men have the highest incidence of prostate cancer among men in the world and also have substantially greater mortality compared to white men.(1) In addition to being at increased risk for developing prostate cancer and dying from this disease, African American men also have an increased risk of experiencing poorer quality of life after diagnosis than white men. For example, Eton and colleagues (2) found that after controlling for treatment type, co-morbidities, and age, African American men reported significantly lower levels of physical functioning compared to white men. Similar findings were reported by Lubeck and

colleagues (3) who found that after controlling for demographic factors, African American men reported significantly lower physical functioning compared to white men. Consistent with these findings, African American race was associated with lower emotional and physical functioning in a sample of men who were newly diagnosed with prostate cancer.(4)

While race is associated with poorer quality of life in many studies (2-4), other factors are likely to contribute to men's functioning, especially since diagnosis and treatment occurs within the general context of their lives. Accordingly, whether or not men experience positive or negative outcomes after being diagnosed with prostate cancer is likely to be due to the amount of stress that they are experiencing and the resources that they have to cope with these stressors.(5) Stress may include issues that are due to medical distrust, discrimination, and limited socioeconomic resources and one's subjective experience of stress.(5) Previous studies have shown that indicators of economic stress (e.g., low income, few years of formal education) are associated with poorer quality of life among prostate cancer patients (6, 7), while other research has shown that spiritual and religious resources play an important role in the quality of life of cancer patients. For example, spiritual beliefs predicted better quality of life in African American cancer patients (8) and greater spirituality was positively associated with improved functioning among low-income men who were diagnosed with prostate cancer regardless of their race.(9) Similarly, greater religious activity was associated with improved psychological functioning in African American and white cancer patients.(10) Recent work has also shown that greater subjective stress is associated with higher PSA levels (11); however, it is not known if perceptions of stress have a significant effect on emotional and physical functioning among prostate cancer patients. Further, it is not known if race has a significant effect on quality of life after adjusting for other variables (e.g., perceptions of stress, socioeconomic factors) that are important to quality of life. Therefore, we evaluated the effects of race on quality of life after adjusting for socioeconomic factors (e.g., income, education), perceptions of subjective stress, and religiosity among men who were newly diagnosed with prostate cancer. We focused on this specific time point within the survivorship trajectory because it is the period when men are likely to experience a variety of stressors as a result of their diagnosis, treatment decisions, and the initiation and completion of therapy. Based on recent conceptual models (5) and previous research (2, 4), we predicted African American men would report lower emotional and physical well-being compared to white men after adjusting for perceptions of stress and cultural factors. We also hypothesized that greater religiosity would be associated with higher functioning whereas greater perceptions of stress would be associated with poorer emotional and physical well-being.

Methods

Study Population

Subjects were African American and white men who were diagnosed with prostate cancer during the past two to five months. Consistent with previous research (12), the study enrollment rate was 48% among all eligible men who were referred to the study (n=536) and African American men were significantly less likely than white men to enroll in the study (Chi Square=10.77, p=0.001). Of the men who enrolled in the study (n=256), 216 completed the baseline telephone interview. Only enrolled men who completed the baseline telephone interview and had complete data on PSA, stage, and Gleason score at diagnosis were included in the analysis;[1] thus, the present study included 194 men. The study was approved by the Institutional Review Board at the University of Pennsylvania.

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[1] A total of 22 men had missing clinical information (n=4), did not complete the perceived stress scale (n=15), or did not complete the religiosity measure (n=1). Six men declined to provide income information; for four men, we used the median income from their census track to obtain income information. Thus, 2 men were excluded from the analysis because of missing income.

Procedures

Men were recruited into the study by clinic and research staff at urology and radiation oncology practices (n=13) located in the Philadelphia, PA metropolitan area. Men were recruited during a follow-up visit after they had been diagnosed with prostate cancer. Recruitment sites included community-based urology practices located in the metropolitan area and those at the University of Pennsylvania Health System (UPHS). It should be noted that some men who were recruited at the UPHS were identified at the radical prostatectomy pre-surgery class and some were being seen for a second opinion and/or treatment. At all recruitment sites, eligible men received a verbal and written description of the study and the procedures involved in participation. All men provided written informed consent for study enrollment. About one to four weeks following study enrollment, men were contacted by telephone to complete a structured baseline interview. This 30-minute interview was conducted by trained research assistants at Penn to obtain information on socioeconomic factors and assess subjective stress, religiosity, and quality of life. Those who completed the baseline were also contacted to complete 3-, 6-, and 12-month follow-up telephone interviews. The present study focuses only on data collected during the baseline telephone interview because we were specifically interested in men's quality of life following their initial experiences with diagnosis and treatment.

Measures

Socioeconomic Characteristics—Race, age, marital status, education, income, and employment status were obtained by self-report during the baseline telephone interview. With the exception of age, these variables were re-coded into dichotomous variables based on the distribution of responses.

Clinical Factors—PSA, Gleason score, and TNM stage at diagnosis were obtained from medical records at enrollment. Gleason score and stage were re-coded into dichotomous variables (e.g., stage T1 versus T2/T3) based on the distribution of responses. We calculated the amount of time since diagnosis and obtained treatment status. Time since diagnosis was based on the interval between completion of the biopsy and enrollment in the study. Treatment status was obtained by self-report during the baseline telephone interview with items that asked men if they had received surgical, radiation, or expectant (e.g., watchful waiting) treatment. Men who had completed surgical treatment or had initiated radiation or other types of therapy (e.g., cryosurgery) were categorized as having initiated or completed treatment. Men who had completed or initiated treatment were also asked to provide the type of therapy they received. Men who had not initiated any treatment were categorized as being pending for treatment.

Subjective Stress—We used the Perceived Stress Scale (PSS) (13) to evaluate perceptions of subjective stress following prostate cancer diagnosis. The PSS is a 14-item Likert-style scale that assesses the extent to which events experienced during the past month are appraised as being stressful. In this study, men were asked to rate how often they experienced stress using a scale of: 1=never, 2=almost never, 3=sometimes, and 4=very often. The PSS had good internal consistency in this sample (Cronbach's alpha=0.70) and higher scores reflect greater perceptions of stress. PSS scores ranged from 0 to 29.

Religiosity—We used the religiosity scale developed by Lukwago and colleagues (14) to evaluate the extent to which men endorsed religious values (e.g., I have a personal relationship with God) and beliefs (e.g., my spiritual beliefs are the foundation for my whole approach to life). The religiosity scale has been used in previous research with African American and white men who are diagnosed with prostate cancer (15) and had excellent

internal consistency in this sample (Cronbach's alpha=0.94). Higher scores reflected greater religiosity; the scores ranged from 9 to 36 in our sample.

Quality of Life—We used the emotional and physical well-being scales of the Functional Assessment of Cancer Therapy (FACT) (16) to evaluate quality of life. The FACT is a validated instrument that evaluates the extent to which men experienced physical symptoms (e.g., lack of energy, nausea, pain) and psychological reactions (e.g., sadness, nervousness, worry about dying) following their diagnosis. We focused on the physical and emotional well-being scales in this study because these domains are most likely to be relevant to men shortly after diagnosis. Higher scores reflected better functioning and 2-point differences in scores have been reported as minimally important differences in these variables.(17) Both scales had good internal consistency in this sample (Cronbach's alpha for emotional well-being=0.75 and physical well-being=0.81) and scores ranged from 7 to 24 and 4 to 28 for emotional and physical functioning, respectively.

Data Analysis

First, we generated descriptive statistics to characterize the study sample in terms of socioeconomic factors and clinical characteristics. We then used chi squared tests to determine if there were racial differences in these factors. Because of the number of variables that were evaluated (e.g., sociodemographic factors, clinical characteristics), we used regression analysis to identify factors having significant independent associations with each quality of life outcome, rather than conducting univariate analyses of each these variables. Separate models were generated for emotional and physical well-being. Socioeconomic (e.g., income, education) and clinical factors (e.g., treatment status) that have been associated with quality of life in previous research (6, 7, 18, 19) were included in each model and these variables were entered into each model on steps one and two, respectively, using hierarchical entry. We entered socioeconomic factors into the model first because they are important to access to resources for prostate cancer diagnosis and treatment.(20) Religiosity and subjective stress were entered into the models on step three and race was entered into the last step of each model because we were interested in determining whether or not race had a significant effect on quality of life after controlling for socioeconomic characteristics, clinical factors, and subjective stress. Each group of variables was tested for significance using a likelihood ratio test. Because of the potential for confounding by recruitment site, the models for each quality of life outcome were adjusted for recruitment site using fixed effects. Standard model-fitting diagnostics were applied, including inspection of residual and influence plots.

Results

As shown in Table 1, the sample consisted of 194 African American (n=66) and white men (n=128). Overall, most men were married (80%), had some college education or were college graduates (65%), were not employed (e.g., retired) (52%), and had an annual income that was greater than $50,000 (59%). With respect to clinical factors, the majority of men were diagnosed with stage T1 disease (67%), had a Gleason score that was less than or equal to six (58%), and had initiated or completed treatment (58%). The majority of men who had initiated or completed treatment had a radical prostatectomy (69%).

There were significant racial differences in socioeconomic factors such that African American men were significantly less likely than white men to be married (p=0.01), have at least some college education (p=0.0002), and have an income that was greater than $50,000 (p=0.003). African American men were also more likely than white men to be unemployed (p=0.02). There were no racial differences in age, stage, or Gleason score; however, African

American men were significantly less likely than white men to have initiated or completed treatment (p=0.001) and had greater PSA scores (p=0.01). African American and white men did not differ in terms of time since diagnosis (p=0.20) or perceptions of stress, but levels of religiosity were significantly greater among African American men (see Table 2).

Table 2 shows the final multivariate regression models for emotional and physical well-being. Socioeconomic indicators were entered on the first step and only age had a significant effect on emotional well-being (estimate=0.13, SE=0.04, p=0.0002). The addition of clinical factors on step two did not significantly improve the model (p=0.49). Adding subjective stress and religiosity on step three significantly improved the model for emotional well-being; however, only subjective stress had a significant effect on this outcome. The addition of race on step four also improved the model (p=0.02). In the final model, age, treatment status, subjective stress, and race had significant effects on emotional well-being such that men who were older reported significantly greater emotional functioning. In addition, men who had completed or initiated treatment reported greater functioning whereas greater subjective stress was associated with poorer functioning. African American men reported greater emotional functioning compared to white men (p=0.03). There was a 1.32 difference in scores for emotional well-being between African American and white men.

Similar results were obtained for physical well-being. Of the socioeconomic factors entered on step one, older age had a significant effect on physical well-being (Estimate=0.16, SE=0.04, p=0.0002). The addition of clinical factors on step two did not significantly improve the model of physical well-being (p=0.11), however, adding subjective stress and religiosity on step 3 improved the model for this outcome (p=0.0001). The addition of race on step four did not significantly improve the model of physical well-being (p=0.75). Only age and subjective stress had significant effects on physical well-being in the final model. Men who were older reported greater functioning whereas physical well-being was significantly lower among those who had greater subjective stress.

Discussion

Although data are emerging on racial differences in quality of life following prostate cancer diagnosis (2, 4, 7), to our knowledge, this is the first empirical report to evaluate racial differences in emotional and physical well-being among prostate cancer patients while adjusting for economic factors, subjective stress, and religiosity. We found that African American men reported better emotional well-being compared to white men despite there being no racial differences in physical functioning. This finding is in contrast with the results of previous studies. (2, 4) It should be noted that racial differences in emotional well-being were modest and were close to, but below, the threshold that have been reported for minimally important differences for this variable. Similar differences have been reported in other research that compared African American and white cancer survivors.(21)

African American men are exposed to a greater number of adverse life events (e.g., poverty, racial discrimination) prior to being diagnosed with cancer; these experiences may reduce the threat of being diagnosed with prostate cancer or may make them better prepared to cope with their diagnosis.(5) Relatedly, African American men may use coping strategies that are effective at mitigating the negative emotional effects of being diagnosed with prostate cancer. For example, African American prostate cancer patients reported significantly greater levels of religiosity compared to white men (15) and also reported that their personal relationship with God was an important source of support that reduced their worry and anxiety.(22) It is important to note that religiosity did not have a significant effect on emotional or physical well-being. This could be because our measure of religiosity assessed participation in religious activities (e.g., prayer, church attendance) and beliefs, but did not

evaluate whether or not these strategies were used to cope with their diagnosis. Future studies should examine the effects of religious and spiritual coping efforts on quality of life among prostate cancer patients and determine whether these strategies contribute to racial differences in quality of life.

Also in contrast with previous research (6, 7), with the exception of age, socioeconomic factors did not have a significant effect on emotional or physical functioning. Our findings demonstrate that the effects of economic variables on quality of life may be less important when they are put into greater context that includes men's psychological functioning and their racial background. For example, race is an important indicator of one's sociological, environmental, and clinical experiences; race may be more important to some aspects of quality of life because it represents the totality of one's experiences, rather than the individual effects of a single economic factor. Similarly, economic factors, while important indicators of exposure to a variety of stressors (e.g., poverty, unemployment), could be less important when they are evaluated while adjusting for subjective stress because these perceptions reflect men's actual experiences.

We also found that subjective stress had a significant adverse effect on emotional and physical functioning. In both cases, men who had greater stress reported poorer functioning. Our findings differ from those reported by Joseph and colleagues (23), who did not find a significant relationship between subjective stress and disease-related side effects. Whether or not men experience disease-related side effects is one aspect of their quality of life; it could be that subjective stress has an impact on men's overall emotional and physical functioning, but not their perceptions of specific side effects. Thus, greater attention to perceptions of stress may be needed as part of support programs for prostate cancer patients. Previous research has shown that problem-solving interventions that help women who have a family history of disease in a first-degree relative to address their appraisals of stress related to breast cancer are effective at minimizing psychological distress and improving health behaviors (24, 25). Helping men to identify specific sources of stress and use coping strategies that are most likely to be effective at managing these issues may reduce levels of stress and enhance quality of life.(26) Similar types of interventions have also improved quality of life in prostate cancer patients in previous research.(27)

In considering the results of our study, several limitations should be noted. First, only about 50% of eligible men enrolled in the study and there were racial differences in enrollment rates. However, our enrollment rates are similar to those that have been reported for other samples of cancer patients (12, 28) and reflect the difficulties that are inherent in enrolling this population into cancer research. Further, the modest rates of study enrollment and racial differences in participation are offset by the high rates of completing the baseline telephone interview and the diversity of our study sample. More than 80% of men who enrolled in the study completed the baseline telephone interview and African American men made up a substantial minority of study participants.

Despite these potential limitations, our findings underscore the importance of adjusting for psychological and cultural factors when evaluating the effects of race on quality of life in prostate cancer patients. In this cross-sectional study of African American and white prostate cancer patients, we found that after controlling for socioeconomic characteristics, psychological variables, and cultural factors there were no racial differences in physical well-being and that African American men scored better on emotional functioning. These findings raise questions about whether or not support programs are needed for African American men. Other research has shown that African American men report lower quality of life compared to white men (2) and recover more slowly in terms of these outcomes (4). It could be that quality of life decreases among African American men as they progress

through different phases of prostate cancer survivorship. If this is the case, then informational or educational interventions, including those that address stress management (27, 29), may be indicated for this population. Similar types of interventions have been evaluated in previous research and have had positive effects on quality of life (27, 29); however, efforts have not been directed towards addressing the specific needs or QOL trajectory of African American men. Further longitudinal studies are needed to follow changes in QOL based on race and perceptions of stress throughout the course of treatment and long-term survivorship.

Acknowledgments

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Table 1

Sample Characteristics

Variable	Level	Total Sample (n=194)	African American (n=66)	White (n=128)	P-Value
Socioeconomic Factors					
Marital status	Married	156 (80%)	46 (70%)	110 (86%)	0.007
Education level	Some college	126 (65%)	31 (47%)	95 (74%)	0.0002
Employment status	Not Employed	101 (52%)	42 (64%)	59 (46%)	0.02
Income level	> $50,000	114 (59%)	29 (44%)	85 (66%)	0.003
Age	Mean (SD)	63.7 (8.0)	63.7 (8.9)	63.6 (7.5)	0.97
Clinical Factors					
TNM stage	T1	130 (67%)	48 (73%)	82 (64%)	0.22
Gleason score	6	113 (58%)	35 (53%)	78 (61%)	0.29
Treatment status	Initiated/completed	113 (58%)	28 (42%)	85 (64%)	0.004
PSA	Mean (SD)	6.3 (4.6)	7.7 (6.3)	5.6 (3.3)	0.01
Psychological and Cultural Factors					
Subjective stress	Mean (SD)	12.9 (5.9)	13.2 (6.2)	12.7 (5.7)	0.60
Religiosity	Mean (SD)	25.7 (7.1)	30.1 (5.7)	23.5 (6.8)	0.0001

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p<0.001

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p<0.01

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p<0.05

Table 2

Final Multivariate Models of Emotional and Physical Well-Being‡

Step	Variables	Levels	Emotional-Well Being‡‡‡			Physical Well-Being‡‡‡		
			Estimate	SE	95% CI	Estimate	SE	95% CI
1	Age	[Continuous]	0.09**	0.03	0.04, 0.15	0.11**	0.04	0.04, 0.19
	Employment	Employed vs not employed	0.32	0.49	−0.64, 1.29	0.18	0.67	−1.15, 1.51
	Income	>$50,000 vs <$50,000	−0.40	0.50	−1.38, 0.58	0.54	0.68	−0.81, 1.90
	Marital status	Married vs not married	0.42	0.54	−0.65, 1.48	−0.71	0.74	−2.18, 0.76
	Education	Some college vs high school	−0.07	0.45	−0.95, 0.82	−0.16	0.62	−1.38, 1.05
2	Time since dx	[Continuous]	0.01	0.008	−0.004, 0.03	−0.007	0.01	−0.03, 0.01
	TNM stage	T2/T3 vs T1	0.38	0.42	−0.46, 1.21	0.41	0.58	−0.74, 1.56
	Gleason score	> 6 vs 6	−0.08	0.40	−0.87, 0.72	0.37	0.55	−0.72, 1.47
	PSA	[Continuous]	−0.009	0.04	−0.09, 0.08	−0.02	0.06	−2.57, 0.03
	Tx status[7]	Initiated/completed vs pending	1.04*	0.48	0.10, 1.99	−1.26†	0.66	−0.14, 0.10
3	Perceived Stress	[Continuous]	−0.36***	0.03	−0.43, −0.29	−0.31***	0.05	−0.40, −0.22
	Religiosity	[Continuous]	0.002	0.03	−0.06, 0.06	0.004	0.04	−0.08, 0.08
4	Race	African American vs white	1.32*	0.59	0.16, 2.48	−0.24	0.81	−1.84, 1.36

‡‡‡Recruitment site did not have a significant effect on emotional (p=0.35) or physical well-being (p=0.13)

*** p<0.001

** p<0.01

* p<0.05

† p<0.10