

General

Racial Disparities and Mental Health Effects Within Prostate Cancer

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Keywords: prostate cancer, mental health, health disparities, racial disparities

<https://doi.org/10.52965/001c.39654>

Health Psychology Research

Vol. 10, Issue 4, 2022

Disparities in prostate cancer (PCa) exist at all stages: screening, diagnosis, treatment, outcomes, and mortality. Although there are a multitude of complex biological (e.g., genetics, age at diagnosis, PSA levels, Gleason score) and nonbiological (e.g., socioeconomic status, education level, health literacy) factors that contribute to PCa disparities, nonbiological factors may play a more significant role. One understudied aspect influencing PCa patients is mental health related to the quality of life. Overall, PCa patients report poorer mental health than non-PCa patients and have a higher incidence of depression and anxiety. Racial disparities in mental health, specifically in PCa patients, and how poor mental health impacts overall PCa outcomes require further study.

INTRODUCTION

DISPARITIES WITHIN PROSTATE CANCER

Racial disparity can often be seen in healthcare, and one of the diseases that display such differences in diagnosis, treatment, and recovery is prostate cancer (PCa). PCa is the second leading cause of cancer-related deaths in the United States (US), and there is a distinct racial disparity among these deaths. Many studies have focused on molecular differences and socioeconomic factors between black and white men to understand the cause of the disparity. Previous studies have shown that black men have a higher incidence of PCa and higher mortality rates from PCa compared to white men.¹ However, PCa may occur at a younger age and present at a more advanced stage for black men than white men. For every 100,000 men, 101 white men and 137 black men are diagnosed with PCa, respectively.² It is speculated that differences in gene expression of inflammatory signaling and activation of androgen receptor signaling and bone metastases contribute to the molecular

differences in black and white men and the observed disparity in PCa diagnosis.³ However, studies have also shown that the disparity may be due to treatment, healthcare access, and socioeconomic differences.⁴ Indeed, studies have shown that black men have poorer access to screening, medical follow-up, and treatment for PCa.^{5,6}

GENETIC DIFFERENCES WITHIN PROSTATE CANCER

Genetic variance may play a role in differences in PCa progression and severity.^{1,7-9} Lachance et al. examined genome-wide association study results and allele frequency data together to investigate the genetic susceptibility to PCa in 64 global populations.¹⁰ The authors identified multiple genetic variants in men of West African descent that resulted in a greater risk of PCa. Polymorphisms in fatty acid synthase have also been linked with PCa progression and lethality.¹¹⁻¹³ This pathway had significantly higher expression levels in black patients with PCa than in European Americans.³

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Androgens and androgen receptor-mediated signaling pathways play an important role in diagnosing PCa.² Androgens, such as testosterone and dihydrotestosterone, have been found to induce PCa.¹⁴ In a study by Ross et al., serum testosterone levels in healthy young black men were 15% higher than in similarly healthy young white men. Although the relationship between PCa and androgen levels is not fully clear, high androgen levels continue to be seen as a risk factor for PCa and may contribute to the underlying differences in PCa diagnosis between black and white men.¹

While elevated cholesterol may also be a risk factor for PCa, its impact on prostate cancer recurrence and its attendant mortality remains unclear. Allot et al. observed that elevated cholesterol was a risk factor for PCa recurrence in black, but not non-black, men.¹⁵ These findings may suggest that hormonal differences are related to the risk of PCa. Still, additional research is needed to fully investigate the biological components of PCa and how they are related to nonbiological ones such as socioeconomic status and stress.¹⁶

SOCIOECONOMIC DISPARITIES AMONG BLACK COMMUNITIES AND PROSTATE CANCER

Nonbiological factors contribute more to racial disparities in mortality than genetic ones. In a cohort study of subjects from the Surveillance, Epidemiology, and End Results (SEER) registry, Veterans Health Administration (VA) system, and National Cancer Institute-sponsored phase 3 clinical trials, Dess et al. compared prostate cancer-specific mortality (PCSM) between black and white men.¹⁷ The authors used inverse probability weighting to adjust for age at diagnosis, Gleason score at biopsy, treatment (clinical trials only), socioeconomic status (SES; SEER only), and insurance status (SEER only). They found that, before adjustment, only black men in the SEER cohort had worse PCSM than white men. Similarly, in a study comparing racial disparities in the SEER and VA systems, Klebaner et al. found that black race had an increased risk of PCSM compared to white race only in the SEER registry and not in the equal-access VA system.¹⁸ However, when biological variables such as disease extent, PSA, and Gleason score are accounted for, the association between race and PCSM becomes insignificant in the SEER population. Additionally, in a retrospective study, census tract-level SES was predictive for PCSM, but only in the private sector.¹⁹ Other studies also report that, in equal access settings such as within VA health systems, racial differences in PCSM were no longer present.^{19–21} However, Lowder et al. assert that equalizing healthcare access alone is not enough to eliminate these racial disparities.¹⁶ Rather, an interdisciplinary approach to PCa should be adopted due to the complex interplay between genetics, social stressors, and disease onset and progression.¹⁶ In comparison to other nonbiological variables like SES and access to care, mental health is relatively understudied in its contribution to racial disparities in PCa mortality.

In the US, black communities are situated in areas with high levels of environmental pollution and low access to medical resources, which may correlate with higher mortal-

ity risk.⁴ According to an analysis by SEER-Medicare, pollution is associated with worse disease states and outcomes for black men with PCa.²² Many studies have also focused on understanding the socioeconomic differences between black and white men and how they may contribute to the difference in diagnosis and treatment for PCa. Many factors, such as medical knowledge, health literacy, family and social support, education, medical insurance, and income, may correlate with race and the diagnosis and outcome among PCa patients.⁴

Worldwide, studies have shown that PCa patients with higher SES have better outcomes from treatments than patients with lower SES and better detection from screening and quality care.²³ A low SES is associated with lower health literacy and poorer health insurance, which may act as barriers to early PCa detection and treatment.⁴ A multi-institutional cohort study from 2010-2015 demonstrated that lower SES was associated with a higher prostate-specific antigen (PSA) and adverse pathology for PCa.²⁴

Minority communities often have lower SES. Black men with PCa were more likely to be uninsured than white men and have lower income and education levels.⁵ In addition, most black men received medical treatment closest to their homes, suggesting that 85% of excess death risk for black men may be attributed to access-related factors. In comparison, only 5% of deaths are due to tumor-related factors.^{5,25}

Pollack et al. found that poorer access was associated with worse perceived quality of care and physician-patient communication.^{5,25} However, racial differences in treatment were found not mediated or modulated by access to care but by socioeconomic factors. Black men have lower treatment availability than white men due to limited insurance coverage, travel longer distances to healthcare clinics, or have shortages of healthcare providers. In addition, black men experience greater difficulty receiving insurance approval and affording medical bills than white men, thus creating a difference in the quality of treatment and the number of resources for healthcare.^{5,25}

Mental health plays a significant role in prostate cancer patients because it affects physical and mental health-related quality of life (HRQOL), treatment decisions, and health outcomes. Yet, mental health remains under-researched. This paper reviews racial disparities throughout prostate cancer screening, diagnosis, treatment, and mortality and addresses its intersecting effects on mental health.

METHODS

The present investigation is a collaborative review addressing the effects of racial disparities within prostate cancer screening, treatment, and outcomes on mental health. Manuscripts published between 2005-2022 were identified using PubMed and combinations of the following search terms: prostate cancer, prostate cancer screening, prostate cancer treatment, prostate cancer mortality, prostate cancer outcomes, racial disparities, healthcare inequities, disparities in mental health, prostate cancer-related anxiety, and depression in prostate cancer. Other relevant manu-

scripts previously reviewed using related topics were also used. Manuscripts were evaluated and chosen based on subject matter and relevance.

PROSTATE CANCER SCREENING

Racial disparities exist in PCa screening, treatment, and outcomes. Compared to white men, black men have a 60% higher incidence of PCa,^{1,8} are more likely to be diagnosed with aggressive tumors and present with cancer earlier in life.⁹ Black men typically have higher PSA values at diagnosis,^{7,9} which strongly correlate with tumor diagnosis, tumor aggressiveness, and bone metastases.²⁶ Current guidelines for PSA values and predicted tumor volume are not equally as effective across all races. For Non-Hispanic black and Hispanic/Latino men, lower cutoff values are more effective predictors of cancer stage and progression.²⁷ Environmental and biological factors such as weight and body mass index (BMI) may influence PSA production and PSA levels.²⁷ Differences in the quality of screening technology utilization exist between black and white men. Multiparametric magnetic resonance imaging-ultrasound fusion biopsy (mpMRI) is an alternative to the standard ultrasound-guided biopsy that may allow for greater diagnostic accuracy. Given similar levels of PCa suspicion, black men were less likely to receive mpMRI screening than white men.²⁸ In some studies, mpMRI in black men demonstrates a significantly lower negative predictive value when compared to white men, suggesting that black men at early stages of cancer cannot accurately exclude the presence of disease.⁸ On the other hand, Falagario et al. found that the accuracy of mpMRI in staging PCa was similar in black and white men, and no difference was found between races in pathological outcomes after radical prostatectomy. The authors concluded that accessing and using advanced diagnostic tests might help mitigate PCa racial disparities. Research shows that black men are less likely to seek out, or receive, screening for PCa, and predictive metrics are not equally effective amongst races.

PROSTATE CANCER TREATMENT

SEER defines low-risk PCa as a clinical-stage \leq T2a, a Gleason sum \leq 6 (on a scale of 2-10), and a PSA \leq 10ng/mL or less,²⁹ and its definitive treatment varied across races. Black and Hispanic men had lower treatment rates within each D'Amico risk category or Gleason score than white men. On the other hand, Asian men had equal or greater rates of receiving treatment than white men.³⁰ Radical prostatectomy was underutilized as an initial treatment for high-risk PCa in black men despite the PCa being diagnosed at an early age and having a worse stage at diagnosis.⁷ However, when black men underwent a radical prostatectomy, they were more likely to experience adverse outcomes, such as emergency room visits and readmissions.³¹ The effectiveness of radiotherapy treatment rates also varied significantly across multiple racial groups.³² In a Texas-based study, radiotherapy rates were significantly lower in Hispanic men compared to black and white men for local-

ized PCa.³³ The study also found that people with low SES were less likely to receive a radical prostatectomy and radiotherapy than those with higher SES.

For low-risk PCa, active surveillance is employed to carefully monitor disease progression. Black men are at a higher risk for PCa progression. Yet, they are less likely to receive active surveillance,⁹ and more likely to receive recommendations for watchful waiting, delayed treatment, or nothing.³⁴⁻³⁶ In fact, a retrospective review of the SEER database from 2007-2011 for men diagnosed with PCa found that black men possessed up to a 90% higher risk of not receiving follow-up PSA tests within five years of diagnosis.³⁷ Another SEER database review found differences in palliative therapy between races. Compared to no treatment for ureteral obstruction from PCa, black men were more likely to undergo percutaneous nephrostomy placement than white men. Still, they were equally likely to receive a ureteral stent. Patients receiving a percutaneous nephrostomy were 55% more likely to die than the untreated group.³⁸ In addition, black men with terminal metastatic cancer are more likely to experience aggressive medical interventions such as cardiopulmonary resuscitation and inpatient admission, which contribute to decreased quality of life, higher financial burden, and adverse psychological effects.³⁹ As a result, PCSM rates remain higher in black men,^{40,41} particularly in patients with low-risk PCa.⁴²⁻⁴⁴ Ultimately, treatments for PCa varied amongst different races, including Hispanic, Asian, black, and white men. Many studies have shown disparities in PCa treatment disfavoring black men, with worse outcomes and higher mortality rates than white men.

MENTAL HEALTH IN PATIENTS WITH PROSTATE CANCER

It is well established that men with PCa experience reduced physical and emotional well-being. Diagnosing mental health illness, especially depression, is integral in PCa diagnosis, treatment, and survival.⁴⁵ Men with PCa are more likely to experience depressive symptoms than those with any other type of cancer.⁴⁶ Depression and anxiety associated with PCa before or after treatment result in lower adherence to treatment, more prolonged hospitalizations, more adverse reactions to treatment, and lower quality of life.⁴⁷ However, 73% of cancer patients do not receive the appropriate care for their depression.⁴⁵

Globally, mental health symptoms are worse in PCa survivors compared to the general population. In Dutch PCa survivors, worse mental health was linked to a lower educational level and lower general health perception.⁴⁸ In South Korean men with PCa, the frequency of psychological distress was significantly higher than in the general population.⁴⁹ Individual demographics (such as age or income) and disease characteristics also impact the severity of psychological distress.⁴⁹⁻⁵² Black men had higher decisional regret and medical mistrust and masculinity scores than non-black men, both of which predicted worse decisional regret independent of race.⁵³ These men experience worse social/family, emotional, and functional well-being.⁵⁰

Existing research highlights the compounding effect of physical, mental, and other social factors to characterize the disparity within experiences in patients with PCa.

DISPARITY IN QUALITY OF LIFE

Impaired mental health, comorbidities, older age, race, and lower level of education are some of the most significant factors affecting HRQOL in patients with PCa.⁵⁴ Quality of life accounts for both physical and mental quality of health (PHQOL and MHQOL). The PHQOL measures physical functioning, role limitations due to physical problems, bodily pain, and general health. The MHQOL measures energy/vitality, social functioning, role limitations due to emotional issues, and general mental health.⁵⁵ Depression is significantly associated with worsened quality of life in patients with PCa.⁵⁶ A study with gay and bisexual men with PCa identifying as men of color experienced worse HRQOL than white and non-Hispanic participants.⁵⁷ In addition to lower MHQOL, sexual minority men with cancer experience higher levels of distress, depression, and anxiety.⁵⁸

Patients with PCa who are unemployed, low-income, or uninsured experience lower emotional well-being and lower levels of PHQOL.^{55,59,60} The significantly lower levels of emotional and physical quality of health in these groups may be due to limited knowledge of cancer resulting in confusion of prognosis, inability to communicate effectively with physicians, or stress from poverty itself.⁶⁰ Patients with PCa who are uninsured and unemployed have worse PHQOL due to lower treatment access or more significant stress and life disruptions resulting from treatment.⁵⁵ Black men are more likely to be of lower SES than Hispanics and white men, yet when researchers provided flexible schedules and transportation for men with lower SES, treatment engagement for PCa equalized across all groups.⁶¹

DEPRESSION

Depression is a major challenge for patients with PCa, especially in the first five years of diagnosis.⁶² A depression diagnosis in patients with cancer increases mortality significantly,⁶³ especially in 12-24 months after the cancer diagnosis.⁶⁴ Older age, poorer health, and being unmarried are additional risk factors for worse mental health and probable depression in PCa survivors.^{62,65} Men with PCa who were not in a committed relationship or unmarried had more symptoms of distress, poorer quality of life, and worse survival outcomes.^{46,60} Married patients in a partnership or affiliated with a community benefited from psychological and social support therapy.^{54,58,66-68} Black men also experience lower levels of social support.⁵⁵

Depressed black men were significantly less likely than depressed white men to talk about cancer with their family and friends.⁶⁹ Higher levels of social support were associated with better mental health and quality of life among black men, and this effect was not seen in white participants.⁵⁵ For black men, the stigma of having cancer may result in a lack of communication; however, other reasons, including concerns for loved ones' well-being and a belief

in self-reliance, were also responsible for poorer communication about their cancer to family and friends.⁶⁹

Black men who have experienced previous traumatic events or experiences are significantly more likely to be unafraid of their cancer diagnosis. Traumatic events include experiencing war, gunshot, robbery, abuse, or devastating divorce. Nondepressed black patients are likelier to have an adaptable attitude regarding their cancer. Half of the patients reported a belief in endurance or faith in God.⁶⁹ Patients with higher levels of spirituality (e.g., praying, receiving support, and coping with cancer) had better mental and physical health outcomes.^{55,66} Physical symptoms such as bowel problems, bowel function, and sexual function also improved with higher spirituality scores.⁶⁶ Overall, spirituality and social support appear to have protective effects on stress, yet ethnicity remains a significant and independent predictor of MHQOL.^{55,66}

Although cancer is not consistently related to depression, cancer is associated with anxiety.⁶⁸ Probable depression is a nondiagnostic indicator for patients with scores below 48 (scale of 0-100; higher scores represent better health) on the Short Form-12 questionnaire regarding HRQOL.⁵⁶ Probable depression is significantly associated with clinically significant prostate cancer-related anxiety (PCRA) and productivity loss.⁵⁶ PCRA and uncertainties about PCa result in major depression and lower quality of life in patients with PCa.⁵⁶ Symptoms of depression, anxiety, fatigue, and pain related to cancer are clustered and should be addressed comprehensively to improve quality of life.⁷⁰ Exercise is recommended by the American Cancer Society and World Health Organization to decrease the likelihood of probable depression,⁶² and has been shown to improve HRQOL.⁷¹ Depression and anxiety related to PCa are moderated more by social consequences of anger, resulting in difficulty getting along with others instead of lack of social support, loneliness, or anger itself.⁷² Although anger is an important factor shaping a patient's understanding of illness, attitude, and decision-making,⁷³ anger is less documented in mental health research. Addressing the psychological needs of men with PCa requires careful consideration of adverse psychological outcomes of anxiety, anger, loneliness, and depression.^{72,73}

GAPS IN RESEARCH

Over ten years, more than half of the studies from a Web of Science search regarding cancer and mental disorders (2002-2011) were about palliative care and quality of life.⁶³ The majority of the search results consisted of studies relating to poor mental health resulting from cancer, while less is known about the effects of mental health on cancer. Treatment of psychological disorders for patients with PCa is seldom explored and poorly understood in relation to treatment disengagement.

Researchers suggest that oncology teams working with patients with PCa prioritize diagnosis and treatment of depression and anxiety to optimize patients' clinical treatment outcomes and quality of life.⁴⁷ Furthermore, health-care providers and their teams should recognize and address depression, anxiety, and high levels of burden and

distress among parents with children with cancer and caregivers of advanced cancer patients.

In black patients with cancer, their strong belief in God may facilitate faith, endurance, and a fighting spirit, which are more likely to result in improved physical and mental health outcomes.^{55,69} Healthcare teams should facilitate communication regarding cancer and mental health with patients, family members, and caregivers, which may be beneficial in initiating social support and mental health intervention or diagnosis for patients with prostate cancer.

Patients with mental health problems struggle most in appraising health information, navigating the health system, and finding good health information.⁷⁴ Researchers recommend using the Health Literacy Questionnaire, especially in men with PCa, to identify the communities with low health literacy skills to provide the necessary resources and help improve their service use and health outcomes.^{74,75} Providing the necessary support for mental health patients is especially important in black communities because they have poorer access to mental health care. However, rates of incidence are comparable to white Americans.⁶² Oncology teams should prioritize education and support in navigating health care systems during the cancer process, prevention, and treatment for patients with PCa and mental health illnesses. The support will likely alleviate anxiety and high levels of burden and distress in patients and their families, resulting in improved quality of life and better health outcomes.^{63,69}

Lastly, there is limited research regarding racial and cultural differences in communities affected by PCa and men-

tal health. Many studies investigated mental health after radical prostatectomy versus radiotherapy, with or without androgen deprivation therapy or treatment regret for PCa. Few studies examined the mental health of patients with PCa in black groups and even fewer examined the impact of mental health in Hispanic and Asian communities with PCa. The studies summarized in this paper should serve as a precedent for further research.

CONCLUSION

Many biological, socioeconomic, cultural, and access-to-care issues contribute to PCa disparities between races. While genetic differences play a key role, nonbiological differences significantly contribute to these disparities. Ultimately, these differences can lead to misdiagnosis, delayed screening, inappropriate or ineffective treatment, and adverse outcomes in black PCa patients compared with white ones. Previous research has focused on biological and nonbiological components separately, with minimal attention to the effect of mental health on PCa. Most studies focus solely on black and white men, with few including data on Latino and Asian populations. Future research should take an interdisciplinary, culturally conscious approach and focus on mental health. We hope that future research considers the racial and ethnic challenges in communities with PCa and mental illness to address unmet needs and develop effective and targeted interventions for these communities.

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