

Perceived stress mediates the effects of social support on health-related quality of life among men treated for localized prostate cancer

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Received 4 September 2009; received in revised form 4 February 2010; accepted 9 April 2010

Abstract

Objective: To examine the longitudinal effect of social support on general health-related quality of life (HRQOL) in men treated for localized prostate cancer, and to evaluate the role of perceived stress as a potential mediator of that relationship, in an ethnically and demographically diverse sample. **Methods:** Psychosocial assessments were administered to a sample of 175 men at baseline, and 2 years later. Hierarchical regression analyses were conducted to investigate the relationships between social support, perceived stress and HRQOL, while controlling for possible covariates that may affect HRQOL (e.g., age, time since diagnosis, medical comorbidities, etc.). **Results:** Higher levels of social support at baseline predicted higher levels of HRQOL at 2-year follow-up after controlling for relevant

covariates and baseline levels of HRQOL. This relationship was partially mediated by level of perceived stress at baseline. Furthermore, men perceiving high levels of social support reported significantly higher HRQOL compared with men perceiving low levels of social support. **Conclusions:** Results indicate positive social relationships contribute to improved HRQOL in patients who have undergone treatment for localized prostate cancer. One pathway through which social support can benefit HRQOL is through lower perceptions of stress. Enhancing or maintaining social support and reducing perceived stress may be potential targets for future psychosocial interventions aimed at improving HRQOL.

Published by Elsevier Inc.

Keywords: Health-related quality of life; Perceived stress; Prostate cancer; Social support

Introduction

In 2009, approximately 192,280 US men will be diagnosed with prostate cancer (PC) [1]. Treatments such as radical prostatectomy and radiation are effective and men with localized PC have a 5-year survival rate approaching 100% [1]. However, these treatments cause decrements in urinary, sexual and/or bowel functioning that compromise health-related quality of life (HRQOL; [2–5]). While the physical side effects of treatment have been well documen-

ted, the extent to which psychosocial processes may impact HRQOL needs further investigation.

Research suggests that PC survivors report greater distress when compared with matched controls [6] and that increased perceived stress (PS) is associated with poorer HRQOL [7]. For example, PC survivors experiencing urinary dysfunction report feelings of embarrassment and consequently greater PS [8]. Reductions in PS have been shown to improve HRQOL [9]. Distress over treatment-related side effects are chronic and can develop years after treatment has been completed [10].

Some have proposed that social support (SS) may buffer individuals from the negative effects of stress [11]. SS appears to have a positive effect on adjustment following treatment. Higher levels of SS have been associated with

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psychological benefits in PC survivors, including reduced depression and anxiety [7,12,13]. Furthermore, higher levels of SS are associated with less pain, and married PC survivors report better physical functioning [14].

Limited, and primarily cross-sectional work has assessed the impact of PS and SS in PC populations. Much of this past research has focused on breast cancer populations. As much of this research has focused on breast cancer populations, how SS specifically impacts PC survivors is not well understood. Furthermore, a recent review of the literature on psychosocial adjustment in PC survivors specifically identified a need to evaluate adjustment in more ethnically and demographically diverse samples [15]. To address existing gaps in this literature, this study examined the longitudinal relationships between SS, PS, and HRQOL in a diverse sample of PC survivors. The study hypotheses were, (a) higher baseline levels of SS predict greater follow-up HRQOL; (b) higher baseline levels of PS predict lower HRQOL at follow-up; and (c) PS mediates the relationship between SS and HRQOL.

Methods

Participants

Participants were recruited for an intervention study examining the effects of stress management in men treated for localized PC [16] and were included if they were 50 or older, were diagnosed with Stage I/II PC, and had no cognitive impairment. Recruitment involved advertisements, urologist referrals and mailings to PC survivors identified from the Florida cancer registry. Eligible participants signed an informed consent approved by the university Institutional Review Board. All participants were administered a psychosocial assessment at four time points (baseline, 3 months, 10 months, and 2 years post-baseline), and the responses from the baseline and 2-year follow-up assessments were analyzed for the present study.

Variables

Social support

The Enhancing Recovery in Coronary Heart Disease Patients Social Support Instrument (ESSI) was used as a measure of perceived SS. The ESSI is seven-item instrument that is highly correlated with other SS measures [17]. Individual items are summed, with higher scores indicating greater levels of perceived SS. The reliability of the ESSI in this study was acceptable (Cronbach's $\alpha=.84$).

Perceived stress

The Perceived Stress Scale (PSS) [18] was used to assess perceptions of how unpredictable, unmanageable and stressful life had been during the past month. This 14-item scale asks to rate the frequency of thoughts and feelings related to stress, with higher scores indicating higher PS. It has been used extensively in PC populations with good

reliability (e.g., Ref. [19]). The reliability of the PSS in this study was acceptable (Cronbach's $\alpha=.80$).

Health-related quality of life

The Functional Assessment of Cancer Therapy-General (FACT-G) was used to assess HRQOL [20]. The FACT-G has demonstrated good reliability across a range of populations, including PC survivors [21], and has been correlated with other measures of QOL following cancer treatment [22]. For the purposes of this study, the physical well-being subscale was used. The reliability of the FACT-G physical well-being subscale in this study was acceptable (Cronbach's $\alpha=.73$).

Statistical analysis

All analyses were conducted with SPSS 16.0. Study variables were evaluated for internal consistency and normality. Zero-order correlations and analyses of variance were used to assess whether any potential covariates (age, education, marital status, ethnicity, time since diagnosis and treatment, medical comorbidities [23], intervention condition) were significantly related ($P<.10$) with HRQOL. Methods by Baron and Kenny [24] were used to evaluate possible mediators. Should complete mediation not be indicated, the Sobel test [25] was applied to evaluate potential partial mediation.

Results

Sample description

A total of 175 men who had undergone treatment for localized PC were evaluated. Please refer to Table 1 for full descriptive information. Results revealed that the only

Table 1
Demographic, medical and psychosocial characteristics for the total sample (N=175)

Variable	M	S.D.	%
Age (years)	64.8	7.5	
Education (years)	13.7	3.4	
Income (in thousands of \$)	50.1	42.1	
Months since diagnosis	15.5	6.2	
Social support (ESSI)	25.6	4.9	
PSS	18.0	7.4	
Physical well-being (FACT)	25.1	3.6	
Treatment type			
Surgery			48%
Radiation			52%
Ethnicity			
Non-Hispanic white			40%
Hispanic			41%
African American			18%
Marital status			
Married, or in similar relationship			84%
Not married			14%

hypothesized covariate that was associated with HRQOL was number of medical comorbidities (at baseline and 2-year follow-up; $P < .05$).

Main analyses

The hypothesized model proposed that higher SS at baseline would predict higher HRQOL at 2-year follow-up. Paired samples t-tests revealed that there was no statistically significant changes ($P > .10$) in SS or PS over the 2-year follow-up. We proposed that the relationship between SS and HRQOL be mediated by PS. First, the relationship between baseline SS and follow-up HRQOL was evaluated. All possible covariates were controlled in the regression models to more conservatively estimate variance explained in HRQOL by SS. In the first step, we controlled for baseline levels of HRQOL, as well as all potential covariates. The second step explored whether baseline SS was associated with follow-up HRQOL. Results indicated that greater baseline SS predicted higher HRQOL scores at 2-year follow-up ($\beta = .16$, $P < .05$; Table 2).

The final set of analyses evaluated whether PS mediated the relationship between baseline SS with follow-up HRQOL. Analyses revealed that complete mediation was not indicated as the introduction of PS to the regression of HRQOL on SS did not cause the relationship between SS and HRQOL to drop to nonsignificance. A subsequent Sobel

test indicated that the relationship between SS and HRQOL is partially mediated by PS (Sobel test $z = 1.99$, $P < .05$).

Post hoc analyses

To investigate the possibility that there may be particular groups of men who are at risk for experiencing greater decrements in HRQOL, men were separated into quartiles based on their SS scores. The highest quartile of men reported SS scores above 31 while the lowest quartile reported scores below 20 (overall mean = 25.6). Results indicated that men in the highest SS quartile reported significantly higher HRQOL scores than those in the lowest SS quartile ($P < .01$; 26.3 compared to 22.8). HRQOL scores for the men with SS scores in the lowest quartile were below US norms [26].

Discussion

Prior work conducted with PC survivors suggests that they experience increased levels of PS, and this is associated with decrements in HRQOL [2,8]. However, these effects can be buffered by SS [11]. This study sought to evaluate the buffering effects of SS on HRQOL in a diverse sample who had undergone treatment for localized PC. Levels of PS were also explored as a potential mediator of that relationship.

Findings showed that after controlling for demographic and medical variables, and baseline levels of HRQOL, baseline SS was a significant predictor of HRQOL 2 years later. It appears that higher levels of SS act as a protective mechanism for HRQOL. Results also indicate that PS mediates the relationship between SS and HRQOL and suggest that one mechanism through which improvements in SS can improve HRQOL in PC survivors is lower levels of PS. This finding supports existing literature suggesting that perceived SS is associated with HRQOL, particularly in stressful situations [27]. Because both SS and PS are modifiable factors, our results identify potential targets that may be addressed in psychosocial interventions particularly for men with limited social resources as our results suggest there may be a subset of the men (those perceiving low levels of SS) who are vulnerable to experiencing poor HRQOL.

Despite the potential implications of our work, we acknowledge several limitations. The sample reported slightly higher HRQOL compared to the general US population [26], although there was a subset of men who are at particular risk for reporting lower levels of HRQOL. Furthermore, the sample was relatively healthy psychologically as we excluded participants with significant psychological impairment. In addition, our measure of SS did not consider other aspects such as level of social integration, and network size (e.g., Refs. [28,29]). Finally, there are several possible mechanisms through which the effects of PS may ultimately affect HRQOL (e.g., reduced treatment adherence or behavioral factors) which were not evaluated in the current study.

Table 2
Hierarchical regression analyses to predict health-related quality of life by social support, partially mediated by perceived stress

Predictor	Standardized regression coefficient (β)	
	Step 1	Step 2
<i>Regression 1: Social support predicting perceived stress</i>		
Block 1		
Baseline FACT-G physical well-being	-.32 **	-.27 **
Months since diagnosis	.09	.04
Months since treatment	-.07	-.07
Medical co-morbidities	.01	.02
Age	-.01	.01
Income	-.05	-.01
Years of education	.00	-.01
Block 2		
ESSI social support		-.34 **
<i>Regression 2: Social support predicting health-related quality of life</i>		
Block 1		
Baseline FACT-G Physical well-being	.39 **	.33 **
Months since diagnosis	-.03	.00
Months since treatment	-.06	-.07
Medical comorbidities	-.16 *	-.12 *
Age	-.01	.02
Income	.09	.07
Years of education	.08	.09
Block 2		
ESSI social support		.15 *

* $P < .05$.

** $P < .01$.

Conclusions

SS can positively impact long-terms HRQOL in localized PC. This relationship is explained by PS, suggesting the benefits of SS on HRQOL may occur via lower perceptions of stress. This may be particularly salient for men perceiving low levels of SS who were more likely to report significantly lower HRQOL. These findings provide potential targets for psychosocial interventions seeking to improve both psychological and physical adjustment in PC survivors.

Acknowledgments

This study was supported by National Cancer Institute grant 1P50CA84944.

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