Cognitive-Behavioral Stress Management Improves Stress-Management Skills and Quality of Life in Men Recovering from Treatment of Prostate Carcinoma

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BACKGROUND. The current study evaluated the efficacy of a 10-week, group-based, cognitive-behavioral stress management (CBSM) intervention relative to a half-day seminar in improving quality of life (QoL) among men who were treated for localized prostate carcinoma (PC) with either radical prostatectomy (RP) or radiation therapy.

METHODS. Ninety-two men were assigned randomly to either the 10-week CBSM group intervention or a 1-day seminar (control group). The intervention was designed to improve QoL by helping participants to identify and effectively manage stressful experiences and was focused on the treatment-related sequelae of PC.

RESULTS. A hierarchical regression model was used to predict postintervention QoL. The final model, including all predictors and relevant covariates (i.e., income, baseline QoL, ethnicity, and group condition), explained 62.1% of the variance in QoL scores. Group assignment was a significant predictor ($\beta = -0.14$; $P = 0.03$) of QoL after the 10-week intervention period, even after controlling for ethnicity, income, and baseline QoL. Post-hoc analyses revealed that individuals in the CBSM intervention condition showed significant improvements in QoL relative to men in the 1-day control seminar. Improved QoL was mediated by greater perceived stress-management skill.

CONCLUSIONS. A 10-week cognitive-behavioral group intervention was effective in improving the QoL in men treated for PC, and these changes were associated significantly with intervention-associated increases in perceived stress-management skills. ***Cancer* 2004;100:192–200.** © *2003 American Cancer Society.*

KEYWORDS: cognitive-behavioral stress management, prostate carcinoma, quality of life, group intervention.

Prostate carcinoma (PC) is the most common solid tumor malignancy and is the second leading cause of death in American men. The American Cancer Society estimates that there will be 220,900 new cases and 28,900 deaths from PC in 2003.[1] Treatment options often are determined by disease stage, tumor size, and prostate-specific antigen (PSA) level as well as the age, health status, and preference of the individual at the time of diagnosis. Radical prostatectomy (RP) and radiation therapy (RT) are the primary treatments for localized disease. Although both are highly effective at suppressing recurrence and extending survival,[2–8] treatment benefit often is offset by serious treatment-related decrements in QoL primarily associated with treatment side effects, such as erectile dysfunction (ED) and urinary and/or bowel incontinence.

Treatment-Related Dysfunction

Recent reviews have summarized a broad range of studies examining the treatment-related QoL of men treated for localized PC.[9,10] They document that both surgical and radiation treatments have a profound impact on urinary, bowel, and erectile functioning. Although the effect on urinary and bowel functioning appears to be relatively time-limited,[11] ED is often a chronic consequence of treatment. ED is experienced by up to 85% of men after treatment, and 61% of men report feeling moderately to extremely distressed by ED.[12] Two to 4 years after treatment, most men continue to report that lack of sexual function is a *moderate problem* or a *big problem* irrespective of treatment.[13] Men who are at high risk for disease progression and undergo multiple treatments (e.g., brachytherapy and external-beam RT) have significantly worse treatment-related QoL across multiple domains of functioning.[14] PC-oriented psychosocial interventions may be valuable in helping men to acknowledge, express, and accept the changes that occur as a result of treatment[15]; to improve communication with their partner and healthcare professionals[16]; and to seek out adaptive solutions to enduring urinary dysfunction, bowel dysfunction, or ED. Such interventions may lead to significant improvements in cognitive and emotional coping skills, use of social support, utilization of health care, and management of symptoms.

Psychosocial Interventions

The efficacy of psychosocial interventions in reducing stress and negative affect and in improving the QoL of cancer patients has been demonstrated clearly. Psychosocial interventions specifically tailored to meet the needs of cancer patients include supportive-expressive group therapy,[17] psychoeducational interventions,[18,19] and multimodal intervention approaches. Research shows that effective therapy components in multimodal efforts include relaxation training (e.g., guided imagery) to lower arousal, disease information and management, an emotionally supportive environment in which participants can address fears and anxieties, behavioral and cognitive coping strategies, and social support.[20,21] Several reviews describe the efficacy of psychosocial interventions among cancer patients. Using anxiety and depression as outcome measures in psychologic interventions for cancer patients, Sheard and Maguire[22] reported findings from separate meta-analyses. Those authors noted that the effect size for anxiety was 0.42 and remained high (0.36) even after limiting the sample to a subset of trials meeting stringent criteria. Although the effect size for depression initially was robust (0.36), it was reduced substantially (0.19) when held to a higher standard (e.g., more reliable designs).

In a meta-analytic review of relaxation interventions targeting patients undergoing nonsurgical cancer treatments, it was found that relaxation significantly decreased treatment-related symptoms (i.e., blood pressure, pulse rate, nausea, and pain) with medium effect sizes, ranging from 0.44 to 0.55.[23] Small-to-medium effect sizes (0.23–0.54) were found for the impact of relaxation in reducing negative mood (i.e., depression, tension, anxiety, hostility, fatigue, and confusion). Because relaxation is typically a component of stress-management interventions with most programs also emphasizing cognitive restructuring, improved coping responses, utilization of social support, assertiveness training, and anger management, the effect sizes related to negative mood may be a conservative estimate of the benefits of such interventions. In a recent review of psychosocial interventions that targeted QoL, including global and disease-specific QoL, in adult patients with cancer, the authors reported an average effect size of 0.31.[24]

Overall, these summaries demonstrate that participation in psychosocial interventions provides a clear and robust benefit to cancer patients by relieving treatment-related symptoms, reducing the physiologic concomitants of stress, and improving mood. Moreover, studies that include men suggest that the benefits to men coping with cancer may be quite significant.[24] This is supported by the positive experiences that men report from their participation in support groups.[25] However, these groups tend to be community-based without an appropriate comparison group and comprised largely of educated, older, white men.[26,27]

Mishel et al.[15] have provided a psychoeducational intervention to equal numbers of white and African-American men primarily treated for localized PC. The intervention was provided by a trained nurse by telephone and focused on managing uncertainty through cognitive reframing, problem solving, patient-provider communication, and provision of medical information. For all participants, the intervention successfully improved cognitive reframing and problem solving; however, no differences between intervention and control groups were detected at 7-month follow-up. The findings suggest that patients with PC are willing to participate in a psychosocial intervention (only 5% drop out), are receptive and responsive to psychosocial skills training across ethnicity and education (43% of participants had an education level $\leq$ 12th grade), and may accrue more benefit from a longer intervention period.[15,24]

These results support earlier studies in men treated for localized PC in which it was found that patients who participated in a multimodal intervention had greater improvement in mental health, less interpersonal conflict, greater perceived control over health and functioning, and lower distress associated with cancer-related intrusive thoughts relative to controls.[16] Further analyses revealed that men with inadequate social resources received the most benefit from the intervention. Although, collectively, these findings indicate that men who are treated for PC derive a benefit from an intervention experience, most studies did not involve a randomized intervention design, did not study an ethnically diverse group that included Hispanics, and did not identify potential mechanisms by which such interventions may exert their effects on QoL.

The Current Study

Few studies have investigated the efficacy of structured, group-based, stress-management interventions in improving QoL and the mechanisms associated with such improvements despite stressful and negative side effects associated with treatment. In the current study, we evaluated the efficacy of an intervention designed to improve QoL through improvements in cognitive-behavioral stress management (CBSM) skills in men treated for localized PC. The study design was a 2×2, randomized, repeated-measures design with 2 levels of the intervention (experimental or control) and 2 time points (preintervention and postintervention). It was hypothesized that participants enrolled in the intervention would demonstrate greater improvements in QoL compared with a control group enrolled in a 4-hour seminar. Moreover, we anticipated that intervention-associated improvements in QoL would be mediated by increased stress-management skills gained among CBSM participants.

MATERIALS AND METHODS

Participants

Participants were recruited for the study primarily through community presentations and posting of fliers. Some participants also were recruited through referral from private urologists and through access to the Florida Cancer Data System, a cancer registry data base maintained by the Florida Department of Health. To be eligible, participants were required to be age $\geq$ 50 years and must have undergone either RP or RT for Stage I or II (i.e., TNM staging TIA to T2B) PC in the past 18 months. To complete assessment materials and to participate in our experimental conditions, participants were required to have a 9th-grade reading level and to be free of cognitive impairment or active psychiatric symptoms, including panic attacks, posttraumatic stress disorder, psychosis, or alcohol/drug dependence, within the past 3 months. In addition, participants were included only if they reported no prior history of cancer of any type and no adjuvant treatment for PC. Participants who met inclusion criteria signed an Institutional Review Board-approved informed consent form, completed psychosocial batteries within 2–3 weeks before and after the intervention period, and received monetary compensation for their time and effort.

Measures

QoL

The Functional Assessment of Cancer Therapy-General Module (FACT-G) was used to assess QoL.[28] The 27-item instrument (version 4) assesses well being across 4 broad domains (i.e., physical, social/family, emotional, and functional). The instructions asked participants to indicate to what degree each statement has been *true* during the past 7 days, and the 5-point response scale ranges from *not at all* to *very much*. The FACT-G has been used extensively to assess posttreatment QoL in PC patients and has demonstrated robust reliability and validity.[29–31] In the current study, the FACT-G demonstrated adequate psychometric properties (preintervention: mean $\pm$ standard deviation [SD], 88.20 $\pm$ 13.31; skewness, $-$ 0.86; postintervention: mean $\pm$ SD, 89.78 $\pm$ 11.92; skewness, $-$ 0.89) and good internal consistency (Cronbach α: preintervention, 0.92; postintervention, 0.86).

Perceived stress-management skill

Perceived stress-management skill was assessed using the Measure of Current Status (MOCS; unpublished instrument), which provides an assessment of perceived ability to respond to the challenges and demands of everyday life or *perceived stress-management skill*. The measure asks participants to rate on a 5-point response scale how well they can perform each of 17 items (i.e., from "I cannot do this at all" to "I can do this extremely well"). Items are based on the components of most stress-management interventions (e.g., awareness of tension, cognitive reframing, use of social support, and adaptive anger expression). Examples include the following: "I can easily recognize situations that make me feel stressed or upset," "I can easily stop and reexamine my thoughts to gain a new perspective," "I am able to use muscle relaxation techniques to reduce any tension I experience," and "I can ask people in my life for support or assistance whenever I need it." In the current study, the MOCS demonstrated adequate psychometric properties (preintervention: mean $\pm$ SD, 63.02 $\pm$ 13.04; skewness

= − 0.89; postintervention: mean ± SD, 64.02 ± 12.20; skewness = − 0.91). Although the MOCS was intended to differentiate among stress management skills, in this sample, the measure was essentially unifactorial with a high degree of internal consistency (Cronbach α: preintervention, 0.92; postintervention, 0.93). The MOCS has been associated with greater optimism and positive mood[32] and has been related inversely to maladaptive coping.[33]

Procedures

After a brief telephone screen, participants were scheduled for an interview and received a more intensive screening, including assessment of cognitive impairment. Participants who scored > 23 on the Mini-Mental Status Examination[34] were included in the study. Items from the Structured Clinical Interview for the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition* (nonpatient edition) were used to exclude individuals with active suicidal ideation, panic attacks, posttraumatic stress disorder, psychosis, or alcohol/drug dependence.[35] Those participants who met eligibility criteria then completed the baseline psychosocial and physical health assessment. Twenty cohorts ranging from 6 to 18 participants were recruited throughout the study period. Participants were assigned to the experimental or control conditions after one of three randomization procedures, depending on the size of the cohort we recruited, to assure that the intervention group was comprised of at least four to six participants. In 3 cohorts that included > 12 participants, we conducted a 1:1 (1 experimental to 1 control) randomization procedure. A 2:1 (2 experimental to 1 control) randomization was conducted in cohorts that included 6–12 participants (3 cohorts). Finally, in the majority of our cohorts (14 cohorts), all participants were included in a group, and the group was assigned randomly to either the experimental condition or the control condition by flipping a coin. The 1-day seminar occurred between Weeks 5 and 6 after the baseline assessment. CBSM participants were reassessed 2–3 weeks after the 10-week intervention, whereas control participants were reassessed 12–13 weeks after their baseline assessment to obtain parallel time periods between the preintervention and postintervention assessments across both conditions.

Experimental Condition

The 10-week CBSM intervention for PC (unpublished intervention manual) was a modified version of a protocol that was designed originally by Antoni et al.[36] and currently is in use with a variety of medical populations, including men and women with human immunodeficiency virus[37,39] and women with breast carcinoma.[39] Groups in the current study met once each week for 2 hours, which included a 90-minute didactic portion as well as 30 minutes of relaxation training. Participants were instructed in a variety of stress-management skills, including identification of distorted thoughts, rational thought replacement, effective coping, anger management, assertiveness training, and utilization of social support. The didactic components were arranged so that the content of each session related to the material presented the previous week. Weekly between-session homework exercises served to link and elaborate session content. Topics included cognitive-behavioral approaches to stress management as well as more informational material related to PC diagnosis and treatment (e.g., the physiology of PC; the mechanics and treatment of sexual dysfunction; communication of medical concerns with family, friends, and medical providers). Participants also were instructed each week in a different technique for inducing relaxation (e.g., deep breathing, progressive muscle relaxation, imagery) and were encouraged to practice relaxation skills on a daily basis. All groups were co-led by parallel master's-level clinical health psychology students and/or Ph.D.-level licensed clinical psychologists trained in our CBSM protocol.

One-Day Seminar Control Condition

Participants in the control condition met in groups of 3–8 for a single, 4-hour seminar. During the 4-hour seminar, participants were instructed in the same stress-management skills that were included in the 10-week CBSM intervention. Participants were encouraged to practice relaxation skills on a daily basis. All groups were co-led by master's-level clinical health psychology students and/or parallel Ph.D.-level licensed clinical psychologists who were trained in our CBSM protocol.

Statistical Analysis

All statistical analyses were performed using the SPSS software package (version 11.0; SPSS Inc., Chicago, IL). To determine relevant control variables, correlations were conducted using Pearson correlations (for continuous variables) and one-way analyses of variance (for categoric variables) between possible control variables and our QoL outcome. Control variables were incorporated into main analyses if P values were < 0.10. Intervention effects were then evaluated using a hierarchical regression model predicting postintervention QoL. In this regression model, relevant control variables were included on Steps 1 and 2, baseline QoL was included on Step 3, and condition (experimental vs. control) was included on Step 4. Subsequent mediation analyses were conducted using criteria out-

lined by Baron and Kenny.[40] Differences between individual cell means within each condition were analyzed using paired-sample Student t tests. In all cases, P values < 0.05 indicated statistical significance.

RESULTS

Participants in the study were 92 men who had received treatment (RP, $n = 65$ men; RT, $n = 27$ men) for localized PC within the past 18 months. All participants were assigned to either a 10-week CBSM program (experimental condition; $n = 52$ men) or a 1-day stress-management seminar (control condition; $n = 40$ men) conducted in either English ($n = 64$ men) or Spanish ($n = 28$ men) for Spanish monolingual participants. The majority of participants were non-Hispanic white (35%), followed by Hispanic (34%), African American (22%), and other (9%). The mean ± SD participant age was 63.1 years ± 2.2 years, and participants had an average yearly household income of $47,200 ± $40,000 and an education of 14 years ± 3.7 years. The average time since PC diagnosis and treatment was 12.4 months ± 7.2 months and 8.2 months ± 4.3 months, respectively. Only income ($r = 0.29$; $P = 0.005$) and ethnic group membership ($F[2, 90] = 3.75$; $P = 0.026$) were associated significantly with postintervention QoL (all other P values > 0.15). However, the effects of group assignment on QoL did not vary as a function of ethnicity, and the group × ethnicity interaction was not significant ($\Delta R^2 = 0.002$; $F[2,87] = 0.2$; $P = 0.78$). Nonetheless, we included the ethnicity factor using two dummy-coded vectors in our regression models.

To determine the effect of the intervention on QoL, we used a hierarchical regression equation that predicted postintervention QoL. In this equation, we entered income on Step 1, ethnicity on Step 2, baseline QoL on Step 3, and group condition (experimental or control) on Step 4. Results indicated that, after controlling for income, ethnicity, and baseline QoL, group assignment was a significant predictor of postintervention QoL ($\beta = -0.14$; $P = 0.03$). The model that included all predictors was significant ($F[5,88] = 22.8$; $P < 0.001$) and accounted for 62.1% of the variance in postintervention QoL scores (see Table 1). Paired-sample t tests indicated that participants who attended the 10-week intervention made significant improvements in QoL (mean ± SD: preintervention, 87.31 ± 12.41; postintervention, 90.48 ± 11.27; $t = 2.90$; $P < 0.01$). In contrast, QoL did not change significantly for participants in the control condition (mean ± SD: preintervention, 89.37 ± 14.30; postintervention, 88.65 ± 13.19; $t = 0.47$; $P > 0.10$). These data are presented graphically in Figure 1.

TABLE 1
Hierarchical Regression Model Predicting Quality of Life from Preintervention to the Postintervention Period

Variable[a]	B	SE B	β
Step 1			
Income	0.0089	0.030	0.29[b]
Step 2			
Income	0.0063	0.034	0.21
Ethnicity (dummy 1)	4.22	3.04	0.17
Ethnicity (dummy 2)	−1.51	3.16	−0.05
Step 3			
Income	0.0016	0.024	0.04
Ethnicity (dummy 1)	3.09	2.06	0.13
Ethnicity (dummy 2)	0.34	2.15	0.01
QoL at baseline	0.66	0.064	0.73[b]
Step 4			
Income	0.0017	0.023	0.06
Ethnicity (dummy 1)	3.06	2.02	0.13
Ethnicity (dummy 2)	0.95	2.12	0.03
QoL at baseline	0.66	0.06	0.73[b]
Experimental condition[c]	−3.49	1.61	−0.14[b]

SE: standard error; QoL: general quality of life; B: unstandardized coefficients beta.
[a] Correlation coefficient ($R^2 = 0.09$ for Step 1; $\Delta R^2 = 0.03$ for Step 2; $\Delta R^2 = 0.48$ for Step 3; and $\Delta R^2 = 0.02$ for Step 4.
[b] $P < 0.05$.
[c] Experimental condition coding: cognitive-behavioral stress management = 1, control = 2.

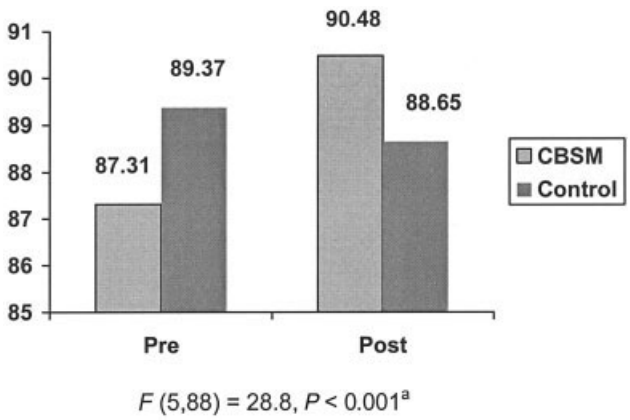

FIGURE 1. Preintervention (Pre) to postintervention (Post) changes in quality of life (QoL) by group assignment. This graph depicts cognitive-behavioral stress management (CBSM) effects of QoL preintervention to postintervention by condition. [a]The F value for the final regression model, which included relevant covariates and group assignment.

Because we were interested in the mechanisms through which the intervention may affect QoL, we performed a post-hoc analysis to determine whether the correlation between group membership and QoL was explained through changes in specific intervention targets. Following Baron and Kenny's[40] approach, we conducted a hierarchical regression analysis to test the hypothesis that the intervention

TABLE 2
Test of Perceived Stress-Management Skill as a Mediator of Cognitive-Behavioral Stress Management's Effect on Quality of Life

Variable[a]	B	SE B	β
Step 1			
Income	0.0012	0.024	0.04
QoL at baseline	0.66	0.064	0.73[b]
Ethnicity (dummy 1)	3.09	2.06	0.13
Ethnicity (dummy 2)	0.34	2.15	0.01
Step 2			
Income	0.0017	0.023	0.06
QoL at baseline	0.66	0.062	0.73[b]
Ethnicity (dummy 1)	3.06	2.02	0.13
Ethnicity (dummy 2)	0.95	2.12	0.03
Experimental condition[b]	−3.49	1.61	−0.14[b]
Step 3			
Income	0.0031	0.022	0.10
QoL at T1	0.70	0.06	0.77[b]
Ethnicity (dummy 1)	1.95	1.92	0.08
Ethnicity (dummy 2)	1.69	2.0	0.06
Experimental condition[c]	−1.65	1.6	−0.07
Perceived stress-management skill (change score)	0.32	0.09	0.25[b]

SE: standard error; QoL: general quality of life; B: unstandardized coefficient beta.
[a] Correlation coefficient ($R^2 = 0.60$ for Step 1; $\Delta R^2 = 0.02$ for Step 2; and $\Delta R^2 = 0.05$ for Step 3.
[b] $P < 0.05$.
[c] Experimental condition coding: cognitive-behavioral stress management = 1, control = 2.

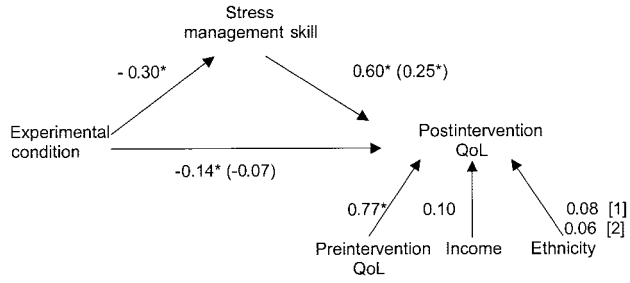

FIGURE 2. Mediation model controlling for income, ethnicity and baseline quality of life (QoL). The correlation between experimental condition and postintervention QoL, as mediated by stress-management skill. The β coefficients outside parentheses represent individual associations after controlling for income, ethnicity, and preintervention QoL. The β coefficients within parentheses reflect results of the overall model and mediation analysis, indicating that the correlation between experimental condition and postintervention QoL drops to nonsignificance when stress-management skill is included in the model. Bracketed numbers reflect two ethnicity dummy-coded vectors. Sobel statistic, − 2.37; $P < 0.05$; asterisks, $P < 0.05$.

contributed to greater QoL through improvements in stress-management skills as assessed by the MOCS. First, we regressed postintervention QoL on group membership after controlling for income and baseline QoL. The correlation was significant ($\beta = -0.14$; $P = 0.03$), as noted above. We then regressed postintervention QoL on the MOCS change score (postintervention-preintervention MOCS) with the same controls. This correlation was significant ($\beta = 0.60$; $P < 0.001$) and indicated that preintervention-postintervention MOCS change score accounted for 14% of the variance in QoL after the intervention. Finally, we entered income, ethnicity, and baseline QoL on the first step, group membership on the second step, and MOCS change score on the third step. With the addition of the MOCS change score, the correlation between group membership and postintervention QoL dropped to nonsignificance ($\beta = 0.07$; $P = 0.30$) (see Table 2, Fig. 2). However, the MOCS change score remained a significant predictor of postintervention QoL ($\beta = 0.25$; $P < 0.001$). The model was significant and accounted for 67% of total variance ($F[6,90] = 29.50$; $P < 0.001$). Because understanding directionality is key in interpreting mediation,[41] we also assessed changes in MOCS scores from preintervention to postintervention. The mediation model was supported by the finding that individuals in the experimental condition made significant improvements in stress-management skills (preintervention: mean ± SD, 63.28 ± 11.39; postintervention: mean ± SD 67.04 ± 9.21; $t = 3.13$; $P < 0.01$); whereas individuals in the control condition did not (preintervention: mean ± SD, 62.75 ± 15.07; postintervention: mean ± SD, 60.10 ± 14.44; $t = -1.82$; $P = 0.07$).

To determine the magnitude of the mediation relation, we used the Sobel test[40] to confirm that the stress-management skills gained through CBSM participation accounted for the improvement in postintervention QoL. Results indicated that this was the case (Sobel statistic = − 2.37; $P < 0.05$).

DISCUSSION

This study tested the extent to which a 10-week, group-based, manualized CBSM intervention improved QoL among ethnically diverse men treated for PC. We also tested whether observed improvements in QoL were mediated by CBSM-associated increases in perceived stress-management skill, the major focus of this intervention. Prior work has documented the efficacy of psychosocial interventions in reducing distress and negative affect as well as improving QoL among various cancer populations.[15,22,24] Most of these studies, however, have been conducted primarily among non-Hispanic white women of middle or upper socioeconomic status after treatment for breast carcinoma.

Some recent work has shown the effectiveness of psychoeducational interventions in improving coping skills and, to a lesser extent, improving sexual functioning[15] among men with PC. In addition, Lepore[16] reported that men participating in a 6-week, multimodal intervention improved across several indices, including mental health and perceived control, and reduced interpersonal conflict and distress associated with cancer-related intrusive thoughts. Although these studies have begun to suggest that psychosocial interventions are beneficial in this population, randomized studies tailored to target stress-management skills to cope with treatment sequelae and improve general QoL have been limited. Furthermore, mechanisms through which psychosocial interventions may improve QoL in men treated for PC remain to be identified.

Prior work suggests that the sequelae of PC treatment appears to have little impact on general QoL[9] despite the fact that men indicate being distressed and bothered by treatment-related impairments.[12,13] Several researchers have attempted to address this disparity and suggest that men may minimize the impact of PC on their daily life.[11] A large portion of men with poor functioning, characterized by decrements in urinary, bowel, or erectile functioning, report that it is *no problem* or only a *very small problem*. Thus, although they may have urgent bowel movements *almost everyday*, leak urine *daily or more often*, or have *no erections*, these patients appear to have made a successful adjustment to these stressors; or, alternatively, they want it to appear to themselves and others that they are handling the problem. We know that men also tend to deny or diminish problems to avoid burdening others or being perceived as needy or vulnerable, to reduce or avoid negative affect, and to maintain a positive self image.[42–44] Thus, although these strategies may be successful and may lead to the appearance of adequate QoL, it also may be true that such cognitive, affective, and behavioral strategies have significant, albeit hidden, consequences (e.g., unexpressed negative affect, such as anger, social isolation, etc.). Consequently, we tested the efficacy of a CBSM intervention designed to impove QoL by providing stress-management skills training.

In the current study, we found that participation in our CBSM intervention was associated with significant improvements in general QoL. Notably, this improvement was not related to ethnic group membership. Although non-Hispanic white participants reported significantly greater general QoL than Hispanic or African-American participants, there was no evidence that the CBSM intervention was effective differentially for any one ethnic group. This suggests that our CBSM intervention adequately addressed the QoL needs and properly targeted stress-management skills in an ethnically diverse sample of men treated for PC. Our current findings expand prior work[15] and suggest that group-based psychosocial interventions can improve general QoL among an ethnically diverse group of men that includes Hispanics treated for PC.

A secondary objective of this study was to identify possible mechanisms through which participation in a psychosocial intervention may have positive benefits on general QoL. We found that men who were randomized to our CBSM intervention demonstrated significant improvements in perceived stress-management skills from the preintervention period to the postintervention period and that these changes were associated significantly with improved QoL after the intervention. To our knowledge, this is the first study to suggest that a group-based CBSM intervention can modify stress-management efficacy on one hand and that improvements in stress-management skills are associated with improved general QoL on the other.

Several limitations are worth noting. Although our hypotheses were supported statistically, this study was based on a relatively small sample size measured over a 3-month period (preintervention to postintervention assessment time points). Future studies should aim at replicating these findings among larger samples studied over a longer period of time with a more adequate sample size. Finally, our sample was relatively healthy (e.g., Charlson medical comorbidities index: mean $\pm$ SD, 1.58 $\pm$ 1.83) and was free of significant cognitive impairment or major psychopathology. This limits the generalizability of our findings to more physically and psychologically compromised PC populations. It is essential that future studies address the long-term impact of psychosocial interventions on QoL and disease processes to establish the clinical significance of the benefits of such interventions among a growing number of ethnically diverse men treated for PC.

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