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Improving Quality of Life in Men With Prostate Cancer: A Randomized Controlled Trial of Group Education Interventions

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Abstract

Men who were recently treated for prostate cancer ($N = 250$) were randomly assigned to a control group, a group education intervention (GE), or a group education-plus-discussion intervention (GED). Both GE and GED increased prostate cancer knowledge. In the year postintervention, men in the GED condition were less bothered by sexual problems than men in the control condition, and they were more likely to remain steadily employed (93.0%) than men in the GE (75.6%) or control (72.5%) conditions. Among noncollege graduates, GED and GE resulted in better physical functioning than the control condition, and GED resulted in more positive health behaviors than the control or GE condition. Among college graduates, controls were comparable with the GE and GED groups in physical functioning and positive health behaviors.

Keywords

prostate cancer; quality of life; group intervention; education; social support

Prostate cancer is the most common solid tumor malignancy and a leading cause of cancer death in American men (American Cancer Society, 2002). The majority of men afflicted with prostate cancer survive for many years, but they may suffer from a host of adverse effects of the disease or its treatments (Eton & Lepore, 2002). Thus, it is critical to develop interventions that can mitigate the adverse effects of this disease and enhance patients' quality of life (QOL). Group education and support interventions, such as "Man-to-Man" and "Us Too!," are becoming increasingly popular among men with prostate cancer. For example, Us Too! was founded in 1990 and already has more than 325 chapters in the United States (Us Too! International, Inc., 2002). However, there have been no systematic evaluations of the effects of such groups on QOL in men with prostate cancer (Germino, 2001). This article reports results from a randomized, controlled trial of group interventions designed to enhance QOL in men treated for prostate cancer.

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Prostate Cancer and QOL

Men with localized prostate cancer typically choose from among three types of treatments: surgical removal of the prostate (prostatectomy), external beam radiation therapy, or brachytherapy (implanting radioactive "seeds" into the prostate). Watchful waiting is an additional option for patients older than 70 years or with other major health problems. In a recent literature review (Eton & Lepore, 2002), we found that prostate cancer and its treatments result in both disease-specific problems (e.g., urinary and sexual dysfunction) and general problems in QOL (e.g., diminished mental and physical functioning, reduced capacity to work). We also found evidence of several significant social risk factors (i.e., ethnicity, education status) for poor QOL outcomes in men treated for prostate cancer.

Most of the literature on QOL in prostate cancer focuses on urinary problems and sexual dysfunction (e.g., incontinence and poor erection quality, respectively; Lepore & Eton, 2000; Litwin et al., 1995; Stanford et al., 2000). A meta-analysis (Robinson, Dufour, & Fung, 1997) of 40 studies showed that the likelihood of erectile dysfunction is .58 after prostatectomy and .31 after radiotherapy. Longitudinal studies (e.g., Lubeck et al., 1999) have shown that urinary problems generally subside within a year after treatment, whereas sexual problems tend to persist. There is relatively little published research on more general QOL outcomes in men with localized prostate cancer. Findings from longitudinal studies suggest that problems in general QOL domains tend to resolve within a year after medical treatment. For example, Lubeck et al. (1999) found that problems in role functioning, physical functioning, well-being, and energy subsided over the first year following a radical prostatectomy. Others have found that men who had had a radical prostatectomy evidenced problems in physical functioning, role functioning, general health, body pain, energy, social functioning, and mental health, but between 86% and 97% of these men had regained pretreatment levels on these outcomes within 1 year of treatment (Litwin, McGuigan, Shpall, & Dhanani, 1999).

As with most cancers, among men treated for prostate cancer there is great variability in their responses to the disease and its treatments (Lepore & Eton, 2000; Lepore & Helgeson, 1998). The emerging literature on social disparities in prostate cancer outcomes suggests that poorer, less educated, and minority men suffer greater declines in QOL and take longer to recover from treatments. For example, Litwin et al. (1999) found that non-White men were less likely than White men to return to pretreatment levels of physical (55% vs. 90%), role (64% vs. 96%), and social (72% vs. 91%) functioning 1 year after having a radical prostatectomy. Penson et al. (2001) found that patients with prostate cancer with lower annual income had significantly lower baseline QOL scores in all domains of the Medical Outcomes Study Short Form–36 (SF-36; Ware, Snow, Kosinski, & Gandek, 1993; e.g., mental and physical functioning) and in several disease-specific QOL domains (e.g., urinary and sexual functioning and bother). Eton, Lepore, and Helgeson (2001) found that less formal education was associated with poorer mental health in men with early-stage prostate cancer. In a study of patients with advanced prostate cancer, patients with less formal education and lower income had faster declines in most QOL domains on the SF-36 (Melmed, Kwan, Reid, & Litwin, 2002).

In summary, prostate cancer often is a chronic illness that threatens the health and well-being of a substantial proportion of elderly men in this society. The burden of this disease is particularly high among poorer, less educated, and minority men, who also have an elevated probability of contracting, suffering with, and dying from prostate cancer (American Cancer Society, 2002; Fincham, Hill, Hanson, & Wijaysinghe, 1990; Steinberg, Carter, Beaty, Childs, & Walsh, 1990). Poorer, less educated, and minority men also have less knowledge about prostate cancer both before and after they get the disease (Eton & Lepore, 2002; Smith, DeHaven, Grundig, & Wilson, 1997), suggesting that educational interventions should be especially fruitful with this population. There is a clear and pressing need to assist men in

increasing and hastening control over urinary and sexual problems and concerns following treatment for prostate cancer, in addition to reducing the somewhat less vexing disruptions in other general QOL domains.

Group Interventions

Group interventions for cancer patients are based on the rationale that providing emotional support and appropriately adjusting patients' knowledge, attitudes, and expectations about cancer can have a positive effect on QOL (Lepore, 2001) and, possibly, disease course. Thus, exchange of social support and information are the primary tools used in group interventions. Information exchange enhances patients' knowledge about cancer, managing side effects, and preventing and coping with problems. Mechanisms of information exchange include direct instruction through lectures, written materials, videos, and other media as well as more indirect methods such as discussion and modeling of successful coping behaviors by group members. Group discussion also can convey information that one is valued, esteemed, and cared for by other group members. To ensure that discussions are conducted in an appropriate and helpful manner, professionals, such as clinical psychologists, counselors, or nurses, often are involved as facilitators.

The relative efficacy of different group-intervention formats (e.g., education vs. education plus discussion) has not been clearly demonstrated (Germino, 2001; Helgeson & Cohen, 1996; Hogan, Linden, & Najarian, 2002). Further, it is not clear whether men respond favorably to group interventions, because most group-intervention studies with cancer patients have comprised solely or mainly women. In a small pilot trial to the present study, we found evidence that group interventions would be beneficial to men treated for localized prostate cancer (Lepore & Helgeson, 1999). The present study is a more rigorous test of the benefits of group interventions, and it addresses gaps in the intervention literature by focusing on men and comparing the effects of different types of group-intervention formats. The study also tests whether group interventions can help to reduce social disparities in QOL outcomes, by examining the interaction between intervention condition and patients' education level. As previously noted, less formal education is associated with poorer QOL outcomes in men with prostate cancer. There is evidence that group interventions tend to be most beneficial to patients who have relatively few psychosocial coping resources (Helgeson, Cohen, Schulz, & Yasko, 2000; Lepore & Helgeson, 1999). Prior research also has shown that among women receiving counseling about their breast cancer risks, psychological benefits were greatest for women with less formal education (Lerman et al., 1996). We reasoned that men with less formal education would benefit the most from education interventions because they have less access to such information or have more difficulty comprehending medical information offered by health professionals than their more educated peers.

Hypotheses

The trial was designed to compare QOL outcomes in patients receiving standard medical care (control group) or one of two types of group education interventions for cancer patients—education alone or education plus facilitated peer discussion. Outcomes included both disease-specific QOL (e.g., sexual and urinary functioning and bother) and general QOL (e.g., physical- and mental-functioning) outcomes. The trial also evaluated the effects of the interventions on patients' knowledge about prostate cancer and health-related behaviors. We hypothesized that the group interventions would increase men's knowledge about prostate cancer, positive health-related behaviors, and QOL beyond that of the control condition. We also hypothesized that adding facilitated group discussion to the education sessions would bolster the effects of education, because group discussions facilitate rehearsal, reinforcement, and clarification of the education material; expose men to positive role models; and enable men to learn from their

peers. Finally, we expected that patients' level of formal education could moderate the effects of the interventions.

Method

Study Population

Doctors ($N = 35$) from 11 greater area Pittsburgh urology and radiology clinics and hospitals referred patients who had been treated for localized prostate cancer in the prior month. The referred sample was further screened by project staff to ensure that they met all eligibility criteria, which included (a) no history of other cancer, (b) primary residence within 1 hr driving distance from intervention sites, and (c) nonmetastatic disease at time of diagnosis. Of 576 referred patients, 87 refused to let us contact them about the study, 127 failed to meet all eligibility criteria, and 362 fulfilled all eligibility criteria. Of the eligible patients, 279 (77%) completed the baseline interview and agreed to randomization; 250 (90%) completed the study, and 29 (10%) were lost to follow-up.[1] Reasons for attrition included major illness (4), death (2), time constraints (1), loss of interest (6), patient could not be located (2), and unexplained dropouts (14). Attrition was unrelated to experimental condition.

Procedure

Appropriate institutional review boards approved the project. We randomized men (stratified by treatment) to one of three conditions: a control group, an education-only group, or an education-plus-facilitated-peer-discussion group. After the baseline interview, participants received a sealed envelope that revealed their assignment. We collected data through structured patient interviews, questionnaires, and review of medical records. A male interviewer conducted the in-home baseline interview as close as possible to the dates patients' surgeries were completed or their radiation regimen commenced (time between these treatment dates and the baseline interview was approximately 2 months: median = 47 days, range = 7−141 days). Follow-up interviews occurred at approximately 2 weeks (Post 1), 6 months (Post 2), and 12 months (Post 3) after the interventions. The schedule of the three follow-up interviews corresponded to approximately 4 months, 10 months, and 16 months after patients' surgery or initiation of radiation treatments. Eight different groups of between 10 and 12 men were created for each condition (93 men per condition). Throughout the trial, patients were not informed of the hypotheses. Interviewers were blind to experimental condition at baseline and did not participate in the interventions.

Interventions

The education-only intervention consisted of six weekly 1-hr lectures that were delivered by an expert on the following topics: overview of prostate cancer biology and epidemiology (oncologist), control of physical side effects (urologist), nutrition and cancer (dietician), stress and coping (oncology nurse), relationships and sexuality (clinical psychologist), and follow-up care and future health concerns (urologist). Men also received printed materials summarizing the lectures. Lecturers allowed 10 min for questions, but participants were not encouraged to talk with one another. The education-plus-discussion intervention consisted of the lecture series and 45 additional min of group discussion after each lecture. A male clinical psychologist facilitated discussions and was responsible for maintaining a safe, nonjudgmental atmosphere. The discussions focused on how the lecture topic was relevant to group members. Patients were encouraged to attend the lectures with a family member or friend. During discussions, female family members convened in a separate room for their own discussion,

[1]The 87 patients who refused to be screened for the study may or may not have met the eligibility criteria. If we count these patients as eligible for randomization, the overall response rate would be 62% (279/449).

which was facilitated by a female oncology nurse. Patients in the control condition received nothing beyond their standard medical care.

Background, Covariate, and Moderator Variables

We collected background demographic and medical information in the first interview. We verified information about cancer pathology and history through medical chart review. We classified patients into two education levels (0 = *noncollege graduate*, 1 = *college graduate*), based on their reports of education background. This division resulted in nearly an equal number of men at each level. As part of data quality control, at the end of each interview, the interviewers rated the extent (1 = *never*, 5 = *very often*) to which the patient had difficulty in understanding questions and had difficulty in concentrating (e.g., got off the topic, mind seemed to wander). We created a composite variable by averaging the ratings on these two items across all interview waves. Higher scores indicate poorer comprehension and concentration.

Outcome Measures

Measures described below were administered at all interviews, with two exceptions: The prostate cancer quiz was administered at the baseline and at Posttest 1, and ratings of the education sessions were completed after the last session.

Prostate cancer knowledge—We created a 13-item quiz with a true-false-don't know format to assess knowledge about prostate cancer (e.g., “The Gleason score is used to measure the degree of malignancy of the prostate cancer”). A urologist verified the accuracy of the items. Higher scores indicate a greater percentage correct (possible range = 0%−100%).

Ratings of the lectures—We used a 5-point rating scale for patients to evaluate the helpfulness (1 = *not at all*, 5 = *very*) of each lecture. We calculated an average rating across all lectures. Higher scores indicate greater perceived helpfulness.

Health behavior index—We developed five questions related to positive health behaviors that were recommended to patients in the intervention arms. Men indicated whether or how frequently in the prior week they had engaged in these behaviors: exercised, did Kegel exercises, took time to relax, took vitamins, and got adequate sleep. We calculated a health behavior index score by summing responses to these questions. Higher scores indicate greater engagement in positive health behaviors (possible range = 5−33).

General QOL outcomes—We used the SF-36 to measure general QOL. The SF-36 consists of multi-item scales that tap functional status in eight domains: general health perceptions, physical functioning, role limitations due to physical problems, bodily pain, mental health, energy level, role limitations due to emotional problems, and social functioning. Sample items include

> During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health: (a) Cut down the amount of time you spent on work or other activities? (b) Accomplished less than you would like? Were limited in the kind of work or activities you were able to do? (c) Had difficulty performing work or activities (for example, it took extra effort)?

The eight scales had good reliability (Cronbach's α ranged from .79 to .88). To create the global physical health component scores (PCS) and a global mental health component scores (MCS), which were used in the present analyses, we followed the scoring procedures established by the authors. Higher numbers indicate better functioning (range = 0−100).

We measured depressive symptoms using a 15-item modified version of Radloff's (1977) original 20-item Center for Epidemiological Studies Depression Scale (CES-D). The 15-item CES-D has been validated with cancer patients, and it captures almost all of the information of the original 20-item CES-D but is free of any gender bias (Stommel et al., 1993). Sample items include "During the past week, I felt depressed" and "I felt sad." In the present study, reliability was good (Cronbach's α = .87). Higher numbers indicate greater depressive symptoms (range = 0−3).

Finally, we assessed employment status (full time, part time, unemployed, retired) at each interview as another indicator of role functioning. We were especially interested in the employment stability of participants who were employed at baseline. As many men are diagnosed and treated for prostate cancer at a time that they would be eligible for retirement, they and their employers often must confront issues regarding productivity and continuation (Bradley & Bednarek, 2002).

Disease-specific QOL—We used the UCLA Prostate Cancer Index to measure sexual, urinary, and bowel functioning (Litwin et al., 1998). Sample items include "How would you rate your ability to have an erection during the last 4 weeks?" "Over the past 4 weeks how often have you leaked urine?" We followed the scoring procedures established by the measure's authors. Higher scores on the scales indicate better functioning (range 0−100). In the present study, these scales had adequate to good reliability (Cronbach's α ranged from .68 to .92). In addition to the functioning scales, three items ask patients to rate the extent to which sexual, urinary, or bowel functioning has created problems for them. Higher scores on these items indicate lower perceived bother by the functional problems (range = 0−100).

Statistical Analyses

We used analysis of variance or chi-square techniques to test whether the experimental groups were equivalent on demographic and medical characteristics, comprehension and concentration, and the dependent variables at baseline. For the inferential analyses, we used an intention-to-treat approach. All *p* values are from two-sided tests. Because we convened eight separate groups of 10−12 men in each of the three experimental conditions, each individual group could exert a random effect that should be statistically controlled. To test whether this was necessary, we used SAS Proc-Mixed (Littell, Milliken, Stroup, & Wolfinger, 1996) to conduct a random-effects mixed-models regression analysis. The intervention was treated as a fixed effect, and the individual group was a random effect in the model. For each outcome, the effect of group in the model was not significant and accounted for less than 1% of the residual variation among men. Thus, we returned to an ordinary least squares regression approach. All analyses were conducted using SPSS (Version 9, SPSS, 1998). For the continuous data, we used repeated measures analysis of covariance (ANCOVA) techniques to test for intervention effects. We tested the effects of condition (control, education, education plus discussion), education status (college degree: *no–yes*), and period (Post 1, Post 2, Post 3), as well as the interactions between these variables, on outcomes. We covaried baseline values of the dependent variable in these analyses. For analyses of employment status, a categorical variable, we used chi-square techniques.

Results

Baseline Equivalence

Table 1 presents descriptive data on the medical and sociodemographic characteristics of the sample. There were no differences between experimental conditions on any medical or sociodemo-graphic variables. Most men had few difficulties in comprehension or concentration during the interview (*M* = 1.32; median = 1.25; range = 1.0−3.5), but there was

a significant group difference, $F(2, 247) = 4.30$, $p < .05$. For the post hoc multiple comparison tests, we used the least significant difference (LSD) test. Results indicated that men in the education group ($M = 1.39$; 95% confidence interval [CI] = 1.29, 1.49) had significantly more comprehension and concentration problems than men in the control group ($M = 1.23$; 95% CI = 1.18, 1.27, $p < .01$). There was a similar trend in the comparison between controls and men in the education-plus-discussion group ($M = 1.33$; 95% CI = 1.26, 1.39), but the difference was statistically marginal ($p < .10$). There was no difference between the two intervention groups. Thus, we used this variable as a covariate in subsequent ANCOVA analyses.[2] Comparisons of the intervention groups revealed no differences in the mean number of lectures attended by the patients (overall $M = 4$). There also were no group differences in overall ratings of the helpfulness of the lectures, which were rated quite high ($M = 4.22$; range = 3.84−4.56 out of 5.00).

Knowledge and Health Behaviors

Table 2 presents descriptive data on all major study variables by condition and measurement period. The emphasis of the education interventions was on changing knowledge and behaviors, so our first analyses examined whether the manipulation changed men's prostate cancer quiz scores and health behaviors. The 3 (condition) × 2 (educational status) ANCOVA on posttest quiz scores revealed a significant condition effect, $F(2, 238) = 18.22$, $p < .01$, and a Condition × Educational Status interaction effect, $F(2, 238) = 3.42$, $p < .05$ (see Figure 1). To understand the interaction, we conducted a series of follow-up analyses on quiz scores within each level of educational status. Among men without a college degree, there was a significant effect of condition on quiz scores, $F(4, 126) = 13.33$, $p < .01$. LSD post hoc analyses indicated that men in the control group had lower quiz scores than men in both intervention groups (ps < .01), but there was no difference between the intervention groups. Among men with a college degree, there also was a significant effect of condition on quiz scores, $F(4, 110) = 7.05$, $p < .01$. LSD post hoc analyses indicated that men in the control group had lower quiz scores than men in the education-only group ($p < .01$) and the education-plus-discussion group ($p < .05$). There also was a trend suggesting that the education-plus-discussion group had lower quiz scores than the education-only group, but it was statistically marginal ($p < .10$).

The 3 (condition) × 2 (educational status) × 3 (period) ANCOVA on the positive health behavior index scores revealed a significant effect of condition, $F(2, 232) = 4.30$, $p < .05$, a significant Condition × Period interaction effect, $F(4, 464) = 2.74$, $p < .05$, and a significant Condition × Educational Status interaction effect, $F(2, 232) = 3.16$, $p < .05$. To understand the Condition × Period interaction, we conducted follow-up between-groups analyses within each time period. There was a significant effect of condition at the 2-week follow-up, $F(2, 240) = 5.78$, $p < .01$, and 6-month follow-up, $F(2, 241) = 4.40$, $p < .01$. At the 2-week follow-up, LSD post hoc analyses indicated that men in the control group were less engaged in positive health behaviors than men in the education-plus-discussion group ($p < .01$) but were not significantly different from the education-only group. Men in the education-only group were less engaged in positive health behaviors than men in the education-plus-discussion group ($p < .05$). At the 6-month follow-up, LSD post hoc analyses indicated that men in the control group were less engaged in positive health behaviors than men in the education-plus-discussion group ($p < .01$) and the education-only group ($p < .05$), whereas the intervention groups did not differ from one another. There were no effects of condition at the 12-month follow-up.

[2]An alternative to the covariate analysis is to remove from analyses those men in the education condition who had the highest level of problems in comprehension and concentration. This approach produces results that are very similar to those that were produced using the covariate approach. We opted for the covariate approach because comprehension and concentration were not related to all outcomes and because preserving the full sample enhances statistical power and maximizes external validity.

To understand the Condition × Educational Status interaction (Figure 2), we conducted separate analyses of the health behavior scores within each level of educational status. There was a significant effect of condition among men without a college degree, $F(2, 122) = 6.12$, $p < .01$, but not among men with a college degree. LSD post hoc analyses indicated that among men without a college degree, the education-plus-discussion group engaged in significantly more positive health behaviors than the control group ($p < .01$) and the education-only group ($p < .05$). There was a trend suggesting that the education-only group engaged in more positive health behaviors than the control group, but the effect was statistically marginal ($p < .10$).

Outcomes

Primary outcomes included general QOL (PCS, MCS, CES-D) and disease-specific QOL (urinary, sexual, and bowel functioning and bother). At baseline, patients' general mental and physical functioning scores (see Table 2), as measured by the PCS and MCS scales of the SF-36, were comparable with those of a sample of men of similar age who are representative of the noninstitutionalized U.S. population in 1990 (Ware, Kosinski, & Keller, 1994). Despite the fairly normal functioning exhibited at baseline on the PCS, a subset of patients reported improvements in physical functioning and appeared to benefit from the interventions. The 3 (condition) × 2 (education) × 3 (period) ANCOVA on the PCS revealed a marginally significant effect of condition, $F(2, 233) = 2.35$, $p < .10$, and a significant Condition × Educational Status interaction effect, $F(2, 233) = 2.98$, $p < .05$ (see Figure 3).

To understand the Condition × Educational Status interaction, we conducted separate analyses of the PCS scores within each level of educational status. There was a significant effect of condition among men without a college degree, $F(2, 122) = 4.41$, $p < .01$, but not among men with a college degree. LSD post hoc analyses indicated that among men without a college degree, level of physical functioning was lower among men in the control group than among men in the intervention groups (ps < .01). There was no difference between the two intervention groups.

In contrast to the PCS results, on the MCS there was no effect of condition, $F(2, 233) = .05$, $p = .95$; educational status, $F(1, 233) = 1.57$, $p = .21$; period, $F(2, 232) = 0.63$, $p = .54$; or the Condition × Educational Status interaction, $F(2, 233) = 0.13$, $p = .88$. Patients also exhibited very few symptoms of depression on the CES-D Scale assessed at baseline (see Table 2). The 3 (condition) × 2 (education) × 3 (period) ANCOVA on the CES-D revealed no effects of condition, $F(2, 235) = 0.73$, $p = .48$; educational status, $F(1, 235) = 1.56$, $p = .21$; period, $F(2, 234) = 1.46$, $p = .23$; or Condition × Educational Status interaction, $F(2, 235) = 0.01$, $p = .99$. Thus, depressive symptoms were low at baseline and stayed that way over time, independent of condition and patients' educational status.

Another indicator of adjustment to the disease is a man's ability to maintain normal role activities such as going to work. As shown in Figure 4, approximately half of the men ($n = 124$) in all conditions were working at baseline. After the intervention, men in the control and education-only groups showed steady declines in employment, whereas men in the education-plus-discussion group did not. To analyze these trends, we classified the 124 men who were working at baseline into two groups—those who were steadily employed throughout the trial and those who experienced a loss in employment at any point during the trial—and conducted a 3 (condition: control, education, education plus discussion) × 2 (work disruption: *yes–no*) chi-square analysis. This analysis revealed that men in the education-plus-discussion condition were more likely to maintain steady employment during the follow-up period (93.0%) than were men in the education-only (75.6%) and control (72.5%) conditions, $\chi^2(2, 124) = 6.59$, $p < .05$. To ensure that this effect was not due to selection, we examined whether participants in the education-plus-discussion group differed from the other two conditions on a number of baseline demographic and medical variables. We found no between-groups differences on any

of the variables, including age, marital status, education status, occupation (e.g., sales, labor), and type of medical treatment for prostate cancer (all *p*s > .10).

Next, we performed 3 (condition) × 2 (educational status) × 3 (period) ANCOVAs on urinary-, bowel-, and sexual-functioning scores. There were significant period effects on urinary functioning, $F(2, 233) = 18.68$, $p < .01$, and sexual functioning, $F(2, 229) = 3.84$, $p < .05$, and a marginally significant period effect on bowel functioning, $F(2, 233) = 2.37$, $p = .10$. Means revealed improvements in genitourinary functioning over time (see Table 2), but functioning was not affected by the interventions or the interaction of the interventions with educational status or period. Finally, we performed 3 (condition) × 2 (educational status) × 3 (period) ANCOVAs on ratings of bother due to problems in urinary, bowel, and sexual functioning. There was a significant effect of condition on sexual bother, $F(2, 222) = 7.09$, $p < .01$. LSD post hoc analyses indicated that the sexual bother was significantly worse ($p < .01$) in the control condition ($M = 34.56$, $SE = 3.13$) than in the education-plus-discussion condition ($M = 50.94$, $SE = 2.99$). The education-only group ($M = 42.87$, $SE = 3.11$) fell in between the other two groups, and the difference between this group and each of the other two groups was statistically marginal (*p*s < .10).

Discussion

This article is the first to report the results of a randomized, controlled group education intervention designed to enhance QOL in men treated for localized prostate cancer. As expected, the educational interventions had a positive influence on several important outcomes, including knowledge about the disease, health behaviors, physical functioning, employment, and sexual bother. Contrary to expectations, the interventions did not affect sexual and urinary functioning. The education-plus-discussion intervention was generally more effective than education alone when compared with the control group, but it generally was not significantly different from the education-alone condition. There was evidence that, relative to the control group, both interventions resulted in improved knowledge, physical functioning, and health behaviors, but only the education-plus-discussion group resulted in more stable employment and diminished bother from sexual dysfunction. In comparisons of the two interventions, there was evidence that, relative to the education-only group, the education-plus-discussion group fared better in employment stability and engagement in positive health behaviors. It is possible that longer or more frequent discussions would have resulted in greater benefits from the education-plus-discussion condition. We found that both interventions tended to be more beneficial to persons with less formal education. Among participants with less than a college degree, those in the education-plus-discussion group engaged in more positive health behaviors than did those in the control or education-only group. Further, among participants with less than a college degree, those in the education-only and the education-plus-discussion groups reported better physical functioning than participants in the control groups.

That patients with more formal education benefit relatively little from the interventions is consistent with prior findings (Lerman et al., 1996) and may be due to multiple factors. Patients with more formal education appear to have more resources available for learning about and accommodating to the disease. For example, college-educated patients in the control group evidenced increases in knowledge about prostate cancer and positive health behaviors that were comparable with the increases evident in the intervention groups. These data suggest that patients with more formal education might be more aggressive about seeking information relevant to their condition and, possibly, are better at comprehending and using the information. For men without a college education, the group-education interventions provided them with an opportunity to acquire important knowledge about prostate cancer and its effects in a supportive setting. This knowledge could enhance their ability to make decisions about managing the disease and its side effects. These findings also suggest that group education

interventions might be especially beneficial to poor and minority men with prostate cancer, who tend to have fewer opportunities for higher education and tend to be at high risk for negative QOL outcomes (Eton et al., 2001; Litwin et al., 1999). That is, educational interventions may help to reduce social disparities in cancer outcomes by increasing patient knowledge and shaping patients' behaviors and attitudes. However, as this is the first study to show this type of effect in men, it warrants replication.

The significant effect of the education-plus-discussion intervention on employment was particularly strong and is quite intriguing. Men who were employed at the beginning of the study and who were assigned to the education-plus-discussion-intervention arm were significantly more likely to maintain steady employment in the year after their treatment than their counterparts in the other experimental arms. It is possible that this was a byproduct of better general physical functioning and a healthier lifestyle. However, men in the education-only group, who also reported improvements in physical functioning, did not evidence stable work patterns. Another potential explanation of the effect is derived from social–cognitive theory (Bandura, 1986): Namely, men in the education-plus-discussion group compared themselves with and modeled their behavior after other men in the group who were still working. These comparisons might have increased men's motivation and confidence to continue working.

The significant effect of the education-plus-discussion intervention on degree of bother with sexual dysfunction is also noteworthy. Men in the education-plus-discussion group were less bothered by their sexual difficulties than men in the control group. Although the effects were marginally significant, men in the education-only group tended to be less bothered by sexual dysfunction than men in the control group but more bothered than men in the education-plus-discussion group. This pattern suggests that education does ease some of the distress associated with sexual dysfunction and discussion with peers may further ease such distress. The education provides information about the time course for recovery of sexual functioning and informs men of options to aid in functioning (e.g., implants, medication). This information may help men set realistic expectations and provide optimism about future functioning. Having discussions with other men may help to normalize and validate men's experiences with sexual dysfunction, thus reducing some of the distress it causes. Further, discussions allow men to hear about successful treatments and recovery of functioning by their peers, which can further boost optimism about the future.

A final discussion point concerns the null effects of the interventions on mental functioning (MCS) and depressive symptoms (15-item CES-D). One possible explanation for these null effects is that the present population was unusually well adjusted on emotional outcomes. Men's scores on the MCS tended to be equal to or better than published norms for this age group, even at the baseline when their physical functioning scores were at the lowest (poorest) levels. We also have anecdotal evidence that men in the present study might have experienced emotional relief after being treated for their cancer. During the course of the study, many of them reported to interviewers or intervention facilitators that they felt their cancer was cured. Thus, although men clearly experienced bothersome physical side effects from their cancer and its treatments, their spirits could have been lifted by the sense that they had beaten their cancer. If we had assessed emotional functioning nearer to the time of diagnosis, we might have found more variance in distress.

In summary, relatively brief group education interventions were successful in enhancing QOL in men treated for localized prostate cancer, especially if they had less formal education. Specific benefits of the group interventions included increased knowledge about prostate cancer, adoption of healthy behaviors, improvements in general physical functioning, greater employment stability, and less bother by sexual dysfunction. However, the study did have some

limitations, including relatively small main effects on critical outcomes. Future research should focus on enhancing group interventions to improve disease-specific QOL, particularly sexual and urinary functioning. More intensive and tailored one-on-one interventions may be required to improve these outcomes (e.g., see Mishel et al., 2002). Future research also should consider how to intervene closer in time to the stressful period when patients are deciding on treatment options. However, there is some evidence that men might be less receptive to psychosocial research at this time than during the recovery phase (Moore & Estey, 1999). In the meantime, health professionals can play a critical role in identifying men who are most at risk for poor outcomes, sharing relevant educational materials about prostate cancer and facilitating interpatient communication in a group format.

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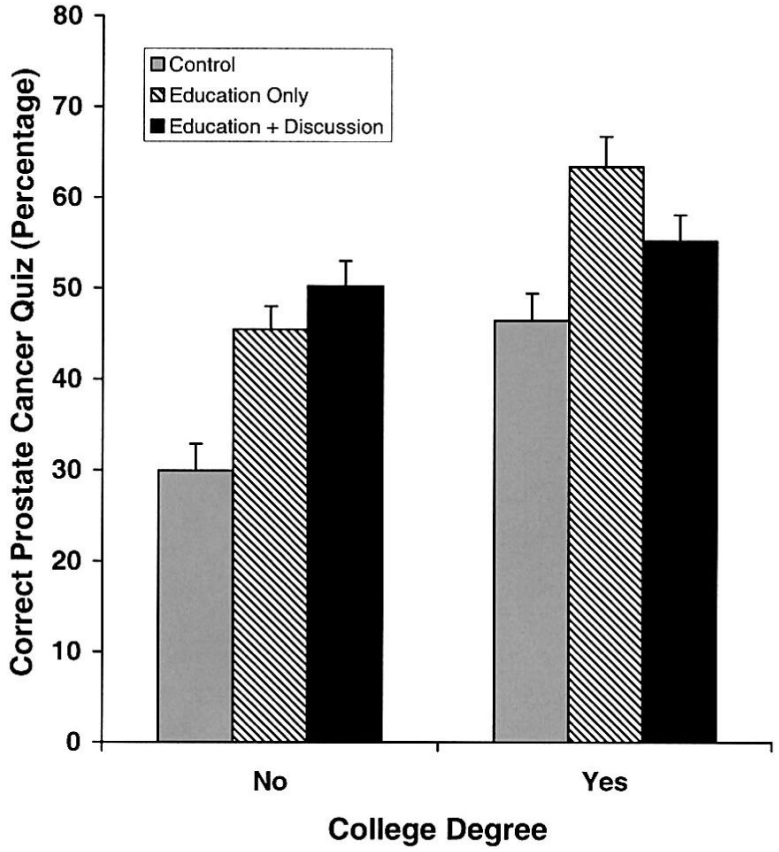

Figure 1.
Mean percentage correct plus standard errors in prostate cancer quiz as a function of experimental condition and patient educational status. Higher scores indicate better performance.

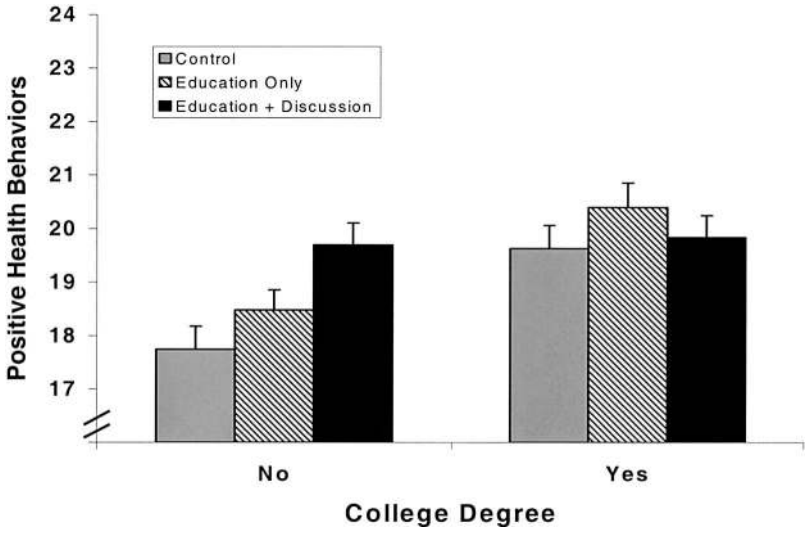

Figure 2.
Mean level of positive health behaviors plus standard errors as a function of experimental condition and educational status. Higher scores indicate healthier lifestyles.

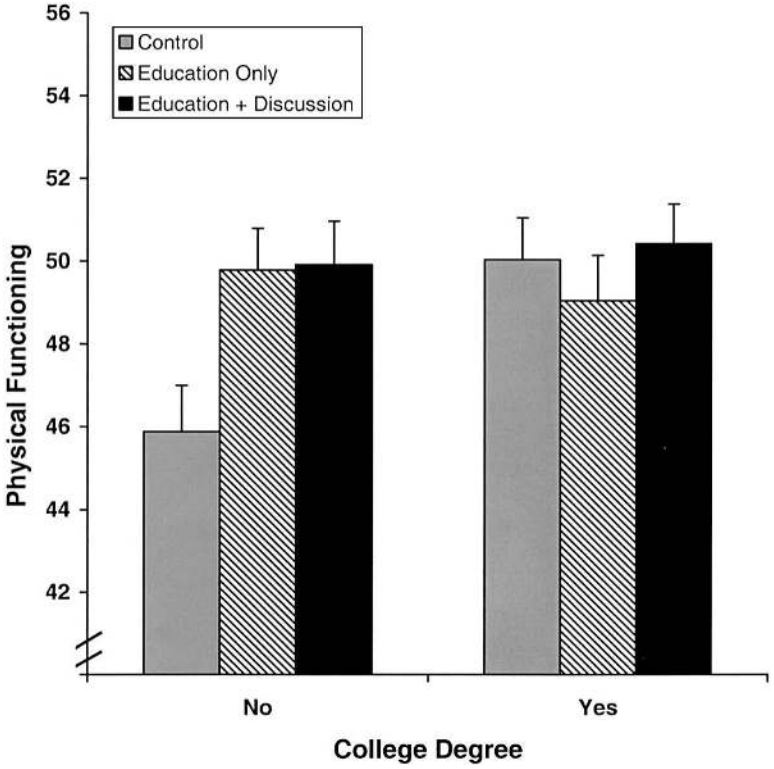

Figure 3.
Mean level of general physical functioning plus standard errors as a function of experimental condition and educational status. Higher scores indicate better general physical functioning.

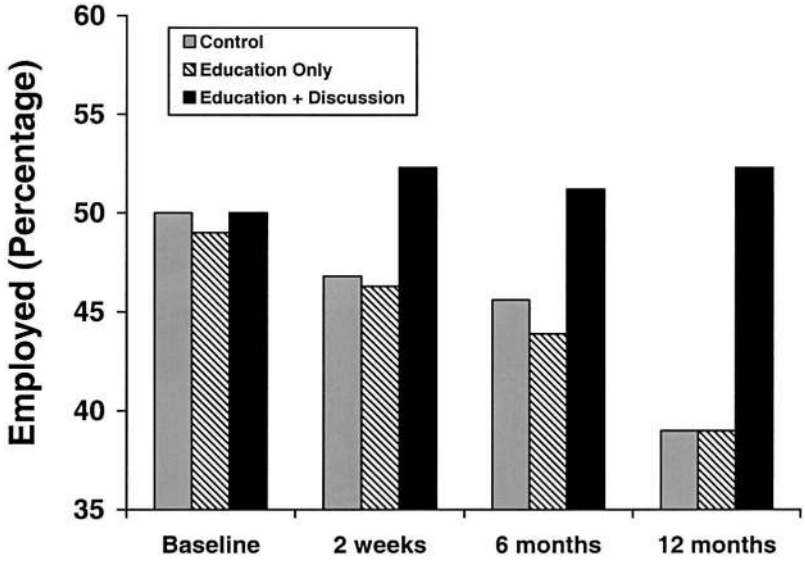

Figure 4.
Percentage employed part time or full time as a function of experimental condition and time.

Table 1

Demographic and Medical Characteristics of Study Population at Baseline (n = 250)

Variable	Control (*n* = 80)	Education only (*n* = 84)	Education + discussion (*n* = 86)
Age in years	65.6 (6.6)	64.8 (7.7)	64.8 (8.0)
Race			
Caucasian	90.0 (72)	90.5 (76)	90.7 (78)
African American	10.0 (8)	9.5 (8)	8.1 (7)
Asian American	0.0 (0)	0.0 (0)	1.2 (1)
Education			
Less than high school	17.5 (14)	6.0 (5)	5.8 (5)
High school graduate	22.5 (18)	31.0 (26)	26.7 (23)
Some college	10.0 (8)	22.6 (19)	17.4 (15)
College graduate	26.3 (21)	20.2 (17)	33.7 (29)
Postgraduate education	23.8 (19)	20.2 (17)	16.3 (14)
Marital status			
Married	87.5 (70)	84.5 (71)	88.4 (76)
Separated–divorced	5.0 (4)	8.4 (7)	7.0 (6)
Widowed	6.3 (5)	6.0 (5)	1.2 (1)
Never married	1.3 (1)	1.2 (1)	3.5 (3)
Employment status			
Full time	38.8 (31)	39.3 (33)	44.2 (38)
Part time	11.3 (9)	9.5 (8)	5.8 (5)
Retired	47.5 (38)	51.2 (43)	48.8 (42)
Disability–unemployed	2.5 (2)	0.0 (0)	1.2 (1)
Latest occupation			
Professional, technical	41.3 (33)	40.5 (34)	34.9 (30)
Management, administration	22.5 (18)	21.4 (18)	27.9 (24)
Sales, clerical, service	16.3 (13)	17.9 (15)	17.4 (15)
Craftsman	8.8 (7)	14.3 (12)	12.8 (11)
Operative, laborer	11.3 (9)	6.0 (5)	7.0 (6)
Treatment			
Prostatectomy	63.8 (51)	53.6 (45)	52.3 (45)
External beam radiation	15.0 (12)	17.9 (15)	18.6 (16)
Brachytherapy	15.0 (12)	19.0 (16)	18.6 (16)
External beam plus brachytherapy	3.8 (3)	4.8 (4)	5.9 (5)
Cryosurgery	2.5 (2)	4.8 (4)	4.7 (4)
Gleason sum score	6.2 (1.2)	6.1 (1.1)	6.2 (1.1)
Stage			
T1	22.5 (18)	16.7 (14)	15.1 (13)
T2	62.5 (50)	69.0 (58)	75.6 (65)
T3	15.0 (12)	14.3 (12)	9.3 (8)
Days postdiagnosis	177.5 (177.0)	178.3 (198.3)	166.7 (152.5)
Days posttreatment	47.0 (21.2)	51.1 (23.0)	47.9 (21.9)

Note. All variables are reported as percentages (with subsamples in parentheses), except age in years, Gleason sum score, days postdiagnosis, and days posttreatment, which are reported as means (with standard deviations in parentheses).

Table 2

Means and Standard Deviations of Major Study Variables (n = 250) by Group

	Baseline		2 weeks post		6 months post		12 months post	
Variable	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
Quiz percentage correct								
Control	31.06	22.65	36.71	21.65				
Education	35.60	23.27	53.58	25.21				
Education plus discussion	35.62	23.05	53.18	25.78				
Health behaviors								
Control	20.88	4.36	19.95	3.97	17.77	3.80	18.47	3.97
Education	20.74	4.34	20.38	4.18	18.70	3.89	18.81	3.75
Education plus discussion	20.59	3.77	21.34	3.72	19.19	4.04	18.52	3.87
Depressive symptoms (CES-D)								
Control	0.46	0.52	0.38	0.48	0.40	0.52	0.40	0.49
Education	0.54	0.45	0.50	0.39	0.41	0.41	0.43	0.42
Education plus discussion	0.49	0.48	0.37	0.36	0.39	0.41	0.35	0.44
Mental functioning (MCS)								
Control	51.03	9.89	53.69	9.10	53.55	9.01	53.42	8.90
Education	50.18	8.24	52.80	7.48	52.28	8.56	53.07	7.21
Education plus discussion	50.73	8.54	53.20	8.20	53.07	8.09	53.95	7.48
Physical functioning (PCS)								
Control	44.82	9.17	49.15	9.69	47.19	10.39	47.42	10.77
Education	46.54	8.14	51.41	6.47	48.38	7.99	48.25	9.43
Education plus discussion	46.91	7.73	51.55	7.52	50.55	6.96	49.39	8.25
Urinary functioning								
Control	60.13	27.15	75.11	21.94	82.58	19.23	83.00	18.26
Education	64.13	29.13	75.53	21.65	79.78	18.89	84.25	18.77
Education plus discussion	60.35	29.68	75.43	23.21	81.69	20.03	83.44	19.17
Sexual functioning								
Control	20.51	25.51	24.04	22.62	26.30	26.01	28.89	27.87
Education	17.13	21.20	19.33	21.63	25.69	28.11	27.14	28.47
Education plus discussion	19.41	24.33	24.16	26.33	28.69	28.27	34.24	30.62
Bowel functioning								
Control	83.37	18.56	88.87	14.11	89.57	14.06	89.33	13.85
Education	79.46	18.46	88.19	12.42	86.38	13.19	88.35	14.18
Education plus discussion	82.55	17.60	87.16	15.31	88.01	14.07	90.50	11.19
Urinary bother								
Control	60.31	32.73	75.32	29.55	82.91	24.53	84.81	24.16
Education	55.95	30.46	77.16	24.43	79.57	24.26	84.82	23.29
Education plus discussion	55.81	33.36	76.45	31.24	81.47	25.34	83.14	24.98
Sexual bother								
Control	45.25	40.05	35.76	37.70	33.86	37.35	37.99	37.52
Education	41.87	40.60	40.63	39.25	38.44	39.37	49.10	37.94
Education plus discussion	46.69	39.58	50.58	37.57	46.73	39.91	56.18	38.17
Bowel bother								
Control	81.56	25.39	88.29	19.13	87.34	22.60	88.92	21.09
Education	76.19	25.71	88.27	18.99	85.54	20.70	89.29	19.90
Education plus discussion	82.85	24.63	87.50	20.20	88.24	18.33	90.41	17.22

Note. CES-D = Center for Epidemiological Studies Depression Scale; MCS = mental health component scores; PCS = physical health component scores.