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Complementary and Alternative Medicine use, Patient Reported Outcomes, and Treatment Satisfaction among Men with Localized Prostate Cancer

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Abstract

Objectives—We sought to evaluate the association between complementary and alternative medicine (CAM) use, satisfaction with treatment, and patient-reported outcomes following treatment.

Methods—The Prostate Cancer Therapy Selection Study (PCATS) prospectively surveyed patients newly diagnosed with localized prostate cancer about their treatment decision making process and outcomes. The PCATS study recruited patients in three geographic areas through hospital-based urology clinics and community urology practices.

Results—More than 700 patients completed the baseline and follow-up surveys. More than 50% of respondents reported using CAM, 39% if prayer was excluded as a type of CAM. In multivariate analysis, factors related to communication with the treating physician, but not CAM use, were associated with treatment satisfaction. The likelihood of stability or improvement in urinary, bowel, and sexual function at 6 months was related to the choice of primary therapy, but unrelated to CAM use.

Conclusions—In this prospective observational study, CAM use was highly prevalent but unrelated to treatment satisfaction or changes in functional status. The impact of CAM on these endpoints remains to be established in comparative effectiveness studies.

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Keywords

prostate cancer; complementary and alternative medicine; urinary function; sexual function; bowel function; treatment satisfaction

Introduction

Of the over 217,000 men estimated to be diagnosed with prostate cancer annually, most (82%) will be diagnosed with localized disease.¹ Newly diagnosed men choose among several treatment options (examples: radical prostatectomy, brachytherapy, external beam radiation, hormone therapy, and watchful waiting) each with a range of potential benefits and short and long-term adverse effects.^{2,3} To address these effects, and sometimes in hopes of reducing the risk of cancer recurrence, approximately one third (30%–39%) of prostate cancer patients choose to use forms of complementary and alternative medicine (CAM).^{4–6} The National Center for Complementary and Alternative Medicine (NCCAM) defines CAM “as a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine.”⁷

Although many men turn to CAM for prostate cancer, the reasons why men supplement conventional treatments with CAM are not well understood. Moreover, it is not known whether men find that CAM mitigates their treatment-related functional outcomes, or if it influences their satisfaction with conventional therapy. Accordingly, in a prospective, multicenter observational study of patients with newly diagnosed localized prostate cancer, we evaluated the association between CAM use and patient treatment satisfaction, comparing CAM use and satisfaction across the major treatment modalities. We also evaluated the association between prostate cancer-related functional status following treatment (incontinence, erectile dysfunction, bowel problems) and CAM use, controlling for the presence and intensity of these factors prior to treatment.

Methods

The Prostate CAncer Therapy Selection study (PCATS), was a prospective, observational study of treatment decision making conducted among men newly diagnosed with localized prostate cancer in selected cities in the western United States. Participating research institutions included the Cancer Prevention Institute of California (CPIC, formerly known as the Northern California Cancer Center (NCCC)), the Fred Hutchinson Cancer Research Center (FHCRC), the Kaiser Permanente Northern California (KPNC), and the University of Southern California (USC). Study sites included a large, managed healthcare organization—KNPC; hospital-based urology clinics affiliated with USC and a VA Hospital in the Los Angeles area; and community urology practices in Washington State. Patients eligible for the study included men over age 21 with localized prostate cancer diagnosed between May 1, 2005 and December 31, 2006. Clinical criteria for eligible patients included those with node negative disease, a T-score <3, a prostate specific antigen (PSA) <50, and no evidence of metastasis.

Patient Recruitment

A complete description of the patient recruitment procedures for the PCATS study is published elsewhere.^{8,9} Briefly, at each site, the study sought to recruit newly diagnosed prostate cancer patients prior to starting their initial therapy. Clinic nurses approached potential participants in Los Angeles and Washington State while KPNC recruited eligible participants by mail after electronic medical records review. Men were excluded if they were diagnosed more than 8 months prior to returning their survey or were unable

comprehend written English. Participants returned surveys by stamped return envelope. Participants received a one-time payment of \$25 if they were recruited through KPNC and \$15 if recruited in Washington State. USC participants did not receive compensation. Institutional Review Boards at each participating institution overseeing recruitment approved the study.

Survey Items

Previous published work by the PCATS study describes the survey development process, pilot testing, and content items in detail.¹⁰ Based on a structured literature review¹¹ and developmental focus group interviews, we included the following items in the baseline survey: treatment options discussed with the physician, information sources used to learn about therapy options, communication with the physician (see Table 2 for questions), physician treatment recommendations, factors that influenced the treatment choice, and socio-demographic questions.

Participants completed a follow-up survey 6 months after recruitment that included questions about the patients' treatment choices and whether they used CAM therapies or not. CAM questions were adapted from other sources,^{12,13} and included the type and number of CAM therapies used, whether the patient discussed CAM use with treatment providers, and the perceived helpfulness of CAM. (See appendix for specific CAM therapies listed in the survey.) For individual CAM options, patients were asked to rate the perceived helpfulness of the CAM used on a 1 to 3 Likert scale: 1=not helpful, 2=somewhat helpful, 3=very helpful.

The surveys also included disease-specific questions from the Expanded Prostate Index Composite (EPIC)^{14–16} and patient-reported treatment satisfaction. The EPIC is a prostate cancer-specific health-related quality of life instrument that measures urinary, bowel, sexual, and hormonal symptoms. The EPIC was administered at baseline and 6 months. Treatment satisfaction at 6 months was categorized on an ordinal scale of 1 through 5 as not at all satisfied, not sure, somewhat satisfied, very satisfied, and completely satisfied.

Analysis—We used linear regression models to evaluate the relationship between CAM use and treatment satisfaction. Residual plots suggested no severe deviations from regression assumptions for the 5-point Likert scale. The difference in urinary, bowel and sexual function at baseline versus 6 months was dichotomized as either the same or better versus worse, with worse used as the reference category. Three logistic regression models were used to evaluate the relationship between CAM use and whether the particular functional outcome was the same or better versus worse. In all models, independent variables included the use of CAM, age, comorbidity, education, employment status, race, insurance, income, prostate cancer risk group, baseline urinary, bowel, and sexual function and survey items dealing with physician communication. Cancer risk at diagnosis was based on D'Amico risk categories. Low risk was defined as Gleason < 7 and PSA < 10. Moderate and high risk patients were grouped together and included those with either a PSA ≥ 10 or Gleason score ≥ 7.¹⁷

Our goal in these multivariate analyses was to determine the role of CAM as a potential influence for each functional outcome. For each urinary, bowel and sexual function score reported at follow-up, we included the patient's corresponding baseline score. Due to the large number of covariates, for parsimony we adopted a forward variable selection algorithm. The variable selection and stopping criteria were based on Schwarz's Bayesian Criterion (SBC) and the criterion for keeping a variable in the model was Akaike's Information Criterion (AIC). Both of these methods use the model likelihood penalized by the number of variables in the current model as the basis for model selection. The CAM

variable was forced into the model at every stage of the variable selection procedure. Because a large number of respondents reported using prayer (209/715, 29%) on the CAM survey, and the uncertainty of prayer in addressing functional outcomes,¹⁸ we conducted separate analyses including and excluding prayer as CAM therapy. Both models used the forward selection rules.

Results

In the three study regions 1472 potential participants were invited to participate. Approximately 5% (n=69) were deemed ineligible due to non-local disease (n=62), missing clinical data (n=5), or survey return more than 8 months after diagnosis (n=2). Of the 1403 remaining eligible participants, 804 (57%) completed the baseline survey, and 91% of those participants (n=730) completed the 6-month follow-up survey. Men were included in the analysis if they returned both surveys, including the treatment satisfaction question (n=715).

The average age of PCATS survey respondents was 66.1 years (SD 8.4); 41% were under the age of 65 (296/715); 78% were white (555/715); 49% were college graduates (350/715); and 22% (157/715) reported an income under \$40,000. The majority of participants had insurance coverage that included private insurance only (53% - 381/715) or a combination of Medicare and private insurance (36% - 260/715). Retirees (56% - 403/715) made up the largest sector of participants while approximately one-third (27% - 196/715) were employed full-time, and 14% (103/715) worked part-time or were self-employed (Table 1). Forty-six percent (328/715) had low-risk disease and 28% (202/715) listed two or more non-cancer comorbidities at diagnosis. Surgery and/or external radiation were the most common treatment options (37% each) (Table 1).

Overall satisfaction with treatment was high with 558/715 men (78%) reporting that they were completely or very satisfied, 97/715 men (14%) were somewhat satisfied, 14/715 men (2%) were not at all satisfied, and 46/715 men (6%) were not sure. In bivariate analysis comparing satisfaction by demographic characteristics, only education was significantly associated with their treatment satisfaction (very/completely satisfied versus somewhat/not satisfied (Table 1). Men who were more satisfied were more likely to (1) have physicians who discussed test results in a way they could understand, (2) feel they understood the status of their prostate cancer, (3) have physicians who talked with them about future care, and (4) feel their physicians were working together to provide care tailored to their needs, and (5) were less likely to get conflicting advice from their doctors (Table 2). At 6 month follow-up men who reported worse bowel and urinary function were less satisfied with their treatment (p=0.01 and p=0.05, respectively). No difference in treatment satisfaction was observed among men who reported worse sexual function (p=0.15).

Approximately half (52% - 372/715) of all patients reported CAM use in the 6 month survey. When excluding prayer as a CAM therapy, 39% (278/715) reported using CAM. Of those patients who used CAM therapies (excluding prayer) 44% (121/278) were under the age of 65, 71% (198/278) were white, and 55% (153/278) were college graduates. Income level, insurance coverage, employment status, disease classification, and number of comorbid conditions for the CAM users were similar to the entire patient group. Among CAM users, external radiation was the most common treatment option (38% - 105/278) with surgery second (34% - 95/278). Additional characteristics of PCATS CAM users are detailed in an earlier publication.¹⁹

In bivariate analysis, the use of CAM therapy was not significantly associated with treatment satisfaction; however, patients who indicated they believed CAM to be very helpful were more likely to be very or completely satisfied with their treatment (p=0.01).

This association was true for both considering prayer as a CAM therapy and excluding it from the analysis (Table 3).

In multivariate analyses three factors were significantly associated with higher levels of satisfaction at follow-up: (1) higher EPIC score (i.e., better function) for bowel function compared to baseline, (OR:1.03, CI: 1.01–1.05); (2) patient perception that the doctors are working together to provide care tailored to their needs, OR: 2.72, CI:1.65 – 4.48; and (3) patient perception of greater levels of discussion with doctors about their future care, OR: 2.91, CI:1.93 – 4.39. CAM use was not significantly associated with treatment satisfaction at 6 months in models that included and excluded prayer. (Table 4)

The multivariate models evaluating factors associated with patient-reported changes in urinary, bowel and sexual function did not show a significant relationship between CAM and any functional outcome. For urinary and sexual function, lower levels of education were significantly and positively associated with either stable or improved function in these domains. (High school or less versus graduate degree, OR 2.37, CI: 1.31–4.30). Treatment with brachytherapy was negatively associated with stable or improved urinary function (OR: 0.26, CI: 0.16 – 0.43) while watchful waiting was associated with much higher likelihood of stable or improved urinary function (OR: 15.98, CI: 2.18 – 117.36) (Table 4). Patients reporting surgery as their primary therapy had significantly lower likelihoods of unchanged or better sexual function at 6 months (OR: 0.56, CI: 0.39 – 0.81); those choosing watchful waiting had higher likelihoods of stable or improved sexual function (OR: 3.56, CI:1.77 – 7.14). Patients were significantly less likely to report stable or improved bowel function between baseline and 6 months if they were treated with brachytherapy (OR: 0.19, CI: 0.11 – 0.34), hormone therapy (OR: 0.57, CI: 0.34 – 0.95), or external radiation (OR: 0.43, CI: 0.26 – 0.72). (Table 4)

Comment

In a multicenter, prospective study, we evaluated the relationship between CAM use, overall satisfaction with treatment, and patient-reported changes in urinary, bowel, and sexual function 6 months following localized prostate cancer diagnosis. The multivariate analyses identified several factors associated with higher treatment satisfaction levels and functional improvement; however, CAM use was not among them, regardless of considering prayer a CAM option or not. On the other hand, our bivariate analysis suggested that those who found CAM to be helpful were more satisfied with their treatment (including or excluding prayer). Thus, this observational study presents a mixed picture of CAM's influence on key aspects of patient's post-treatment urinary, bowel, or sexual function, or their overall treatment satisfaction. A recent review of studies evaluating the prevalence of CAM use among prostate cancer patients found wide variation in reported use (8–50%), with trends towards higher rates among men with higher education/income and more severe disease.²⁰ Men report a variety of reasons for using CAM, such as belief that CAM would improve the quality of life (35–90%);^{5,21} relieve symptoms (60%);²¹ mediate treatment side effects (10–12%);^{5,22} cure disease (21–47%);^{5,21,22} and prolong life (90%).²¹ A substantial proportion of patients (43–63%) do not report CAM use to their treating physician.^{19,23,24} Clinicians may need to be more vigilant in asking their patients about CAM use, particularly for substances where clinical trials have established the lack of benefit or potential harm (e.g., vitamin E and selenium). We previously reported the relationship between the several information sources men consulted and their reported use of CAM¹⁹ In multivariate analysis, CAM users were significantly more likely to use literature (nonbook), consult with family or friends with prostate cancer, or consult with another health professional than non-users of CAM.

Higher educational status was correlated with declines in functional status at follow-up. Prior studies examining education and functional status after prostate cancer therapy have been uneven in their findings. Some have also found a negative relationship between education, income, and outcomes for urinary, bowel and sexual function over time,²⁵ or no association.²⁶ In contrast, a large longitudinal study of prostate cancer patients treated in Veterans Administration hospitals found greater improvement over a wide range of symptoms and quality of life among more highly educated veterans.²⁷ One study showed greater improvements in sexual function among those with higher educational attainment.²⁸

In the absence of high quality studies evaluating CAM versus placebo or conventional therapies, researchers have examined the correlation between CAM use and symptoms, treatment-related side effects, and satisfaction. For example, Eng et al. asked recently diagnosed prostate cancer patients who used CAM about their perceptions of its effectiveness. More than half (60%) of respondents felt they were better or a lot better on measures of energy level, stress, sense of control over disease, and PSA levels. The remainder reported that their CAM therapies had no effect or worsened these measures. When asked if their use of CAM therapies minimized the side effects of conventional treatments, one-third of the CAM users (34%) reported improvement, 56% reported no effect, and 10% reported they felt the CAM treatments had made their side effects worse.⁵ Ponholzer et al. found CAM users reported lower treatment satisfaction, quality of life, and health status than patients who did not use CAM.²⁹ Unlike our study, these studies did not assess change using baseline measures of functional outcomes, or employ multivariate techniques to control for factors that might influence these outcomes, such as pre-existing comorbidity or type of cancer treatment. Our study suggests that patient reports of perceived helpfulness of CAM may not be a good measure of outcome, because actual CAM use is not correlated with improved outcomes, adjusting for other factors.

There are several limitations to this study. First, we did not ask men about CAM use prior to diagnosis, so we cannot report whether the men in our sample chose CAM therapies prior to their diagnosis or in response to specific symptoms. Second, our study is observational, so the characteristics and reported outcomes of those using CAM compared to those not using CAM are subject to unmeasured factors that could have influenced the decision to choose CAM and the (perceived) outcome related to its use. Third, some patients did not respond to the 6 month follow-up survey; it is possible that the nonresponse may be associated both with the treatment outcomes and overall treatment satisfaction and CAM use. We also did not have long-term follow-up information to assess CAM use after the initial therapy period or evaluate the long-term benefits of CAM use.

Conclusions

Patient's perceptions of the impact of CAM and conventional treatments on their outcomes can be influenced by expectations about the risks and benefits of those therapies. Similarly, satisfaction with the outcome of conventional therapy choices is influenced by many factors, including patient perceptions, their interaction with the healthcare system, the outcomes of the primary treatment(s), and the effectiveness of adjunct therapies aimed at mitigating the adverse effects of the disease and/or its treatment. In our multivariate analyses, we found that the primary factor influencing treatment satisfaction was the quality of the interaction between the patient and his physician(s). Accounting for this issue, CAM use did not influence satisfaction, possibly because the CAM therapies measured in this study have little or no impact on outcomes that were measured. The finding from our other multivariate analysis—that the primary treatment itself is the only factor that is significantly associated with changes in urinary, bowel, or sexual function at 6 months following diagnosis—bolsters this hypothesis. In general, physician-patient communication may be more

important to overall satisfaction with care. Enhanced discussions of CAM may be a part of that experience.

Even if CAM has little impact on functional outcomes or satisfaction with treatment, patients may choose to use CAM to address other issues that matter to them. These may include getting a better sense of control over their disease, perceived usefulness in reducing the chance of recurrence, or to maintain a sense that they are doing something to “fight” the cancer after the primary therapy ended. These factors may explain our finding that patients who found CAM to be helpful were also more likely to be satisfied with their treatment outcome. These issues may be important and misunderstood by clinicians, particularly since many physicians are unlikely to recommend CAM as an adjunct to primary therapies.³⁰

In this context, we believe that prospective or retrospective comparative effectiveness studies would be helpful to further separate the impact of the most popular CAM therapies on functional outcomes from other factors that may be associated with patients’ reasons for choosing CAM. For example, new research should evaluate patients’ perceptions of the benefits that CAM provides (e.g., a better sense of control over their disease, better prognosis compared to conventional therapy alone), and how these perceptions change over time. Given patients’ perceived need for better disease control, new studies should also evaluate patient-physician communication regarding primary prostate cancer therapy.

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Appendix

PCATS Study participants were asked about the following CAM therapies at 6 month follow-up.

Have you used any complementary or alternative medicine options since you have been diagnosed with prostate cancer? (*Please mark all that apply.*)

- ☐ Special diets such as low fat or mostly vegetarian diet
- ☐ Herbs or dietary supplements (such as saw palmetto, lycopene supplements, or selenium).
- ☐ High dose vitamins or mega vitamins (such as vitamin E) (*DO NOT include 1-a-day multivitamins*)
- ☐ Homeopathy
- ☐ Movement or physical therapies such as yoga, tai chi, massage, chiropractic therapy
- ☐ Oriental therapies such as acupuncture, acupressure, Qigong, or Shiatsu
- ☐ Mental health counseling or psychotherapy
- ☐ Personal prayer
- ☐ Faith healing, laying on of hands, or any other spiritual or religious group experience
- ☐ Mind/body therapies such as guided imagery/visualization, biofeedback, meditation, relaxation techniques, hypnosis/hypnotherapy, energy healing, therapeutic touch, or music therapy
- ☐ Other (please specify): _____
- ☐ Did not use any of these types of therapies

Table 1

Percent Distribution of Baseline characteristics by Treatment Satisfaction with Medical Treatment at 6 Months

Baseline Characteristics	Treatment Satisfaction			
	Very/Completely Satisfied		Somewhat/Not Satisfied or Not Sure	
	N	%	N	%
Total	558	100%	157	100%
Age (p=0.78)				
< 60	121	22%	38	24%
60 – 64	106	19%	31	20%
65 – 69	129	23%	36	23%
70 – 74	104	19%	31	20%
75 +	98	18%	21	13%
Marital Status (p=0.97)				
Married/Living with partner	465	83%	131	83%
Race (p=0.07)				
White	445	80%	110	70%
Black	41	7%	14	9%
Hispanic	32	6%	13	8%
Asian	34	6%	15	10%
Other	6	1%	5	3%
Insurance (p=0.11)				
Medicare & Private	214	38%	46	29%
Private Only	292	52%	89	57%
Medicare Only	33	6%	13	8%
Other/Unknown	19	3%	9	6%
Employment (p=0.51)				
Full-Time	152	27%	44	28%
Part-Time/Self-Employed	76	14%	27	17%
Retired	321	58%	82	52%
Unemployed/Unknown	9	2%	4	3%
Income (p=0.64)				
< \$40,000	119	21%	38	24%
\$40,000 – \$59,999	114	20%	30	19%
\$60,000 – \$74,999	70	13%	21	13%
\$75,000 – \$199,999	115	21%	30	19%
\$120,000 +	110	20%	25	16%
Unknown	30	5%	13	8%
Education (p=0.04)				
High school or less	87	16%	36	23%
Some college	178	32%	59	38%
College graduate	158	28%	34	22%
Graduate degree	130	23%	28	18%

Baseline Characteristics	Treatment Satisfaction			
	Very/Completely Satisfied		Somewhat/Not Satisfied or Not Sure	
	N	%	N	%
Unknown	5	1%	0	0%
Site (p=0.56)				
Kaiser Permanente Northern California (KPNC)	428	77%	123	78%
University of Southern California (USC)	60	11%	19	12%
Fred Hutchinson Cancer Research Center (FHCRC) *	70	13%	15	10%
Risk Group (p=0.27)				
Low	256	46%	72	46%
Moderate/High	248	44%	76	48%
Unknown	54	10%	9	6%
Comorbidity (p=0.07)				
None	205	37%	47	30%
1 Condition	206	37%	55	35%
2 Conditions	108	19%	35	22%
3+ Conditions	39	7%	20	13%
Treatment (at 6 months) ⁺				
Surgery (p=0.20)	212	38%	51	32%
Seeds (p=0.21)	85	15%	18	11%
External Radiation (p=0.65)	202	36%	60	38%
Hormone Therapy (p=0.58)	130	23%	40	25%
Watchful Waiting (p=0.26)	62	11%	23	15%

* FHCRC recruitment via community urology practices in Washington State.

⁺ Patients could have selected multiple treatments. Treatment as recorded at 6 month follow-up. All other factors are baseline results.

Table 2

Percent Distribution of Responses to Questions concerning Communication with Physician by Treatment Satisfaction at 6 Months

	Treatment Satisfaction			
	Very/Completely Satisfied		Somewhat/Not Satisfied or Not Sure	
	N	%	N	%
Total	558	100%	157	100%
How often were test results discussed in a way you could understand? (p<0.01)				
Always	457	82%	84	54%
Usually	68	12%	42	27%
Sometimes	16	3%	19	12%
Never	9	2%	10	6%
Unknown	8	1%	2	1%
How often did you feel you understood the status of your condition? (p<0.01)				
Always	408	73%	59	38%
Usually	124	22%	67	43%
Sometimes	18	3%	23	15%
Never	3	1%	6	4%
Unknown	5	1%	2	1%
How often did your doctors talk with you about your future care? (p<0.01)				
Always	311	56%	44	28%
Usually	144	26%	37	24%
Sometimes	73	13%	54	34%
Never	25	4%	20	13%
Unknown	5	1%	2	1%
How often did you seem to get conflicting advice from your doctors? (p=0.01)				
Always	17	3%	3	2%
Usually	16	3%	9	6%
Sometimes	75	13%	37	24%
Never	443	79%	107	68%
Unknown	7	1%	1	1%
Do you feel that your doctors are working together to provide care tailored to your needs? (p<0.01)				
Always	385	69%	57	36%
Usually	119	21%	54	34%
Sometimes	29	5%	33	21%
Never	14	3%	12	8%
Unknown	11	2%	1	1%

Table 3

Percent Distribution of Use of Complementary and Alternative Medicine (CAM) and Reasons for CAM use
By Treatment Satisfaction at 6 months

	Treatment Satisfaction			
	Very/Completely Satisfied		Somewhat/Not Satisfied or Not Sure	
	N	%	N	%
Any CAM Use (p=0.13)	282	51%	90	57%
Any CAM Use (No Prayer) (p=0.28)	211	38%	67	43%
How helpful was CAM in improving your health and/or making you feel better about your diagnosis? (including prayer) (p=0.01)				
Very helpful	145	51%	26	29%
Somewhat helpful	99	35%	45	50%
Not at all helpful	13	5%	10	11%
Missing	25	9%	9	10%
How helpful was CAM in improving your health and/or making you feel better about your diagnosis? (excluding prayer) (p=0.01)				
Very helpful	99	47%	18	27%
Somewhat helpful	81	38%	36	54%
Not at all helpful	13	6%	9	13%
Missing	18	9%	4	6%

Table 4

Adjusted Odds Ratios and 95% Confidence Limits for Factors Associated with Treatment Satisfaction and Functional Changes at 6 months after Diagnosis with Localized Prostate Cancer^{*}

	Outcome Variable [*]			
	Treatment Satisfaction Adj OR (95% CL)	Change in Urinary Function Adj OR (95% CL)	Change in Sexual Function Adj OR (95% CL)	Change in Bowel Function Adj OR (95% CL)
CAM Use (excluding prayer)	0.85 (0.61– 1.18)	1.44 (0.91– 2.26)	1.21 (0.83– 1.76)	0.88 (0.55– 1.39)
Doctors always/usually talk with patient about future care	2.91 (1.93– 4.39)			
Patient feels doctors always/usually are working together to provide care tailored to needs	2.72 (1.65– 4.48)			
Insurance				
Medicare Only	ref			
Medicare & Private	1.30 (0.66– 2.57)			
Private Only	0.84 (0.44– 1.63)			
Education				
High school or less		2.98 (1.42– 6.72)	2.37 (1.31– 4.30)	
Some college		1.93 (1.09– 3.41)	1.71 (1.05– 2.77)	
College graduate		1.32 (0.75– 2.31)	1.23 (0.75– 2.01)	
Graduate degree		ref	ref	
Baseline EPIC Bowel Function	1.03 (1.01– 1.05)			
Treatment:				
Surgery			0.56 (0.39– 0.81)	
Brachytherapy		0.26 (0.16– 0.43)		0.19 (0.11– 0.34)
Hormone therapy				0.57 (0.34– 0.95)
External radiation				0.43 (0.26– 0.72)
Watchful waiting		15.98 (2.18– 117.36)	3.56 (1.77– 7.14)	

^{*} If there is no adjusted odds ratio estimate for the outcome variable, then the effect was not significant and was not included in the model.