Behaviors Used by Men to Protect Themselves against Prostate Cancer

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Abstract

This paper reports on behaviors men use to protect themselves against prostate cancer. Data were collected via a telephone or mailed survey from 353 men enrolled in two studies of prostate cancer screening. Respondents reported behaviors they used to protect themselves against prostate cancer, and responses were coded as conventional care, self-care, or nothing. Men who reported using both conventional care and self-care were categorized as conventional care users. Polytomous logistic regression was conducted to evaluate the association between sociodemographic background, prior prostate screening, and cognitive, affective, and social support and influence factors with protective behavior type.

The distribution of protective behaviors was as follows: conventional care, 63%; self-care only, 19%; and nothing, 18%. In multivariable analyses, higher education level was found to be positively associated with conventional care use. Perceived salience and coherence of prostate cancer screening was positively associated with conventional care use among men in one of the two studies. Low concern about screening was positively associated with self-care use, as was mailed survey completion.

This study presents self-report data regarding prostate cancer protection behaviors. Most men in the study reported using some type of prostate cancer protective behavior. Decision-making about whether or not to take protective action and what type of behavior to use may be influenced by socioeconomic background, cognitive perceptions related to behavioral options, and concern about risk.

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Introduction

In the United States, 220,900 new cases of prostate cancer and 28,900 deaths are estimated for 2003 (1). Prostate cancer is the second leading cause of cancer-related mortality in men.

Prostate cancer screening is controversial (2, 3) because there is no epidemiological evidence to support that prostate cancer screening with prostate-specific antigen (PSA) will reduce mortality. Different professional societies have each suggested guidelines for screening that vary considerably. The United States Preventive Services Task Force (USPSTF) (2002) states that there is insufficient evidence to recommend for or against routine prostate cancer screening with PSA or digital rectal examination (DRE) because the potential benefits are unclear, and the potential for harm as a result of screening is evident (4, 5). The American Cancer Society (ACS) (2001) recommends that PSA and DRE be offered annually to men 50 years or older who are expected to live at least 10 years (6). Both the American Cancer Society and the American Urological Association (AUA) support the premise that men who ask their clinicians to decide about prostate cancer screening should be tested (6, 7). The American College of Physicians (ACP) recommends that after weighing the risks and benefits of screening, an individualized decision should be made with the patient (8). All of the above organizations support informed decision-making about prostate cancer screening.

Despite reservations about the usefulness of screening, physicians commonly use DRE and PSA testing to detect early prostate cancer. Estimates from the Behavioral Risk Factor Surveillance System (2001) indicate that 57% of men 50 or more years of age have had a PSA test within the past year, and 56% of men have had a DRE within the past year (9). The use of PSA is comparable among white non-Hispanic males and African American non-Hispanic males, but the use of DRE is lower in African American non-Hispanic males (10). Reports in the literature on screening test use provide little insight into what men are doing that they believe protects them from developing this disease. Indeed, being screened for prostate cancer is just one possibility. Other methods include, but are not limited to, getting regular exercise, eating a healthy diet, and taking vitamins/nutritional supplements.

Recent reports have drawn attention to the potential that chemoprevention, vitamin supplements, and dietary modification hold relative to prostate cancer prevention (2, 11–17). In one report, it was suggested that a low-fat, high-fiber diet may protect against prostate cancer (18). It has also been reported that consumption of isoflavones, found in many soy products, may help to prevent prostate cancer (19). Another investigation showed that there was a positive association between vitamin supplement use and decreased prostate cancer risk (20). Such reports, along with stories appearing in the lay media, are provocative and may serve to spur the use of a wider spectrum of protective behaviors against prostate cancer, either alone or in conjunction with conventional medical care.

The study reported here seeks to provide insight into the use of conventional care and other behaviors used for protection

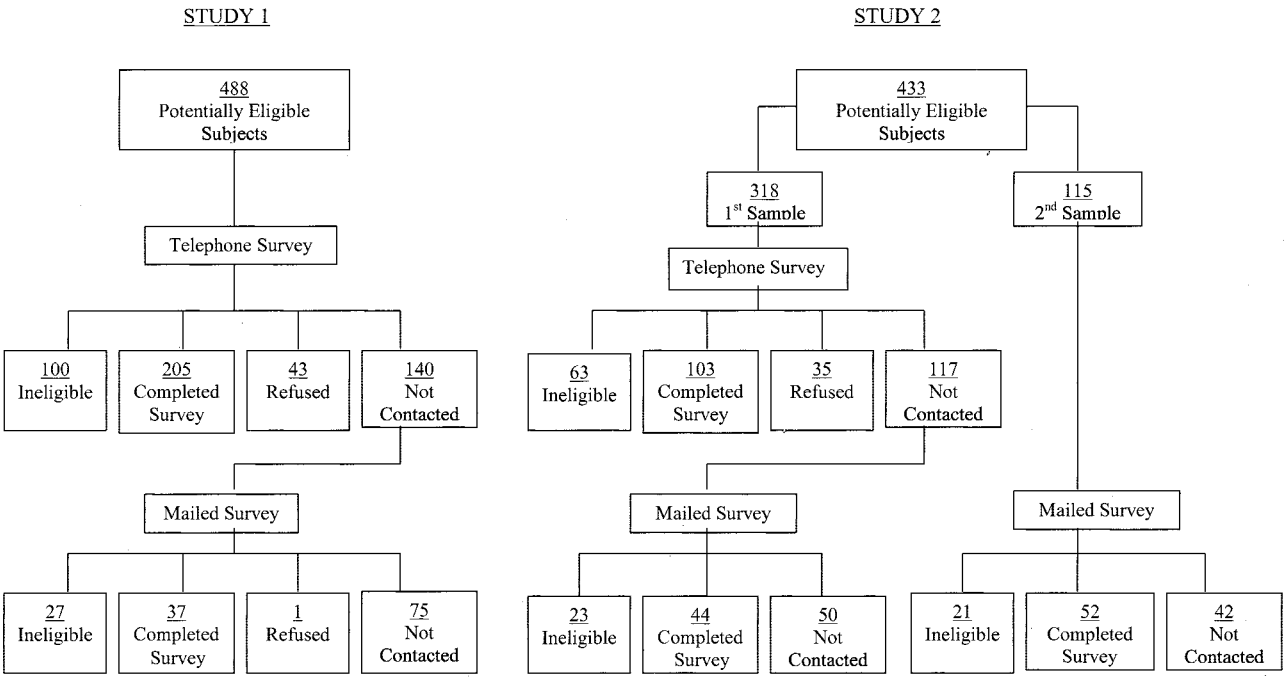

Fig. 1. Survey data collection in Study 1 and Study 2.

against prostate cancer. This report draws on data collected in two randomized controlled trials of a prostate cancer screening decision-counseling intervention. Specific aims of both trials were to (*a*) assess the impact of a decision counseling intervention on prostate cancer screening utilization, (*b*) identify factors associated with screening utilization, and (*c*) assess the intervention impact on participant knowledge, attitudes, and beliefs related to prostate cancer and screening. In this paper, we report on our findings regarding factors associated with self-reported protective behaviors, as reported on the baseline survey obtained from the participants in the two trials.

Materials and Methods

Study Design and Study Population. This investigation involved men who participated in two parallel, institutional review board-approved, randomized trials designed to evaluate a behavioral intervention intended to facilitate informed decision-making about prostate cancer screening. Participants in the first trial (Study 1) were patients of three community-based primary care practices, whereas those in the second trial (Study 2) were patients enrolled in a university-based primary care practice (Jefferson Internal Medicine Associates). Both studies were conducted in Philadelphia, Pennsylvania. Study 1 included only African-American men between 40 and 69 years of age, whereas Study 2 included both white and nonwhite men aged 50–69 years. For both trials, eligibility was limited to patients who had visited their respective primary care practices in the previous 2 years and who had no personal history of prostate cancer, benign prostate hyperplasia, prostate biopsy, or transrectal ultrasound. The trials were otherwise similar in design, procedures, and data collection. Each participant completed a baseline survey, either by telephone (interview conducted by Mathematical Policy Research, Inc., Princeton, NJ) or by mail, before randomization.

Of 921 potentially eligible men, 520 were contacted and were eligible; 234 men were contacted but were ineligible, and 167 could not be contacted. Of 520 eligible men who were contacted, 441 (85%) completed a baseline survey (242 men in Study 1 and 199 men in Study 2). The study sampling design and enrollment for the two trials is shown in Fig. 1.

The study population for Study 1 was drawn from a sampling frame of 488 men. Initially, attempts were made to interview these men by telephone. Upon contact, 100 (20%) of these men were found to be ineligible, 205 (42%) completed the survey over the phone, and 43 (9%) refused. The remaining 140 (29%) men who could not be contacted by telephone were sent a self-administered version of the baseline survey by mail. Of those, 27 men were found to be ineligible on the basis of their responses to the survey screener, 37 returned a completed survey, 1 refused to participate, and 75 did not respond. Thus, the final study sample was 242 men (205 men + 37 men).

The study population for Study 2 was drawn in two waves from an initial sampling frame of 433 men. We attempted to contact the first sample of 318 men by telephone. Upon contact, 63 (20%) men were found to be ineligible, 103 (32%) completed the baseline survey, and 35 (11%) refused. The remaining 117 (37%) men who could not be contacted by telephone, as well as a second wave of 115 men, were sent a mailed version of the survey. Of those, a total of 44 men (21 men + 23 men) were found to be ineligible, 96 men (44 men + 52 men) returned a completed survey, and 92 men (50 men + 42 men) did not respond. Thus, the resulting study sample consisted of 199 men (103 men + 44 men + 52 men).

After survey completion, participants were randomized to one of two groups, an enhanced intervention group (receipt of a mailed informational booklet on prostate cancer screening and participation in a decision counseling session on prostate cancer screening mediated by a health educator) or a minimal intervention group (receipt of a mailed informational booklet only).

This report is based only on baseline survey (prerandomization) data; trial end point data are not reported here.

Study Outcome and Other Measures. Baseline survey data were collected using an instrument that operationalized the Preventive Health Model constructs. The Preventive Health Model is an explanatory framework based on concepts from Antonovsky's work on the coherence of health behavior in everyday life (21), the Health Belief Model (22), theory of Reasoned Action (23), and Social Cognitive theory (24). The baseline survey instrument, which has been validated as a measure of knowledge, attitudes, and beliefs related to cancer early detection (25), allows for the collection of data on study factors, as well as a subject's background characteristics, cognitive and psychological representations, social support and influence, and intention. The Preventive Health Model has previously been useful in explaining cancer screening intention and adherence (26, 27).

At the time of the baseline survey, study participants were asked whether they had had a DRE or PSA in the past 12 months. They also were asked to respond on the telephone or mailed survey to the following question: "What, if anything, are you doing to protect yourself from developing prostate cancer?" For the telephone survey, this was an open-ended question; responses were recorded verbatim and then categorized as follows: screening; watching what I eat (reducing fat, increasing fiber); getting regular exercise; taking vitamins/supplements; other (specify); or nothing. On the mailed survey, recipients were presented a list of choices, including "Watching what I eat, like reducing the amount of fat or eating more fiber," "Getting regular exercise," "Taking vitamins and/or nutritional supplements," "Not doing anything in particular," and "Don't know." In addition, the men could write in other protective behaviors in a space provided ("Other"). Responses from both survey modes initially were classified as follows: (*a*) doing nothing; (*b*) engaging in self-care only; (*c*) undergoing conventional care; or (*d*) using both self-care practices and conventional care. Classifications of responses were performed by three of the coinvestigators, and discrepancies were resolved through discussion. All final determinations were unanimous. Categories were then combined to create three final categories: (*a*) doing nothing; (*b*) self-care only; and (*c*) conventional care alone or combined with self-care.

"Self care" was defined here as voluntary health behaviors (*e.g.*, using diet, exercise, vitamins or supplements, taking medications, or other behaviors outside of a medical practice setting, used to reduce or eliminate personal risk for developing prostate cancer). Protective health behaviors (*e.g.*, medication use) that are recommended or prescribed by health care professionals for purposes other than prostate cancer protection but are perceived by patients as protective were also placed under "self-care." "Conventional care" included recommended procedures that health care professionals offer or perform (*e.g.*, DRE, PSA testing, physical exams) in a medical practice setting. The definitions of self-care and conventional behaviors were intended to distinguish between behaviors strictly tied to conventional medical recommendations (*e.g.*, PSA testing or DRE) *versus* self-care behaviors that the participant might initiate, believing that such self-care behaviors might prevent prostate cancer (irrespective of whether or not such behaviors are scientifically shown to be protective).

Sociodemographic background characteristics included the participant's race (white *versus* nonwhite), age (40–49, 50–59, or 60–69 years), place of birth (Philadelphia *versus* other), level of formal education (≤12 years *versus* >12 years), marital status (married *versus* not married), and history of prostate cancer in father or brothers (yes/no). Factors related to prostate cancer early detection were ascertained using a number of Preventive Health Model-based items, measured with a four-point Likert-type response pattern (*i.e.*, 1 = strongly disagree, 2 = sort of disagree, 3 = sort of agree, and 4 = strongly agree). On the basis of exploratory factor analyses, four scales were constructed: salience and coherence of prostate cancer screening (eight items, Cronbach's $\alpha = 0.76$); perceived susceptibility to prostate cancer (three items, $\alpha = 0.64$); worry and concern related to prostate cancer screening (seven items, $\alpha = 0.64$); and intention to have prostate cancer screening (four items, $\alpha = 0.89$). In addition to these four scales, five additional constructs were measured: self-efficacy (one item); curability of prostate cancer (one item); social support (two items); social influence (two items); and knowledge about prostate cancer one item (see "Appendix").

A scale score was computed by averaging the scale's items only when more than half of those items had no missing values. Some items were reverse-coded before averaging, so that higher scale scores were expected to correlate with more frequent screening (*e.g.*, all "worry and concern" items were reverse-coded, so that higher levels of concern corresponded to lower scores). We considered categorizing or dichotomizing the scales and single items, but the choice of cut points was unclear. Because of the varying and often very skewed distributions, using *a priori* cut points was not an attractive option because they can typically yield very unbalanced categories (*i.e.*, some with a large number of subjects and others with very few). On the other hand, we wanted to avoid defining cut points *a posteriori* to not inflate the false-positive rate of our findings. Therefore, we used all scales and single items as continuous variables (from 1 to 4). This approach has the disadvantage of assuming approximate linearity of effect. For example, if a variable's effect is U-shaped, this approach will not detect it. However, because the prior expectation was for a monotonic effect of these variables on protective behaviors, using the scales as continuous predictors amounts to a trend test and is reasonable in this context.

Statistical Methods and Analyses. After preliminary descriptive analyses, we modeled the protective behaviors as a function of covariates via polytomous logistic regression. Initial univariable analyses were followed by full multivariable modeling. Polytomous logistic regression is the generalization of logistic regression for the case of an outcome that has more than two categories. In analyses performed here, the protective behaviors outcome has three levels: 0 = nothing; 1 = self-care only; and 2 = conventional care (with or without self-care).

Data from both studies were pooled in a single analysis, but a study indicator was included as a covariate (0 = Study 1; 1 = Study 2). For each of the other independent variables, we allowed for the possibility that its association with protective behaviors might vary across the two studies, an important consideration because the two trials were conducted in different populations and settings and had different modes of baseline data collection. A simple model with a single such covariate (Education: 0 = ≤12 years; 1 = >12 years) can be written as

$$\begin{cases} \text{logit}\dfrac{\pi_1}{\pi_0} = \beta_0^{(1)} + \beta_1^{(1)}\,STUDY + \beta_2^{(1)}\,EDUC + \beta_3^{(1)}\,(STUDY{*}EDUC) \\ \text{logit}\dfrac{\pi_2}{\pi_0} = \beta_0^{(2)} + \beta_1^{(2)}\,STUDY + \beta_2^{(2)}EDUC + \beta_3^{(2)}\,(STUDY{*}EDUC) \end{cases}$$

where π_0 is the probability that a man does nothing, π_1 is the probability that he engages in self-care behaviors only, and π_2

is the probability that he has conventional care with or without self-care. The regression coefficients have the usual interpretation as log odds ratios. However, the polytomous logistic regression for a three-level outcome involves two such sets of odds ratios. Specifically, the first equation refers to the odds of engaging in self-care as opposed to doing nothing; $\exp[\beta_2^{(1)}]$ compares high- with low-education subjects in Study 1, whereas $\exp[\beta_2^{(1)} + \beta_3^{(1)}]$ compares high- with low-education subjects in Study 2. The second equation refers to the odds of having conventional care with or without self-care as opposed to doing nothing. The corresponding odds ratios for education are $\exp[\beta_2^{(2)}]$ and $\exp[\beta_2^{(2)} + \beta_3^{(2)}]$ for Study 1 and Study 2, respectively.

This pooled approach has several advantages over analyzing each study separately. First, it allowed us to conduct a formal test of whether a covariate's association with protective behaviors was similar across the two studies [by testing the study-by-covariate interaction terms, *e.g.*, $\beta_3^{(1)}$ and $\beta_3^{(2)}$]. Second, it allowed us to estimate a common covariate effect for both studies, if the study-by-covariate interaction was found to be nonsignificant. Finally, estimates obtained from the pooled analysis had higher precision than study-specific estimates because they were based on a larger sample size (*i.e.*, data from both studies).

For multivariable modeling, we started with a rich model that included all main effects, as well as all study-by-covariate interactions, that allowed each factor's effect on protective behaviors to be different across the two studies. This model essentially corresponds to fitting separate logistic regressions for each study. We then formally tested each interaction ($\alpha = 0.05$) using a backward elimination strategy. If the interaction were significant ($p < 0.05$), we retained it and estimated separate effects. Otherwise, we eliminated it and estimated a single common effect with increased precision.

The terms for study and for the participants' sociodemographic characteristics were retained in the model irrespective of their statistical significance. All other main effects were included only if they were significant ($p < 0.05$). Model selection and testing (p-values) were based on the likelihood ratio test. Wald-type confidence intervals were constructed for the odds ratios. Analyses were conducted in SAS 6.12 (SAS Institute Inc.) and Stata 7 (StataCorp).

Results

Baseline surveys were completed by 242 men in Study 1 and by 199 men in Study 2. Of these 441 men, 353 (80%) had complete data on study covariates and outcomes: 197 men (81%) in Study 1 and 156 men (78%) in Study 2. Table 1 shows the distribution of protective behaviors, which differed across the two studies ($p < 0.001$). The behaviors were distributed about evenly among men in Study 1, but conventional care behaviors (with or without self-care) were more common in Study 2.

Table 2 shows the characteristics of the men in each study. Men in the two studies differed significantly on education level; place of birth; several cognitive, affective, and social factors; and on mode of baseline survey. It should be noted that, by design, Study 1 included men who were African American and who were 40–69 years old, whereas Study 2 included both white and nonwhite men who were 50–69 years old.

Table 3 shows the results of univariable analyses of protective behaviors. A number of variables (*i.e.*, study, age, race/ethnicity, education level, survey mode, and perceived salience and coherence of screening) were significantly associated with protective behavior type.

Table 1 Reported prostate cancer protective behaviors

	Study 1[a] *n* (%)	Study 2[a] *n* (%)	*P*[b]
Protective behaviors			<0.001
Nothing	43 (22)	20 (13)	
Self-care only	49 (25)	19 (12)	
Conventional care[c]	52 (26)	51 (33)	
Conventional care with self-care[c]	53 (27)	66 (42)	
Total	197 (100)	156 (100)	

[a] Study 1, three community-based primary care practices; Study 2, one university-based primary care practice.
[b] *P* tests the difference between Study 1 and Study 2 with respect to protective behaviors.
[c] Categories "conventional care" and "conventional care with self-care" were combined in subsequent analyses.

Table 4 shows the results of multivariable polytomous logistic regression analyses. The association between salience and coherence and protective behaviors was different across the two studies ($p = 0.012$); therefore, study-specific effects were estimated. In Study 1 (community practices), salience and coherence was inversely but nonsignificantly associated with the use of both conventional care and self-care. In Study 2 (university-based practice setting), perceived salience and coherence of prostate cancer screening was positively and significantly associated with the use of conventional care (and, to a lesser extent, with the use of self-care).

The association between each of the other independent variables and protective behavior was similar across the two studies, and, therefore, pooled estimates are presented. Education was the only sociodemographic variable that was significantly associated with protective behaviors (global $p = 0.002$). The overall significance of education was mainly due to its strong positive association with conventional care (although it also had a weaker association with self-care). There was also an overall marginally significant association between worry and concern about prostate cancer screening and type of reported behaviors ($p = 0.05$). This appeared to be primarily due to increased odds of using self-care among men with lower worry and concern (*i.e.*, higher scores on this scale), whereas the odds of conventional care were mostly unchanged. Finally, the odds of reported self-care were more than four times higher among men who responded to the mailed survey as compared with men who completed a telephone survey, whereas the odds of conventional care did not differ significantly by survey mode.

Discussion

It has been reported elsewhere that men with higher education (2, 28–30) and those who view screening as salient and coherent may be more likely to undergo prostate cancer screening, a form of conventional care (28, 29, 31, 32). Findings reported here are similar to these reports. Specifically, conventional care use, as compared with nothing, was more common among men with a higher educational level than those with less education. The likelihood of self-care use, as compared with nothing, was also somewhat higher among those with higher education, but to a lesser degree.

We found that stronger belief in the salience and coherence of screening was associated with substantially increased odds of conventional care, as opposed to doing nothing, in the

Table 2 Participant characteristics

Variable	Study 1[a]		Study 2[a]		p^c
	Mean ± SD	*n* (%)[b]	Mean ± SD	*n* (%)[b]	
Demographic characteristics					
Age (yrs)	52 ± 7		57 ± 5		
40–49		90 (46)			
50–59		70 (36)		113 (72)	
60–69		37 (19)		43 (28)	
Race/ethnicity					
Nonwhite		197 (100)		39 (25)	
White				117 (75)	
Education (in yrs)[d]					<0.001
<12		48 (24)		12 (8)	
12		71 (36)		38 (24)	
>12		78 (40)		106 (68)	
Marital status					0.107
Not married		70 (36)		42 (27)	
Married		127 (64)		114 (73)	
Place of birth[e]					<0.001
Philadelphia		119 (60)		71 (46)	
Outside of Philadelphia, in US		65 (33)		77 (49)	
Outside of US		13 (7)		8 (5)	
Family history of prostate cancer					0.713
No		180 (91)		140 (90)	
Yes		17 (9)		16 (10)	
Baseline survey mode					<0.001
Telephone		167 (85)		70 (45)	
Mail		30 (15)		86 (55)	
Cognitive, affective, and social factors					
Salience and coherence (8 items)[f]	3.7 ± 0.5		3.7 ± 0.3		
Worry and concern (7 items)[f]	3.2 ± 0.5		3.4 ± 0.5		<0.001
Susceptibility (3 items)[f]	1.7 ± 0.7		1.8 ± 0.7		0.034
Intention (4 items)[f]	3.4 ± 0.8		3.1 ± 0.9		0.007
Self-efficacy[f]	3.3 ± 1.0		3.6 ± 0.7		0.007
Curability[f]	3.7 ± 0.6		3.7 ± 0.6		0.304
Social support form doctor[f]	3.3 ± 1.0		3.7 ± 0.7		<0.001
Social support from family[f]	3.3 ± 1.0		3.4 ± 0.9		0.331
Social influence from doctor[f]	3.7 ± 0.7		3.6 ± 0.7		0.436
Social influence from family[f]	2.9 ± 1.2		2.7 ± 1.2		0.044
Knowledge[f]	2.8 ± 1.1		3.3 ± 0.8		0.002

[a] Study 1, three community-based primary care practices; Study 2, one university-based primary care practice.
[b] Percentages may not add to 100 because of rounding.
[c] *p*-values test the difference between Study 1 and Study 2 with respect to each variable. *p*-value is not reported for age or race/ethnicity because differences across the two studies are due to design.
[d] Education was dichotomized as "less than or equal to 12 years" *versus* "more than 12 years" in the final analyses.
[e] Place of birth was dichotomized as "Philadelphia" *versus* "Outside of Philadelphia" in the final analyses. US, United States.
[f] All items and scales used as continuous (scored from 1 to 4). Scoring for the worry and concern scale was reverse-coded. Thus, a higher scale score reflects lower worry and concern.

university practice setting. This pattern was reversed in the community practice study, where perceived salience and coherence of screening was inversely but nonsignificantly associated with both self-care and conventional care behaviors. We have no explanation for this difference, and one can only speculate that it may be linked to some unmeasured characteristics of the two study populations.

In other research studies, measures of worry or concern about prostate cancer screening have been used to determine whether this construct differentiates men who had a screening exam from those who did not (27, 33, 34). Findings reported in the literature have not been consistent. Our findings, which are based on a measure of worry and concern that addresses both cancer and cancer screening, indicate that men who were less worried and concerned were more likely to engage in self-care (but not conventional care), as compared with doing nothing.

Men who completed the baseline survey by mail were also more likely to report using self-care (and, to a much lesser degree, conventional care), as compared with doing nothing, to protect themselves from prostate cancer. Participants who completed a mailed survey tended to be younger and more educated than those who completed a telephone survey. However, because age and education were controlled for in the multivariable model, the association between survey mode and protective behaviors can only reflect respondents' differences on some other (unmeasured) characteristic, lifestyle, or environmental factor.

Alternatively, this association could be artifactual. In the mailed survey, self-care behaviors were presented as explicit choices, whereas in the telephone survey, an open-ended question was posed, and spontaneous responses were recorded. Thus, the higher levels of self-care responses among mailed survey respondents might be due to the more direct prompting regarding such practices. This was a weakness in our survey design and underlines the need for consistency of data collec-

Table 3 Univariable Analyses of Protective Behaviors

Variable	Protective behaviors			p^c
	Nothing	Self-care[a]	Conventional care[a]	
	n (%)[b]	n (%)[b]	n (%)[b]	
Study				<0.001
Study 1	43 (22)	49 (25)	105 (53)	
Study 2	20 (13)	19 (12)	117 (75)	
Demographic characteristics				
Age (yrs)				0.014
40–49	21 (23)	26 (29)	43 (48)	
50–59	27 (15)	30 (16)	126 (69)	
60–69	15 (19)	12 (15)	53 (66)	
Race/ethnicity				<0.001
Nonwhite	48 (20)	57 (24)	131 (56)	
White	15 (13)	11 (9)	91 (78)	
Education (yrs)				<0.001
≤12	42 (25)	37 (22)	90 (53)	
>12	21 (11)	31 (17)	132 (72)	
Marital status				0.211
Not married	23 (21)	26 (23)	63 (56)	
Married	40 (17)	42 (17)	159 (66)	
Place of birth				0.472
Philadelphia	37 (19)	39 (21)	114 (60)	
Outside of Philadelphia	26 (16)	29 (18)	108 (66)	
Family history of prostate cancer				0.892
No	58 (18)	61 (19)	201 (63)	
Yes	5 (15)	7 (21)	21 (64)	
Baseline survey mode				0.012
Telephone	51 (22)	39 (16)	147 (62)	
Mail	12 (10)	29 (25)	75 (65)	
Cognitive, affective, and social behaviors				
Salience and coherence[d]				0.038
Worry and concern[d]				0.457
Susceptibility[d]				0.577
Intention[d]				0.401
Self-efficacy[d]				0.382
Curability[d]				0.637
Social support from doctor and family[d]				0.282
Social influence from doctor and family[d]				0.271
Knowledge[d]				0.183

[a] "Self-care" includes men with self-care only. "Conventional care" includes men with conventional care with or without self-care.
[b] Percentages indicate the proportion of each type of protective behavior at each level of a variable.
[c] *p*-values test the difference of protective behaviors across levels of a variable.
[d] All items and scales used as continuous (scored from 1 to 4). Scoring for the Worry and Concern scale was reverse-coded. Thus, a higher scale score reflects lower worry and concern.

tion practices across different study phases and for different participant subgroups.

The use of self-care as a general health care strategy has been reported in between 40% and 50% of Americans who have used complementary alternative medicine (35), frequently in conjunction with conventional medicine (36–41). To date, many complementary and alternative medicine studies have included diet, exercise, and vitamins (*i.e.*, self-care) in their definitions of complementary and alternative medicine. One large population-based survey conducted in South Carolina (42) showed a 44% overall use of complementary and alternative medicine, with a slightly higher (but not statistically significantly different) level of use among whites (55%) as compared with African Americans (46%). Elsewhere, men and women from five different African-American communities reported using conventional care, exercise, diet, smoking cessation, alcohol use reduction, and lifestyle change to maintain personal health or to prevent cancer (43). Inspection of the data from the current study shows that over half of the men reported using self-care either alone or in combination with conventional care as a prostate cancer protective strategy. This finding, although not a primary focus of the paper, is important because there are no reports in the literature related to self-care use by men to protect themselves against prostate cancer. Research is needed to learn about the way white and nonwhite men understand and decide to use different prostate cancer protective strategies, and whether sociodemographic, cognitive, affective, or social support and influence factors can predict screening behaviors. Finally, the role of the physician in determining the use of prostate cancer protective strategies should also be the focus of future study.

The current study is unique in that men were asked to report on behaviors they use to protect themselves from prostate cancer. To our knowledge, this is the first report in the literature that categorizes self-reported prostate cancer protective behaviors. Most study participants reported that they were protecting themselves from prostate cancer by using conventional care with or without self-care, whereas the proportions of men who reported using self-care only or

Table 4 Multivariable analyses of protective behaviors

Variable	Protective behaviors				p^c
	Self-care[a] *vs.* nothing		Conventional care[a] *vs.* nothing		
	OR[b]	95% CI[b]	OR[b]	95% CI[b]	
Study					0.311
Study 1	1.00	Reference	1.00	Reference	
Study 2	0.40	0.06–2.45	0.28	0.06–1.41	
Age (yrs)					0.373
40–49	1.06	0.41–2.71	0.54	0.24–1.19	
50–59	1.00	Reference	1.00	Reference	
60–69	0.94	0.36–2.46	0.90	0.42–1.91	
Race/ethnicity					0.193
Nonwhite	1.00	Reference	1.00	Reference	
White	0.31	0.07–1.33	0.80	0.24–2.67	
Place of birth					0.930
Philadelphia	1.00	Reference	1.00	Reference	
Outside of Philadelphia	1.11	0.53–2.33	1.12	0.61–2.07	
Education (yrs)					0.002
≤12	1.00	Reference	1.00	Reference	
>12	1.47	0.66–3.31	2.92	1.50–5.70	
Marital status					0.308
Not married	1.00	Reference	1.00	Reference	
Married	0.95	0.45–2.01	1.44	0.76–2.72	
Salience and coherence (1-point increase)[d]					0.008
Study 1[e]	0.43	0.14–1.32	0.66	0.23–1.88	
Study 2[e]	1.27	0.25–6.43	6.87	1.86–25.5	
Worry and concern (1-point increase)[d]					0.050
	1.93	0.92–4.06	0.92	0.50–1.68	
Baseline survey mode					0.002
Telephone	1.00	Reference	1.00	Reference	
Mail	4.20	1.63–10.83	1.31	0.58–2.95	

[a] "Self-care" includes men with self-care only. "Conventional care" includes men with conventional care only and men with conventional care and self-care.
[b] OR, odds ratio; CI, confidence interval.
[c] *p*-values test the difference of protective behaviors across levels of a variable, adjusting for all other variables in the model (likelihood ratio test).
[d] Scales used as continuous (scored from 1 to 4). Scoring for the worry and concern scale was reverse-coded. Thus, a higher scale score reflects lower worry and concern.
[e] The association of salience and coherence with protective behaviors was significantly different across the two studies ($p = 0.012$).

doing nothing to protect themselves from this disease were relatively smaller. One limitation of the study is that men may have answered the survey question about protective behaviors affirmatively if they engaged in self-care or conventional care as part of their general health maintenance, *i.e.*, not specifically just to protect themselves again prostate cancer. Future study in the area could clarify the distinction between general health behaviors (*e.g.*, regular exercising) and behaviors specifically aimed at protecting oneself against prostate cancer.

The generalizability of findings from this report may be limited by the fact that both studies were carried out in one city in the northeastern United States, and study participants represented patients from only four primary care practices. However, we note that these practices included both community and university-based practices and that the associations between different variables and protective behaviors were largely similar across settings. Nevertheless, patients from other geographic regions and in other types of practice settings may differ in relation to self-reported protective behaviors, as well as other characteristics. Practitioners in various settings may also differ in terms of educational messages imparted to patients related to prostate cancer protective behavior and, as a result, may influence patient perceptions and self-reports of protective behaviors. Such factors might also modify the effects of the variables reported in this study. Furthermore, the results of this report are based on information obtained from subjects who consented to participate in a behavioral research study. The distribution of protective behaviors among persons not inclined to take part in such studies may differ.

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Appendix

Survey Constructs, Scales, and Items

All items were scored as follows: 1, strongly disagree; 2, sort of disagree; 3, sort of agree; and 4, strongly agree.

Multi-Item Scales

1. Salience and coherence (eight items): (*a*) being treated for prostate cancer is likely to increase my chances of living a healthier life; (*b*) I think the benefits of prostate screening outweigh any difficulty I might have in going through the tests; (*c*) being treated for prostate cancer is likely to increase my chances of living a longer life; (*d*) having a prostate screening test makes sense to me; (*e*) I believe that going through prostate screening would help me to be healthy; (*f*) going through prostate screening is an important thing for me to do; (*g*) I believe that prostate screening is an effective way to find prostate cancer early; and (*h*) I believe that I can protect myself from prostate cancer by going through screening.

2. Worry and concern about prostate cancer and screening (seven items; all reversed-coded): (*a*) I am bothered by the possibility that prostate screening might be physically uncomfortable; (*b*) I think prostate screening would be painful; (*c*) if I have prostate cancer, I would just as soon not know about it; (*d*) if I am meant to get prostate cancer, I will get it no matter what I do; (*e*) men who go through prostate screening will have more problems than men who do not go through screening; (*f*) if I get prostate cancer, nothing can be done to cure me of the disease; and (g) going through prostate screening would be embarrassing.

3. Prostate cancer susceptibility (three items): (*a*) I believe it is likely that I will get prostate cancer at some time in the future; (*b*) I am afraid that if I have a prostate screening test, the test result will show that I have prostate cancer; and (*c*) I think it is likely that I will develop prostate cancer.

4. Intention to screen (four items; items *b* and *d* are reverse-coded): (*a*) I intend to have a prostate screening examination in the next 6 months; (*b*) I don't plan on having a prostate screening examination in the next 6 months; (*c*) in the next 6 moths, I intend to discuss prostate screening with a physician; and (*d*) in the next 6 moths, I don't plan on talking to my doctor about prostate cancer.

Single-Item or Two-Item Constructs

5. Knowledge: I think that men who have a father or a brother with prostate cancer are more likely to develop prostate cancer than men who do not have a father or brother with prostate cancer.

6. Self-efficacy: arranging my schedule to go through prostate screening would be an easy thing for me to do.

7. Curability: I believe that when prostate cancer is found early, it can be cured.

8. Social support: (*a*) the doctor I see is likely to think I should go through prostate cancer screening (with a rectal exam and a PSA blood test); (*b*) members of my immediate family are likely to think I should go through prostate screening.

9. Social influence: (*a*) I want to do what the doctor I see thinks I should do about prostate screening; (*b*) I want to do what members of my immediate family think I should do about prostate screening.

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