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Prostate cancer screening amongst men with a family history of prostate cancer: The role of partners in influencing men's screening uptake

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Short title: Partners' involvement in men's prostate cancer screening

Key words: Familial prostate cancer, screening, partners, women

ABSTRACT

Objective: To assess the role of the partners, and other sociodemographic and psychological factors, in influencing prostate cancer screening uptake amongst men with a family history of prostate cancer.

Methods: Cross-sectional study of 280 unaffected men with a family history of prostate cancer along with 174 of their partners, using mailed, self-administered questionnaires. **Results:** The majority of respondents reported having had at least one Prostate Specific Antigen (PSA) test (78.9%) and/or one digital rectal examination (DRE) (78.0%). Ever having had a PSA test was associated with number of first- and second-degree relatives with prostate cancer (OR = 1.79; 95% CI, 1.03 to 3.12; p = 0.040) and relationship status. Compared to men who were single, those with partners with high involvement in men's screening had a significantly higher uptake of PSA screening (OR = 3.41; 95% CI, 1.12 to 10.4; p = 0.031). Ever having had a DRE was significantly and positively associated with age (OR = 1.09; 95% CI, 1.05 to 1.13; $p < 0.001$) and perceived prostate cancer risk (OR = 1.03; 95% CI, 1.01 to 1.04; $p<0.001$) as well as having sons (OR = 2.06; 95% CI, 1.06 to 3.97; p=0.032).

Conclusions: Psychological factors are the most important influence on men's uptake of DRE, while external factors, including partner's involvement, influence PSA uptake. If prostate cancer screening is ultimately shown to be efficacious for men with a family history of prostate cancer, screening uptake will be maximized in this target group by enlisting the support of partners.

Prostate cancer is the most commonly diagnosed non-skin malignancy in men worldwide.[1] Men with a family history of prostate cancer have a greater risk of the disease and this risk increases with number of relatives affected.[2,3] A recent meta-analysis of empiric risks of prostate carcinoma for relatives of men with prostate cancer shows a 2.5-fold relative risk for first-degree relatives.[3] The relative risk is compounded by the numbers of affected relatives, with a 5-fold risk for men who have 2 or more affected family members.[3] In addition, age at diagnosis of the affected relatives appears to influence risk, with an increasing relative risk with decreasing age at diagnosis.[2,3] The proportion of prostate cancer attributable to dominantly inherited susceptibility genes is currently estimated at 5% to 10%.[4] Male carriers of mutations in the *BRCA1/2* breast cancer genes also have an increased risk of prostate cancer.[5,6] In addition, several genetic loci have been identified that could harbor prostate tumor suppressor genes, however the genes that confer a high disease penetrance that would be suitable for genetic testing remain elusive (for an overview, consult Bruner et al.[4] and Verhage and Kiemeney[7]).

Screening for prostate cancer remains controversial.[8] The currently most utilized methods, the Digital Rectal Examination (DRE) and Prostate Specific Antigen (PSA) test, both have limitations, and at present, there is limited evidence that these screening methods reduce morbidity and mortality.[8,9] Definitive results from large, ongoing randomized controlled trials will not be available until the end of the decade.[10] Consensus guidelines regarding prostate cancer screening have been developed in several countries, some of which recommend population screening of asymptomatic men at average and increased risk (e.g.[11]), while others advocate an informed choice model where screening may be recommended by the individual doctor, following appropriate counseling regarding potential risks and benefits.[12,13]

Several previous studies have assessed uptake and sociodemographic, medical and psychological predictors of prostate cancer screening amongst men with a family history of prostate cancer.[8,14-20] The results from these previous studies are not uniform and require replication; furthermore almost all have been undertaken in the United States, and the extent to which findings translate into others settings with different government health and insurance policies is currently unknown. Also, while women have been shown to influence their partners' behaviours in other health care contexts,[21] to our knowledge, no data are currently available on the role of women in influencing the uptake of prostate screening by men.

This study aimed to survey men with a family history of prostate cancer and their partners in regards to men's uptake of prostate cancer screening tests, in particular digital rectal examination (DRE) and the Prostate Specific Antigen test (PSA), as well as sociodemographic and psychological predictors of uptake.

METHODS

Participants

Participants were ascertained through two existing cohorts. The first was a register of 179 men ('self-selected sample') who had been ascertained in 2001 through newspaper advertisements, inviting men with a family history of prostate cancer to participate in research. The family histories of these men have not been verified. No previous research had been performed on these men at the time of this survey. The second cohort was a sample of 325 men (the 'family study sample') ascertained through a population-based study conducted between 1994 and 1998 of men with a verified diagnosis of prostate cancer and their first-degree relatives.[22] In a previous study involving this sample, we found that 89.6% of men for whom records were available to verify family history were accurate in their reporting.[23] For

the current study, a subgroup of participants in the population-based study were selected who met the following eligibility criteria: unaffected with prostate cancer; and having two or more relatives with prostate cancer or one relative diagnosed with prostate cancer before 55 years of age. Additional eligibility criteria for both samples were: no prior diagnosis of prostate cancer, ability to give informed consent and literacy in English.

Procedure

This study was undertaken as part of a larger study that also assessed men's information and support needs and preferences.[24] An approach letter outlining the purpose of the study, questionnaires and reply paid envelopes were mailed through each of the two primary study centers. A brief questionnaire was also enclosed in the questionnaire package for completion by the female partners of respondents.

Measures

Sociodemographic variables: These included age, marital status, level of education, and whether the respondent has sons.

Family history: Family history was elicited with a single question ("Who in your family has had prostate cancer?").

Utilization and beliefs about prostate cancer screening tests: Four items asked respondents whether they had ever had a DRE or a PSA screening test and, if so, at what age they had their first check. The perceived accuracy of both screening tests was assessed using two items where the respondents indicated their response on a five-point Likert-type scale.

Risk perception: A visual analogue scale anchored by 0% to 100% assessed perceived risk of developing prostate cancer by age 75. Only men aged 75 years and under were included in the

analyses involving perceived risk, as lifetime risk is commonly estimated from the cumulative rate percent to age 75.

The Impact of Events Scale (IES): This 15-item validated scale[16,25,26] was used to assess prostate-cancer-specific distress. It measures intrusion and avoidance responses in relation to a specific stressor (in this study 'concern about being at risk of prostate cancer').

Partners' questionnaire

Several items were administered to partners. In this analysis we only report on the potential impact of partners' involvement in screening on men's uptake of screening.

Partners' involvement in men's screening: Partners were asked using questions with 'Yes' and 'No' response options whether they were (i) involved in organizing his appointments, (ii) reminding him about his check ups and (iii) discussing his choices about check ups. A summary score was calculated and partners were categorized, using a median split, into those with low and those with high involvement in their partners' screening. Cronbach's alpha of the three items was $\alpha = 0.87$.

Statistical analyses

To assess the association between previous utilization of each screening test and categorical and non-normally distributed interval predictor variables, χ^2 analyses and Mann Whitney *U* tests were performed respectively. All variables with a bivariate association with $p<0.1$ were entered into two regression models and progressively eliminated until the only remaining variables were those with $p<0.05$, or those which confounded the association of interest. In order to explore whether the relationship between each of the potential predictor variables and the outcome variables varied by recruitment source, appropriate interaction terms were tested for significance.

RESULTS

Response

A total of 504 questionnaires were mailed out; 23 packages were returned to sender, and eight men were found to be deceased. Of the remaining 473 eligible participants, 59.2% (51.2% in the family study and 73.5% in the self-selected sample) returned completed questionnaires. Assuming that all of the 234 men with partners passed the partner's questionnaire onto their partners, the response amongst partners was 74.4% (*N*=174). The majority of respondents was in a relationship (83.6%) and had biological sons (72.0%). Table 1 provides a summary of the sociodemographic and family history characteristics of the sample.

[Insert Table 1 about here]

Uptake of prostate cancer screening

Seventy-nine percent of respondents reported a previous PSA test, 16.4% none and 4.6% responded 'Don't know'. Seventy-eight percent reported ever having had a DRE, and 22.0% never. The majority (69.7%) reported both DRE and PSA screening, while 12.9% reported a PSA test only and 9.5% a DRE only (men reporting 'Don't know' were excluded from the calculation of percentages.) The mean age at which men had their first PSA test and DRE was 52.4 (*SD* 9.4) and 51.3 (*SD* 10.7) years respectively. The mean rating for perceived accuracy of the PSA test was 3.6 (*SD*=1.4, range 'Not at all accurate' [1], 'Somewhat accurate' [3], 'Extremely accurate' [5]), and the mean rating for the DRE 3.4 (*SD* 1.5).

Analyses of variables associated with utilization of the PSA screening test

The logistic regression model on utilization of the PSA screening test (Table 2) showed significant associations between previous uptake of PSA testing and relationship status and

number of affected relatives. Compared with men who were single, men whose partners were highly involved in men's screening had a significantly higher uptake of PSA testing, and the uptake of screening by men whose partners had low involvement fell between. An interaction was found between age and recruitment source (p=0.021); increasing age was associated with having had a PSA test amongst the self-selected sample (OR=1.20; 95% CI, 1.07 to 1.36; p=0.003), but not the family study sample (OR=1.03; 95% CI, 0.97 to 1.07; p=0.30).

[Insert Table 2 about here]

Analyses of variables associated with utilization of the DRE test

Table 3 shows the logistic regression model on utilization of the DRE test. It showed that age was significantly and positively associated with ever having had DRE, as was perceived prostate cancer risk; further, men with sons were significantly more likely to report having had a DRE.

[Insert Table 3 about here]

DISCUSSION

This study describes the uptake of prostate screening in a sample of Australian men with a family history, finding that 79% of men in our sample reported a previous PSA test. The high level of prostate cancer screening amongst men in our study is consistent with similar overseas studies of at-risk men, which found that between 50% and 95% of unaffected men with a family history of prostate cancer reported a previous PSA test.[8,14,15,17,18] Presumably, the presence of a family history of prostate cancer increases screening uptake,[27] although this was not the case in other reports.[18] We found that 78% (95% CI, 73% to 83%) of men in our sample reported ever having had a DRE, which is similar to the rates of DRE ascertained in

previous studies of men at increased risk, which range from 88% (95% CI, 76% to 100%) to 97% (95% CI, 94% to 100%).[15,17,18] Interestingly, the associations of age, higher perceived risk of developing prostate cancer,[8] and having sons with uptake of DRE suggest that psychological factors are important motivating factors for men's uptake of DRE. In contrast previous uptake of PSA appears to be associated with external factors, including partners' involvement and possibly physician recommendation. This extends previous studies which found the following associations with increased frequency of screening behaviors amongst men with a family history of prostate cancer: increasing age,[14,17,18] marital status,[19] income,[14,19] number of relatives with prostate cancer,[16] self-efficacy about being able to undergo prostate cancer screening,[14] and having discussed prostate cancer screening with one's physician. [17] By contrast, findings on the relationship between screening and perceived susceptibility[8,14] and prostate-cancer-specific distress[16] have been equivocal.

There is strong empirical evidence that shows marriage is associated with lower morbidity and longer life.[21,28] Research has shown women play an important role in health service utilization of the men and communicate health information on their behalf.[21] They are more likely than men to monitor the health service utilization of their partner[21,29] and to encourage their partners to seek health care.[28] A previous pilot study of 10 couples' preferences for prostate cancer screening suggests that women may have an influence on men's attitudes to prostate screening; in particular, in the majority of husbands in this study were found to prefer a no screening strategy, while almost all wives preferred screening for their husbands.[30] However, the impact of partners on actual *uptake* of PSA screening was not known. The current study therefore fills an important gap in the literature, showing not only that partners influence actual uptake of screening, but also that greater partner involvement correlates with greater uptake. The findings confirm the belief that women play a critical role in men's

health-related behaviors.[21] and contrasts with our previous study using the same cohorts, we found that partners did not affect attitudes to specialist health services.[24] Should prostate cancer screening be shown to be efficacious for men with a family history of prostate cancer, screening uptake would be maximized by enlisting the support of women to influence their partner's surveillance behavior. It is likely that women will respond to such interventions with enthusiasm and interest.[21] Furthermore, this is a potentially cost effective strategy for those men who have partners.

We also found that previous PSA uptake was associated with the number of affected relatives, confirming results from another study.[16] A greater number of affected relatives may prompt physicians to recommend prostate cancer screening. Interestingly, number of affected relatives was not associated with DRE, which may reflect physicians' beliefs in the greater sensitivity of PSA testing.

This study is potentially limited by its cross-sectional design and the possibility of selection bias. With regard to participants in the family study sample, their participation in previous studies may have affected responses, and participants in the self-selected sample may have heightened awareness of their increased risk and be particularly motivated to undergo prostate cancer screening. However, while they may not be representative of the broader population of men with a family history of prostate cancer, they are likely to represent those most likely to attend a clinical service.[24] The inclusion of two different clinically relevant samples (those at high risk who need to consider their risk management options and those who already have a heightened awareness of their increased risk) is also likely to increase the external validity of our findings.

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Table 1: Socio-demographics and family history variables of study sample (*N*=280)

Variable	*Level*	*Family study sample*		*Self-selected sample*		*Total sample*	
		N	*%*	*N*	*%*	*N*	*%*
Age	<55	68	44.4	54	43.2	122	43.9
	55-65	35	22.9	55	44.0	90	32.4
	66+	50	32.7	16	12.8	66	23.7
Marital status	Partner	131	84.5	103	82.4	234	83.6
	No partner	24	15.5	22	17.6	46	16.4
Biological sons	Yes	118	76.1	83	66.9	201	72.0
	No	37	23.9	41	33.1	78	28.0
Educational	No post-school	63	42.3	38	30.9	101	37.1
level**	qualifications[a]	86	57.7	85	69.1	171	62.9
	Post-school qualific.						
Number of 1st &	0[b]	13	8.4	2	1.6	15	5.4
2nd degree	1	81	52.3	100	80.0	181	64.6
relatives with	2-3	46	29.7	21	16.8	67	24.0
prostate	4-6	15	9.6	2	1.6	17	6.1
cancer**							

**Compared to men in the self-selected sample, men in the family study sample had significantly lower educational levels (χ^2=8.63, p=0.003) and a higher number affected first- and second-degree relatives (z=2.61, p=0.009). [a]Post-school qualifications refers to additional qualifications gained after secondary school (high school). [b]Participants had third- or higher relatives diagnosed with prostate cancer.

Table 2: Logistic regression of predictors of utilization of a PSA screening test[a] (*N*=187)

Variable	*Reference group*	*OR*	*95% CI OR*	*p*
Relationship status[b]				0.092
	Low involvement	1.88	0.74, 4.75	0.18
	High involvement	3.41	1.12, 10.44	0.031
No of first- and second-degree relatives[c]		1.79	1.03, 3.11	0.040
Age		0.89	0.76, 1.03	0.11
Recruitment source	Family study sample	0.001	0.00, 0.52	0.31
Age x recruitment source		1.16	1.02, 1.31	0.021

Final model: -2 Log likelihood: 148.08. $\chi^2 = 26.19$. $p < 0.001$. [a]Percentage of men reporting having ever had a PSA test. Men reporting don't know are treated as missing data. Men whose partners had not returned the partner's questionnaire (*N*=60) were not included in this analysis, because partner's data were required to allow categorisation of men according to their partner's level of involvement. [b]Comparing unpartnered men to those with partners with high and those with low involvement in their partners' screening. [c]Refers to number of first and second-degree relatives with PC.

Table 3: Logistic regression of predictors of utilization of a DRE screening test[a]

Variable	*Reference group*	*OR*	*95% CI OR*	*P*
Age		1.09	1.05, 1.13	<0.001
Sons	No sons	2.06	1.06, 3.97	0.032
Perceived prostate cancer risk		1.03	1.01, 1.04	<0.001

Final model: -2 Log likelihood: 148.08. $\chi^2 = 26.19$. $p < 0.001$. [a]Percentage of men reporting having ever had DRE. Men reporting 'don't know' are treated as missing data. Only men aged 75 years and under were included from this analysis.

References

1. Parkin D, Bray F and Devesa S: Cancer burden in the year 2000: The global picture. Eur J Cancer 37: S4-S66, 2001.

2. Gronberg H, Wiklund F and Damber J-E: Age specific risks of familial prostate carcinoma. Cancer 86: 477-483, 1999.

3. Zegers M, Jellema A and Ostrer H: Empiric risk of prostate cancer carcinoma for relatives of patients with prostate carcinoma. Cancer 97: 1894-903, 2003.

4. Bruner D, Moore D, Parlanti A, Dorgan J and Engstrom P: Relative risk of prostate cancer for men with affected relatives: Systematic review and meta-analysis. Int J Cancer 107: 797-803, 2003.

5. Edwards S, Kote-Jarai Z, Meitz J and et al.: Two percent of men with early-onset prostate cancer harbor germline mutatons in the BRCA2 gene. Am J Hum Genet 72: 1-12, 2003.

6. Brose M, Rebbeck T, Calzone K, Stopfer J, Nathanson K and Weber B: Cancer risk estimates for BRCA1 mutation carriers identified in a risk evaluation program. J Natl Cancer Inst 94: 1365-72, 2002.

7. Verhage B and Kiemeney A: Genetic susceptibility to prostate cancer: A review. Familial Cancer 2: 57-67, 2003.

8. Jacobsen PB, Lamonde LA, Honour M, Kash K, Hudson PB and Pow-Sang J: Relation of family history of prostate cancer to perceived vulnerability and screening behavior. Psychooncology 13: 80-5., 2004.

9. Bratt O, Kristoffersson, U., Lundgren, R., & Olsson, H.: Sons of men with prostate cancer: Their attitudes regarding possible inheritance of prostate cancer, screening, and genetic testing. Adult Urology 50: 360-365, 1997.

10. Lamb D, Denham J and Delahunt B: Prostate cancer screening in Australia. Clin Oncol 17: 231-233, 2005.

11. Recommendations from the American Cancer Society Workshop on Early Prostate Cancer Detection M aAgotfepcdUCCJC.

12. Urological Society of Australasia (www.urosoc.org.au) Australian Cancer Society (www.cancer.org.au) da.

13. AHTAC Prostate Cancer Screening, Australian Health Technology Advisory Committee, 1996.

14. Vadaparampil S, Jacobsen P, Kash K, Watson I, Saloup R and Pow-Sang J: Factors predicting prostate specific antigen testing among first-degree relatives of prostate cancer patients. Cancer Epidemiol Biomarkers Prev 13: 753-758, 2004.

15. Bock C, Peyser P, Gruber S, Bonnell S, Tedesco K and Cooney K: Prostate cancer early detection practices among men with a family history of disease. Urology 62: 470-475, 2003.

16. Bratt O, Damber J, Emanuelsson M, Kristoffersson U, Lundgren R, Olsson H and Gronberg H: Risk perception, screening practice and interest in genetic testing among unaffected men in families with hereditary prostate cancer. Eur J Cancer 36: 235-241, 2000.

17. Cormier L, Reid K, Kwan L and Litwin MS: Screening behavior in brothers and sons of men with prostate cancer. J Urol. 169: 1715-9., 2003.

18. Miller SM, Diefenbach, M.A., Kruus, L.K., Watkins-Bruner, D., Hanks, G.E., & Engstrom, P.F.: Psychological and screening profiles of first-degree relatives of prostate cancer patients. J Behav Med 24: 247-258, 2001.

19. Spencer B, Babey S, Etzioni D, Ponce N, Brown E, Yu H, Chawla N and Litwin M: A population-based survey of prostate-speficic antigen testing among Californian men at higher risk for prostate carcinoma. Cancer 106: 765-774, 2006.

20. Weinrich S and on behalf of the African American Hereditary Prostate Cancer Study Network: Prostate cancer screening in high-risk men: African American hereditary prostate cancer study network. Cancer 106: 796-803, 2006.

21. Norcross W, Ramirez C and Palinkas L: The influence of women on the health care-seeking behavior of men. J Fam Pract 43: 475-480, 1996.

22. Staples MP, Giles GG, English DR, McCredie MR, Severi G, Cui JS and Hopper JL: Risk of prostate cancer associated with a family history in an era of rapid increase in prostate cancer diagnosis (Australia). Cancer Causes & Control 14: 161-6, 2003.

23. Gaff C, Aragona C, MacInnis M, Cowan R, Payne C, Giles G and Lindeman G: Accuracy and completeness in reporting family history of prostate cancer by unaffected men. Urology 63: 1111-1116, 2004.

24. Gaff C, Cowan R, Meiser B and Lindeman G: Genetic services for men: The preferences of men with a family history of prostate cancer Genet Med 8: 771-778 2006.

25. Meiser B, Butow P, Barratt A, Suthers G, Smith M, Colley A, Thompson E and Tucker K: Attitudes to genetic testing for breast cancer susceptibility in women at increased risk of developing hereditary breast cancer. J Med Genet 37: 472-476, 2000.

26. Horowitz MJ, Wilner N and Alvarez W: Impact of Event Scale: A measure of subjective stress. Psychosom Med 41: 209-218, 1979.

27. Jacobsen P, Lamonde L, Honour M, Kask K, Hudson P and Pow-Sang J: Relation of family history of prostate cancer to perceived vulnerability and screening behaviour. Psychooncology 13: 80-85, 2004.

28. Umberson D: Gender, Marital status and the social control of health behavior. Social Science in Medicine 34: 907-917, 1992.

29. Kandrack M and Grant KS, A: Gender differences in health related behaviour: Some unanswered questions. Soc Sci Med 35: 576-590, 1991.

30. Volk R, Cantor S, Spann S, Cass A, Cardenas M and Warren M: Preferences of husbands and wives for prostate cancer screening. Arch Fam Med 6: 72-76, 1997.