HHS Public Access

Author manuscript

Ann Epidemiol. Author manuscript; available in PMC 2015 July 29.

Published in final edited form as:

Ann Epidemiol. 2008 July ; 18(7): 579–583. doi:10.1016/j.annepidem.2008.02.004.

Racial differences in prostate cancer screening by family history

Bettina F. Drake, MPH, PhD[1,2], **Christopher S. Lathan, MD, MPH**[3], **Cassandra A. Okechukwu, MSN, MPH**[2], and **Gary G. Bennett, PhD**[1,2]

[1]Center for Community-Based Research, Dana-Farber Cancer Institute, Boston, MA

[2]Department of Society, Human Development and Health, Harvard School of Public Health, Boston, MA

[3]Center for Outcomes and Policy Research, Dana-Farber Cancer Institute, Boston, MA

Abstract

Purpose—Prostate cancer (CaP) is disproportionately prevalent among Black, compared to White men. Additionally, men with a family history of CaP have 75% to 80% higher risk of CaP. Therefore, we examined racial variation in the association of family history of CaP and self-reported PSA testing in the nationally-representative National Health Interview Survey (NHIS)

Methods—Data was obtained from the 2005 NHIS, including the Cancer Control Module supplement. We restricted the sample to men, over the age of 40 who reported having “ever heard of a PSA test” (N=1,744). Men were considered to have a positive family history if either their biological father or at least one biological brother had been diagnosed with CaP. SUDAAN 9.0 was used to perform descriptive and multivariable logistic regression analyses.

Results—Men with a family history of CaP were more likely to have a PSA test than those who never had a PSA test (OR=1.8 CI 1.3, 2.5). Among Blacks, men with a family history were not significantly more likely to have a PSA test.

Conclusions—Despite having the highest risk of cancer, Black men with a family history are not screened more than Black men without a family history.

Keywords

Prostate cancer; screening; family history; NHIS; disparity

Introduction

Prostate cancer is disproportionately prevalent among Blacks. The average annual prostate cancer incidence rate is 60% higher in Black men compared to White men, and Black men have the highest mortality rate for prostate cancer of any other racial or ethnic group [1]. Early detection of prostate cancer is complicated by the relatively limited number of established risk factors for the condition [1-6]. Men with a positive family history of prostate cancer as well as Black men have 75% to 80% higher risk of prostate cancer [37, 8]. Given the non-

Corresponding Author: Bettina F. Drake, MPH, PhD, Center for Community-Based Research, Dana-Farber Cancer Institute, 44 Binney Street, Boston, MA 02115, Tel: 617 582-7461, Fax: 617 632- 4858, bettina_drake@dfci.harvard.edu.

modifiable nature of many of the accepted risk factors for CaP, screening is an early detection approach [9, 10].

There is mixed evidence regarding the nature of racial/ethnic variation in the frequency of PSA screening among men with a family history of CaP [11-14]. Miller et al., found no significant difference in PSA screening history among men with first-degree relative family history of prostate cancer versus men without a family history [12]. Among a subset of Black men in a state-based [11] and nationally representative sample [13], those with self-reported family histories of prostate cancer, and older age groups [13] were more likely to report having a PSA test [11, 13]. Alternatively, a study comparing PSA screening among participants in the national African American Hereditary Prostate Cancer (AAHPC) cohort and Black male participants in the 2000 NHIS survey, found that men in the AAHPC cohort, with 4 or more relatives with prostate cancer, had significantly lower rates of PSA screening compared to the nationally representative sample of Black men [14].

Therefore, we examined whether racial variation exists in the association of family history of prostate cancer and self-reported receipt of PSA testing in the nationally-representative National Health Interview Survey (NHIS).

Methods

Source of the Data

NHIS, an annual health survey conducted by the National Center for Health Statistics, is a major source of information on the health of the civilian, non-institutionalized, household population in the United States [15]. We utilized data from the 2005 NHIS, which included additional cancer-related data collected as part of the 2005 Cancer Control Module supplement. One adult was randomly selected from each participating family to complete the core NHIS survey, including questions about the respondent's health status, sociodemographic characteristics, socioeconomic circumstances, and access to and use of health services. Both Black and Hispanic populations were over-sampled. Person-level weights were adjusted to 2000-Census-based population estimates for sex, age, and race/ethnicity, post-stratification [15].

Participants

The 2005 interviewed sample adult component was 31,428 persons. The conditional response rate for the sample adult component was 80.1% of persons identified as sample adults. We restricted the sample to men, over the age of 40 who reported having “ever heard of a PSA test” (N =8,490) and who did not have missing values for the main study variables, ever had a PSA test (N =841); and family history of prostate cancer (N=65). Participants with an unknown race were included in the “other” category. Additionally, all individuals with a cancer diagnosis were excluded from analysis (N=301). Analyses were conducted on N =1,744 participants.

Measures

Demographic and health characteristics—Data on age, race, education, marital status, insurance, place to go when sick, and physician visits during the past 12 months were all self-reported. Age was included in analyses as a continuous variable. Race/ethnicity was collapsed into three categories: non-Hispanic White, non-Hispanic Black, and Other. Education was categorized into four levels based on high school and college levels of attainment. Marital status was reported as never married, married or separated, divorced or widowed at the time of the survey. Insurance was combined into a dichotomous variable of insured vs. uninsured. The NHIS survey also assessed the type of facility visited most often when one is sick and whether the individual has seen a physician within the past 12 months.

Screening—All male adults aged 40 years and older were asked, “Have you ever had a PSA test?” For the purposes of this analysis, “prostate cancer screening” is defined as the individual's response to this question. The 2005 NHIS survey did not inquire about digital rectal examinations or other prostate cancer screening methods.

Family history—Men were considered to have a positive family history if they responded that either their biological father, or at least one biological brother had been diagnosed with prostate cancer.

Data Analysis

NHIS uses a stratified, multistage-cluster sampling design; all analyses were conducted using SUDAAN (version 9, RTI) to account for this sampling. Descriptive statistics using weighted values and corresponding 95% confidence intervals were used to examine demographic characteristics by PSA screening status. All variables significant at alpha ≤ 0.05 in bivariate analyses were included in multivariable models.

We estimated multivariable logistic regression models to examine the first question: Are men with a family history of prostate cancer more likely to have received PSA testing, compared to men without a family history? We subsequently utilized race-stratified models to identify whether racial differences existed in the association between family history and PSA testing. A logistic regression model is also presented to answer the second research question: Are Black men with a family history of prostate cancer more likely to report ever having a PSA test compared to White men with a family history of prostate cancer? Crude and multivariable analyses were stratified by family history to examine the association between race and receipt of PSA testing within levels of family history. For all logistic regression models, odds ratios (OR) and 95% confidence intervals (CI) are presented.

Results

Characteristics of study sample

Descriptive characteristics by PSA screening status (ever vs never) are presented in Table 1. The average age of men was 55.30, but men reporting receipt of PSA testing were significantly older than those who reported not being tested. A significantly larger percentage of men with a family history of prostate cancer reported ever having a PSA test,

compared to those who never had a PSA test. There was no significant difference in being screened vs. never being screened among Blacks; however a higher percentage of Whites have been screened. Significantly larger percentages of men who received a PSA test were seen by a physician within the past year, had a bachelor's degree or above, were insured and were married, compared to those who have never received a PSA test.

Crude and adjusted results

Men with a family history of prostate cancer were more likely to report PSA screening than those who have never had a PSA test (OR=1.82 CI 1.31, 2.52). See Table 2. Similarly, Black men were more likely to report PSA screening compared to White men (OR=1.85 CI 1.05, 3.25). Among Whites, men with a family history of prostate cancer were significantly more likely to report PSA screening compared to those without a family history of prostate cancer (OR=1.66 CI 1.14, 2.40). See Table 3. However, among Blacks, men with a family history were not significantly more likely to report PSA screening.

Analyses stratified by family history of prostate cancer are also shown in Table 3. Among those with a family history, Blacks were over three times more likely to report PSA screening than Whites (OR=3.76 CI 1.26, 11.22). There were no racial differences seen among men with no family history.

Discussion

Given that family history is a strong risk factor for prostate cancer, we hypothesized that men with a family history of prostate cancer were more likely to have had a PSA test. The findings in this study confirm this hypothesis. This is consistent with recent studies finding a higher prevalence of PSA testing among men with a family history compared to those without [11, 16]. Black men with a positive family history of CaP are at particularly high risk of CaP, given this; they should be disproportionately likely to undergo PSA screening. However, we observed no difference by family history status in PSA screening among Black men. Further, we found that indeed among men with a family history of prostate cancer, Black men are more likely than White men to have had a PSA test.

Our findings both support and extend those of other studies. Bloom et al., found that Black men with a family history were more likely to have had a PSA test [11]. Similar to our findings, an analysis of Black men in the 2000 NHIS survey found that older age, having insurance, and a positive family history of prostate cancer were significantly associated with ever having a PSA test [13]. Our findings extend these reports by showing that the association of family history with screening varies by race. Blacks with a family history of CaP are at highest risk for CaP, therefore, it is important to note that this group of men are receiving CaP screening at a higher rate than other groups.

We found that Black men are screened more than White men, which is expected given their increased risk. We expected to see very high rates for Black participants with a family history, relative to Blacks with no history and all Whites. However, we did not find that Black men with a family history are screened more than Black men without a family history. This may reflect challenges experienced for both patient and physician when considering

family history Patients may be less aware of their family history or the importance of family history to CaP. Similarly men may not be knowledgeable concerning the role of family history in informed decision-making. Other studies have reported that Black men are aware of increased risk of prostate cancer due to their race but there is no difference in perception of prostate cancer risk between Black men with and without a family history of prostate cancer [11, 17]. These findings warrant additional attention because, despite the current controversy regarding the efficacy of screening, few debate the importance of screening Black men with a positive family history, given their dramatically increased risk.

Limitations

Several limitations should be considered when drawing interpretations from these findings. The accuracy of self-reported family history of prostate cancer may be of concern; however, an evidence-based analysis found family history of prostate cancer as a valid self-report measure. [18]. Our measures are based on self-report and are therefore subject to reporting error. NHIS did not survey individuals who were institutionalized or without landline telephone service; this affects both the generalizability of our findings and, if these groups vary on screening, may have biased our estimates. Generalizability of these findings should also be considered in light of the response rate. Nonresponse is a continuing and worsening challenge for all RDD household telephone surveys [19, 20] and constrains the representativeness of our sample to the responding portion of the population.

Conclusions

Given the controversy surrounding PSA screening in men, the questions raised in this study are important ones. Black men, the group at highest risk for prostate cancer, often see conflicting messages regarding PSA screening. On one hand they are told about the risk of the disease, and its disparate effect on Black men, and on the other hand, many feel that PSA screening has not been proven as a useful screening tool. This study examines differences in PSA screening between Whites and Blacks and its results show that Black men are obtaining PSA screening more than their White counterparts. A family history of prostate cancer does not seem to matter in Blacks as much as in White patients which indicates that Black men see their risk as high as a group.

Black men appear to be at the forefront of the PSA screening debate, and as this study indicates, race alone appears to have as much of a role as family history in PSA screening in the Black community. These findings are important as the results of the large randomized clinical trials of PSA screening become available and PSA screening recommendations are revisited.

References

1. Crawford ED. Epidemiology of prostate cancer. Urology. 2003; 62(6 Suppl 1):3–12. [PubMed: 14706503]
2. Drake BF, Keane TE, Mosley CM, et al. Prostate Cancer Disparities in South Carolina: Early Detection, Special Programs, and Descriptive Epidemiology. The Journal of the South Carolina Medical Association. 2006; 102(7):241–9. [PubMed: 17319238]
3. Catalona WJ, Antenor JA, Roehl KA, Moul JW. Screening for prostate cancer in high risk populations. J Urol. 2002; 168(5):1980–3. discussion 3-4. [PubMed: 12394689]

4. Grumet SC, Bruner DW. The identification and screening of men at high risk for developing prostate cancer. Urol Nurs. 2000; 20(1):15–8. 23–4, 46. [PubMed: 11998038]
5. Jones RA, Wenzel J. Prostate cancer among African-American males: understanding the current issues. J Natl Black Nurses Assoc. 2005; 16(1):55–62. [PubMed: 16255315]
6. Thompson IM, Ankerst DP, Chi C, et al. Assessing prostate cancer risk: results from the Prostate Cancer Prevention Trial. J Natl Cancer Inst. 2006; 98(8):529–34. [PubMed: 16622122]
7. Gronberg H, Xu J, Smith JR, et al. Early age at diagnosis in families providing evidence of linkage to the hereditary prostate cancer locus (HPC1) on chromosome 1. Cancer Res. 1997; 57(21):4707–9. [PubMed: 9354426]
8. Smith JR, Freije D, Carpten JD, et al. Major susceptibility locus for prostate cancer on chromosome 1 suggested by a genome-wide search. Science. 1996; 274(5291):1371–4. [PubMed: 8910276]
9. Hernandez J, Thompson IM. Prostate-specific antigen: a review of the validation of the most commonly used cancer biomarker. Cancer. 2004; 101(5):894–904. [PubMed: 15329895]
10. Volk RJ, Cass AR, Spann SJ. A randomized controlled trial of shared decision making for prostate cancer screening. Arch Fam Med. 1999; 8(4):333–40. [PubMed: 10418541]
11. Bloom JR, Stewart SL, Oakley-Girvans I, Banks PJ, Chang S. Family history, perceived risk, and prostate cancer screening among African American men. Cancer Epidemiol Biomarkers Prev. 2006; 15(11):2167–73. [PubMed: 17119042]
12. Miller SM, Diefenbach MA, Kruus LK, Watkins-Bruner D, Hanks GE, Engstrom PF. Psychological and screening profiles of first-degree relatives of prostate cancer patients. J Behav Med. 2001; 24(3):247–58. [PubMed: 11436545]
13. Ross LE, Uhler RJ, Williams KN. Awareness and use of the prostate-specific antigen test among African-American men. J Natl Med Assoc. 2005; 97(7):963–71. [PubMed: 16080666]
14. Weinrich SP. Prostate cancer screening in high-risk men: African American Hereditary Prostate Cancer Study Network. Cancer. 2006; 106(4):796–803. [PubMed: 16411222]
15. National Center for Health Statistics. Data File Documentation, National Health Interview Survey, 2005 (machine readable data file and documentation). National Center for Health Statistics, Centers for Disease Control and Prevention; Hyattsville, Maryland: 2006.
16. Spencer BA, Babey SH, Etzioni DA, et al. A population-based survey of prostate-specific antigen testing among California men at higher risk for prostate carcinoma. Cancer. 2006; 106(4):765–74. [PubMed: 16419068]
17. Myers RE, Hyslop T, Jennings-Dozier K, et al. Intention to be tested for prostate cancer risk among African-American men. Cancer Epidemiol Biomarkers Prev. 2000; 9(12):1323–8. [PubMed: 11142417]
18. Murff HJ, Spigel DR, Syngal S. Does this patient have a family history of cancer? An evidence-based analysis of the accuracy of family cancer history. JAMA. 2004; 292(12):1480–9. [PubMed: 15383520]
19. Atrostic BK, Bates N, Burt G, Silberstein A. Nonresponse in U.S. Government Household Surveys: Consistent Measures, Recent Trends, and New Insight. Journal of Official Statistics. 2001:209–26.
20. Curtin R, Presser S, Singer E. Changes in Telephone Survey Nonresponse over the Past Quarter Century. Public Opinion Quarterly. 2005:87–98.

Abbreviations

CaP	Prostate cancer
PSA	Prostate-Specific Antigen
AAHPC	African American Hereditary Prostate Cancer
NHIS	National Health Interview Survey
OR	odds ratios

CI 95% confidence intervals

Ann Epidemiol. Author manuscript; available in PMC 2015 July 29.

Table 1

Demographic Characteristics of Men 45+ by Ever Had a PSA Test, 2005 NHIS data

	Total		Ever Had a PSA Test	
			Yes	No
Characteristic	**Weighted N**	**Unweighted N**	**% (95% CI)**	**% (95% CI)**
Total	23,437,279	3,245		
Age (mean; std error)	55.30		59.70 (0.22)	50.87 (0.18)
PrCA Family History				
Yes	2,109,173	271	28.22 (25.06, 31.60)	18.20 (15.14, 21.72)
No	5,366,101	721	71.78 (68.40, 74.90)	81.80 (78.28, 84.86)
Race				
NH White	18,613,039	2,390	79.45 (77.79, 81.02)	72.48 (70.55, 74.33)
NH Black	2,302,692	422	9.83 (8.64, 11.16)	9.68 (8.48, 11.04)
Other	2,511,704	431	10.72 (9.54, 12.03)	17.84 (16.47, 19.30)
Sick Care				
Clinic/Health Center	2,841,955	418	12.79 (11.40, 14.32)	18.28 (16.44, 20.27)
Dr's Office/HMO	19,040,146	2,594	85.67 (84.08, 87.13)	78.41 (76.38, 80,32)
Emergency Room	103,649	16	0.47 (0.25, 0.88)	0.93 (0.63, 1.35)
Other	238,183	42	1.07 (0.76, 1.52)	2.38 (1.90, 2.99)
Seen MD within Year				
Yes	19,413,608	2,680	82.85 (81.32, 84.28)	58.07 (56.25, 59.87)
No	4,019,401	564	17.15 (15.72, 18.68)	41.93 (40.13, 43.75)
Education				
< High School	1,637,527	334	7.03 (6.19, 7.99)	9.99 (8.94, 11.16)
High School	5,116,294	749	21.98 (20.42, 23.63)	27.64 (26.07, 29.27)
Some College	6,390,651	887	27.45 (25.69, 29.29)	30.42 (28.66, 32.25)
Bachelors or Above	10,133,757	1,253	43.53 (41.55, 45.54)	31.94 (30.21, 33.72)
Insurance				
Yes	21,399,185	2,928	91.42 (90.28, 92.44)	79.23 (77.71, 80.68)
No	2,007,450	312	8.58 (7.56, 9.72)	20.77 (19.32, 22.29)

			Ever Had a PSA Test	
	Total		Yes	No
Characteristic	**Weighted N**	**Unweighted N**	**% (95% CI)**	**% (95% CI)**
Marital Status				
Married	18,860,467	2,174	80.58 (79.22, 81.88)	72.26 (70.55, 73.92)
Divorced/Separated	3,416,821	811	14.60 (13.51, 15.76)	16.20 (15.53, 19.93)
Never Married	1,127,433	250	4.82 (4.15, 5.59)	11.04 (9.90, 12.29)

* χ^2 p-value (for ever having a PSA test and each characteristic) < 0.0001

Table 2

Adjusted Measures of Association Comparing Ever Having A PSA Test, 2005 NHIS Data

Characteristic	Level	OR (95% CI)
Age		1.09 (1.07, 1.11)
PrCA Family History	**No**	1.00 (reference)
	Yes	1.82 (1.31, 2.52)
Race	**NH White**	1.00 (reference)
	NH Black	1.85 (1.05, 3.25)
	Other	1.34 (0.86, 2.09)

* Adjusted for place to go when sick, seen MD within past year, education, insurance and marital status

Table 3

Interaction between prostate cancer screening and family history varies by race, 2005 NHIS Data

		Whites	Blacks
Characteristic	**Level**	**OR (95% CI)**	**OR (95% CI)**
PrCA Family History	**No**	1.00 (reference)	1.00 (reference)
	Yes	1.66 (1.14, 2.40)	2.96 (0.87, 10.03)
		Family History	**No Family History**
		OR (95% CI)	**OR (95% CI)**
Race	**White**	1.00 (reference)	1.00 (reference)
	Black	3.76 (1.26, 11.22)	1.41 (0.73, 2.71)
	Other	2.05 (0.70, 5.99)	1.22 (0.73, 2.05)

* Adjusted for age, place to go when sick, seen MD within past year, education, insurance and marital status

** Interaction term p-value = 0.48