Published in final edited form as:

J Immigr Minor Health. 2013 August ; 15(4): 803–809. doi:10.1007/s10903-012-9662-y.

Clinical Profile, Quality of Care, and Recurrence in Arab-American and Caucasians Prostate Cancer Patients in Michigan

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Abstract

Prostate cancer is the most common cancer among men in the United States with striking differences in incidence and mortality among ethnic groups. Michigan has one of the largest concentrations of Arab Americans (AAs) in the U.S. and little is known about this ethnic minority with respect to prostate cancer. This study investigated differences in clinical profile, quality of care, and recurrence among prostate cancer survivors comparing AAs and Caucasian Americans (CAs). Participants in this study included 2499 prostate cancer survivors from the Michigan Cancer Registry from 1985 to 2004. Participants completed surveys regarding health-seeking behavior, post-treatment symptoms, quality of care and recurrence. Ethnicity was self-reported and AAs and CAs were compared with respect to clinical profile, quality of care, and recurrence. There were 52 AAs and 1886 CAs patients with AAs being younger ($\bar{x}$ age 68.3 $\pm$ SD 21.4 years, $\bar{x}$ age 72.3 $\pm$ SD 14.1 years, for AAs and CAs, respectively) ($P = 0.05$). AAs had lower socioeconomic standard than CAs (34 vs. 10.6 %, <\$20,000 yearly income/year; for AAs vs. CAs, respectively) ($P < 0.0001$). AAs reported poorer health than AAs (7.7 vs. 3.0 % for AAs vs. CAs, respectively) ($P < 0.0001$). AAs were more likely to visit specialists for prostate follow-up (44.5 vs. 19.7 % visited a specialist, for AAs vs. CAs respectively) ($P < 0.0001$) and received supplementary healthcare workers (13 % of AAs vs. 3.1 % CAs) ($P = 0.032$). In addition, AAs reported higher occurrence of urinary incontinence compared to CAs (67.4 vs. 60.4 %, for AAs vs. CAs, respectively) ($P = 0.001$). Ethnic background was not a predictor of recurrence [(Odds ratio (OR) = 1.1 (95 % confidence intervals CI = 0.40, 2.9)] ($P = 0.873$) even after adjusting for age, PSA levels within the last 2 years, metastasis and hormonal therapy. While AAs prostate cancer patients were different from CAs in age, income, seeking medical care, and health reporting,

ethnic background was not a predictor of recurrence. Future studies of the impact of socioeconomic, demographic and cultural factors, and health care seeking behavior on long-term survival of prostate cancer in AAs and other ethnic minorities are warranted.

Keywords

Prostate cancer; Arab-Americans; Ethnic minorities; Quality of care; Treatment; Survivorship

Introduction

According to Surveillance Epidemiology and End Results [1], prostate cancer is the most common cancer among men in all ethnic-groups in the U.S with a 5-year period survival of 99.4 % during 1999–2006 [2]. Striking differences exist in prostate cancer incidence and mortality among ethnic groups with more than 60 % of the difference being accounted for modifiable factors such as socio-demographic factors and screening [3]. While disparities are recognized with respect to minority participation in early detection programs or screening, little is known about disparities with respect to post-treatment follow up, symptom management, recurrence, and quality of life after treatment among ethnic minorities.

Out of all ethnic minorities resident in the U.S., Arab-Americans (AAs) have been residents of the U.S. for more than a century but are not typically reported in the U.S. census as minorities since they are usually included as Whites [4]. Michigan has one of the largest concentrations of AAs in the U.S. [4]. The limited publications on the number of AAs in Michigan estimate a population size of 191,607 individuals [5]. The major countries where AAs come from to Michigan are Iraq, Lebanon, Yemen, Jordan, and Syria and about one-third of AAs in Michigan are foreign-born [5]. Whether AAs are migrants or first-generation Americans, they have distinct socioeconomic and cultural backgrounds that may modulate their medical care seeking behavior and subsequent follow up and survival profiles [6]. However, very little is known about the health behavior of AAs especially chronic diseases and cancer. Prostate cancer is the most incident cancer among AA males in the U.S. [7] which due to screening and effective treatments ensures high survival. Nevertheless, there is clearly a lack of information on differences in prostate cancer care profile between AAs and Caucasian-Americans (CAs) in the context of the distinct socioeconomic and cultural backgrounds of AAs. In order to fill the above knowledge gap that exists, the present study was undertaken to investigate the difference in patterns of prostate cancer between AAs and CAs with respect to symptoms, quality of care and recurrence.

Methods

This study originated from a collaborative effort between the Michigan Public Health Institute (MPHI) Cancer Control Services Program, the Michigan Cancer Consortium (MCC), and the Cancer Prevention and Control section at the Michigan Department of Community health (MDCH). In 2008, a sample of 7,763 prostate cancer survivors diagnosed between 1985 and 2004 were identified as possible participants for this study from the Michigan Cancer Registry, a statewide registry that collects information on all cancer

patients diagnosed in Michigan. Of the patients who were identified in the registry, 967 were lost to follow up and 1,232 were ineligible for follow up because of death (n = 221), cognitive problems (n = 160), wrong addresses (n = 386), out of state residence (n = 151), convict (n = 16), and patients unable to complete the survey (n = 14). A total of 2,499 surveys were completed and received, of which 1938 surveys were included in the final statistical analysis. They surveys included 52 surveys of AAs and 1,886 surveys of CAs. The response rate was 39.1 % for AAs and 38.2 % for CAs.

The survey included 17 pages with 3 several sections on demographic background, clinical symptoms and their persistence, and quality of follow up. We asked the respondents to indicate at the end of the interview how much time it took them to fill out the questionnaire and the time needed ranged from 30 to 60 min. Survey subjects were given enough time to return the questionnaire to us and they could complete it at their convenience in the comfort of their own homes. Self-addressed and pre-paid envelopes were provided to return the completed interviews in plus a \$5 gift card was offered for further incentive. For AA men the questionnaire was given in both English and Arabic. Two boards reviewed the study protocols, the Michigan Department of Community Health Scientific Advisory Board who reviews all privacy sensitive studies that use resources of the state cancer registry and the MPHI IRB that is the designated Research Integrity Review Board. The study was also approved by the University of Michigan IRB committee.

Data Management

The mailed survey included information about 327 variables and variables related to ethnic background, socioeconomic and demographic, and clinical variables were included in this analysis.

CAs were defined as individuals that had self-reported being Caucasians on the survey. AAs were defined as individuals that had self-reported being Arab, Armenian, Chaldean or Middle Eastern. The rationale behind this classification was geographic proximity and interrelated histories of these peoples. For SES three categories were created: <\$20,000, \$20,000–\$49,999 and \$50,000+. Similarly educational status had three categories: less than or equal to high school, college, and graduate school. Marital status was combined into two categories: Single/Divorced/Widowed and Married. Health insurance and health status were self-reported as Present/Absent, Excellent/Very Good, Good/Fair, and Poor.

Data Management: Quality of Care Characteristics

Quality care characteristics included healthcare providers having four categories: Urologist, Oncologist, Primary Care/Family Doctor and Others. Referral had the following two categories: “went” and “did not go to one of the following five categories: Mental Health, Social Worker, Spiritual Counselor, Sexual Therapist, and Support Groups”.

Data Management: Difference in Symptoms

The following conditions denoted differences in symptoms and had “Rarely or Never” and “More than once a day to once a week” as outcomes: Urinary Control, Leaked urine, Pain or Burning Sensation, Bleeding with Urination, Need to Urinate Frequently, Self Reported

Extent that Urinary Symptoms are a problem, Erectile Dysfunction, Ability to Maintain Reliable Erection, Feeling Down Depressed or Hopeless, and Healthcare Provider Diagnosis of Depression. The aforementioned variable choices were based on “EPIC-26”, a set of 26 variables identified that were reliable in measuring HRQOL (Health-related Quality of Life) of patients undergoing prostate cancer treatment [8].

Data Management: Predictors of Recurrence

Recurrence was self reported and was based on answering “Yes” to either one of the following questions or both: “Has your doctor ever told you that your cancer has come back to the same part of your body (meaning your prostate area)?” and/or “Has your doctor ever told you that your cancer has come back and spread to another part of your body (outside the prostate)?”

Statistical Analysis

All statistical analysis was conducted in SAS 9.2.1 (SAS Inc. Cary, NC, USA). Distribution of the continuous variables was determined and Student’s *t* test was conducted to compare the two racial groups to obtain *P* values. Chi Square and Fischer’s Exact tests were conducted to compare the two racial groups with respect to the categorical variables to obtain *P* values. Finally, unconditional logistic regression was utilized to obtain odds ratios (ORs), 95 % confidence intervals (CIs) and *P* values to further examine the significant associations observed in our bivariate analyses comparing the two races regarding recurrence.

Results

Table 1 shows the distribution of various important variables in the study population. Among the 52 AAs and 1886 CAs, AAs were younger than CAs ($\bar{x} = 68.3 \pm \text{SD } 21.4$, $\bar{x} = 72.3 \pm \text{SD } 14.1$, for AAs and CAs respectively) ($P = 0.05$). More AAs belonged to lower SES than CAs (34 vs. 10.6 % <\$20,000; 40 vs. 49 % \$20,000–\$49,999; 26 vs. 40.4 % 50,000+; AAs vs. CAs respectively) ($P < 0.0001$). Less CAs than AAs reported having poor health status (3.0 vs. 7.7 %; $P < 0.0001$).

Table 2 outlines the quality of care characteristics depicting that more AAs than CAs went to specialists such as urologists and oncologists compared to primary care physicians (37.8 vs. 17.1 % visited urologist; 6.7 vs. 2.6 % visited oncologist; 53.3 vs. 77.5 % visited primary care/family doctor; AAs vs. CAs respectively) ($P < 0.0001$). Also, more AAs than CAs visited supplementary health care professionals (13 vs. 3.1 % AAs vs. CAs, respectively) ($P = 0.032$).

Table 3 outlines the differences in symptoms with more AAs than CAs having difficulty in urinary control (8.7 vs. 4.6 % reported no urinary control; 17.4 vs. 12.2 % reported frequent dribbling; 41.3 vs. 43.6 % reported occasional dribbling; 32.6 vs. 39.6 % reported total control; AAs vs. CAs, respectively) ($P = 0.001$). There were no noticeable differences between AAs and CAs with respect to other symptoms.

The various predictors of recurrence have been analyzed in Table 4. Presence of metastasis at the time of diagnosis increased the likelihood of recurrence (9.2 vs. 2.8 % reported metastasized cancer at diagnosis; recurrence vs. no recurrence, respectively) ($P < 0.0001$). Among patients with recurrence, far more patients were still undergoing hormone therapy (60.0 vs. 31.1 % still undergoing hormone therapy; recurrence vs. no recurrence, respectively) ($P < 0.0001$). There were also more patients without recurrence who had completed treatment (72.8 vs. 27.2 % reported completing treatment; no recurrence vs. recurrence, respectively) ($P < 0.0001$).

Table 5 depicts the findings of the unconditional logistic regression model predicting recurrence. Patients having recurrence were more likely to be older in age (OR = 1.01 [95 % CI = 1.0–1.03]) ($P < 0.035$). Patients with recurrence were more likely to have had the cancer metastasized during diagnosis (OR = 2.25 [95 % CI = 1.3–3.9]) ($P = 0.005$). Patients having recurrence were less likely to have stopped hormone therapy (OR = 0.22 [95 % CI = 0.16–0.3]) ($P < 0.0001$).

Discussion

This study showed the following interesting observations. First, AAs were significantly younger than CAs. Second, AAs had lower SES than their CAs. Third, AAs had a distinct medical profile as compared to their CA counterparts with regards to reporting poorer health status, more seeking health care at specialist's office, more utilization of supplementary healthcare opportunities, and a higher prevalence of urinary incontinence. Fourth, ethnic background was not a predictor of recurrence even after controlling for age, PSA diagnosis within past 2 years, cancer metastasis and stopping of hormone therapy.

According to SEER the most common age group for prostate cancer incidence amongst CAs was 70–74 years [2]. As such, our observation of a mean age of 72.3 for CAs was consistent with that of U.S. SEER that does not report on AAs and no data was available regarding the age of prostate cancer incidence among AAs. However, evidence from native Arab populations indicates that prostate cancer is indeed a disease of earlier age as seen in United Arab Emirates where mean age of prostate cancer incidence was 56.5 years [9].

Prostate cancer is not a common disease among native Arab populations accounting for no more than 4–10 % of male cancers [10]. However, prostate cancer is the most common cancer among AAs males living in the state of Michigan [7]. Change in risk factors with migration may lead to increasing risk for diseases of that are more common in the new country than the homeland [11]. This implicates the increasing effect of local environmental risk factors in the new country on disease causation or availability of diagnostic tools. Related to this, the migration of AAs to USA occurred in three waves, the first being at the turn of the last century and the second after World War II, and the third in 1965 with a substantial increase in the 1990s [4, 7, 12]. Descendants of earlier immigrants have prostate cancer incidence patterns similar to CAs while more recent first generation immigrants have patterns similar to native Arabs [7]. Since our population of AAs is comprised of both early and late generations, it is quite expected that the age of incidence of prostate cancer is to be intermediate of native Arabs and CAs.

AAs in general have lower income than the U.S. median income [12]. This was shown in this study where AAs were more likely to belong to a lower SES than their CAs and this may be related to long-term survivorship [13–15].

This study showed significant differences between AAs and CAs with respect to reporting medical conditions after prostate cancer. The first difference was in more CAs self-reporting excellent/very good health status compared to more AAs self-reporting poor health status. It will not be possible from information obtained through this mailed survey to confirm if this report of poorer health is true or not. Cultural factors related to under-reporting of good health should be taken cautiously in this reporting [16]. The second difference was the observation of increased seeking care of AAs at specialist office as well as increased supplementary health care usage. Seeking care at specialist office has preferential cultural connotations for AAs. The culture phenomenon may be due to the absence of family medicine (i.e. primary care) as a specialty in Arab countries [17]. The earliest training of family medicine specialty in the Arab countries began in 1979 and since then, of the 22 League of Arab States, only 15 States participate in The Arab Board of Family and Community Medicine [17]. The absence of the predominance of family medicine specialty may lead AAs to seek specialist care and forego primary care physicians as they have either not been to a family specialist in countries they immigrated from, or cultural norms have maintained throughout the generations from parent to child.

The third difference between the two groups was with respect to higher reporting of urinary incontinence among AAs than CAs. Urinary incontinence is one of the most frequent consequences of prostate surgery. AAs reported having more urinary incontinence than CAs, which could be due to previous diseases or prostatectomy, although in our study there was no difference in the proportions of patients who had a prostatectomy in the two groups. There is evidence to suggest that urinary incontinence after treatment occurs more commonly following radical surgery [18]. It may also develop due to tumor progression during deferred treatment or sphincter involvement in advanced disease [19]. However, the similarity of recurrence patterns between AAs and CAs, whose most commonly associated with metastatic disease as observed in our study as well as in other studies [20], may indicate that the probable cause for urinary symptoms in AAs is probably related to either pre-operative factors [21, 22] or higher choice of radical surgery. The choice of treatment depends on the type of specialist visited therefore urinary incontinence may be linked to the preference of AAs for specialists, especially urologist, who may suggest radical surgery [23].

With regards to recurrence, the study found that ethnic background was not a predictor of recurrence of prostate cancer. As expected, metastasized cancer at diagnosis had implications for recurrence; primarily that individuals who had metastasized cancer also had higher odds of recurrence. Aging had a slight modification on the odds of developing prostate recurrence and completion of hormone therapy had a protective effect on both CAs and AAs. In about one-third of patients after radical prostatectomy there is a biochemical relapse with increasing prostate specific antigen (PSA) within 10 years [24]. However, most of these patients with a biochemical relapse are not candidates for salvage treatment with curative intent [25]. Among non-curative options, hormone therapy remains the first line of

treatment [24] with peripheral androgen blockade—anti-androgen and a 5 α -reductase inhibitor being the first choice [25].

This study is the first study to report on prostate cancer post-treatment patterns of AAs with CAs. Since Michigan has one of the largest concentrations of AAs in U.S. [12], conducting the study among this ethnic minority population was a point of strength for the study. The study had a relatively large number of AAs relative to the rarity of the disease. However, the percentage of AAs participants in our study (2.68 %) compared well to the percentage (1.2 %) of Michigan population comprised by AAs [26]. The overall relative low response rate of the study compares favorably to similar studies of cancer survivors recruited from a short follow up and survival periods. Nevertheless, the respondents in this study were similarly distributed compared to all sampled cases with regard to cancer therapy method [27]. In addition to the relatively small sample size of AAs, our study was also limited by the fact that it was based on self-reported surveys and thus lacked adequate information regarding the pre-treatment period such as stage at diagnosis and details of the treatment provided such as the type of primary surgery conducted. Self reporting can also result give rise to certain forms of recall bias. In spite of our limitations, our results on the lack of role for ethnic background in predicting prostate cancer recurrence are in agreement with the recent finding that age-adjusted cancer mortality rates of AAs in Michigan are not statistically different from AA cancer mortality rate [28].

AAs were different from CAs in age, income, seeking medical care, and health reporting. However, ethnic background was not a predictor of recurrence. Future studies of the impact of socioeconomic, demographic and cultural factors, and health care seeking behavior on long-term survival of prostate cancer in AAs and other ethnic minorities are warranted by employing longitudinal study designs. It might also be imperative to assess the access and preference of ethnic minorities especially AAs for primary care physicians in the light of our findings.

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Table 1

Descriptive characteristics of Arab-American and Caucasian-American prostate cancer patients

Variables	Arab-Americans (N = 52)	Caucasian-Americans (N = 1,886)	P value
Age (years)			
Mean ($\pm$ SD)	68.3 ($\pm$ 21.4)	72.3 ($\pm$ 14.1)	0.050 ^a
Median (min–max)	75 (52–94)	75 (38–98)	
Socio economic status (income per year)			
<\$20,000	17 (34 %)	188 (10.6 %)	
\$20,000 to \$49,999	20 (40 %)	866 (49 %)	
\$50,000+	13 (26 %)	713 (40.4 %)	<0.0001 ^b
Education			
High school	26 (59.1 %)	725 (45.5 %)	
College	7 (15.9 %)	486 (30.5 %)	
Graduate school	11 (25 %)	384 (24 %)	0.090 ^b
Marital status			
Single/divorced/widowed	8 (15.4 %)	347 (18.5 %)	
Married	44 (84.6 %)	1529 (81.5 %)	0.560 ^b
Having health insurance			
Yes	48 (96 %)	1850 (99.2 %)	
No	2 (4 %)	15 (.8 %)	0.060 ^c
Self reported health status			
Excellent/very good	20 (38.5 %)	893 (48 %)	
Good/fair	28 (53.8 %)	911 (49 %)	
Poor	4 (7.7 %)	55 (3 %)	<0.0001 ^c

^a Student's *t* test

^b Chi-square test

^c Fisher's exact test

Table 2

Quality of care characteristics of Arab-American and Caucasian-American prostate cancer patients

Variables	Arab-Americans	Caucasian-Americans	P value
Health care provider			
Urologist	17 (37.8 %)	292 (17.1 %)	
Oncologist	3 (6.7 %)	45 (2.6 %)	
Primary care/family doctor	24 (53.3 %)	1323 (77.5 %)	
Other	1 (2.2 %)	48 (2.8 %)	<0.0001 ^b
Referrals ^a			
Went	3 (13 %)	32 (3.1 %)	
Did not go	20 (87 %)	998 (96.9 %)	0.032 ^b

^a Combined referrals to Mental Health, Social Worker, Spiritual Counselor, Sexual Therapist, and Support Groups. Also operationally defined “Went” as going irrespective of a doctor’s referral and “Did Not Go” irrespective of doctor referral

^b Fisher’s exact test

Table 3

Differences in symptoms between Arab-Americans and Caucasian-Americans prostate cancer patients

Variables	Arab-Americans	Caucasian-Americans	P value
Urinary control			
No control	4 (8.7 %)	83 (4.6 %)	
Frequent dribbling	8 (17.4 %)	222 (12.2 %)	
Occasional dribbling	19 (41.3 %)	792 (43.6 %)	
Total control	15 (32.6 %)	718 (39.6 %)	0.001 ^b
Leaked urine			
Rarely or never	19 (46.3 %)	815 (47.8 %)	
More than once a day to once a week	22 (53.7 %)	889 (52.2 %)	0.355 ^c
Pain or burning sensation			
Rarely or never	38 (97.4 %)	1389 (95.7 %)	
More than once a day to once a week	1 (2.6 %)	63 (4.3 %)	0.317 ^b
Bleeding with urination			
Rarely or never	36 (97.3 %)	1418 (98.1 %)	
More than once a day to once a week	1 (2.7 %)	27 (1.9 %)	0.357 ^b
Need to urinate frequently			
Rarely or never	20 (47.6 %)	832 (52.8 %)	
More than once a day to once a week	22 (52.4 %)	744 (47.2 %)	0.507 ^c
Self reported extent that urinary symptoms are a problem ^a			
No problem	20 (40.8 %)	882 (47.9 %)	
Slight problem	19 (38.8 %)	705 (38.3 %)	
Problem	10 (20 %)	255 (13.8 %)	0.373 ^c
Erectile dysfunction			
Diagnosis before cancer	6 (22.2 %)	144 (10.1 %)	
Diagnosis after cancer	15 (55.6 %)	925 (64.6 %)	
Not diagnosed	6 (22.2 %)	363 (25.4 %)	0.119 ^c
Ability to maintain reliable erection			
Not reliable	33 (80.5 %)	1337 (82.3 %)	
Reliable (half time to full)	8 (19.5 %)	287 (17.7 %)	0.760 ^c
Feeling down, depressed or hopeless			
Yes	33 (76.7 %)	1358 (81.4 %)	
No	10 (23.3 %)	310 (18.6 %)	0.438 ^c
Healthcare provider diagnosis of depression			
Yes	2 (4.4 %)	193 (11.5 %)	
No	43 (95.6 %)	1485 (88.5 %)	0.070 ^b

Using EPIC-26 health related quality of life outcome [6]

^a Operationally combined: very small and small into slight; moderate and big to problem

^b Fisher's exact test

^cChi-square test

Table 4

Differences in recurrence of prostate cancer amongst Arab-Americans and Caucasian-Americans

Variables	Recurrence		<i>P</i> value
	Yes (N = 329; 14 %)	No (N = 2015; 86 %)	
Race			
Arab-Americans	6 (2.3 %)	43 (2.7 %)	0.6955 ^a
White-Americans	253 (97.7 %)	1526 (97.3 %)	
At diagnosis had cancer metastasized?			
Yes	29 (9.2 %)	55 (2.8 %)	<0.0001 ^a
No	285 (90.8 %)	1910 (97.2 %)	
Did you have surgery to remove prostate cancer?			
Yes	201 (65.9 %)	1,306 (68.2 %)	0.4249 ^a
No	104 (34.10 %)	609 (31.8 %)	
Have you completed external beam radiation?			
Yes	181 (94.8 %)	505 (93.5 %)	0.5381 ^a
No	10 (5.2 %)	35 (6.5 %)	
Have you stopped hormone therapy?			
Yes	58 (40 %)	204 (68.9 %)	<0.0001 ^a
No	87 (60 %)	92 (31.1 %)	
Have you completed treatment?			
Yes	27 (42.2 %)	169 (72.8 %)	<0.0001 ^a
No	37 (57.8 %)	63 (27.2 %)	

Above categories are not mutually exclusive

^a Chi-square test

Table 5

Adjusted odds ratios and 95 % confidence intervals via unconditional logistic regression comparing recurrence in Arab-Americans and Caucasian-Americans prostate cancer patients

Variables	OR (95 % CI)	P value
Race		
White-Americans	1.00	
Arab-Americans	1.1 (0.40, 2.9)	0.873
Age	1.01 (1.0, 1.03)	0.035
PSA diagnosis within past 2 years		
No	1	
Yes	0.36 (0.05, 2.8)	0.327
At diagnosis had the cancer metastasized		
No	1.00	
Yes	2.25 (1.3, 3.9)	0.005
Have you stopped hormone therapy		
No	1.00	
Yes	0.22 (0.16, 0.3)	<0.0001

Adjusted for all variables in this table