

Within-Group Differences Between Native-Born and Foreign-Born Black Men on Prostate Cancer Risk Reduction and Early Detection Practices

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Abstract To better address prostate cancer disparities, we investigated the differences among US-born, African-born, and Caribbean-born Black men on prostate cancer risk reduction and early detection behaviors. Data were collected from over 3,400 Black men in five cities in Florida. One-way analysis of variance was used to explore the ethnic variations among the three study groups. We found that there were significant differences among the three groups. The US-born Black men had the highest knowledge, were most likely to have health insurance, and consume the most meat compared to African-born, and Caribbean-born Black men. African-born Black men were most likely to use chemoprevention products and discuss prostate cancer risk-reduction and early detection with a physician. Given the significant number of foreign-born Blacks in the US, it is important to disaggregate the data of US-born and foreign-born Blacks to develop effective programs and policies to address the needs of each group.

Keywords Prostate cancer · Black men · Early detection · Risk reduction · Prevention

Background

Globally, prostate cancer (CaP) is the second most frequently diagnosed cancer in men and the sixth-leading cause of cancer death [1]. While Black men have been noted to have the highest incidence of CaP in the US [2, 3], the World Health Organization's (WHO) report indicates low incidence of CaP in Sub-Saharan African countries [1]. In contrast to the United States (US) incidence rate of 124.8/100,000 [1], WHO's estimates for the 2002 age-standardized incidence rates for Africa were 13.8/100,000 for Eastern Africa, 24.5 for Middle Africa, 5.8 for Northern Africa, 40.5 for Southern Africa and 19.3/100,000 for Western Africa [1]. Although not directly comparable; in the same year (2002), the incidence rate for CaP was 234.1/100,000 for US Black men [4]. A close review of the literature suggested that the lower incidence observed among African men may be due to underreporting [5], lack of appropriate diagnosis [5–8], limited access to care [6], differences in technical manpower and infrastructure [6], and quality of cancer data system [6, 9–12]. On the other hand, recent reviews on CaP burden (morbidity and mortality) have documented increasingly high burden of CaP among Black men in Africa, the Caribbean, and United Kingdom [13, 14]. The latest review on the burden of CaP among Black men suggested that the highest incidence is among Jamaican men, followed by US Black men while West African men report low incidences of CaP [14].

In general, the high CaP burden observed in populations of African ancestry may be attributed to the fact that these populations share ancestral genetic factors that increase

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susceptibility to CaP. For example, Kittles et al. [15] in a Haplotype variation and diversity study of over 1,000 chromosomes from Africa, Asia and North America found populations of Black men of African ancestry (US Black men, Sierra Leonean and Nigerian men) to have significantly shorter alleles at the CAG and GGC repeat loci of the androgen receptor than non-African populations. In another study, Zeigler-Johnson et al. [16] concluded that alleles previously associated with increased CaP risk were greatest among Africans and US Black men. The findings on the genetic risk locus 8q24 among Black men [17–20] further suggest that endogenous factor confers an elevated risk of developing CaP among Black men. Given the reported within-group differences among Black men on CaP burden [13, 14], the question of exogenous factors in the origin and cause of CaP among this at-risk group remains. Without any doubt, the variability in CaP burden as well as exogenous factors exists among the diverse Black population in the US.

America's Black Population: Racial Context of Origin

In the US, the racial/ethnic group classified as African Americans are Blacks of African origin. The forefathers of the native African Americans were originally taken from Africa as slaves [21]. The African regions where slaves were mainly sourced for the Trans-Atlantic slave trade were Senegambia, Upper Guinea, Windward Coast, Gold Coast, Bight of Benin, Bight of Biafra, West Central and South East [22]. Over 10 million slaves were exported between 1650 and 1900. Since the slave trade, African Americans through intermarriage and interbreeding with Native Americans and Europeans of diverse ethnic backgrounds, have gene pools that are more heterogeneous compared to their source population in Africa [23, 24]. However, being the primary source population for African Americans, Central and West Africans share similar genetic structure with African Americans.

In addition to the African-origin population from the slave era (US-born Blacks), immigration has led to significant increase in the US Black population. The US foreign-born Blacks include Black immigrants from Africa, the Caribbean, South America and Europe. Between 1980 and 2005, the number of foreign-born Blacks more than tripled [25]. Without any doubt, foreign-born Blacks continue to transform the ethnic composition of the Black population in the US. Unfortunately, US-born and foreign-born Blacks are grouped together in health disparities research. This practice limits the ability to effectively address health and healthcare disparities. Disaggregated data based on US nativity are important to identify knowledge gaps and develop effective programs and policies to address disparities. This is especially crucial given the phenomenon of the Healthy Immigrant Effect.

The Healthy Immigrant Effect: US-Born Versus Foreign-Born Blacks

The Healthy Immigrant Effect (HIE) phenomenon proposes that: (1) when immigrants arrive in the US, they are healthier than their locally born counterparts; and that (2) this health advantage dissipates over time [26, 27]. While this phenomenon has been well studied and documented among Asians and Hispanics, few studies have explored the HIE among Blacks. Majority of the Black immigrants (foreign-born) are from the West Indies (54%) followed by 16% from Africa [28]. Most of the African immigrants are from West Africa, with a significant number from Nigeria [29]. Compared to US-born Blacks, foreign-born Blacks have been found to have better health [30–33], sometimes comparable or even better than US-born Whites [33, 34]. For example, foreign-born Black men were found to have 9.4 longer life expectancy compared to US-born Black men [29]. In comparison to US-born Blacks, foreign-born Blacks were found to have 35% lower cancer mortality [29] and were 40% less likely to be obese [35]. African-born immigrants have consistently been found to have the best health status compared to other foreign-born Black immigrants and US-born Blacks [31, 36] in spite of lower health insurance rates and employment [37]. Interestingly, the health advantage of African-born immigrants also persist although they have low perception of health benefits [38, 39] and are less likely to seek medical care [40].

Most research studies on CaP health disparities have focused on comparing Black men to other ethnic groups within the US. A research area that has been over-looked and under-studied is the within-group differences among Black men relative to CaP burden and risk factors. The primary objective of this paper was to explore the ethnic variations among native born Black men, African-born Black men, and Caribbean-born Black men relative to CaP risk reduction and early detection behaviors. Specifically, we investigated the differences among these groups on the following factors: (1) personal history of CaP; (2) discussion of CaP risk reduction and early detection with physician; (3) screening by digital rectal examination (DRE); (4) screening by Prostate Specific Antigen (PSA); (5) CaP Knowledge; (6) Diet; (7) use of Chemoprevention products; and (8) physical activity. In addition, we compared the three groups on their insurance status, access to a regular doctor, and annual physical examination.

Methods

Study Sites, Participants and Recruitment Strategy

This study was part of the Florida Prostate Cancer Disparity Project referred to as the PIPCaD project. The

inclusion criteria for this study's objective were Black men (regardless of country of origin) who were 35 years and older. Data collection took place primarily in the Florida cities Tallahassee, Tampa Bay area, Miami, Jacksonville and Orlando.

The data collection sites for the study were Barbershops in predominantly Black neighborhoods and organized health events/meetings by community-based and faith-based organizations. Using non-probability sampling, Black men of diverse socio-demographic background were recruited through barber shops, local black churches, mosques, community pharmacies, fraternities and social organizations (First Fridays, 100 Black men organizations), and radio/newspaper advertisements in the black media.

Data Collection

Human subject approvals were obtained from the study's academic institution as well as the US Army's Medical Research and Materiel Command Office of Research Protections. Following these approvals, data collection started on April 14 2008 and ended on October 15, 2009. Trained community research assistants were hired for the study data collection at all study sites, and provided the surveys to all Black men who self-identified as being Black and consented to participate in the study. The steps for data collection included: (1) informed consent by participants; (2) self-administered survey. The survey was in English language and the men who were unable to read had the survey questions read to them either by a community research assistant, wife, or a friend; (3) participants who returned a completed survey received as incentive a \$10 Wal-Mart gift card or a \$15 gift certificate toward a haircut when recruited at barber shops. In addition, all participants were provided CaP educational materials for more information about CaP. The average time spent by participants to complete the survey was about 20 min.

Measures

The primary independent variable was *nativity* of participants defined as place of birth, and classified as US-born, African-born, or Caribbean-born Black man. The outcome variables were personal history of CaP, discussion of CaP risk reduction and early detection with physician, CaP screening by digital rectal exam (DRE) and by prostate-specific antigen (PSA) within the last year, CaP knowledge, diet, use of chemoprevention, physical activity, insurance status, access to a regular doctor, and annual physical examination.

The *knowledge* measure was developed by investigators and assessed participants' understanding of CaP disease, prevention and detection. The following ten questions

assessed participants' CaP knowledge using a True/False/Don't Know scale:

1. Prostate cancer is the most common cancer in men.
2. I should be able to tell immediately if I have prostate problem.
3. Black men are more likely to get and die from prostate cancer than any other men.
4. Having somebody in your family with prostate cancer increases the chance of getting prostate cancer.
5. Getting up often at night to pass urine may be a sign of prostate cancer.
6. A diet high in fat will decrease the chance of getting prostate cancer.
7. The two main tests for prostate cancer are the blood test called Prostate Specific Antigen (PSA) and the Digital Rectal Exam (DRE) where a gloved finger is placed in the rectum to feel the prostate.
8. Doing only one of the tests, Prostate Specific Antigen (PSA) or the Digital Rectal Exam (DRE), is enough to test for prostate cancer.
9. Early screening for prostate cancer cannot tell if one has prostate cancer.
10. It is often suggested that black men over the age of 40 should get tested for prostate cancer every year.

Each correct response had 1 point and incorrect response or "I don't know" response had 0 point. Higher score indicated high knowledge of CaP information.

The *Diet* and *Chemoprevention* measures focused on food and nutrients that have been implicated in prostate carcinogenesis, including fruits, vegetables, meat products, dairy products, butter/oil, selenium supplement, lycopene, Vitamin A and other retinoid, Vitamin D supplements and Soy. Based on the National Center for Health Statistics' (NCHS) National Health and Nutrition Examination Survey (NHANES) [41], participants reported on their eating habits and consumption of nutrients within the last week using a food frequency questionnaire (FFQ) with the following responses: Never, 1–3 times a week, 4–6 times a week, Once a day, and 2 or more times a day. *Physical activity* was assessed by having the men state: (1) how often they exercised in the last month (None/1–3 days a week/4–6 days a week/Everyday); (2) the level of exercise (Did not exercise/Mild exercise/Moderate exercise/Strenuous exercise); and (3) how many minutes they spent each time they exercised. An index of exercise was then created based on these three scales. Yes/No response scales were used to measure health insurance status, access to a regular doctor, and annual physical examination. Finally, participants responded to socio-demographic questions on age, education, marital status, employment status, and household income.

Analyses

Eleven participants having incomplete data and nine participants reporting racial group other than black were excluded from analyses, resulting in a total sample of 3,410 black men. Using SPSS analytical software, frequency analyses of the variables were conducted to confirm responses were appropriately entered and to correct any errors. Following this, socio-demographic and study variables were summarized using descriptive statistics. One-way analysis of variance (ANOVA) was used to explore the ethnic variations among the three groups on the study variables. Multiple regression analysis was also performed to examine the differences among the three study groups on the study variables after adjusting for demographic variables.

Results

Of the 3,410 responses received, 3,040 indicated their nativity: 2,405 were US-born Black men, 315 were African-born Black men, and 320 were Caribbean-born Black men. Table 1 provides the summaries of participants' demographic characteristics. The three study groups were diverse in terms of age distribution, marital status, education, employment and income. Relative to age, there were more participants who were less than 50 years in both African-born and Caribbean-born groups than US-born men. The results also indicated that there was significantly more numbers of African-born men with Post College Degrees. Other findings on demographic characteristics were that: significantly less numbers of US-born men were married; and significantly more numbers of US-born men were unemployed and earned less than \$20,000.

Table 2 provides a summary of the CaP risk reduction and screening behaviors of participants as well as the results of the analysis of variance. Most of the participants eat fruits, vegetables, dairy products and butter/oil one to three times a week. While most of the African-born and Caribbean-born men consume meat products one to three times a week, US-born men eat meat products four to six times a week. In addition, more native born men reported meat as the biggest portion of their meal compared to African-born and Caribbean-born men. Most of the men did not use chemoprevention products within the last week.

A one-way ANOVA analyses were carried out to determine if there were significant differences among the three groups on outcome variables. Accordingly, it was found that there were significant differences on CaP Knowledge level ($F\{2, 3,016\} = 13.43, P < 0.001$), vegetable consumption ($F\{2, 3,016\} = 13.43, P < 0.001$), use of Chemoprevention products ($F\{2, 3,016\} = 13.43,$

$P < 0.001$). Post hoc tests revealed that US-born men had significantly higher CaP knowledge compared to African-born and Caribbean-born men ($P < 0.05$).

Table 2 also depicts the chi-square test results comparing the three groups with respect to frequencies of meat consumption ($\chi^2\{2\} = 45.2845, P < 0.001$), discussion of CaP risk-reduction and early detection with a doctor ($\chi^2\{2\} = 3.81, P = 0.022$), and their insurance status ($\chi^2\{2\} = 8.5071, P < 0.014$). Relative to diet, significantly more US-born men reported meat products make up the biggest portion of their meal. Over 70% of US-born men reported eating meat at least four to six times a week compared to 64% African-born men and 62% Caribbean-born men. African-born men were the least insured of the three groups but more men in this group reported that they discuss CaP risk-reduction and early detection with a physician every chance they get, compared to native born and Caribbean-born men. In addition, the frequency of chemoprevention use was highest among African-born men.

Given that the three groups were diverse on the key demographic variables, multiple regression analyses were also conducted to control for the demographic variables when comparing the groups on the study variables. The results of these analyses are provided in Table 3. Except for vegetable consumption (P -value = 0.2585); the findings (after adjusting for demographic variables) confirm the previous significant differences we found with ANOVA and nonparametric tests among the ethnic groups on CaP Knowledge (P -value < 0.0001), meat consumption (P -value = 0.0008), use of Chemoprevention (P -value = 0.0262), and CaP discussion with a doctor (P -value = 0.0013).

Discussion

Given that the number of foreign-born Blacks in the US more than tripled between 1980 and 2005 [25], it has become important to disaggregate the data of US-born and foreign-born Blacks to better understand behavioral risk factors for CaP in Black men. With the well accepted phenomenon of HIE [26, 27, 42], which proposes that immigrants are on average healthier than the US-born, knowledge of the ethnic variations among Black men is highly important to close the prostate health disparities gap. Not taking into consideration the racial context of origin of Black men [36] mask important variations in CaP within this group and compromises our ability to comprehensively understand and effectively address CaP health disparities seen in US Black men.

In this study, we compared the risk reduction and early detection behaviors associated with CaP among US-born,

Table 1 Summary of participants' demographic characteristics by nativity

	Native-born black men N = 2,405 Freq (%)	African-born black men N = 315 Freq (%)	Caribbean-born black men N = 320 Freq (%)
Age (years); <i>P</i> -value = 0.0011			
35–40	160 (06.75)	39 (12.66)	26 (08.41)
40–49	1,016 (42.85)	144 (46.75)	139 (44.98)
50–59	795 (33.53)	80 (25.97)	83 (26.86)
60–69	316 (13.33)	38 (12.34)	49 (15.86)
70–79	75 (03.16)	4 (01.30)	11 (03.56)
Greater than 80	9 (00.38)	3 (00.97)	1 (00.32)
Frequency missing	34	7	11
Marital status; <i>P</i> -value < 0.001			
Single	947 (39.97)	125 (40.45)	93 (29.34)
Married	1,049 (44.28)	154 (49.84)	186 (58.68)
Divorced	297 (12.54)	23 (07.44)	29 (09.15)
Widowed	76 (03.21)	7 (02.27)	9 (02.84)
Frequency missing	36	6	3
Education; <i>P</i> -value < 0.001			
Less than high school	325 (13.96)	42 (14.33)	34 (11.22)
High school degree	905 (38.87)	100 (34.13)	113 (37.29)
Some college training	482 (20.70)	35 (11.95)	55 (18.15)
College degree	437 (18.77)	76 (25.94)	82 (27.06)
Post-college degree	179 (07.69)	40 (13.65)	19 (06.27)
Frequency missing	77	22	17
Employment; <i>P</i> -value < 0.001			
Full time	1,091 (46.33)	148 (48.05)	172 (54.26)
Part time	249 (10.57)	57 (18.51)	43 (13.56)
Retired	275 (11.68)	30 (09.74)	39 (12.30)
Disability/workers compensation	232 (09.85)	25 (08.12)	13 (04.10)
Unemployed	508 (21.57)	48 (15.58)	50 (15.77)
Frequency missing	50	7	3
Income (\$); <i>P</i> -value < 0.001			
0–19,999	945 (40.86)	112 (36.48)	82 (26.45)
20,000–39,999	549 (23.74)	79 (25.73)	107 (34.52)
40,000–59,999	304 (13.14)	37 (12.05)	61 (19.68)
60,000–79,999	196 (08.47)	31 (10.10)	30 (09.68)
80,000–99,999	144 (06.23)	14 (04.56)	21 (06.77)
100,000 and above	175 (07.57)	34 (11.07)	9 (02.90)
Frequency missing	92	8	10

African-born and Caribbean-born Black men. It was not surprising to find that the US-born men were older than the foreign-born men since immigrant populations tend to be younger. As reported in past studies, we also found African-born men had significantly higher education level compared to US-born Black men [43, 44]. In general, the US-born Black men had higher unemployment rate and lower household income compared to foreign-born Black men. This may be as a result of the lower educational level of the US-born participants in this study.

The results of the study variables found to be significantly different among the three groups after controlling for demographic factors are summarized in Figs. 1 and 2. While there were no significant differences among the groups relative to fruit, vegetables, dairy products, and fat/oil consumption, US-born Black men consumed more meat products than foreign-born men. Greater consumption of fat from animal sources has however been linked to increased risk for CaP and advanced CaP among Black men [45]. Also notable is the significantly higher use of

Table 2 Comparisons of study groups on study variables

Variable/item	Native-born black men N = 2,405	African-born black men N = 315	Caribbean-born black men N = 320	P-value
Mean comparisons ^{†§}				
Prostate cancer knowledge	5.35 ± 2.69 6 0–10	4.58 ± 2.63 5 0–10	4.96 ± 2.65 5 0–10	<0.001
Frequency of fruit consumption within the last week	1.81 ± 1.14 1 0–4	1.82 ± 1.15 1 0–4	1.96 ± 1.2 2 0–4	0.105
Frequency of vegetable consumption within the last week	2.04 ± 1.08 2 0–4	1.88 ± 1.04 2 0–4	2.06 ± 1.05 2 0–4	0.041
Frequency of dairy product consumption within the last week	2.16 ± 1.10 2 0–4	2.20 ± 1.04 2 0–4	2.21 ± 1.08 2 0–4	0.808
Frequency of fat and oil consumption within the last week	2.21 ± 1.13 3 0–4	2.23 ± 1.10 3 0–4	2.23 ± 1.15 2 0–4	0.958
Frequency of chemoprevention use within the last week	0.85 ± 0.99 0.5 0–4	1.05 ± 0.98 1 0–4	0.84 ± 1.04 0.5 0–4	<0.001
Frequency and duration of physical activity within the last month	8.23 ± 8.75 6 0–36	8.19 ± 8.71 6 0–36	7.99 ± 8.08 6 0–36	0.959
Proportion comparisons [§]				
Men who whose biggest portion of meal is meat	46.00%	29.00%	26.00%	<0.001
Men who eat meat at least four to six times a week	70.69%	64.24%	61.84%	<0.001
Men who discuss CaP prevention and/or early detection with a doctor	40.97%	50.17%	39.61%	0.022
Men who had DRE screening within the last year	28.20%	29.45%	25.00%	0.422
Men who had PSA screening within the last year	32.56%	31.45%	30.10%	0.668
Men with health insurance	65.18%	56.57%	64.38%	0.014
Men who have annual physical regularly	66.40%	67.78%	71.66%	0.17
Men who have a regular doctor	70.63%	65.85%	71.62%	0.215
Men with personal history of prostate cancer	4.82%	5.94%	5.97%	0.613

[†] Table entry: first line = Mean ± SD; second line = Median; third line = Scale range

[§] Results in bold-font are statistically significant at $P < 0.05$ level

chemoprevention products by African-born men to reduce their risk for CaP.

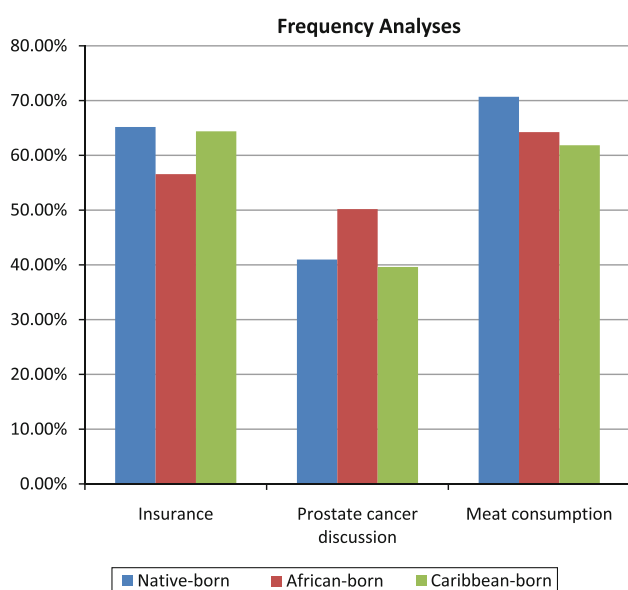
It is interesting to note that while more African-born men report not having health insurance, they are more likely to discuss CaP risk reduction and early detection with a physician. Given the importance of informed decision making with respect to CaP screening, it is important for Black men to discuss critical health issues such as CaP with a physician. It is unclear why the African-born men in this study reported a higher rate of CaP discussion with a physician, but we suspect that this may be due to their

higher education level. Another consideration, although anecdotal, is that African immigrants are more likely to seek medical care from African physicians. Having both the patient and physician from the same ethnic group fosters good physician-patient interaction, with the patient more likely to be comfortable in discussing his health issues with the physician.

African-born Black men's CaP discussion with doctors did not however translate to high CaP knowledge. Similar to our past study [38, 46], African-born men scored the lowest on the knowledge scale among the three groups.

Table 3 Multiple regression analyses results controlling for demographic variables

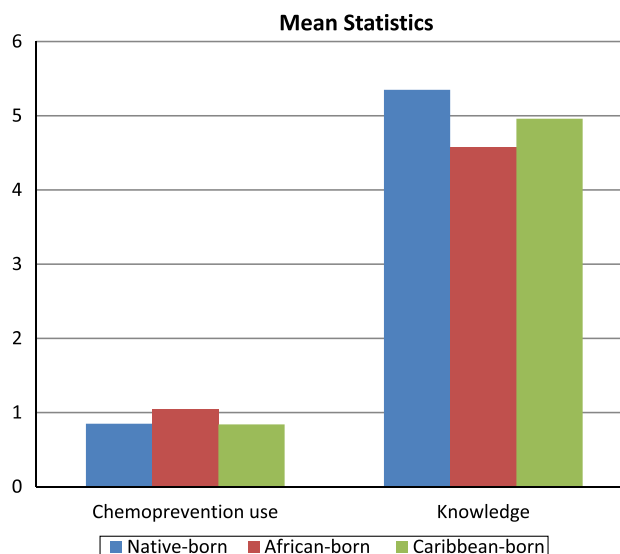
Variable/item	<i>F</i> -values and probability values (Pr > F) for					
	Ethnicity	Age	Education	Marital status	Employment status	Income
Prostate cancer knowledge	14.92 (<0.0001)	8.40 (<0.0001)	27.36 (<0.0001)	7.14 (<0.0001)	0.69 (0.6004)	9.07 (<0.0001)
Frequency of vegetable consumption within the last week	1.35 (0.2585)	4.15 (0.0009)	1.44 (0.2186)	4.13 (0.0006)	1.66 (0.1361)	1.68 (0.1361)
Frequency of chemoprevention use within the last week	3.65 (0.0262)	1.35 (0.2416)	0.68 (0.6067)	0.87 (0.4547)	3.72 (0.0050)	0.49 (0.7808)
Consumption of meat at least four to six times a week	7.21 (0.0008)	2.06 (0.0677)	1.39 (0.2335)	0.30 (0.8281)	2.93 (0.0199)	3.82 (0.0019)
Discussion of CaP prevention and/or early detection with a doctor	6.67 (0.0013)	11.55 (<0.0001)	1.39 (0.2345)	0.37 (0.7777)	7.39 (<0.0001)	1.66 (0.1415)

**Fig. 1** Proportion comparisons of study groups on insurance, prostate cancer discussion, and meat consumption

While the mean knowledge score for all study participants was low, US-born Black men had the highest knowledge score (about 54% correct) compared to Caribbean-born men with a mean score of about 50% and African-born men at about 46%. This has great implication for Black immigrant health, underscoring the need to educate and raise awareness about CaP among African and Caribbean immigrants.

New Contribution to the Literature

It is worth noting that a limitation of this study that cannot be avoided was that the participants were self-selected since they volunteered to be surveyed for the study. In

**Fig. 2** Mean comparisons of study groups on prostate cancer knowledge and chemoprevention use

addition, the assessment of the study variables were by self-reports, which may have been biased by social desirability (lying to look good), acquiescence (tendency to agree), and extremity (tendency to use extreme ratings). In spite of these limitations, our findings have made significant contribution to the literature. As opposed to the usual approach of comparing Blacks and Whites on health disparities, this study uniquely pays particular attention to reducing “health gaps” among diverse Black men to better understand CaP health disparities. Focusing on the ancestral relations of US-born Black men, our goal was to provide evidence on the differential effect of US nativity and immigration status on CaP health disparity. Continuous disregard of the heterogeneity of the US Black population impedes the progress to eliminate health disparities. Overall, we found risk reduction behaviors (reduced meat consumption and use of chemoprevention) and early

detection behavior (informed CaP discussion with a physician) to be lower in US-born Black men although they were better insured and had higher CaP knowledge. This study supports our previous studies which found significant differences among US-born Black men, Nigerian-born men, and indigenous Nigerian men on behavioral risk factors, health beliefs and cultural beliefs [38, 46, 47] and is in line with the phenomenon of “protective effect” of immigration on general health that has been documented among US foreign-born Blacks [29–32, 34, 36, 37, 39, 40].

Without any doubt, new knowledge on the modifiable risk/protective factors that potentially “buffer” foreign-born Black men from lifestyles leading to high CaP morbidity will foster the development of culturally-appropriate intervention programs for US-born Black men. The two primary theories that have been suggested for the HIE include: (1) Immigrant selectivity whereby only the persons with good health selectively migrate; and (2) Cultural beliefs and values of immigrants buffer them from the adverse effect of the host country’s lifestyle [48–50]. Furthermore, the advantage of the HIE is proposed to disappear with longer duration in the US, due to acculturation (adoption of US-born behaviors, especially lifestyle). The loss of the HIE advantage has been noted to be primarily due to reduced protective factors (family support and cultural values) as well as increased at-risk lifestyle [51]. Future studies should explore the public health impact of acculturation on foreign-born Black men. With the increasing number of Black immigrants in the US [25, 28], it is important to understand their health issues to better serve this population.

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