American Journal of Men's Health
2017, Vol. 11(5) 1415–1425

DOI: 10.1177/1557988315607958
journals.sagepub.com/home/ajmh
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# Barbershop Prostate Cancer Education: Factors Associated With Client Knowledge

**Barry C. Hill[1], David R. Black[2], and Cleveland G. Shields[3]**

**Abstract**

The purpose of this paper is to identify characteristics of Black barbershop clients and barbers in an urban Midwestern city participating in a health promotion program called Affecting Cancer Together (ACT) that are associated with client knowledge about prostate cancer. Statistical analyses examined client and barber characteristics for their potential association with client prostate cancer knowledge, while controlling for ACT variables. Study findings suggested clients who are married ($\beta = 0.99$; CI [0.38, 1.59]; $p < .01$) and have higher levels of education ($\beta = 0.34$; CI [0.01, 0.67]; $p = .04$) may be more likely to know more about prostate cancer. Barbers with at least "some college" education may be more effective in increasing client knowledge ($\beta = 0.85$; CI [0.05, 1.64]; $p = .04$). Trained peer-helper programs may consider prioritizing limited educational resources for barbers with at least some college education and incorporating the social support of spouses for making informed decisions. Considering the potential of barbershop programs to reach Black men about a serious racially disproportionate health issue, ameliorating adoption, implementation, effectiveness, and sustainment are an important public health priority for underserved populations.

**Keywords**

health disparities trained peer helpers, lay health advisors, health promotion, barbershop, African American, prostate cancer

Received March 26, 2015; revised August 18, 2015; accepted August 25, 2015

The American Cancer Society (ACS) estimates that prostate cancer ranks second in both incidence and mortality rates among American men with 238,590 new cases and 29,730 deaths in 2013 (ACS, 2013). Significant health disparities exist among Blacks as they are 63% more likely to get and 2.44 times more likely to die from prostate cancer compared to Caucasian men (DeSantis, Naishadham, & Jemal, 2013). Higher rates of regional, metastatic, and more advanced stages of prostate cancer among Blacks at the time of diagnosis may reflect the delay in early detection (Fowler, Bigler, Bowman, & Kilambi, 2000; Fowler & Bigler, 1999; Thompson et al., 2001). Mistrust of the medical community, lack of insurance, fear, perceived threats to masculinity, embarrassment, and lack of prostate cancer knowledge and awareness may act as barriers to prevent Black men from being screened until symptoms present (Allen, Kennedy, Wilson-Glover, & Gilligan, 2007; Blocker et al., 2006; Forrester-Anderson, 2005; Richardson, Webster, & Fields, 2004; Sanchez, Bowen, Hart, & Spigner, 2007; Woods, Montegomery, Belliard, Ramirez-Johnson, & Wilson, 2004).

Despite common public perception, the effectiveness of prostate cancer screening using the prostate-specific antigen (PSA) test is questionable following conflicting results of two large randomized studies (Andriole et al., 2009; Moyer, 2012; Schröder et al., 2009). Although subsequent studies have addressed some of the weaknesses of these studies, there is still a lack of consensus regarding the efficacy of screening; leaving patients to balance the potential benefits and harms of screening (Bokhorst et al., 2014; Kim & Andriole, 2015). Over-diagnosis of prostate cancer through PSA screening often results in

[1]Center for Healthcare Policy and Research, UC Davis, CA, USA
[2]Department of Health and Kinesiology, Purdue University, West Lafayette, IN, USA
[3]Department of Human Development and Family Studies, Purdue Center for Cancer Research, Purdue University, West Lafayette, IN, USA

**Corresponding Author:**
Dr. Cleveland G. Shields, Human Development & Family Studies, Purdue University, West Lafayette, IN 47907, USA.
Email: cgshields@purdue.edu

unnecessary treatment for cancers that do not progress or result in death within the patient's lifetime (Welch & Black, 2010). Treatment options for indolent prostate cancer may result in needless cases of urinary incontinence, erectile dysfunction, and surgical complications resulting in death and serious cardiovascular events (Chou et al., 2011). The ACS and the American Urological Association recommend patients engage in a shared decision-making process with their health-care provider in order to weigh the potential benefits and risks of prostate cancer screening, while taking into consideration the patient's personal preferences and values (Carter et al., 2013; Wolf et al., 2010). This process requires men to have a basic understanding of prostate cancer, the potential benefits and limitations of screening, and the risks associated with treatment options (Wolf et al., 2010).

Despite the increased risk of prostate cancer, many Black men lack this basic knowledge and may have difficulty interpreting facts about prostate cancer to make personalized and informed decisions (Allen et al., 2007; Kilbridge et al., 2009; Richardson et al., 2004). Moreover, some studies suggest Black men are less informed than White men about prostate cancer (Chan et al., 2003; Demark-Wahnefried et al., 1995). Many Black participants express the opinion that knowledge would promote self-advocacy concerning prostate cancer (O'dell, Volk, Cass, & Spann, 1999) and increase the desire to participate in an informed decision-making process (Allen et al., 2007). Prostate cancer knowledge may be a particularly important outcome for programs aiming to promote well-informed and personalized decisions regarding prostate cancer screening.

Although clinical encounters may address gaps in knowledge, physicians often do not initiate discussions about prostate cancer screening with their patients due to competing clinical priorities, time constraints, and language barriers (Dunn, Shridharani, Lou, Bernstein, & Horowitz, 2001; Guerra, Jacobs, Holms, & Shea, 2007). When physicians do discuss screening with their patients, they often do not discuss the advantages and disadvantages of screening prior to ordering tests (Han, Coates, Uhler, & Breen, 2006; Hoffman et al., 2010). Several studies also indicate that physicians may not involve the patient in the decision-making process altogether and will order screening without the patients knowledge or consent (Chan, Vernon, Ahn, & Greisinger, 2004; Dunn et al., 2001; Federman, Goyal, Kamina, Peduzzi, & Concato, 1999; Han, Coates, Uhler, & Breen, 2006; Jordan, Price, King, Masyk, & Bedell, 1999; Volk & Cass, 2002). Many Black men have adopted a passive role in making decisions about their health due to cultural perceptions of White male physicians as authority figures who are not to be questioned, further preventing health self-advocacy (Allen et al., 2007; Sanchez et al., 2007).

Black barbers may serve as indigenous, volunteers who provide accurate health information in a format suited to the social, cultural, ethnic, communication values, norms, and beliefs of the Black community (Jackson & Parks, 1997). Because of these qualities, barbers may function as peer helpers that share related experiences, values, and lifestyles and serve as role models and sources of credible information (Tindall & Black, 2009). Furthermore, health interventions delivered by barbers have been successful in areas such as controlling hypertension and increasing prostate cancer screening behaviors and knowledge (Linnan, D'Angelo, & Harrington, 2014). Considering the potential for barber-delivered interventions to inform Black men about prostate cancer, methods of improving program outcomes should be considered. Identifying barber characteristics associated with client knowledge may inform methods of recruiting barbers more likely to increase knowledge among barbershop clients; potentially improving program effectiveness.

Community-based programs have become sine qua non in application for educating preferred minority populations. Program planners may tailor these programs to meet the needs and expectations of Blacks by providing trusted sources of health information outside the medical community (Allen et al., 2007; Woods et al., 2004). Barbershops are important Black community structures that foster social exchange within the context of Black culture and are feasible, appropriate, and culturally relevant community settings to disseminate health-related information (Alexander, 2003; Boutte & Hill, 2006; Luque et al., 2010).

Health promotion programs in these settings should be tailored to the intended population to improve effectiveness (Luque, Ross, & Gwede, 2014). Previous research reported PSA test recognition to be significantly lower among those with lower levels of education and income and those without health insurance (Steele, Miller, Maylahn, Uhler, & Baker, 2000). Programs armed with this information may consider interventions linking clients with community health centers where they can engage in an informed-decision process with a clinician and make a screening decision. Therefore, an examination of barbershop client factors associated with knowledge may allow program planners to identify limitations and strengths in knowledge and develop targeted interventions to meet client needs.

The research questions this study will address are (a) "what client factors associate with client prostate cancer knowledge?"; (b) "what barber factors associate with client prostate cancer knowledge?"; and (c) "are there weaknesses in client knowledge by prostate cancer topic (e.g., screening, risk factors…etc.)?" Results from this study may inform the development of health communication strategies using trained, volunteer peer helpers.

## Materials and Methods

### Program Description

"Affecting Cancer Together" (ACT) is a prostate cancer and health promotion program designed to address knowledge and awareness-related health disparities and promote primary and secondary prevention behaviors such as diet, physical activity, and health screenings.

ACT participants are barbers and clients in 18 urban, predominantly Black barbershops located in a large city in Indiana with a population of over 820,000, a Black population of 27.5%, and a median household income of $41,962 (U.S. Census Bureau, 2015).

Over half of participating barbershops ($n$ = 10) received regularly occurring informal health promotion "general health" visits from a graduate-level trained health promotion practitioner who educated barbers about health issues such as diet, exercise, and prostate cancer. The remaining barbershops ($n$ = 8) also, in addition to general health visits, had at least one barber receive a formal, structured, and more comprehensive "prostate session" educational intervention. Prostate sessions lasted 1 day and focused on communication skills and informing clients about prostate cancer information such as population incidence, risk factors, symptoms, methods of early-detection, treatment options, and preventive behaviors. Sessions were conducted by the health promotion practitioner from August through January with evaluation data collected following the education session during the summer of 2013. All participating barbershops were provided ACT promotional items such as t-shirts, barber capes, and placards displaying the ACT logo and prostate cancer risks. In addition, barbershops were periodically stocked with educational pamphlets which were placed in conspicuous locations. The Institutional Review Board of the involved university approved this study.

### Procedure

*Recruitment of Participants and Inclusion Criteria.* A research assistant (RA) visited the barbershops with the ACT program manager to acquaint the barbers with the RA and to establish convenient times for the RA to return to introduce the surveys for data collection. ACT inclusion criteria were (a) all male clients 18 or older, and (b) all barbers at participating ACT barbershops. In addition to ACT criteria, the present study included only Black clients and Black male barbers.

*Survey Administration.* The RA used a standardized script to approach barbers and clients explaining and asking them to complete barber and client surveys, respectively. The RA introduced the surveys to all eligible barbers and clients within barbershops during data collection visits. Upon completion of the survey, the RA gave clients and barbers a $5 gas card. Surveys were numbered in order to match clients to their barbershop without identifying the individual client.

### Independent Variables

*Client.* Client age was coded as a rank ordered variable with 18–24 = 1, 25–39 = 2, and over 40 = 3. Marital status also was dichotomized as 1 = *married* and 0 = *unmarried*. Client education was coded on a 6-point Guttman-type scale from "Some high school" to "Professional Degree." However, due to the low number of respondents reporting education levels higher than a bachelor's degree, "Graduate Degree" and "Professional Degree" were collapsed into the "Bachelor Degree" category, which resulted in a 4-point Guttman-type scale. Barbershop visit frequency was measured as an ordinal variable coded as 1 = *every week*, 2 = *every 2 weeks*, 3 = *every 3 weeks*, and 4 = *less frequent intervals*. Time spent in the barbershop was dichotomously coded with times of less than 1 hr = 0 and times of 1 hr or greater = 1.

*Barber.* Barber education was measured as the average level of barber education by shop with individual barber education levels measured using a Guttman-type scale as follows: some high school = 1, high school or general education development (GED) = 2, some college = 3, bachelor's degree = 4, graduate degree (master's) = 5, and professional degree (MD, JD, etc.) = 6. Barber education level was constructed with shop education averages less than 2.5 coded as 1; averages greater than 2.5 or equal to, but less than 3, coded as 2; and averages of 3 or greater coded as 3. Barber age was measured as average barber age by shop with 1 coded for 18–24 years old, 2 = 25–39, 3 = 40–64 years of age, and 4 = 65 years of age and older. Barber marital status was measured as the shop percentages of married barbers. Shops with no married barbers were recoded as 1; shops with percentages greater than 0, but less than 100, were re-coded as 2; and shops with 100% married barbers were re-coded as 3. Barber/physician cancer discussions were measured as shop averages of client-reported conversation with barbershops having less than 50% of barbers reporting having discussed cancer with their physician re-coded as 0% and 50% or greater re-coded as 1. Barber prostate cancer screening (reported as past year DRE or PSA screening), was constructed with non-screened shops re-coded as 0 and shops reporting screening (25–100%) recoded as 1.

*ACT Program.* ACT interventions and intervention components were controlled in the analyses as potential confounding factors of client knowledge. Clients visiting "general health" barbershops were coded as 0 for the "Prostate session" variable. Clients visiting "prostate

**Table 1.** Prostate Cancer Knowledge Scale.

| | | | |
|---|---|---|---|
| 1. | Prostate cancer is one of the most common cancers among men | | |
| | True | False | Don't know |
| 2. | 1 in 6 men will be diagnosed with prostate cancer in his lifetime | | |
| | True | False | Don't know |
| 3. | The chance of getting prostate cancer increases with age | | |
| | True | False | Don't know |
| 4. | A man is more likely to get prostate cancer if his father, brother, or son has it or has had it | | |
| | True | False | Don't know |
| 5. | African American men are more likely to get and die from prostate cancer than Caucasian men | | |
| | True | False | Don't know |
| 6. | What is a digital rectal exam? | | |
| | A tube inserted into the rectum and viewed for polyps | | |
| | A doctor feels the prostate with his or her finger | | |
| | A dye is inserted and an X-ray is taken | | |
| | A tissue sample is taken from the rectum | | |
| 7. | What is a prostate-specific antigen test? | | |
| | An X-ray | | |
| | A biopsy | | |
| | A surgery | | |
| | A blood test | | |
| 8. | Based on your opinion, perhaps based on what you have heard from others, what do you believe increases the chance of developing prostate cancer? (Please check all that you believe applies.) | | |
| | Diet | | |
| | Age | | |
| | Race | | |
| | Lifestyle | | |
| | Family History | | |
| | Stress | | |
| | Lack of Exercise | | |
| | Poverty | | |
| | Sexual Activity | | |
| | Environment | | |
| 9. | When should men begin having a prostate cancer screening? | | |
| | African American men 30, all other men 35 | | |
| | African American men 35, all other men 45 | | |
| | African American men 40, all other men 50 | | |
| | African American men 50, all other men 60 | | |

*Note*. *Item of interest.

session" barbershops were coded as 1. Barber familiarity with the ACT program was measured as shop averages of barbers reporting they had heard of ACT. "Barbers know ACT" was coded as 1 when 50% or fewer of barbers knew of ACT. It was coded as 2 when familiarity was greater than 50%, but less than 75%, and coded as 3 when familiarity was 75% or greater, but less than 100%, and coded as 4 when all barbers were familiar with ACT. "Shop materials" was coded as 1 for clients reporting increased awareness because of ACT prostate cancer educational pamphlets. Otherwise, the variable was coded as 0.

## Dependent Variables

Client prostate cancer knowledge and awareness were assessed using a prostate cancer knowledge scale. This scale comprised 9 multiple-choice and true/false items which were taken from a longer survey of 48 items in order to assess the objectives of the study (Table 1). The prostate cancer knowledge scale tested basic knowledge of prostate cancer prevalence rates, major risk factors, and screening procedures and recommendations. One point was awarded for each correct answer for a maximum score of 9.

## Sample

Surveys were completed by 145 clients and 54 barbers. Study participants were predominantly Black with 135 (93%) clients and 51 (94%) barbers classifying themselves as Black. Non-Black clients ($n$ = 10) and barbers ($n$ = 3), and female clients ($n$ = 6) and female barbers ($n$ = 4) were excluded in accordance with study selection

criteria. In addition, barber data were not collected in two shops resulting in a deletion of 12 client participants without corresponding barber data. Final study data included a total of 47 barber participants and 118 client participants with an average of 6.6 clients ($SD = 2.7$) and 2.6 ($SD = 1.2$) barbers per shop. The response rate for clients and barbers were 81% ($n = 96$) and 89% ($n = 42$), respectively. Because the distribution of the knowledge scale did not approximate a normal distribution, a transformation was applied in which scores of "0," "1," and "2;" "3" and "4;" and "8" and "9" were combined for a final 6-item scale. Missing data in the knowledge scale appeared in random items and were replaced with the mean of the items themselves.

## Statistical Analyses

All statistical analyses were performed using the SAS 9.3® statistical software package. Table 2 reports client, barber, and ACT characteristics. Client, barber, and ACT variables were independently regressed on the prostate cancer knowledge scale using hierarchical linear regression. Independent variables from each regression with a $p$-value of ≤ .2 were included in the final models (Table 3). A $p$-value of ≤ .2 was selected because variables with $p$-values of this magnitude may explain a significant portion of model variance, while competing against other variables within a given classification. Final model client, barber, and ACT variables were then regressed on client knowledge in a successive manner with Model 1 consisting of client level variables, Model 2 including barber level variables in addition to Model 1 variables, and Model 3 including ACT level variable in addition to Model 2 variables. In this manner, barber and client-level variables were examined while controlling for ACT-level variables.

## Results

### *Client Characteristics*

Clients reported going to the barbershop frequently with 44.1% ($n = 52$) reporting going every week, 35.6% ($n = 42$) reporting every 2 weeks, 9.3% ($n = 11$) reporting going every 3 weeks, and 11.0% ($n = 13$) reporting going once every month or longer (Table 2). Clients also reported spending a significant amount of time in the barbershop with 80.5% ($n = 95$) spending 1 hr or more and 19.5% ($n = 23$) spending 1 hr or longer. Most clients were between 25 and 39 years old ($n = 56$, 47.5%), with a significant proportion of clients being 40 or older (n = 45, 38.1%). Clients seemed to be fairly well educated as 47.5% ($n = 56$) reported having attended "some college" and nearly a quarter ($n = 28$, 23.7%) reported having a bachelor's degree or higher. Although the vast majority of clients were 25 and older, only 43.2% ($n = 51$) of clients reported being married.

**Table 2.** Client and Barber Characteristics.

| Category/variable | *n* (%) |
|---|---|
| Client variables | |
| How often barbershop | |
| Every week | 52 (44.1) |
| Every 2 weeks | 42 (35.6) |
| Every 3 weeks | 11 (9.3) |
| Once every month or longer | 13 (11.0) |
| Duration in barbershop | |
| Less than 1 hr | 95 (80.5) |
| An hour or more | 23 (19.5) |
| Client demographics | |
| Age 1 | 17 (14.4) |
| Age 2 | 56 (47.5) |
| Age 3 | 45 (38.1) |
| Some high school | 6 (5.1) |
| High school degree/GED | 28 (23.7) |
| Some college | 56 (47.5) |
| Bachelors or higher | 28 (23.7) |
| Married | 51 (43.2) |
| Barber variables | |
| Barber age | 2.5 (1.0)[a] |
| Barber education[b] | |
| LT 2.5 | 39 (33.1) |
| GE 2.5 LT 3.0 | 27 (22.9) |
| GE 3.0 | 52 (44.1) |
| Barber marital status | |
| All married | 29 (26.3) |
| Combination married/single | 70 (49.2) |
| All single | 19 (24.6) |
| Barber physician interaction | |
| Barber PSA/DRE | 64 (54.2) |
| Barber discuss cancer screen w/Dr. | 72 (69.5) |
| ACT variables | |
| Barber heard ACT | |
| LE 50% heard of ACT | 22 (24.6) |
| GT 50% LT 75% | 23 (13.6) |
| GE 75% LT 100% | 22 (18.6) |
| 100% heard of ACT | 51 (43.2) |
| Prostate session[c] | 48 (40.7) |
| Shop materials increased awareness[d] | 36 (30.5) |

*Note.* GED = general education development; PSA = prostate-specific antigen; DRE = digital rectal exam; ACT = Affecting Cancer Together. All barber variables are averaged by shop.
[a]Reported as median and range with Barber age 1 (18–24), 2 (25–39), 3 (40–64), and 4 (65 and above). [b]Barber education reported as barbershop averages with 1 (some high school), 2 (high school), 3 (some college), 4 (bachelor's degree), 5 (master's degree), 6 (doctoral degree). [c]Reported as number of clients surveyed in shops with barbers receiving structured prostate educational sessions. [d]Reported as number of clients indicating increased prostate cancer awareness from ACT educational pamphlets.

**Table 3.** Multiple Linear Regression: Client Prostate Cancer Knowledge.

| | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| Level | β | 95% CI | *p*-value | β | 95% CI | *p*-value | β | 95% CI | *p*-value |
| Client | | | | | | | | | |
| Marital status | 0.79 | [0.23, 1.36] | .01 | 1.04 | [0.45, 1.64] | < .01 | 0.99 | [0.38, 1.59] | < .01 |
| Education | 0.32 | [−0.02, 0.66] | .06 | 0.34 | [0.01, 0.67] | .04 | 0.32 | [−0.02, 0.65] | .06 |
| Shop duration | −0.56 | [−1.26, 0.14] | .12 | −0.56 | [−1.27, 0.14] | .12 | −0.44 | [−1.20, 0.31] | .25 |
| Barber | | | | | | | | | |
| Education 2 | | | | 0.81 | [0.07, 1.56] | .03 | 0.85 | [0.05, 1.64] | .04 |
| Education 3 | | | | 0.89 | [0.23, 1.54] | .01 | 0.94 | [0.26, 1.63] | < .01 |
| ACT | | | | | | | | | |
| Shop materials | | | | | | | −0.25 | [−0.87, 0.37] | .43 |
| Prostate session | | | | | | | 0.13 | [−0.60, 0.85] | .73 |
| Barbers know ACT | | | | | | | 0.09 | [−0.18, 0.36] | .53 |

*Note.* β = regression coefficients; CI = confidence interval; ACT = Affecting Cancer Together.

## *Barber Characteristics*

Barber education level by shop revealed many clients ($n$ = 52, 44.1%) were surveyed in barbershops with an average barber education level of "some college" or higher. A third of clients ($n$ = 39, 33.1%) were surveyed in shops in which the majority of barbers had at most completed high school or the GED. Clients were surveyed in barbershops with all single barbers ($n$ = 19, 24.6%), all married barbers ($n$ = 29, 26.3%), or some combination of married and single barbers ($n$ = 70, 49.2%). The majority of clients ($n$ = 64, 54.3%) were surveyed in barbershops in which 25% to 100% of barbers had been screened for prostate cancer. The other 45.8% ($n$ = 54) were surveyed in shops with no barbers reporting screening. Nearly 70% of clients ($n$ = 72, 69.5%) were surveyed in shops where 50% or more of barbers had reported discussing cancer screening with their physician.

## *ACT Characteristics*

Overall, most barbers were familiar with ACT with 43.2% ($n$ = 51) of clients visiting shops in which every barber was familiar with ACT, 32.3% ($n$ = 45) visited shops in which between 50% and 100% of barbers were familiar with ACT, and 24.6% ($n$ = 22) visited shops in which 50% or less were familiar with ACT. Shops in which at least one barber attended a formal prostate cancer education session were visited by 40.7% ($n$ = 48) of study participants and almost a third ($n$ = 36, 30.5%) reported increased prostate cancer awareness due to educational materials situated in participating barbershops.

## *Client Knowledge*

*Client Factors.* A hierarchical linear regression was conducted on client, barber, and ACT level variables with the Prostate Cancer Knowledge Scale as the dependent variable (Table 3). Married clients had greater prostate cancer knowledge than single clients, Model 1 (β = 0.79; CI [0.23, 1.36]; $p$ = .01). In the initial regressions, before variables with a $p$-value > .2 were excluded, this association remained significant while controlling for client education and age. Although Model 2 revealed a significant association for client education (β = 0.34; CI [0.01, 0.67]; $p$ = .04) with more highly educated clients demonstrating greater knowledge, this association bordered significance in Models 1 and 3.

*Barber Factors.* Barber education was positively and significantly associated with client knowledge. Clients visiting barbershops in which the average barber education was greater than 2.5 (halfway between "high school" and "some college"), but less than 3 (some college) were more likely to demonstrate greater knowledge compared with clients visiting barbershops with an average education of less than 2.5 (β = 0.81; CI [0.07, 1.56]; $p$ = .03). Moreover, clients visiting more highly educated barbershops having an average education level of 3 (some college) or greater (β = 0.89; CI [0.23, 1.54]; $p$ = .01) demonstrated greater knowledge than those visiting barbershops with an education level of greater than 2.5 and less than 3. The significance and trend of this relationship remained in Model 3. None of the ACT variables were significant in Model 3.

*Client Prostate Cancer Knowledge by Topic.* Participants, on average, answered 54.8% questions correctly with a median value of 60.0% and a standard deviation of 19.5%. However, knowledge of prostate cancer varied by topic (Figure 1). Most barbershop clients were able to identify prostate cancer as one of the most common cancers among men (81.6%) and recognize that risk increases with age (77.0%).

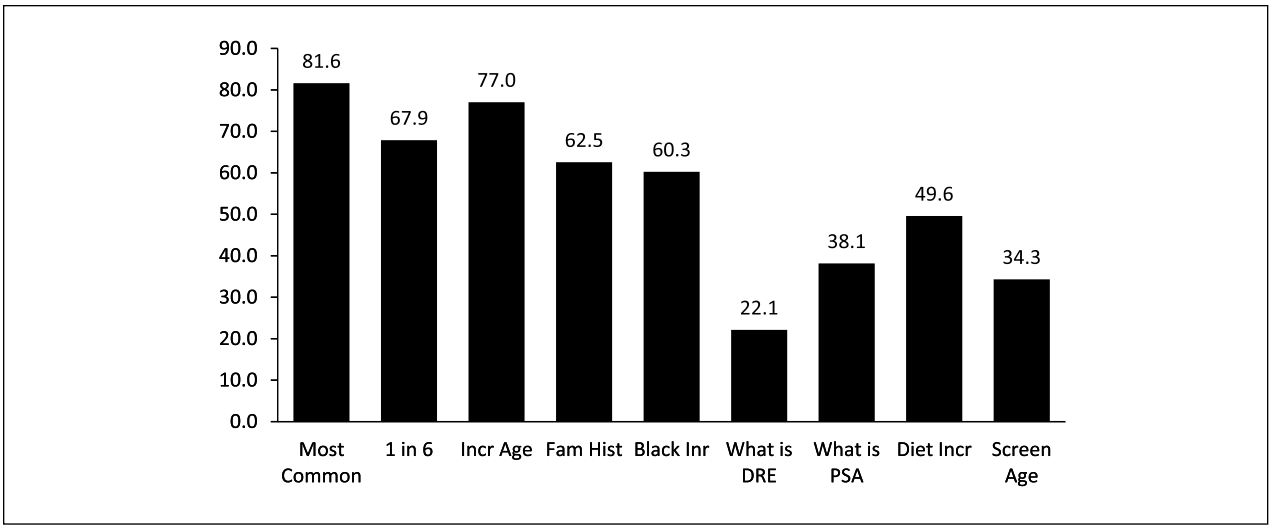


**Figure 1.** Client knowledge by question: percentage of correct responses.

However, 39.8% did not recognize Blacks as having an increased risk of prostate cancer. Few men were able to correctly identify the DRE (22.1%) and PSA test (38.1%). Nearly half of clients (49.6%) correctly identified dietary behaviors as potentially increasing the risk of developing prostate cancer. In general, clients did not know when to consider screening with only 34.3% correctly identifying 40 and 50 as the approximate age when Black and White men should consider screening, respectively. The most frequently reported age for screening (39.8%) was 30 and 35 years old for Black and White men, respectively; the youngest of the four age groups (data not reported). In the present study, client recognition of prostate cancer prevalence and age as a risk factor were strengths in client knowledge as these topics were above the sum of the mean and standard deviation of client knowledge (74.3%). Conversely, client recognition of the DRE and the appropriate age when men should consider screening were weaknesses in client knowledge as these topics fell below the difference between the mean and standard deviation (35.3%).

## Discussion

Black barbershops provide an opportunity to educate men about the potential risks and benefits of prostate cancer screening in a community setting. However, barbershops are but one source of information in the broader context of individual, family, and social network factors. Understanding client-level characteristics will allow programs to identify weaknesses in client knowledge and develop interventions to meet the needs of the community. An understanding of client knowledge will help guide the development of focused barber training interventions to address specific areas of needed improvement. Because of the importance of providing accurate and balanced information, programs must also consider barber-level characteristics associated with improvements in key program outcomes such as client knowledge. In this manner, barbershop programs may tailor their interventions to address weaknesses in client knowledge by utilizing barber strengths. The present study provides insight into client and barber-level factors associated with client knowledge and identifies strengths and weaknesses in client-knowledge following the implementation of a barbershop health-promotion program.

### *Barbershop Clients*

In line with a study by Smith, DeHaven, Grundig, & Wilson (1997), the current findings suggest married clients may have greater prostate cancer knowledge after controlling for the clients age, education, and ACT intervention received. Reasons for this may stem from the tendency of spouses to take an active role in monitoring and advocating for their husbands' health (Blocker et al., 2006; McFall, Hamm, & Volk, 2006). Furthermore, social support from spouses has been cited as a contributing factor for initiating cancer-screening decisions among Black men who would otherwise be less likely to get screened on their own (Jernigan, Trauth, Neal-Ferguson, Cartier-Ulrich, 2001; Matterne & Sieverding, 2008; Odedina et al., 2004). Thus, marital status may not only act to inform men about prostate cancer, but also may serve as an impetus for seeking more timely preventative care. Future barbershop programs may consider including interventions for spouses such as the use of educational pamphlets tailored to promote wife health advocacy or forming partnerships with hair and beauty salons.

Consistent with previous studies (Chan et al., 2003; O'Dell et al., 1999; Smith et al., 1997; Winterich et al., 2009), the findings of the present study suggest that clients with less education were less knowledgeable and aware of prostate cancer. Moreover, individuals with low education are more likely to defer screening decisions to their physicians compared to those with higher education and greater knowledge who prefer to share or retain control in screening decision making (O'Dell et al., 1999). This trend may be particularly concerning for Black men because they have the highest risk of cancer morbidity and mortality, are less informed than White men, are less likely to become informed within clinical settings, and are more likely to undergo procedures and tests without being informed or participating in decisions about them (Allen et al., 2007; Chan et al., 2003; DeSantis et al., 2013; Richardson et al., 2004; Ries et al., 2008). However, barbershop programs may be able to empower Black men because they can reach the less-educated members of the Black community due to the sense of community and ongoing interactions that occur within their shops. In this manner, barbershop settings may help prostate cancer information reach the vulnerable populations in the Black community by increasing awareness and knowledge, giving men the information they need to make informed screening decisions and promoting self-advocacy in health decision making (Allen et al., 2007; O'Dell et al., 1999; Taylor, Davis, & Turner, 2006).

### *Barbers*

Black barbers may be able to gain significant knowledge about prostate cancer in brief educational sessions. A study by Wilkinson (2003) examined prostate cancer awareness and knowledge retention among Blacks and reported significant improvements in pre- and post-test scores following a 1-hr educational seminar (Wilkinson, List, Sinner, Dai, & Chodak, 2003). Furthermore, knowledge and awareness improvements were associated with increasing levels of education; those not graduating from high school had the lowest pre- and post-seminar knowledge scores (Wilkinson et al., 2003). These associations seem to support the present findings that barbers with higher levels of education may be more likely to learn and retain information from educational interventions and may be more effective at increasing knowledge among clients; thus informing the larger community. Furthermore, study analyses suggest these findings are significant regardless of the ACT intervention the barber had received, possibly suggesting a range of applications. Although it may be that barbershops with more highly educated barbers attracted more educated clients, Model 3 indicated barber education was significant after controlling for client education. Given the potential to improve program effectiveness, barbershop programs may consider prioritizing limited educational and training resources for barbers with at least "some college" when possible. Findings from this study suggest barbers with more education may be more effective peer helpers with a sustained health-promotion presence in the community; serving as readily accessible and frequently visited sources of reliable health information.

### *Prostate Cancer Knowledge*

Although client levels of prostate cancer knowledge were insufficient, men surveyed in barbershops participating in ACT seemed to have greater awareness of their risk compared to previous studies. In the present study, 60.3% of men correctly identified Blacks as having a higher risk of prostate cancer mortality compared with 51% of Black men surveyed in barbershops (Magnus, 2004). Similarly, in other studies, 53% of Black men identified race as a significant risk factor for prostate cancer and only 30% knew that Blacks were more vulnerable to prostate cancer (Demark-Wahnefried et al., 1995; Smith et al., 1997). In the present study, 62.5% of clients correctly identified heredity as a risk factor compared with 41.0% to 42.2% of Blacks in other studies (Demark-Wahnefried et al., 1995; Smith et al., 1997). Although, while the population was younger compared to the other studies, education levels in two of the studies were comparable. Increased awareness of Black race and heredity as risk factors may be low-hanging fruit for programs to achieve because these topics are related to cultural and family experiences. However, recognition of screening options and appropriate age ranges to consider screening were weaknesses in client knowledge that may require additional attention in future programs. Many factors may have contributed to the higher rates of knowledge in the current study such as time and history, increased media usage among younger men (more information available on TV and other media), and greater exposure to clinical education. However, caution is warranted in drawing conclusions because the study design does not permit causal conclusions.

### *Limitations*

Survey collection methods allowed clients to be linked to their barbershop rather than their individual barber. Lack of identifying information in barber surveys prevented surveys from being administered to barbers who were absent the first time barber data were collected; preventing potential duplications. Thus, barbers absent at the time of data collection were not included in the study. Practical limitations in data collection methods made it impossible to include all barbershops participating in

ACT, the authors acknowledge field studies have limitations, but provide useful information. Although this study provides an initial glance into factors associated with client knowledge, other barber and client factors should be considered in future research such as barber family history, having a friend who has/had prostate cancer, and whether clients overhear and join in on barbershop prostate cancer discussions.

Many barriers often prevent Blacks from engaging in meaningful and comprehensive shared-decision making within clinical settings. Barbershops are frequently visited, culturally relevant, and socially engaging venues in which trained peer helpers may inform the Black community about prostate cancer. However, given the importance and complexity of the issue, Black barbershop programs should consider methods of improving program effectiveness to increase knowledge and create more informed and personalized decision making regarding prostate cancer screening.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The Purdue Center for Cancer Research and Indiana State Department of Health Grants A70-1-041075, A70-1-096099, A70-2-096109, A70-4-096182 supported this program and research. Support also was provided by Indianapolis area Barbers, Indiana Minority Health Coalition, Marion County Health Department, Indiana Cancer Consortium, Indiana Black Expo, and other community partners.

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