



## Prostate cancer educational intervention among men in Western Jamaica

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### ABSTRACT

To conduct and evaluate the impact of a theory-based health education intervention on awareness of prostate cancer and intention to screen among men in Western Jamaica and determine screening rates of men participating in the intervention at 6 months post-intervention. 454 men utilizing various clinics and hospitals in Western Jamaica completed an interviewer-administered pretest survey on general prostate cancer knowledge and intention to screen. Upon completing the pretest, participants observed a prostate cancer health education intervention and immediately completed a posttest survey. Statistically significant improvements in the percentage of correct responses between the pretest and posttest were evident ( $p < 0.05$ ). Additionally, screening rates increased dramatically by 6 months post-intervention with over 33% of men receiving a prostate exam after participating in the educational intervention. The theory-based educational intervention increased participants' knowledge of prostate cancer, types of screening tests, frequency of screenings and risk factors and symptoms, and was effective in increasing screening rates among the men in Western Jamaica within 6 months post-intervention. This theory-based educational intervention may be replicated to promote awareness of prostate cancer and further increase screening rates in other areas of Jamaica and other developing countries.

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### Introduction

For men, prostate cancer (PCa) continues to be one of the leading worldwide causes of cancer-related deaths (International Agency for Research on Cancer, 2012). However, globally the trends for PCa related deaths and the risk of developing PCa are not uniform. Within the past decade, the number of new cases of PCa in the United States of America has increased from 198,100 in 2002, to 238,590 in 2013, while the number of prostate cancer-related deaths has decreased from 31,500 to 29,720 (American Cancer Society, 2002; American Cancer Society, 2013). Jamaica shows a similar increase in the number of new PCa cases, but a similar drop in prostate cancer-related deaths is not evident (Gibson et al., 2010; International Agency for Research on Cancer, 2012). In fact, previous studies have shown that “men of African descent in the Caribbean region have the highest PCa mortality in the world, with age-standardized rates more than four times higher than those in the US and more than 15 times higher than men in the Middle East and Eastern Asia” (American Cancer Society, 2011). It is now believed that men on the island of Jamaica possess the highest incidence rate of PCa in the world with 78.1/100,000 men being afflicted

(Gibson et al., 2010), and PCa as the leading cause of cancer deaths among Jamaican men (Blake et al., 2002; International Agency for Research on Cancer, 2012). The gradual decline of prostate cancer-related deaths in the US, and a majority of developed countries, has been attributed to preemptive screening and early detection methods, such as the Prostate-Specific Antigen (PSA) test and the Digital Rectal Exam (DRE).

However, prostate cancer screening remains controversial internationally because of the risk of over-diagnosis and related sequelae from treatment such as impotence. High risk groups such as black men are agreed to benefit more from prostate screenings (Carter et al., 2013), and thus many urological authorities in Jamaica have emphasized the need for a national screening program and promoting screening in general (Aiken and Eldemire-Shearer, 2012; Morrison et al., 2014). Currently the Jamaica Urology Society and Jamaica Cancer Society recommend Jamaican men over 40 to be screened for prostate cancer annually, however, the number of Jamaican men screened for PCa remains low even after the introduction of the PSA test to Jamaica in 1989 (Coard and Skeete, 2009). This low rate of screening results in the late diagnosis of PCa, with greater clinical severity and higher morbidity than in the United States (Glover et al., 1998; Shirley et al., 2002; Morrison et al., 2011). Thus it has been suggested that while the population of Jamaica is becoming increasingly aware of PCa, there are no significant changes in the clinical status of patients at the time of their diagnosis, due to the lack of organized screening programs for PCa in Jamaica (Coard and Skeete, 2009).

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Previous studies have shown that health education interventions are able to increase the knowledge and awareness of PCa, increase the uptake of PCa screening by African American men (Myers et al., 2000; Wilkinson et al., 2003), and increase intent to screen by Jamaican men (McCree-Hale et al., 2012). In this study we implemented the evidence-based intervention by McCree-Hale et al. in a larger sample of men, with the intention to increase participants' knowledge about PCa and increase the intention of men in the four parishes of Western Jamaica to utilize PCa screening services. Additionally, in this study we followed the men to determine the percentage that accessed PCa screening by 6 months post-intervention.

## Method

This study was conducted with a pretest/posttest design. The goal of the research was to implement and evaluate a PCa educational intervention in a population of men who lived in any of the four parishes comprising the western region of Jamaica. The men had to be 40 years or older and should not have been previously screened for PCa. Upon meeting these criteria, the men were asked to give their informed consent, stating that the men would be participating in an educational intervention and that their survey answers could be used for research before being allowed to complete the questionnaire and participate in the educational intervention. The educational intervention was based on constructs from the Transtheoretical Model (TTM; Prochaska and Velicer, 1997) and the Health Belief Model (HBM; Rosenstock et al. 1988). It has previously been shown that educational interventions based on these models promoted the decision of men to seek out PCa screenings, thereby lowering PCa mortality (McCree-Hale et al., 2012; Schroder et al., 2009). In addition to these preventative measures, these educational programs have also been shown to have positive psychological benefits and improve the quality of life of men who developed PCa in the future (Lepore et al., 2003). The intervention in this study was implemented over a 3 month period from May to August 2013. The Institutional Review Board (IRB) of the University of Alabama at Birmingham, the Advisory Panel of Ethics and Medio-Legal Affairs in the Ministry of Health Jamaica and the WRHA approved the study protocol before its implementation.

The four major parish hospitals, Cornwall Regional in St. James, Noel Holmes in Hanover, Savanna-la-Mar in Westmoreland and Falmouth in Trelawny, along with 3 rural clinics, 1 urban clinic, a church and a technical university were selected as the study sites. Participants were approached in waiting rooms in outpatient clinics, or other study sites and invited to participate in the study. 454 men met our inclusion criteria, gave informed consent and were enrolled in the study. The men were asked to complete a 27 item interviewer administered questionnaire and a pre-test. The questionnaire was based on a reading level below 8th grade. The interviewer administered questionnaire was first piloted with a sample of Jamaican men ( $n = 10$ ) aged 40 years and older for comprehension and understandability before any data were collected. Two additional questions were added after this initial pilot testing and the revised questionnaire was tested again with an additional sample of Jamaican men ( $n = 5$ ) to ensure the new questions were also understood.

Question stems and response options were deemed culturally appropriate and easy to comprehend during this piloting. Questions were categorized into 4 main groups. The first, was socioeconomic and demographic, which included age, marital status, educational level, religious affiliation and race. The second group was attitudes towards healthcare, which included access to healthcare, healthcare visits and opinions about doctors and their decisions. The third section was knowledge regarding PCa risk factors and symptoms and the final section included questions on attitudes, beliefs and practices regarding PCa screenings. All questions were adapted from the pretest and posttest of the previously conducted educational intervention (McCree-Hale et al., 2012). After the men completed the pretest a health

education intervention was administered by a study staff member using a PowerPoint® presentation which was either displayed on a laptop computer or on printed slides. The intervention sessions were administered to groups of approximately one to eight men with a large majority of men having a one on one interview.

The educational intervention presentation consisted of general information about the prostate, such as basic anatomy and physiology and easy descriptions of its location on a man's body. A description of what PCa is and how it spreads, risk factors, signs and symptoms and a description of all possible PCa screening methods were also explained in detail since most men in Jamaica are still diagnosed through the recognition of symptoms (Coard and Skeete, 2009). Furthermore, understanding of the frequency of the screenings suggested by the Jamaica Urological Society, and the different types of screenings available was ensured, so that patients would be more informed when they discussed screening options with their doctor after the intervention. Colorful images were included on each slide to ensure that even men who were not literate could follow along, and relevant media including symbols of Jamaican culture like the flag and the national colors were used to increase interest and relevance when presenting simple statistics about PCa among Jamaicans. In total the intervention consisted of 21 slides and was previously tested in the educational intervention conducted by McCree-Hale et al., 2012. The posttest was administered immediately following the conclusion of the presentation and questions were identical to those found on the pretest. 6 months after the intervention all men who provided the interviewers with a phone number were contacted. In this interview men were asked if they had received a prostate screening since participating in the educational intervention, to determine screening rates.

## Statistical analyses

Statistical analysis was focused on assessing the differences in men's knowledge of PCa screening tests, risk factors, signs and symptoms, and stage of change from pretest to post-test. Paired  $t$  tests and McNemar's tests for correlated proportions were conducted on pretest and posttest scores to determine if there was a significant increase in men's knowledge about PCa, or whether their intentions to receive any of the screening tests for PCa increased due to the intervention. A summarized index of correct answers to PCa screening tests, risk factors, and signs and symptoms was created. A paired  $t$  test with  $\alpha = 0.05$ ,  $p < 0.05$ , and 95% confidence intervals was used to assess differences between pretest and posttest index scores. McNemar's tests with  $\alpha = 0.05$  and  $p < 0.05$  were used to assess the significance of differences between pretest and posttest proportions for knowledge variables included in the summated index plus intention to screen variables. Missing values were excluded from the analysis. Data were analyzed using IBM SPSS Statistics 21 (IBM Corp. Armonk, NY).

## Results

All sociodemographic data are listed in Table 1. The men ranged in age from 40–93 years, with a mean age of 56.8. Sixty percent of men were between the ages of 40–59 years old, with roughly equal numbers of participants between the ages of 40–49 and 50–59. The majority of the men surveyed were black (97.1%), which is fairly consistent with Jamaica's ethnic population percentages. As the study looked at men from all four parishes in the western region, effort was made to have the number of participants from each parish represent that of the actual population of the parish. The most populated parish in the western region is St. James, and more than forty percent of the men participating in the study resided in this parish. This was closely representative of the percentage population (38.9%) in the western region of Jamaica who resided in St. James (Statistical Institute of Jamaica, 2011). The percentage of men from Westmoreland, Hanover and Trelawny in our study was 28.9%, 13.4% and 15.4%, respectively, and is close to the actual

**Table 1**  
Sociodemographic characteristics of participants who were over 40 years and had never been tested for prostate cancer (n = 454).

|  | n <sup>a</sup> | %    |
|--|----------------|------|
| Age (years) <sup>b</sup>                     |                |      |
| 40–49  | 132            | 29.1 |
| 50–59  | 148            | 32.6 |
| 60–69  | 104            | 22.9 |
| >70  | 70             | 15.4 |
| Parish                                       |                |      |
| St. James                                    | 192            | 42.3 |
| Hanover                                      | 61             | 13.4 |
| Westmoreland                                 | 131            | 28.9 |
| Trelawny                                     | 70             | 15.4 |
| Marital status                               |                |      |
| Single                                       | 197            | 43.4 |
| Married                                      | 169            | 37.2 |
| Living together                              | 52             | 11.5 |
| Divorced, separated or widower               | 36             | 7.9  |
| Occupation                                   |                |      |
| Manual labor                                 | 241            | 53.1 |
| Non-manual labor                             | 91             | 20.0 |
| Unemployed                                   | 49             | 10.8 |
| Retired                                      | 46             | 10.1 |
| Self-employed                                | 27             | 5.9  |
| Highest education level                      |                |      |
| No formal education                          | 45             | 9.9  |
| Primary (1–6 grade)                          | 197            | 43.4 |
| Secondary (7–11 grade)                       | 182            | 40.1 |
| Some college, vocational, or 4 year degree   | 29             | 6.3  |
| Faith or religious background                |                |      |
| Christian                                    | 315            | 69.4 |
| Rastafarian                                  | 29             | 6.4  |
| Other  | 18             | 3.9  |
| No religion                                  | 92             | 20.3 |
| Father, brother or son with prostate cancer? |                |      |
| Yes  | 53             | 11.7 |
| No   | 274            | 60.4 |
| Don't know                                   | 102            | 22.5 |
| No father, brother or son                    | 24             | 5.3  |

All data are from men in Western Jamaica in 2013.

<sup>a</sup> Totals may not equal 454 due to missing values.

<sup>b</sup> Mean age = 56.8.

population percentages of 30.5%, 14.7% and 15.9%, respectively (Statistical Institute of Jamaica, 2011). The majority of men were either single (43.4%) or married (37.2%), worked as manual laborers (53.1%), identified themselves as Christians (69.4%), received either primary (43.4%) or secondary (40.1%) education and stated they did not have a father, brother or son with PCa (60.4%).

The data on attitudes towards healthcare providers and whether men had been previously informed to receive a PCa test data are presented in Table 2. Men were indifferent in their opinions on how their doctors appeared to care about patients. Almost 41% of men choose to remain neutral when asked if their doctor cared more about what was convenient than about their patients. However, when the men were asked if they trusted their doctors' medical decisions, the majority of men agreed or strongly agreed (57.0%) that they did. A large proportion of men indicated that they had never been advised by a doctor or nurse to have PCa screening (70.6%), but among men who were aware of PCa tests (23.0%), most cited their doctor as the source of the information (50.9%).

The pretest and posttest results of the percentage and number of correct responses to items regarding knowledge of the screening tests, risk factors and symptoms of PCa are presented in Table 3, with *p* values of the McNemar's test signifying statistically significant increases in the number of correct responses between questions asked during the pre and posttest. Contrasting the two tests, the results of the pretest appear low, with the average number of questions correctly answered (Q-score) being 5.42 out of 17 questions. In the pretest the majority of

**Table 2**  
Attitudes of participants towards healthcare providers and whether healthcare providers inform patients of prostate cancer screening (n = 454).

|  | n <sup>b</sup> | % <sup>a</sup> |
|--|----------------|----------------|
| Do you think doctors care more about what is convenient rather than patients' needs? |                |                |
| Strongly agree   | 20             | 4.7            |
| Agree  | 106            | 24.8           |
| Neutral  | 174            | 40.7           |
| Disagree   | 111            | 25.8           |
| Strongly disagree  | 17             | 4.0            |
| Do you completely trust doctors' decisions about medical treatments?                 |                |                |
| Strongly agree   | 73             | 17.1           |
| Agree  | 171            | 39.9           |
| Neutral  | 119            | 27.8           |
| Disagree   | 61             | 14.3           |
| Strongly disagree  | 4              | .9             |
| Has a doctor or nurse ever advised you to have a prostate cancer screening?          |                |                |
| Yes  | 123            | 28.7           |
| No   | 302            | 70.6           |
| Don't know   | 3              | .7             |
| If you have heard of a prostate cancer test, how did you hear about it?              |                |                |
| Doctor   | 53             | 50.9           |
| Nurse  | 9              | 8.7            |
| Family member  | 30             | 28.8           |
| Radio, television or newspaper   | 30             | 28.8           |

All data are from men in Western Jamaica in 2013.

<sup>a</sup> Totals may not equal 100 due to multiple answers.

<sup>b</sup> Totals may not equal 454 due to missing values.

men were not able to correctly describe how often a man should get a prostate exam (66.5%), nor were they able to list any of the tests available to check for PCa (77.0%). In the pretest, men were able to identify some risk factors and symptoms for PCa; 61% of the men identified being over 40 years as a risk factor and 47% identified eating a high fat diet as a risk factor. For 16 of the 17 items listed in the PCa knowledge section, a statistically significant increase in the number of correct responses was observed between the pre and posttest, with the average Q-score rising from 5.42 to 15.25 out of 17 ( $p < 0.0001$ ). The largest improvement was the knowledge of the types and frequency of the PCa screening tests. The percentage of participants who knew the frequency of PCa screenings recommended by the Jamaica Urological Society increased from 33.5% to 96.5% ( $p < 0.0001$ ), and the percentage of participants who were able to describe a PCa test rose from 23.0% to 97.8% ( $p < 0.0001$ ). Approximately 96% of men remembered the PSA, 96.7% remembered the DRE and 83.5% remembered the ultrasound. Knowledge of PCa risk factors and symptoms increased between 37.9% and 65.2%.

The men's beliefs, attitudes and practices towards PCa pretest and posttest data are listed in Table 4. Men seemed unwilling or reluctant to share why they had never before received a prostate exam, with the most frequent reason listed as fear of the test by 16.7% of men; 44.9% of the men listed no reason at all. The majority of men indicated that they tried to eat a low fat diet (62.3%), they relied on their religion to keep them healthy (49.6%), they did not worry about PCa (57.1%), but they did worry that PCa would affect their sexual function (58.8%). In the pretest most men were found to be in either the precontemplation (44.9%) or preparation (33.5%) stages of change based on the TTM. In the posttest, statistically significant increases were seen in the number of men who indicated that they had moved on to the preparation stage (91.4%), a change of 57.9% ( $p < 0.0001$ ), and decreases in the number of individuals in precontemplation (4.6%), a change of 40.3% ( $p < 0.0001$ ). Few participants were found to be in the contemplation stage in either the pre or posttest.

The post-intervention PCa screening rates among men who participated in the follow-up interview 6 months after the educational intervention are as follows: Of the 163 men (35.9% of all participants) who

**Table 3**  
Participants' prostate cancer knowledge in pretest and posttest (n = 454).

|   | Pretest n <sup>a</sup> | Pretest % <sup>b</sup> | Posttest n <sup>a</sup> | Posttest % <sup>b</sup> | Difference % | p value      |
|---|------------------------|------------------------|-------------------------|-------------------------|--------------|--------------|
| How often should a man be screened after 40?                              |                        |                        |                         |                         |              |              |
| Once per year   | 152                    | 33.5                   | 439                     | 96.5                    | 63           | p < 0.0001** |
| Only if he has signs of prostate cancer                                   | 44                     | 9.7                    | 5                       | 1.1                     | 8.6          | p < 0.0004** |
| Don't know  | 258                    | 56.8                   | 11                      | 2.4                     | 54.4         | p < 0.0001** |
| Are you aware of any tests available for prostate cancer checkups?        |                        |                        |                         |                         |              |              |
| Yes   | 104                    | 23.0                   | 445                     | 97.8                    | 74.8         | p < 0.0001** |
| No  | 349                    | 77.0                   | 10                      | 2.2                     | 74.8         | p < 0.0001** |
| If you are aware of any tests, which tests do you know about?             |                        |                        |                         |                         |              |              |
| PSA   | 45                     | 43.3                   | 436                     | 95.8                    | 52.5         | p < 0.0001** |
| DRE   | 91                     | 87.5                   | 440                     | 96.7                    | 9.2          | p < 0.0003** |
| Ultrasound  | 7                      | 6.7                    | 380                     | 83.5                    | 76.8         | p < 0.0001** |
| Do you think any of the following are prostate cancer risk factors?       |                        |                        |                         |                         |              |              |
| Being over 40   | 276                    | 60.8                   | 449                     | 98.7                    | 37.9         | p < 0.0001** |
| Being a black man   | 155                    | 34.1                   | 422                     | 92.7                    | 58.6         | p < 0.0001** |
| Having a family history of prostate cancer                                | 176                    | 38.8                   | 426                     | 93.6                    | 54.8         | p < 0.0001** |
| Eating a high fat diet  | 213                    | 46.9                   | 428                     | 94.1                    | 47.2         | p < 0.0001** |
| Eating ackee  | 159                    | 35.0                   | 162                     | 35.6                    | 0.6          | p > 0.05     |
| Do you think any of the following are symptoms if prostate cancer?        |                        |                        |                         |                         |              |              |
| Frequent urination, especially at night                                   | 154                    | 33.9                   | 422                     | 92.7                    | 58.8         | p < 0.0001** |
| Trouble starting or holding back urination                                | 167                    | 36.8                   | 428                     | 94.1                    | 57.3         | p < 0.0001** |
| A weak flow of urine  | 164                    | 36.1                   | 434                     | 95.4                    | 59.3         | p < 0.0001** |
| Painful or burning urination  | 174                    | 38.3                   | 440                     | 96.7                    | 58.4         | p < 0.0001** |
| Blood in the urine or semen   | 150                    | 33.0                   | 424                     | 93.2                    | 60.2         | p < 0.0001** |
| Problems getting an erection  | 123                    | 27.1                   | 390                     | 85.7                    | 58.6         | p < 0.0001** |
| Constipation or changes in bowel habits                                   | 108                    | 23.8                   | 390                     | 86.7                    | 62.9         | p < 0.0001** |
| Pain in the lower back, groin, between scrotum and rectum or upper thighs | 128                    | 28.2                   | 425                     | 93.4                    | 65.2         | p < 0.0001** |

All data are from men in Western Jamaica in 2013.

<sup>a</sup> Totals may not equal 454 due to missing values.<sup>b</sup> Totals may not equal 100 due to multiple answers.

\*\* 1% level of significance.

**Table 4**  
Prostate cancer attitudes, beliefs and practices of men participating in the educational intervention (n = 454).

|  | Pretest n <sup>a</sup> | Pretest % <sup>b</sup> | Posttest n <sup>a</sup> | Posttest % | Difference % | p value      |
|--|------------------------|------------------------|-------------------------|------------|--------------|--------------|
| What has stopped you from getting a prostate exam?                                       |                        |                        |                         |            |              |              |
| Afraid to get the test   | 76                     | 16.7                   |                         |            |              |              |
| Too expensive  | 70                     | 15.4                   |                         |            |              |              |
| Test is too embarrassing   | 73                     | 16.1                   |                         |            |              |              |
| No transportation  | 34                     | 7.5                    |                         |            |              |              |
| No symptoms  | 36                     | 7.9                    |                         |            |              |              |
| Lack of information  | 37                     | 8.1                    |                         |            |              |              |
| No reason checked by participant   | 297                    | 65.4                   |                         |            |              |              |
| Have you seriously thought about being checked for prostate cancer?                      |                        |                        |                         |            |              |              |
| Yes (contemplation)  | 244                    | 53.7                   | 425                     | 93.4       | 39.7         | p < 0.0001** |
| No (precontemplation)  | 204                    | 44.9                   | 21                      | 4.6        | 40.3         | p < 0.0001** |
| Don't know   | 6                      | 1.3                    | 9                       | 2.0        | 0.7          | p > 0.05     |
| If you are thinking about getting checked, do you think it will be in the next 6 months? |                        |                        |                         |            |              |              |
| Yes (preparation)  | 183                    | 74.6                   | 416                     | 97.9       | 23.3         | p < 0.0001** |
| No (contemplation)   | 53                     | 21.7                   | 7                       | 1.6        | 20.1         | p < 0.0001** |
| Don't know   | 9                      | 3.7                    | 2                       | .5         | 3.2          | p > 0.05     |
| Do you think prostate cancer generally runs in families?                                 |                        |                        |                         |            |              |              |
| Yes  | 206                    | 45.4                   |                         |            |              |              |
| No   | 248                    | 54.6                   |                         |            |              |              |
| Do you try to eat a low fat diet?  |                        |                        |                         |            |              |              |
| Yes  | 283                    | 62.3                   |                         |            |              |              |
| No   | 171                    | 37.7                   |                         |            |              |              |
| Do you rely on your faith or religion to keep you healthy?                               |                        |                        |                         |            |              |              |
| Yes  | 225                    | 49.6                   |                         |            |              |              |
| No   | 201                    | 44.3                   |                         |            |              |              |
| Not applicable   | 28                     | 6.1                    |                         |            |              |              |
| Do you worry about getting prostate cancer?  |                        |                        |                         |            |              |              |
| Yes  | 195                    | 42.9                   |                         |            |              |              |
| No   | 259                    | 57.1                   |                         |            |              |              |
| Do you worry prostate cancer would affect your sexual function?                          |                        |                        |                         |            |              |              |
| Yes  | 267                    | 58.8                   |                         |            |              |              |
| No   | 187                    | 41.2                   |                         |            |              |              |

All data are from men in Western Jamaica in 2013.

<sup>a</sup> Totals may not equal 454 due to missing values.<sup>b</sup> Totals may not equal 100 due to multiple answers.

\*\* 1% level of significance.

were able to be reached by phone for post-intervention follow-up, 54 (33.1%) had been screened for PCa, 109 had not been screened (66.9%).

## Discussion

The results of this study are similar to the PCa educational intervention conducted in St. James by McCree-Hale et al. (2012). The present study was conducted with a larger sample of men from all four parishes in the western region. While men participating in the study seemed to have some prior knowledge of PCa, with approximately 30% of them identifying some risk factors and symptoms, the men were much less likely to have any knowledge about the types and frequency of PCa tests available. This is due in part to the fact that none of the participating men had ever been screened for PCa previously, but could also be due to the fact that the majority of the men (70.6%) claimed that they had never been told to have a prostate exam by a doctor or nurse. However, the men's lack of reasoning as to why they had never been screened before (65.4%) limits our knowledge as to why this avoidance to PCa screenings continues. This lack of reasoning may be indicative of stigma or cultural barriers that men did not want to discuss with the interviewer, or could indicate an oversight in the pre and post-test where questions on stigma or cultural reasons for avoiding PCa screenings were not asked. Previous studies have illustrated stigma and cultural reasons for Jamaican immigrants in America, who were cited as having the greatest fear of emasculation when compared to U.S. born African Americans and European Americans (Consedine et al., 2007). Further studies have highlighted Latino and Spanish West Indian men's avoidance of colorectal and prostate cancer screenings (Goldman et al., 2009; Rivera-Ramos and Buki, 2011), and similar beliefs could be affecting Jamaican men as well. Notably, a majority of men cited that they worried about sexual dysfunction in relation to prostate cancer (59%), which may provide clues as to part of their reasoning for avoiding prostate cancer screenings. Future efforts to increase PCa screening rates should focus on discovering this reasoning in order to maximize the effectiveness of these educational interventions.

This intervention approach does seem to continue to be a positive health education mechanism for Jamaican men who are at risk for PCa, as there are significant increases in PCa knowledge, awareness, screenings intentions, and uptake of screening. These findings also reinforce the concept that a theory-based educational intervention can significantly improve Jamaican men's knowledge and awareness of PCa, and induce men to get screened earlier and more often as seen in the transition of many men from the precontemplation stage of the TTM to the preparation and action stages. Of the men who could be reached 6 months post intervention, 33.1% had been screened and successfully changed their health behaviors to receive a PCa screening. This transition to the action stage represents a significant victory in informing future practices in regards to Jamaica and PCa, as it suggests that if more men were educated and made aware about prostate cancer they would receive screenings. Thus, Jamaica's PCa rates as the highest in the world could be reduced through informing men about prostate cancer, and lowering the high percentage of men who have never been told that they should receive PCa screening.

It is important to convey the restraints placed upon the study as well. First, since men were surveyed at locations where prostate screenings were not always available the self-reported intentions of men to seek out screening may not precisely reflect the participants' ability to receive a prostate exam. Additionally, men's reported intention to screen for PCa may have been influenced by the interviewer's presence which biased the results towards screening after the presentation.

## Conclusion

The results of this study suggest that future educational interventions can utilize the method used as a model to promote healthcare knowledge. By using a short presentation in either laptop or printed

slide format we were able to survey and educate 454 men from all 4 parishes in the western region of Jamaica, and increase the rate of screening within 6 months of the intervention. By using simple wording and highlighting crucial information on the PCa screening tests and the importance of PCa screening, this project ensured that men participating understood why annual PCa screenings are essential to their health and well-being. While stigma, cultural barriers, and worries about sexual health may be continuing to impede men's decision to receive a prostate exam, through the utilization of continued educational intervention behavior change can be further promoted in Jamaican men, instilling healthier life styles for this and future generations.

## Conflict of interest

The authors declare that there are no conflicts of interests.

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