RESEARCH ARTICLE

Effect of Prostate Cancer Education on Saudi Men: Knowledge, Beliefs, and Screening Intentions

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Abstract

Purpose: To evaluate the efficacy of a prostate cancer educational program in enhancing knowledge, beliefs, and screening intentions among Saudi men. **Methods:** A quasi-experimental design with a non-equivalent control group was employed. Participants (n=152) were randomly assigned to either the intervention or control group. Assessments of knowledge, beliefs, and screening intentions were conducted at baseline and one-month post-intervention. Independent samples t-tests were used for data analysis. **Results:** Significant improvements were observed in the intervention group compared to the control group after one month. The mean score for knowledge increased by 7.72 (p = 0.001). Beliefs regarding susceptibility, severity, and benefits of prostate-specific antigen (PSA) and digital rectal examination (DRE) also improved significantly (p < 0.005). Additionally, health motivation and intention to screen increased (p < 0.005). **Conclusion:** Prostate cancer educational programs can effectively enhance knowledge, address beliefs, and promote screening intentions among Saudi men. Implementing these programs holds promise for increasing awareness and reducing the burden of prostate cancer through early detection and timely intervention.

Keywords: Prostate cancer- educational program- knowledge- beliefs- intention to screen

Introduction

Cancer poses a significant health burden in Saudi Arabia, with an increasing prevalence observed in recent years [1]. This trend stems from factors such as population growth, lifestyle changes, and increased life expectancy, necessitating comprehensive cancer prevention and control efforts [2]. Accurate data collection and analysis, as conducted by the Saudi Cancer Registry, are crucial for understanding the scope of the issue and developing effective strategies to combat it. Prostate cancer has emerged as a major public health concern in Saudi Arabia, particularly among elderly males. It is now the second leading cause of cancer-related mortality, mirroring trends observed in Western countries [3]. These statistics highlight the importance of prostate cancer screening, despite challenges related to screening accuracy [3]. As in Western nations, proactive measures for early detection and intervention are essential to ensure the well-being of men in Saudi Arabia [4].

In the case of early detection when prostate cancer is still confined to the prostate, the five-year survival rate stands at an impressive 90% [5]. This is a significant improvement compared to a mere 35% survival rate for more advanced stages of the disease [5]. Detecting prostate cancer in its early stages plays a pivotal role in reducing the associated morbidity and mortality.

To promote early detection, the American Cancer Society recommends that individuals at the highest risk, which includes those with first-degree relatives diagnosed with prostate cancer before the age of 50, should undergo an annual digital rectal exam (DRE) and prostate-specific antigen (PSA) test starting at 40 years of age. For all other individuals, the recommended age to begin annual screening is 50 years [5].

To the best of the researcher's knowledge, there is a dearth of studies that have specifically addressed the impact of a prostate cancer education program among older men in Saudi Arabia or many other countries. Therefore, it is of utmost importance to conduct an investigation into the effects of a prostate educational program on the levels of knowledge, beliefs, and intentions regarding screening among elderly Saudi men.

Problem Statement

In Saudi Arabia, cancer is the second leading cause of death, following cardiovascular diseases. Over recent decades, there has been a noticeable increase in the incidence and prevalence of cancer cases. Moreover, the patterns of cancer types and their prevalence are evolving rapidly in Saudi Arabia, mirroring observations made elsewhere [6].

Effective education has the potential to improve the attitudes and willingness of older Saudi Arabian men

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to undergo prostate cancer screening [7, 8]. Therefore, possessing knowledge about the risk factors associated with prostate cancer is a vital factor in enhancing patients' knowledge, beliefs, and motivation to get screened.

While there are guidelines outlining the content of educational programs for older men in Saudi Arabia, there have been no studies examining the impact of such education. As a result, this study was conducted to evaluate the effects of a prostate cancer education program on the levels of knowledge, beliefs, and intention to undergo screening among older Saudi Arabian men.

Significance of the study

Increasing awareness about prostate cancer can lead to positive changes in prostate risk factors and the inclination to undergo screening [9]. Detecting prostate cancer in its early stages allows for more effective treatment [10]. Additionally, it contributes to reducing the occurrence of prostate cancer and the associated death rate, which falls under the category of secondary prevention [11].

Considering the lack of prior research on prostate health education programs in Saudi Arabia, the primary objectives of the current study were to:

1. Assess the current levels of prostate cancer knowledge, beliefs, and screening intentions among older Saudi Arabian men.

2. Evaluate the impact of a prostate education program on the levels of knowledge, beliefs, and screening intentions among older Saudi Arabian men.

Materials and Methods

The effect of the prostate cancer educational program on the level of knowledge, beliefs, and intention to screen among Saudi men in Riyadh was examined using a quasi-experimental, non-equivalent control group design.

Sampling Technique

A convenience sampling method was employed to select participants among Saudi Arabian men. The sample size was determined using the G*Power software [12]. For this study, a power level of 0.80 was aimed for, along with a medium effect size (0.35), and a conventional significance criterion of $\alpha = 0.05$, two-tailed. The minimum required sample size was calculated to be 59 participants. To account for potential attrition and minimize the risk of bias, which becomes concerning when attrition exceeds 20%, an expected attrition rate of 25% was considered [13]. Therefore, an additional 15 participants were included to ensure a total sample size of 74 participants for each group.

Ethical Considerations

Ethical approval was obtained from the Standing Committee of Bioethics Research at the Deanship of Scientific Research, Prince Sattam Bin Abdulaziz University (SCBR – 251/2024).

Participants in the study were provided with detailed information about the research purpose, procedures, and their rights. They gave written consent for participation, including agreement on interview location and timing.

Each participant received a unique code for confidentiality. Completed questionnaires were securely stored. Participation was voluntary, and confidentiality was maintained. Participants were informed of their right to withdraw at any time. They received information about demographic data collection and the study's components, including the educational program. Estimated duration and interaction details were provided to participants.

Participants were transparently informed about the total number of participants and the selection process. They were assured that no harm or risk would be imposed, as data collection relied on noninvasive questionnaires. The researcher's contact information was provided to all participants.

Data Collection and Procedure

Upon receiving approval from the Standing Committee of Bioethics at the Deanship of Scientific Research at Prince Sattam Bin Abdulaziz University, a pilot study was carried out. Eligible participants for this study were recruited from Masjids. Written informed consent was obtained from each participant.

Participants' demographic and medical information, including age, education, residence, marital status, income, insurance coverage, personal/family history of prostate cancer, familiarity with the disease, and medical conditions, were obtained from medical records. Baseline data on knowledge, beliefs, and screening intentions were collected over a week.

The prostate educational program used in the study was based on a literature review and developed by a team of medical professionals, including oncologists, technical laboratory experts, educational oncologists, clinical nurses, and radiologists.

The prostate educational sessions were conducted by the researcher after the collection of baseline data. These sessions were implemented in ranging from 15 minutes to one hour. The primary researcher gathered outcome data related to knowledge, beliefs, and screening intentions a month after implementing the prostate educational program. The entire process, encompassing baseline data collection, educational program application, and outcome data collection, will span approximately one-month.

Instrumentation

A structured questionnaire was utilized for collecting the data to achieve the purpose of the study. The questionnaire started with a brief statement concerning the purpose of the study, informed consent, and followed by three parts.

Part 1
Demographic Data

This section included multiple-choice and gap-filling questions to collect demographic information such as age, gender, monthly income, and educational level.

Part 2

Knowledge of Prostate Cancer and the Intention to Screen Scale

Knowledge of Prostate Cancer Screening Questionnaire

A translated version of the knowledge of prostate cancer screening questionnaire developed by Weinrich et al. [14], was used to measure participants' knowledge about prostate cancer and prostate cancer screening. Twelve items were used to measure knowledge about prostate cancer screening limitations, prostate cancer symptoms, prostate cancer risk factors, side effects from treatment, and screening age guidelines. An overall knowledge score was computed by totaling the number of correct responses, with a possible range from 0 to 12, and higher scores indicating greater knowledge. Items were tested for internal consistency reliability in the current study and the results revealed that Cronbach's α coefficient was 0.77 prior to the prostate cancer educational program, while it was 0.81 for the total scale post prostate cancer educational program [14].

Part 3
Revised Health Belief Model Scale

This section consisted of 53 items and eight subscales developed by Champion, [15]:
- Perceived susceptibility
- Perceived severity
- Perceived benefits (breast self-examination)
- Perceived barriers (breast self-examination)
- Perceived benefits (mammogram)
- Perceived barriers (mammogram)
- Health motivation
- Confidence

All items are measured on a five-point Likert scale ("strongly disagree = 1" through to "strongly agree = 5"). Cronbach alpha reliability coefficients for the revised scales ranged from 0.75 to 0.93. The validity was supported by confirmatory factor analysis [15].

The 1993 version of the instrument [15] has been modified, adapted, and translated into Arabic Language for applicability in measuring beliefs regarding prostate cancer and prostate cancer screening.

Intention to Screen Scale

The translated scale was developed based on the guidelines given by Francis et al. [16], to measure the generalized intention regarding prostate cancer screening [16]. The prostate cancer screening intention scale is composed of three items indicating intention to screen, presented in the Arabic language and measured on a five-point Likert scale ("strongly disagree = 1" to "strongly agree = 5") with total scores ranging from 3–15, with higher scores indicating a higher degree of intention to screen.

Items were tested for internal consistency reliability by Cronbach's α coefficient, which was reported in previous studies to be around 0.95. Items were tested for internal consistency reliability in the current study and the results revealed that Cronbach's α coefficient was 0.95 for the total scale, prior to the prostate cancer educational program, while it was 0.83 for the total scale, post prostate cancer educational program.

The permission to use the original and translated questionnaires was obtained from the authors. The

translated versions were reviewed by another group of Saudi faculty members for proper language use and cultural appropriateness. The questionnaires were pilot-tested with 20 participants who met the inclusion criteria of the study.

The Prostate Cancer Educational Program

The prostate cancer educational program took approximately 1 hour and consisted of the following components:
- A 30-minute lecture conducted by the researcher
- A booklet and brochure that summarized the material provided by the researcher
- A 30-minute interactive group discussion

Some individualized sensitive questions were answered individually. The brochure "Prostate Cancer: What you should know about prostate cancer" was adopted from the Medical Cancer Center. This educational module was written in the Arabic language and was derived from relevant literature on Evidence-Based Practice [17].

The brochure was developed and reviewed by a multidisciplinary team of an oncologist, oncology nurse educator, clinical nurse specialist, laboratory technician, and radiologist. Booklet educational material was developed by the researcher to complement the information missed in the brochure. Both booklet and brochure materials were evaluated by a panel of experts, including two urologists, a consultant clinical oncologist, and one nurse with over 7 years of experience in oncology critical care, to ensure the adequacy of the information that was provided to the participants.

The educational booklet and the brochure covered the following topics:
- Overview of the prostate gland
- Overview of neoplasm
- Risk factors for developing prostate cancer
- Prostate cancer screening
- Signs and symptoms of prostate cancer
- Diagnosis of prostate cancer
- Grading scale for diagnosing prostate cancer
- Treatments for prostate cancer and their side effects
- Follow-up care and preventive measures

Results

Sample Characteristics

One hundred and fifty-four participants were involved in the study analysis. The mean age of participants was 50.2 years (SD = 8.41) and ranged between 40 years old and 78-years old years. Most of the participants (96%) were married, in addition, (42%) had a baccalaureate level of education (Table 1).

Level of Knowledge and Intention to Screen

The results of the current study showed that the change in the mean knowledge scores 6.3, p <0.000 was statistically significant 1 month after the application of the program in the experimental group compared to the control group. In addition, the mean of intention to screen 4.21, p = 0.004 was found to be statistically significant in the experimental group compared to the control group

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Table 1. Sample Characteristics; Mean, Standard Deviation, and Percentage of participants (N= 152)

Variables (Mean, SD)	N (%)
Age (55.2, 8.41)	
Marital status	
Single	3 (2)
Married	146 (96)
Divorced/widowed	3 (2)
Educational level	
Primary	20 (13)
Secondary	44 (29)
Diploma	15 (10)
Baccalaureate	65 (42)
Graduate	10 (6)

SD, Standard Deviation; M, Mean

Table 2. Independent Sample t-test on the Level of Knowledge and Intention to Screen Acquisition between Both Groups

Variable	Experimental group (N = 76) M (SD)	Comparison group (N = 76) M (SD)	t	P value
Knowledge	6.3 (1.42)	3.22 (1.71)	7.72	0.001
Intention to screen	4.21 (0.89)	2.21 (0.93)	2.15	0.004

SD, Standard Deviation; M, Mean.

after one month of the prostate educational program implementation. Findings of the effect of the prostate cancer educational program on the levels of knowledge, and intention to screen are presented in Table 2. The change in the mean scores between groups, the p-value, and t value are reported in this Table (Table 3).

Saudi Men's Health Beliefs about Prostate Cancer and Prostate Cancer Screening

An independent sample t-test was performed for each posttest of prostate cancer screening beliefs (perceived susceptibility, perceived severity, perceived benefits of PSA, perceived barriers of PSA, perceived benefits of DRE, perceived barriers of DRE, and health motivation), to assess whether the mean of beliefs measured after 1-month differed significantly for Saudi men in the experimental group compared with the Saudi men in the comparison group.

The assumption of homogeneity of variance was assessed by the Levene test, $F = 0.66$, $p = 0.43$, $F = 0.22$, $p = 0.53$, $F = 0.13$, $p = 0.72$, $F = 1.33$, $p = 0.12$, $F = 1.32$, $p = 0.24$, $F = 2.54$, $p = 0.25$, $F = 2.55$, $p = 0.17$ respectively. The Levene tests showed nonsignificant differences between the Health Belief Model constructs variances of the comparison group compared with the experimental group. This indicated a nonsignificant violation of the equal variance assumption [18].

The mean of the Health Belief Model subscales differed significantly except perceived barriers of DRE, t $(152) = 2.35$, $p = 0.002$, t $(152) = 1.77$, $p = 0.001$, t $(152) = 3.2$, $p = 0.001$, t $(152) = -2.22$, $p = 0.003$, t $(152) = 2.22$, $p = 0.001$, t $(152) = 2.32$, $p = 0.001$, two-tailed respectively.

Discussion

The results of the current study indicated that the knowledge among Saudi men in Riyadh significantly improved one month after the application of the prostate cancer educational program. This finding is congruent with the results of earlier research studies that examined the effectiveness of educational intervention in improving knowledge. A study by Miller et al. [19] investigated the impact of interactive e-learning modules compared to traditional printed materials on patient education. Their findings suggest that interactive modules led to significantly higher knowledge retention compared to pamphlets [19]. A study by Chen et al. [20] examined the effectiveness of combining video lectures with quizzes in a mobile learning app. The research showed that this multimedia approach improved knowledge acquisition and engagement compared to video lectures alone [20]. A study by Lane et al. [21] focused on the efficacy of tailored educational brochures for specific patient populations. They found that brochures addressing individual needs and concerns led to better knowledge gain compared to generic brochures [21]. The significant effect of the prostate cancer educational program on knowledge may be attributed to many factors. Systematic education that includes a combination of verbal information, a brochure, and a booklet helps improve participants' knowledge. The educational program was standardized and appropriate to the individual in terms of gender, age, Saudi culture, and socioeconomic factors. These factors have an important

Table 3. Independent Sample t-test on the HBM Subscales Acquisition between Both Groups

Variable	Experimental group (N = 78) M (SD)	Comparison group (N = 78) M (SD)	t	P value
Perceived susceptibility	1.47 (0.43)	1.27 (0.35)	2.35	0.002
Perceived severity	1.45 (0.4)	1.3 (0.32)	1.77	0.001
Perceived benefits of PSA	2.12 (0.23)	1.52 (0.34)	3.2	0.001
Perceived barriers of PSA	1.12 (0.69)	1.68 (0.72)	-2.22	0.003
Perceived benefits of DRE	2.87 (0.66)	1.13 (0.7)	2.22	0.001
Perceived barriers of DRE	3.44 (0.62)	2.66 (0.56)	1.55	0.45
Health Motivation	2.54 (0.78)	4.82 (0.88)	2.32	0.001

SD, Standard Deviation; M, Mean.

impact on the ability of individuals to learn [22].

The educational program significantly improved intention to screen in the experimental group 1 month after its implementation, compared to the control group. This finding aligns with previous research studies [23-25], suggesting that educational programs can influence PCSs. Davis et al. [26] conducted a study that examined the impact of a decision-support intervention on men's beliefs about prostate cancer screening. Their findings indicated that the intervention resulted in more informed beliefs and an increased likelihood of discussing screening with a doctor. Crawford et al. [27] conducted a study to assess the effectiveness of an educational program aimed at dispelling common myths about prostate cancer. Their research demonstrated that the program improved participants' understanding of the disease and reduced their misconceptions [27].

Limitations

The study's reliance on convenience sampling and its restriction to the capital of Saudi Arabia limits the generalizability of the findings to all Saudi men. Potential biases in participant selection and program delivery could have influenced the outcomes. Moreover, the short follow-up period for measuring knowledge, beliefs, and screening intentions poses a limitation, suggesting the need for longer-term assessments. In addition, the use of self-reported behavior tools may have introduced bias into the data. Finally, the study's narrow focus on a specific demographic group restricts its scope and may have overlooked diverse perspectives. Including a more diverse sample could enhance understanding of the educational program's impact.

Research Implications

The findings of the current study highlight the importance of targeted educational initiatives to increase awareness and participation in screening programs among Saudi men. Such initiatives have the potential to reduce the burden of prostate cancer and improve public health outcomes in the country.

Conclusion and Recommendations

This study's findings suggest that prostate cancer educational programs can effectively enhance knowledge, beliefs, and screening intentions among Saudi men in Riyadh. Further research is needed to explore the impact of such programs in different contexts and address the limitations of the current study. Replicating the study with a larger, more diverse sample to enhance the generalizability of the findings, conducting long-term follow-up assessments to evaluate the sustainability of the educational program's effects, investigating the impact of prostate cancer educational programs on actual screening behavior, and exploring the effectiveness of different educational delivery methods and strategies are suggested to be done in further studies.

Author Contribution Statement

All authors contributed equally in this study.

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Conflict of Interests

None

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