

The Effect of Educational Program on Knowledge and Commitment of Male Employees at Tanta University Regarding Prostate Cancer Screening

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Abstract

Background: Prostate cancer is increasingly becoming one of the most significant health problems facing men and the commonest cause of cancer-related death in men globally. Thus, screening has immense public health importance. **The aim of the study:** was to evaluate the effect of educational program on knowledge and commitment of male employees at Tanta University regarding prostate cancer screening. **Subjects and Method: Design:** A quasi-experimental research design was utilized. **Settings:** This study was conducted at the faculties of the medical campus (Faculty of Nursing, Medicine, Pharmacy, Dentistry, and Faculty of Science) at Tanta University. **Subjects:** Systematic random sample of 80 male employees, aged 40 to 60 years old who were free from prostate cancer, and willing to participate in the study were included. **Tools:** Two tools were used for data collection: **Tool (I)** A structured interview schedule which consisted of two parts: **Part I:** bio socio-demographic characteristics of studied employees. **Part II:** Knowledge about prostate cancer and prostate cancer screening. **Tool (II)** Commitment to prostate cancer screening. **Results:** The majority of studied employees had a low level of knowledge pre-program. Immediately after the program intervention most of them had a high level of knowledge. Meanwhile, two-thirds of them had a high level of knowledge one month after the program intervention. More than two-thirds of the studied employees had a low level of commitment to prostate cancer screening tests pre and immediately post-intervention. While less than two-thirds of them retain a high level of commitment one month after the program intervention. **Conclusion:** There was a significant improvement in the total level of knowledge and commitment to prostate cancer screening. **Recommendation:** An ongoing effort should be undertaken to raise awareness of the significance of prostate cancer and to eliminate screening barriers.

Key words: Prostate cancer, Screening tests, Employees, Commitment.

Introduction

In recent years, Prostate Cancer (PC) has gained the highlight as a public health problem influencing men. Besides being the second most diagnosed cancer type worldwide, prostate cancer is the leading cause of cancer mortality in developed and developing countries among the world's male population⁽¹⁾. It is accounting for 1,414,259 new cases and causing 375,304 deaths about (6.8%) of all deaths caused by cancer in men in 2020. Nearly 60% of all prostate cancers are diagnosed in men at the age of 65 and older. The average age of men at diagnosis is about 66⁽²⁾.

In Egypt, according to the Global Cancer Observatory (GLOBOCAN) (2020) age-

standardized incidence rate is (13.9) per 100,000 and the estimated prevalent cases (in the last 5 years) and deaths for all ages are (10,532) cases and (2227) deaths respectively. In Egypt, by 2040 the estimated number of incident cases and death of prostate cancer will be expected to rise to (9607) cases and (4978) deaths respectively. Also, the worldwide prostate cancer burden is expected to grow to almost (2,426,825) million new cases and (739,861) deaths by 2040 simply due to the growth and the aging of the population⁽³⁾.

The exact cause of prostate cancer is not easy to determine. Major risk factors that are believed to affect one's chance of developing prostate cancer are increasing age, positive family history, and race. Other risk factors such as,

diet, obesity, smoking may have some connection to the pathogenesis of the disease⁽⁴⁾. The early detection of the disease in early stages can be an effective measure to reduce the mortality rate of the disease in asymptomatic men and provides an opportunity to create an effective and inexpensive therapeutic method for people⁽⁵⁾.

Several less invasive tests are used for early detection of prostate cancer, such as a prostate specific-antigen (PSA) blood test and digital rectal exam (DRE). Imaging tests such as MRI and prostate biopsy, which refers to the removal of small pieces of the prostate, guided by trans-rectal ultrasound, for microscopic examination, are also can be used in the confirmation and for definite diagnosis of prostate cancer⁽⁶⁾.

The time of screening tests is controversial while the American Cancer Society (ACS) advises receiving annual digital rectal exams (DREs) and prostate-specific antigen (PSA) tests, starting at age 45 years for at-risk groups comprising individuals with first degree relatives diagnosed with PC at an early age. Others should be screened annually from 50 years onwards. As for men over 75 years, the United States Preventive Services Task Force (USPSTF) recommended against PSA screening where the potential risks outweigh the benefits^(7, 8).

Commitment is the degree to which people voluntarily integrate and collaborate with the healthcare provider in terms of instructions regarding timing and frequency of screening tests and return for the follow-up to ensure an improved health outcome. Good knowledge and understanding of a disease are generally associated with a more optimal healthcare-seeking commitment^(9, 10).

Community health nurse (CHN) plays a vital role in the ongoing health screening of prostate cancer, data gathering, and monitoring practices. CHN has an opportunity to provide health education and counseling to men and interpret, share surveillance data with those who may be to use them in ways that decision-makers, the community and the public can understand⁽¹¹⁾.

Significance of the study:

Currently, prevention and early detection of prostate cancer have immense public health

importance as the expected number of patients with prostate cancer has increased due to aging of the population⁽¹²⁾. Therefore, the current study aims to evaluate the effect of educational program on knowledge and commitment of male employees at Tanta University regarding prostate cancer screening.

Aim of the Study

Evaluate the effect of educational program on knowledge and commitment of male employees at Tanta University regarding prostate cancer screening.

Research hypothesis:

Knowledge and commitment of male employees at Tanta University are expected to be improved after application of education program regarding prostate cancer screening.

Subjects and method

Study design:

A quasi-experimental research design was utilized in this study.

Study setting:

This study was conducted at the faculties of the medical campus (Faculty of Nursing, Medicine, Pharmacy, Dentistry, and Faculty of Science) at Tanta University.

Subjects:

A systematic random sample of 80 male employees, working in the previously mentioned settings.

Inclusion criteria:

1. Men aged from 40 - 60 years.
2. Not having prostate cancer.
3. Accepted to participate in the research.

The proportional allocation technique was used to select about 50% of the total male employees who meet the inclusion criteria (164 employees). The sample size was estimated with the test of power analysis (95% confidence limit, 80% power of the study).

The sample was selected according to the following table:

Faculty	Total number of male employees	Number of male employees (40-60 years)	50% of total male employees (40-60 years)
Faculty of nursing	27	12	6
Faculty of Medicine	77	45	22
Faculty of Pharmacy	71	47	23
Faculty of Dentistry	88	35	17
Faculty of Science	84	25	12
Total	347	164	80

Tool of data collection

- Two tools were developed by the researcher to obtain the necessary data as follow:

Tool I: A structured interview schedule:

It was developed by the researcher based on the review of recent and related literatures^(13, 14). It was included the following parts:

Part 1: Biosocio-demographic characteristics of the studied employees:

It covered data about the employees' age, marital status, level of education, occupation, monthly income, and residence in addition to the past health history of prostate problems and family history of prostate cancer.

Part 2: Study subjects' knowledge about prostate cancer and prostate cancer screening:

This part was developed by the researcher to assess the subjects' knowledge about prostate cancer and its screening tests. It comprised of 16 questions that covered the following items: definition of prostate cancer, risk factors, signs and symptoms, complications, treatment and early detection, types of prostate cancer screening tests, and times of prostate cancer screening^(15, 16).

Scoring system:

The knowledge score of the studied subjects regarding prostate cancer and its screening was calculated as the following: The subjects' response to knowledge questions was checked with a model key answer, which were prepared by the researcher. Complete and correct answers were taken score "two", incomplete correct answers were taken score "one" while incorrect / don't know answers was taken score "zero". It comprised of 16 questions. Then all correct

answers were summed up. The total score of knowledge was 32, ranged from (0-32), and classified into:

- Low level of knowledge: < 60 % of the total score: < 19.2.
- Moderate level of knowledge: 60 % - < 75 % of the total score: 19.2 - < 24.
- High level of knowledge: ≥ 75 % of the total score: ≥ 24.

Tool II: Commitment of the study subjects to prostate cancer screening

It was developed by the researcher to assess the study subjects' commitment to prostate cancer screening and early detection measures such as screening practices, duration and type of screening tests, medical checkups, and compliance with treatment of prostate problems. It comprised of 8 questions. The total score of commitment was 8, ranged from (0-8).

Scoring system

The commitment score of the studied subjects' regarding prostate cancer screening was calculated as the following: The done procedure was given a score (one), while the not done (zero).

- Low commitment: < 60 % of the total score: < 4.8.
- Moderate commitment: 60 % - < 70 % of the total score: 4.8 - < 5.6.
- High commitment: ≥ 70 % of the total score: ≥ 5.6.

Method

The operation of this study was carried out as follows:

1- Obtaining approvals:

- An official permission was obtained from the ethical committee of the faculty of nursing, Tanta University on the proposal of the study before conducting it.
 - An official permission to conduct the study was obtained from the Dean of the Faculty of Nursing and directed to the responsible authorities (Deans of the selected faculties) to obtain their approval and cooperation to carry out the study.
- 2- Ethical and legal considerations** were considered all over the study phases as the following:
- Informed consent was obtained from all study subjects after providing the appropriate explanation about the purpose of the study.
 - Each participant was informed that he has the right to withdraw from the study any time he wants.
 - Nature of the study didn't cause any harm or pain to the entire sample.
 - Assured the subjects about the privacy and confidentiality of collected data and explained that it was used only for study purpose.
- 3- Developing of the tools**
- The study tools (I and II) were developed by the researcher based on the review of related literature⁽¹³⁻¹⁶⁾.
 - The developed tools were reviewed by the supervisors. Then the sheet was submitted to five experts in the field of community health nursing and public health & community medicine for testing its face and content validity. The validity of the questionnaire based on experts' opinions was calculated and found to be (97%). The reliability test was applied to the previous tools using Cronbach's Alpha test:
 - For **tool I it was 0.802** for 34 items applied on 8 male employees.
 - For **tool II it was 0.825** for 8 items applied on 8 male employees.
 - For **the sheet in total it was 0.951** for 42 items applied on 8 male employees which indicates high reliability of the study tools.
- 4- The pilot study:**
- A pilot study was carried out by the researcher on 8 employees which represent 10 % of all study subjects to ensure the clarity, applicability, and comprehension of the tools, identify obstacles that may be encountered during data collection and to determine the length of time needed to collect the data.
 - According to the pilot study there were no modifications occurred after the pilot study so,

those employees were included in the main study sample.

5- Developing the educational program

The following steps were adopted to develop the program.

I) Assessment phase: before running the program, employees were interviewed individually to initiate good rapport, the data were collected by the previously mentioned tools through interviewing each employee individually in his office to collect the baseline data about prostate cancer and its screening as a pre-intervention assessment.

II) Planning phase: An educational program was planned according to the employees' needs and literature review to carry out the program.

- The goal of the program was: to increase the male employees' knowledge about prostate cancer and promote their commitment to prostate cancer screening.

III) Implementation phase: the program consisted of two sessions provided for male employees at their faculties three days per week. The duration of each session was 45 minutes.

Session (1): Program orientation and general idea about prostate cancer

This session aimed to establish a relationship with the employees and orient them about the importance of the education program, its sessions and expectations of each session, pretest and clarification the definition, causes and risk factors, signs and symptoms, and complications of prostate cancer to increase awareness of employees about prostate cancer as a disease were done.

Session (2): Prostate cancer screening

This session aimed to was to increase the awareness of employees about types of prostate cancer screening tests, their recommendations and enable male employees to identify their role toward themselves, their peers, and their community in the early detection of prostate cancer.

- The program was carried out by the researcher. Employees were divided into 3 groups so that the number of employees in each educational session didn't exceed 8 employees; this was to ensure complete, consistent, and accurate knowledge about prostate cancer and its screening to the study participants.
- Implementation of the program was carried out in the conference room of each faculty.

- Lectures, group discussions were used as a teaching methods.
- Power point presentation, pictures, videos, booklet and brochure were used as teaching aids.
- Booklet was designed by the researcher and given to the employees to use them as a source of information in the future.
- The fieldwork of this study was done in 4 months starting from the beginning of November (2020) to the end of February (2021).

IV) Evaluation phase

- This phase aimed to evaluate the effectiveness of the educational program on employees' knowledge and commitment. The evaluation was conducted three times as follow:
 - **First time (pretest):** before introducing prostate cancer screening education program for the employees using tools (I and II) to test their baseline data and practices of prostate cancer screening for early detection of prostate cancer.
 - **Second time (immediate posttest):** Immediately after implementation of the education program using tools (I part II and tool II).
 - **Third time:** After one month of implementation of the education program using tools (I part II and tool II).

6- Statistical analysis

- The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 26. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, the comparison was done using the Chi-square test (χ^2). For comparison between means of two variables in a group, paired-samples t-test was used. For comparison between means for variables during three periods of intervention in a group, or for more than two variables, the F-value of analysis of variance (ANOVA) was calculated. Correlation between variables was evaluated using Pearson and Spearman's correlation coefficient r. A significance was adopted at $P < 0.05$ for interpretation of results of tests of significance. Also, highly significance was adopted at $P < 0.01$ for interpretation of results of tests of significance⁽¹⁷⁾.

Results

Table (I): represents the distribution of the studied employees according to their total knowledge about prostate cancer and its screening tests pre- and post- educational program. It illustrates that there were

statistically significant differences related to knowledge levels of the studied employees regarding prostate cancer and its screening tests before, immediately, and after a month of implementing the educational program ($P < 0.001$).

Table (2): represents the distribution of the studied employees according to their commitment regarding to prostate cancer screening. It shows that, there was a significant improvement in the commitment of the studied employees specifically related previous screening prostate cancer, type of screening tests conducted before, last screening, reasons for getting screened, and Intention to have a regular prostate cancer screening. The differences observed among pre, immediate and post educational intervention in relation to the studied employees' commitment in all previous mentioned items was statistically significant ($P < 0.001$).

Table (3): represents the distribution of the studied employees according to their total commitment level regarding prostate cancer screening. It illustrates that there was a statistically significant difference related commitment levels of the studied employees regarding prostate cancer screening before, immediately and after a month of implementing the educational program ($P < 0.001$).

Table (4): represents the relation between the mean score of commitment of studied employees and their socio-demographic characteristics. This table illustrated that there was a statistically significant relationship between the commitment of studied employees regarding prostate cancer screening and their income before, immediately, and after a month of implementing educational program. There was a statistically significant relationship between the commitment of studied employees regarding prostate cancer screening and their residence before and immediately after implementing the educational program.

Table (5): represents the correlation between studied employees' knowledge score and their commitment to prostate cancer screening tests pre and post-educational program. This table showed that there was a statistically significant positive correlations between the total knowledge of the studied employees and their total commitment to prostate cancer screening tests before, immediately, and after one month

of implementing educational program ($P < 0.05$) respectively.

Table I: Distribution of the studied employees according to their total knowledge about prostate cancer and its screening tests throughout periods of study

Total knowledge level	The studied employees (n=80)						χ^2 P
	Pre		Immediately		Post 1 month		
	N	%	N	%	N	%	
Knowledge about prostate cancer							
▪ Low	74	92.5	2	2.5	9	11.3	19.53 <0.001**
▪ Moderate	6	7.5	4	5.0	18	22.5	
▪ High	0	0.0	74	92.5	53	66.3	
Range	(0-6)		(5-9)		(3-9)		F=23.80
Mean ± SD	2.69±0.39		7.90±1.01		7.10±1.45		P=<0.001**
Knowledge about prostate cancer screening tests							
▪ Low	61	76.2	0	0.0	4	5.0	75.32 <0.001**
▪ Moderate	13	16.3	3	3.8	18	22.5	
▪ High	6	7.5	77	96.2	58	72.5	
Range	(4-13)		(11-16)		(8-16)		F=49.13
Mean ± SD	7.90±1.29		14.10±1.37		12.52±1.73		P=<0.001**
Total knowledge level							
▪ Low	69	86.2	0	0.0	2	2.5	19.86 <0.001**
▪ Moderate	10	12.5	2	2.5	23	28.7	
▪ High	1	1.3	78	97.5	55	68.8	
Range	(4-19)		(18-25)		(14-24)		F=47.73
Mean ± SD	10.59±1.59		22.00±1.65		19.62±2.37		P=<0.001**

** Highly significant at level $P < 0.001$

Table 2: Distribution of the studied employees according to their commitment regarding to prostate cancer screening throughout periods of study

Commitment items	The studied employees (n=80)						χ^2 P
	Pre		Immediately		Post 1 month		
	N	%	N	%	N	%	
Previous Screening for prostate cancer							
No	56	70	56	70	30	37.5	21.42 <0.001**
Yes	24	30	24	30	50	62.5	
# Type of screening tests performed							
Prostate Specific Antigen (PSA)	11	44.0	11	44.0	37	74.0	15.26 0.04*
Digital Rectal Examination (DRE)	23	92.0	23	92.0	49	98.0	
Prostate biopsy	2	8.0	2	8.0	3	6.0	
Don't Remember	1	4.0	1	4.0	1	2.0	
Last screening							
A month ago	0	0.0	0	0.0	26	52.0	36.98 <0.001**
> 6 months	24	100.0	24	100.0	24	48.0	
# Reasons for getting screened							
Doctor Recommendation	0	0.0	0	0.0	10	20.0	16.01 <0.001**
A routine examination	9	36.0	9	36.0	13	26.0	
Worried about prostate cancer	16	64.0	16	64.0	23	46.0	
Symptoms emergence such difficulty urinating	20	80.0	20	80.0	24	48.0	
Prostate cancer in a family member/friend	1	4.0	1	4.0	1	2.0	
Result of screening							
Negative	24	100.0	24	100.0	44	88.0	6.38 0.041*
Conducting another test to confirm first one.	0	0.0	0	0.0	6	12.0	
# Reasons for not being screened							
Afraid of doing	19	33.9	6	10.7	10	33.3	21.45 <0.001**
Very uncomfortable and embarrassing	18	32.1	7	12.5	15	50.0	
Don't know where to do	45	80.4	26	46.4	9	30.0	
Don't know it and its importance	39	69.6	24	42.9	10	33.3	
Expensive	27	48.2	21	37.5	18	60.0	
Don't have time to perform	18	32.1	18	32.1	20	66.7	
Having medical checkup when feel any problem in genitourinary system							
No	56	70.0	56	70.0	30	37.5	21.42 <0.001**
Yes	24	30.0	24	30.0	50	62.5	
Intention to have a regular prostate cancer screening							
No	56	70.0	12	15.0	7	8.8	84.59 <0.001**
Yes	24	30.0	68	85.0	73	91.3	

More than one answer was chosen

*Significant at level P<0.05

**Highly significant at level P<0.001

*Significant at level P<0.05

Table 3: Distribution of the studied employees according to their total commitment level regarding prostate cancer screening throughout periods of study

Total commitment level	The studied employees (n=80)						χ^2 P
	Pre		Immediately		Post 1 month		
	N	%	N	%	N	%	
▪ Low	55	68.8	55	68.8	30	37.5	23.72 <0.001**
▪ Moderate	1	1.3	1	1.3	0	0.0	
▪ High	24	30.0	24	30.0	50	62.5	
Range	(0-7)		(0-7)		(0-7)		F=11.47 P=<0.001**
Mean ± SD	2.16±0.235		2.71±0.882		4.34±1.824		

* Significant at level P<0.05

** Highly significant at level P<0.001

Table 4: Relation between mean score of commitment of studied employees and their socio-demographic characteristics

Characteristics	The studied employees (n=80) Total commitment score		
	Pre	Immediately	Post 1 Month
Age (in years)			
▪ 40-	1.08±0.63	1.77±0.35	4.08±1.90
▪ 45-	1.86±0.09	2.41±0.77	3.59±0.90
▪ 50-	3.18±1.66	3.73±1.13	5.55±1.30
▪ ≥ 55	2.59±0.45	3.07±0.09	4.78±0.79
F , P	1.10 , 0.36	1.17 , 0.33	1.65 , 0.19
Educational level			
▪ Secondary	2.33±0.33	2.88±0.95	4.40±0.86
▪ High education and more	1.94±0.13	2.47±0.81	4.41±0.76
t , P	0.79 , 0.46	0.92 , 0.40	0.54 , 0.59
Marital status			
▪ Married	2.31±0.29	2.84±0.93	4.44±0.81
▪ Not married	0.00±0.00	2.00±0.00	1.53±0.72
t , P	0.79 , 0.50	0.81 , 0.49	1.30 , 0.28
Residence			
▪ Rural	2.77±3.46	3.29±3.05	4.69±2.76
▪ Urban	1.25±2.66	1.84±2.41	3.81±2.88
t , P	4.43 , 0.04*	5.10 , 0.03*	1.86 , 0.18
Income			
▪ Just enough	3.26±0.50	3.70±0.10	4.87±1.77
▪ Enough to be spared	0.00±0.00	0.50±0.71	3.50±0.54
▪ Not enough and borrow	0.00±0.00	0.80±0.41	3.28±0.69
F , P	11.53 , <0.01**	11.67 , <0.01**	2.91 , 0.06*

* Significant at level P<0.05

** Highly significant at level P<0.01

Table 5: Correlation between studied employees' knowledge score and their commitment to prostate cancer screening tests throughout periods of study

	Total knowledge level					
	Pre		Immediately		Post 1 month	
	r	P	r	P	R	P
Total commitment level	0.404	<0.01**	0.268	0.016*	0.357	0.031*

r: Pearson correlation' coefficient

* Significant at level $P < 0.05$

** Highly significant at level $P < 0.01$

Discussion

Prostate cancer is one of the major health problems in developing countries. It has a large impact on the quality of patient's life and their caregivers and imposes heavy costs on them. The disease is the second most common cancer and the second leading cause of cancer death among the world's male population. The high incidence of prostate cancer is important in the middle-aged and elderly. Prostate cancer doesn't cause symptoms in the early stage. When the symptoms appear; usually it has already run its course. So, understanding of the disease and its screening continue to be important areas for discussion among the men population for early detection of the disease⁽¹⁸⁾.

Studies have found that a lack of knowledge about the disease and its screening tests serves as a barrier to effective cancer prevention and control^(19, 20). Dissemination of information via education programs about prostate cancer and its screening through different community settings can promote active engagement and commitment of men with screening⁽²¹⁾.

As regard to the total level of knowledge, the results of the present study illustrated that there was a significant improvement in the total knowledge score of the studied employees throughout the study phases, where the mean scores of their knowledge increased from 10.59 ± 1.59 in pre-program intervention to $22.00 \pm 4.1.65$ immediate post-intervention and to 19.62 ± 2.37 one-month post-intervention ($p < 0.001$). The majority of the studied employees had low knowledge scores about prostate cancer and its screening in pre-program intervention. Meanwhile, immediately after the program

implementation, most of studied employees had a high level of knowledge while more than two-thirds of them retained a high level of knowledge one month after the program implementation (**Table I**). This is in accordance with **Saleh et al. (2020)**⁽²²⁾ who conducted a study to assess prostate cancer-based interventions' efficacy on knowledge and adherence intention to a healthy lifestyle among men in Jordan and found that there was a significant improvement in the total knowledge score from pre-program to the post-program at ($p < 0.001$), where the mean scores of their knowledge increased from 5.08 ± 2.99 in pre-program to 8.7 ± 2.422 post-program.

Also, this result is in agreement with **Awosan et al. (2018)**⁽²³⁾ who conducted a study to assess Knowledge of prostate cancer and screening practices among men in Sokoto, Nigeria and **Molazem et al. (2018)**⁽²⁴⁾ who conducted a study to determinate the effect of an educational program for prostate cancer prevention on knowledge and prostate-specific antigen (PSA) testing in men over 50 years old in community areas of Shiraz and reported that 64% of participants had poor knowledge about prostate cancer and its screening. This may be due to a lack of health education programs about prostate cancer and its screening and may be due to the lower level of education as three-quarters of the studied employees had a secondary degree of education.

Prostate cancer screening can aid in the identification of the disease at an early stage, and permit more effective treatment, all of which will increase survival rates, reduce risk of

death, and reduce the cost of care. It is believed that more than 69% of prostate cancer deaths could be prevented during the first five years through proper screening. Therefore, increasing knowledge about prostate cancer screening through educational program enhance commitment of men with prostate cancer screening tests⁽²⁵⁾.

In the context, the present study revealed that, less than three quarters of studied employees mentioned that they didn't perform previous screening tests for prostate cancer or had medical checkup or have the intention to have a regular prostate cancer screening pre-program implementation (**Table 2**). From the researcher point of view, these results explained as that participant were not aware of the screening methods and the time to do it as indicated by their total knowledge score. There are no schedules as to when men should go for prostate cancer screening like other cancers such as breast and cervical cancer, hence a very low screening uptake. This results are supported by **Nakwafila et al (2017)**⁽¹⁶⁾ who conducted a study to examine knowledge and attitudes towards prostate cancer screening amongst men in Oshana region, Namibia who found that (41%) of participants had undergone prostate cancer screening tests. Also, **Gift et al. (2020)**⁽²⁶⁾ who conducted a study to assess knowledge, practice and attitude towards prostate cancer screening among male patients aged 40 years and above at Kitwe Teaching Hospital, Zambia. They found that only 13% of the participants were screened for prostate cancer in the last 2 years. From the researcher point of view, these results explained as that participant were not aware of the screening methods and the time to do it as indicated by their total knowledge score. There are no schedules as to when men should go for prostate cancer screening like other cancers such as breast and cervical cancer, hence a very low screening uptake.

Additionally, the present study is congruent with **Kinyao et al. (2018)**⁽²⁷⁾ who conducted a study to examine attitude, perceived risk and intention to screen for prostate cancer by adult men in Kenya and reported that about 50% of the participant didn't have the intention to have regular screening. From the researcher point of view, the low intention among studied employees may be due to their ignorance of seriousness of prostate cancer and perceived barriers such as cost and fear of screening. This

implies that more effort needs to be made to increase awareness of prostate cancer magnitude and reduce its screening barriers.

Regarding the type of screening tests performed previously for most of the employees it was DRE which was done more than six months before the program by all the screened employees (**Table 2**). This result is in agreement with **Gift et al. (2020)**⁽²⁶⁾ who found that (76.9%) of the previously screened participants mentioned that DRE was performed as a method of screening in the last 2 years. This result indicate that DRE is used in a wide scale as a diagnostic test for prostate problems.

Active recommendation to screen from health care providers, persuasion from their close social networks, and exposure to personal experience of cancer supported men's acceptance and willingness to undergo prostate cancer screening. Further, men believed that early detection could improve chances of survival, which was also a strong motivator to commit with screening tests⁽²⁸⁾. Concerning to the reason for getting screened, the most common cause was the emergence of symptoms followed by worried about prostate cancer and all of them had negative results (**Table 2**). This result is congruent with **Mbugua et al. (2021)**⁽¹⁹⁾ who conducted a study to explore the barriers and facilitators to the uptake of prostate cancer screening among men aged 40–69 years in a rural community in Kenya and found that most of the participants reported that experience of symptoms, worried about prostate cancer were the main motivators for their prostate cancer screening.

Commitment of men with prostate cancer screening is highly dependent on their knowledge about PC and the benefits of early detection. However, some men refused or delayed prostate cancer screening because of many reasons. The most prominent reason is lacking of knowledge about the existence of prostate cancer screening facilities, as when and where to go for screening and fear of a diagnosis of PC. Also, the cost, low perception of self-vulnerability and sociocultural value regarding masculinity are other barriers hinder the commitment with prostate cancer screening. Therefore, cultural factors must be taken into account when counseling and educating men regarding prostate cancer screening. Also, male clinicians and male nurses should be involved in educational session for provision of culturally

acceptable screening services; hence raise commitment of men^(18, 29).

Concerning the most obvious reason for not being screened in this study was ignorance of where to do (80.4%), don't know the screening and its importance (69.6%) and the expensiveness of screening tests (48.2%) (**Table 2**). This result is in disagreement with **Awosan et al. (2018)**⁽²³⁾ who conducted a study to assess Knowledge of prostate cancer and screening practices among men in Sokoto, Nigeria and found that cost of screening and no health insurance cover were the main barriers mentioned by 80% of the respondents. Meanwhile, **Wachira (2018)**⁽³⁰⁾ who conducted a study to assess the knowledge, perception and uptake of prostate cancer screening among men attending Mathare North health center in Kenya, found that (64%) of respondents don't know the screening and its importance and were not aware of the existence of prostate cancer screening services. This result may be due to low levels of awareness and accessibility to screening services.

Concerning the total commitment score of the studied employees, pre and immediately post-intervention, more than two-thirds of the studied employees had a low level of commitment to prostate cancer screening tests. While slightly less than two-thirds of them reported a high level of commitment one month after the program implementation (**Table 3**). This result is similar to the result of **Zare et al. (2016)**⁽³¹⁾ who conducted a study to investigate the effect of Health Belief Model (HBM)-based education on knowledge and prostate cancer screening behaviors and found that the rate of participation in prostate cancer screening in the intervention group increased from 7.5% to 24% and 43.3% one month and three months after the intervention, respectively.

The present study also demonstrated that there was a significant improvement of the total commitment score of studied employees pre, immediate and one month post-program intervention, where the mean scores of their commitment increased from (2.16±0.235) pre-program intervention to (2.71±0.882) immediately post-intervention and (4.34±1.824) one month post-intervention. This difference was statistically significant ($P < 0.001$) (**Table 3**). This result is in agreement with **Jeihooni et al. (2019)**⁽¹⁸⁾ who conducted a study to evaluate the effect of educational program based on

PRECEDE model in promoting prostate cancer screening in a sample of Iranian men and reported that there was a significant improvement of the score of prostate cancer screening behavior of the experimental group 6 months after the intervention compared to pre-intervention. This indicates the great impact of knowledge about prostate cancer and its screening on the studied employees' commitment; hence, the effectiveness of the educational program.

Concerning the relation between the commitment of studied employees and their socio-demographic characteristics. This study revealed that employees whose aged 50 years, who are married, who live in rural resident and whose income is just enough more committed to prostate cancer screening than the others pre and one month post educational program implementation (**Table 4**). This result is similar to **Ojewola et al. (2017)**⁽³²⁾ who found that men whose aged 51-60 and married more committed to prostate cancer screening. This may be due to the increase perceived susceptibility of studied employees to prostate cancer as men who perceive themselves at risk are more likely to commit screening. On the other hands, this result is in contrast with **Mbugua et al. (2020)**⁽³³⁾ who conducted a study to determine the intra- personal factors influencing uptake of prostate cancer screening among men aged 40-69 years in Kenya and found that participants who had high income are more committed with prostate cancer screening. This difference may be due to economic limitations of the rural communities and indicate to more efforts should be considered the provision of affordable or free screening services to men considered to be at risk of prostate cancer to enhance the commitment to prostate cancer screening.

Regarding the educational level, the studied employees who had a secondary education were more committed than the others pre-educational program. While highly educated employees committed to prostate cancer screening than the others one month post educational program (**Table 5**). This result is congruent with **Mbugua et al. (2020)**⁽³³⁾ who found that participants who had secondary education were more compliance with prostate cancer screening than the others. This may be explained as the working place in the medical field of medical campus' faculties, enabling them with medical knowledge.

Regarding the correlation between studied employees' knowledge and their commitment to prostate cancer screening tests pre and post-educational program. The result of present study showed that there was statistically significant positive correlations between the total knowledge of the studied employees and their total commitment with prostate cancer screening tests before, immediately, and after one month of implementing the educational program ($P < 0.001$) (Table 5). This result is supported by **Tobias-Machado et al. (2013)**⁽³⁴⁾ who conducted a study in Brazil to assess the association between literacy, compliance with prostate cancer screening, and cancer aggressiveness and found that there were statistically significant positive correlations between literacy of the participants and their compliance with prostate cancer screening. This may be due to increase knowledge of studied employees about the risks and seriousness of prostate cancer leading to an increase in their commitment to its screening. This may reflect that the men who have poor knowledge about prostate cancer screening are at higher risk of being diagnosed with more advanced and aggressive prostate cancer due to poor commitment to screening recommendations and follow-up.

Also, this result is in the same line with **Rezaei et al. (2020)**⁽³⁵⁾ Who conducted a study in Tehran to determine the effect of educational program based on the theory of planned behavior on prostate cancer screening and found that there were statistically significant positive correlations between knowledge of the participants and their commitment to prostate cancer screening before and after 2 months of the educational program. This may be due to increase knowledge of studied employees about the risks and seriousness of prostate cancer leading to an increase in their commitment to its screening. This may show that low commitment to prostate cancer screening has been associated with poor knowledge about prostate cancer and the screening methods. Hence, leading to late diagnosis and increased prostate cancer mortality and morbidity.

Finally, Continuous effort should be made to increase studied employees' knowledge and commitment to prostate cancer screening. This can be achieved through the organization and implementation of the health education programs in hospitals, in out-patient clinics, and

the public in the community. Raising awareness about prostate cancer screening can prevent and early detect the occurrence of new prostate cancer cases, prevent its serious consequences and as a result of that, the quality of life and productivity of the men population are improved.

Conclusion

Based on the findings of the current study, it was concluded that the educational program was effective and improve knowledge and commitment of the studied employees with prostate cancer screening. There was a significant improvement of the total level of knowledge related to prostate cancer and the total level of knowledge related to prostate cancer screening immediately and post one month after educational program implementation compared to pre implementation of the educational program as indicated by their mean score of knowledge. Also, there was a significant improvement in the total level of commitment with prostate cancer screening post one month after the educational program implementation than pre implementation of the educational program.

Recommendations

Based on the results of the present study the following recommendations were suggested:

1. An ongoing effort should be undertaken to raise awareness of the significance of prostate cancer and to eliminate screening barriers.
2. Health care professionals should devote more time and effort to educating and advising males about the nature of prostate cancer, its risks, importance, screening and early detection procedures, and tools.
3. The program might be established as part of a routine to test males in their forties and fifties who are at risk of getting prostate cancer.
4. Intervention actions aimed at increasing knowledge screening services, as well as ensuring screening services are widely available, must be stepped up.
5. Further research is necessary to measure the effect after the application of the prostate cancer educational program.

References

- 1- Saleh AM, Petro-Nustas W, Fooladi M. Knowledge of prostate cancer screening among Jordanian men in Amman. The Journal of

- Middle East and North Africa Sciences. 2018; 4(10): 1-4.
- 2- Ferlay EM, Lam F, Colombet M, Mery L, Pineros M, Znaor A. Global cancer observatory: Cancer today. Lyon, France. International Agency for Research on Cancer. 2020. Available from: <https://gco.iarc.fr/today>
 - 3- Culp MB, Soerjomataram I, Efstathiou JA, Bray F, Jemal A. Recent global patterns in prostate cancer incidence and mortality rates. *European Urology*. 2020; 77(1): 38-52.
 - 4- American Cancer Society. Prostate cancer risk factors. 2020. Available from: <https://www.cancer.org/cancer/prostate-cancer/causes-risks-prevention/risk-factors.html>
 - 5- Centers for Disease Control and Prevention (CDC). What is screening for prostate cancer? 2020. Available from: https://www.cdc.gov/cancer/prostate/basic_info/screening.htm
 - 6- Smith RA, Andrews KS, Brooks D, Fedewa SA, Manassaram-Baptiste D. Cancer screening in the United States, 2019: A review of current American cancer society guidelines and current issues in cancer screening. *CA: A Cancer Journal for Clinicians*. 2019; 69(3):184-210.
 - 7- U.S Preventive Services Task Force Prostate Cancer: Screening. .2018. Available from: <https://www.uspreventiveservicestaskforce.org/uspstf/document/RecommendationStatementFinal/prostate-cancer-screening>
 - 8- Grossman DC, Curry SJ, Owens DK, Bibbins-Domingo K, Caughey AB, Davidson KW. Screening for prostate cancer: US preventive services task force recommendation statement. *JAMA*. 2018; 319(18):1901-13.
 - 9- Hahn EE, Baecker A, Shen E, Haupt EC, Wakach W, Ahuja A, et al. A patient portal-based commitment device to improve adherence with screening for colorectal cancer: A retrospective observational study. *Journal of General Internal Medicine*. 2021; 36(4): 952-60.
 - 10- Bugoye FC, Leyna GH, Moen K, Mmbaga EJ. Knowledge, perceived risk and utilization of prostate cancer screening services among men in dar Es salaam, Tanzania. *Prostate Cancer*. 2019; 2019:1-6.
 - 11- MacDonald S, Jakubec S, Stanhope M, Lancaster J. *Community Health Nursing in Canada*. 3rd ed. Canada: Mosby Canada, 2016; 672.
 - 12- Morlando M, Pelullo CP, Di Giuseppe G. Prostate cancer screening: Knowledge, attitudes and practices in a sample of men in Italy. *PLoS One*. 2017; 12(10): 1–11.
 - 13- Yeboah-Asiamah B, Yirenya-Tawiah D, Baafi D, Ackumey MM. Perceptions and knowledge about prostate cancer and attitudes towards prostate cancer screening among male teachers in The Sunyani Municipality, Ghana. *African J Urol*. 2017; 23(3):184–91.
 - 14- Arafa MA, Rabah DM, Wahdan IH. Awareness of general public towards cancer prostate and screening practice in Arabic communities: A comparative multi-center study. *Asian Pacific J Cancer Prev*. 2012; 13(9): 4321–6.
 - 15- Oladimeji O, Bidemi YO, Olufisayo Y, Sola AO. Prostate cancer awareness, knowledge and screening practices among older men in Oyo State, Nigeria. *Int Q Community Health Educ*. 2010; 30(3): 271–86.
 - 16- Nakwafila O. Knowledge and attitudes towards prostate cancer screening amongst men in Oshana Region, Namibia. Doctoral Dissertation. Faculty of Applied Science ,University of Namibia, Namibia, 2017.
 - 17- Dawson B, Trapp R. *Reading the Medical Literature: Basic & Clinical Biostatistics Lange Medical Book*. 3rd ed. New York: McGraw – Hill. Medical Publication Division, 2001; 161-314.
 - 18- Jaihooni AK, Kashfi SM, Hatami M, Avand A, Bazrafshan MR. The effect of educational program based on PRECEDE model in promoting prostate cancer screening in a sample of Iranian men. *Journal of Cancer Education*. 2019; 34(1): 161-172.
 - 19- Mbugua RG, Karanja S, Oluchina S. Barriers and facilitators to uptake of prostate cancer screening in a Kenyan Rural Community. *Ann Afr Surg*. 2021; 18(3): 130-136.
 - 20- Persaud H, Yuan J, Afable A, Bruno DM. Barriers to prostate cancer screening among indo-guyanese. *Journal of community health*. 2021; 46(3): 591-96.
 - 21- Walsh-Childers K, Odedina F, Poitier A, Kaninjing E, Taylor III G. Choosing channels, sources, and content for communicating prostate cancer information to Black men: A systematic review of the literature. *American Journal of Men's Health*. 2018; 12(5): 1728-45.
 - 22- Saleh AM, Petro-Nustas W, Ebrahim EE, Vellaiyan A, Najjar Y, Almutairi, M AM. Prostate cancer-based interventions' efficacy on knowledge and adherence intention to healthy lifestyle among men. *Asian Pacific Journal of Cancer Prevention*. 2020; 21(4): 1129.

- 23- Awosan KJ, Yunusa EU, Agwu N P, Taofiq S. Knowledge of prostate cancer and screening practices among men in Sokoto, Nigeria. *Asian Journal of Medical Sciences*. 2018; 9(6): 51-56.
- 24- Molazem Z, Ebadi, M, Khademian M, Zare R. Effects of an educational program for prostate cancer prevention on knowledge and PSA testing in men over 50 years old in community areas of Shiraz in 2016. *Asian Pacific Journal of Cancer Prevention*. 2018; 19(3): 633.
- 25- Abuadas MH, Petro-Nustas W, Albikawi ZF. Predictors of participation in prostate cancer screening among older men in Jordan. *Asian Pacific Journal of Cancer Prevention*. 2015; 16(13): 5377-83.
- 26- Gift S, Nancy K, Victor M. Assessment of knowledge, practice and attitude towards prostate cancer screening among male patients aged 40 years and above at Kitwe Teaching Hospital, Zambia. *African Journal of Urology*. 2020; 26(1): 1-7.
- 27- Kinyao M, Kishoyian G. Attitude, perceived risk and intention to screen for prostate cancer by adult men in Kasikeu sub location, Makueni County, Kenya. *Annals of Medical and Health Sciences Research*. 2018; 8(3):125-132.
- 28- James LJ, Wong G, Craig JC, Hanson C, Ju A, Howard K, et al. Men's perspectives of prostate cancer screening: A systematic review of qualitative studies. *PloS one*. 2017; 12(11): e0188258.
- 29- Shungu N, Sterba KR. Barriers and facilitators to informed decision-making about prostate cancer screening among Black men. *The Journal of the American Board of Family Medicine*. 2021; 34(5): 925-36.
- 30- Wachira BW, Meng'anyi LW, Mbugua GR. Knowledge, perception and uptake of prostate cancer screening: A cross sectional study at a level III Hospital in Kenya. *Public Health Research*. 2018; 8(4): 81-87.
- 31- Zare M, Ghodsbin F, Jahanbin I, Ariaifar A, Keshavarzi S, Izadi T. The effect of health belief model-based education on knowledge and prostate cancer screening behaviors: A randomized controlled trial. *International Journal of Community Based Nursing and Midwifery*. 2016; 4(1): 57-68.
- 32- Ojewola RW, Oridota ES, Balogun OS, Ogundare EO, Alabi TO, BanjoOO, et al. Knowledge, attitudes and screening practices regarding prostatic diseases among men older than 40 years: A population-based study in Southwest Nigeria. *The Pan African Medical Journal*. 2017; 27(5):151-166.
- 33- Mbugua RG, Oluchina S, Karanja S, Cheboi S. Uptake of prostate cancer screening and associated intra-personal factors among men aged 40-69 years: A cross-sectional study in a rural community in Kenya. *African Journal of Health Sciences*. 2020; 33(3): 73-82.
- 34- Tobias-Machado M, Carvalhal GF, Freitas CH, Reis RBD, Reis LO, Nogueir L, et al. Association between literacy, compliance with prostate cancer screening, and cancer aggressiveness: Results from a Brazilian screening study. *International Braz J urol*. 2013; 39(4): 328-34.
- 35- Rezaei H, Negarandeh R, Pasheypoor S, Kazemnejad A. Effect of educational program based on the theory of planned behavior on prostate cancer screening: A randomized clinical trial. *International Journal of Preventive Medicine*. 2020; 11(1):146-152.