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Assessing Knowledge, Attitude and Practice Toward Prostate Cancer Among Males at Seiyun University, Hadramout, Yemen

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Abstract

Prostate cancer remains a major global health challenge, recognized as the second most prevalent cancer among men and the fifth leading cause of mortality worldwide. This study aimed to evaluate the current knowledge, attitudes and practices regarding prostate cancer. An analytical, cross-sectional survey was conducted among 326 adult males at Seiyun University, Yemen. Data were collected using a validated, self-administered questionnaire that covered sociodemographic, family history, awareness, symptoms' knowledge, risk factors, attitudes and screening practices. Ethical approval and verbal informed consent were obtained. Descriptive statistics, KAP categorization, and chi-square were performed. Overall, participants demonstrated limited awareness with 25% having heard of prostate cancer and 6% aware of specific screening programs. The majority (69%) correctly identified blood tests as the best screening method, only 17% knew the appropriate age for screening. Interestingly, only 1.2% of participants reported having been screened for prostate cancer. Meanwhile, 6% indicated a family history of cancer, mostly breast cancer in second-degree relatives. The study found significant correlations between participants' knowledge levels, age, and the type of college attended. Importantly, there was a significant association between having a family history of cancer and undergoing screening procedures. In other words, participants with a family history of cancer were more likely to participate in screening practices. This study highlights a significant deficit in prostate cancer knowledge and alarmingly low screening rates. The findings underscore an urgent need for comprehensive, culturally sensitive, and evidence-based educational initiatives in Yemen. These efforts should specifically target identified knowledge gaps related to symptoms, risk factors, and appropriate screening age, and be tailored to specific age groups and college types, leveraging the influence of family history, to foster proactive health behaviors and improve early detection.

Keywords: Attitude, Knowledge, Practice (KAP), Prostate cancer, Yemen

INTRODUCTION

Prostate cancer represents a significant global health burden, affecting millions of men worldwide. It stands as the second most common cancer in men and the fifth leading cause of cancer-related death globally (Zhang et al., 2023; Abdulwahab et al., 2024). In 2022, GLOBOCAN projections from the International Agency for Research on Cancer (IARC) indicated 1,466,680 new prostate cancer cases and 396,792 deaths from the disease in men (Bray et al., 2024). The substantial impact of prostate cancer is further underscored by its contribution of 6.1 million Disability-Adjusted Life Years (DALYs) globally in 2016 (GBDCC, 2018).

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Prostate cancer originates from the uncontrolled proliferation of abnormal cells within the prostate gland, a small gland located below the bladder in males. Pathogenesis typically involves genetic mutations (both inherited and acquired), hormonal influences (particularly androgens like testosterone), and potentially chronic inflammation, leading to the transformation of normal prostatic epithelial cells, most commonly adenocarcinomas. These changes often begin as pre-malignant lesions, such as prostatic intraepithelial neoplasia (PIN), before progressing to invasive carcinoma (ACS 2023; Mayo Clinic, 2024). Advancing age, Black race, and a family history of prostate cancer are well-documented non-modifiable risk factors. Additionally, several dietary and lifestyle factors, including vitamin E supplementation, diabetes mellitus, obesity, physical inactivity, and certain eating habits, have been connected to an increased risk (Wang et al., 2022; Rao et al., 2023). The significant impact of early detection on prostate cancer mortality rates is exemplified by data from Sweden, where a reduction in PSA-based screening resulted in a 2.5-fold increase in prostate cancer-related deaths compared to the United States. Screening typically relies on the identification of elevated prostate-specific antigen (PSA) levels in the blood, often complemented by an abnormal digital rectal exam (DRE) in symptomatic patients, both of which contribute to a positive predictive value (Kirby et al., 2024; Salah et al., 2024).

Prostate cancer incidence and mortality rates vary significantly across different regions. While countries in Oceania, particularly New Zealand and Australia, exhibit the highest incidence rates, other Asian nations may experience underreported cases. Notably, developed countries often demonstrate lower mortality-to-incidence ratios compared to developing countries, suggesting that the quality of healthcare and clinical management play a more crucial role in determining prostate cancer outcomes than inherent racial or ethnic differences within the Asian population (Ito & Kimura, 2023). The Middle East, for instance, has shown a considerable increment in prostate cancer occurrences, partly attributable to changing lifestyles and increased life expectancy (Abdulwahab et al., 2024). Conversely, while Age-Standardized Incidence Rates (ASIR) in North America and Oceania exceed 70 cases per 100,000 populations, South-Central Asia records a significantly lower ASIR of merely 6.3 per 100,000 populations (Budukh et al., 2023). In the Yemeni male population, prostate cancer is reported with an Age-Standardized Rate (ASR) of 2.8 per 100,000 populations (Ibrahim et al., 2020). However, comprehensive and locally representative data on the true incidence and prevalence of prostate cancer across all regions of Yemen remains a significant challenge due to limited cancer registries and healthcare infrastructure.

Despite the global burden and the importance of early detection, localized data on prostate cancer awareness, attitudes, and practices (KAP) in Yemen, and particularly among specific demographics, remains notably scarce. Previous studies on prostate cancer in Yemen have primarily focused on incidence statistics from limited registries, with a conspicuous absence of research exploring public knowledge, attitudes, and health-seeking behaviors related to the disease. This critical knowledge gap hinders the development of effective public health strategies tailored to the Yemeni context, where limited diagnostic and treatment infrastructure underscores the need for early recognition and intervention. General awareness about prostate cancer in Yemen is often presumed to be low due to the absence of robust national screening programs, limited public health campaigns specifically targeting male cancers, and competing healthcare priorities.

To understand and influence health behaviors related to prostate cancer, it's crucial to consider the underlying factors that drive individuals' choices. This study is guided by the Health Belief Model (HBM), a widely used theoretical framework in health psychology for explaining and predicting health behaviors (Rosenstock, 1966; Jones et al., 2015; Khodaveisi et al., 2021). The HBM posits that an individual's likelihood of engaging in a health-related action, such as prostate cancer screening, is influenced by several key perceptions:

a. Perceived Susceptibility: The individual's belief about their personal risk of developing prostate cancer.
b. Perceived Severity: Their belief about the seriousness of prostate cancer and its potential consequences.
c. Perceived Benefits: Their belief in the effectiveness of screening or preventive behaviors in reducing the threat of prostate cancer.
d. Perceived Barriers: Their belief about the potential negative consequences or obstacles associated with taking the health action (e.g., pain, cost, embarrassment, time, cultural norms).
e. Cues to Action: Internal or external stimuli that trigger the individual to act (e.g., symptoms, family history, media campaigns, recommendations from healthcare providers).
f. Self-Efficacy: Their confidence in their ability to successfully perform the desired health behavior.

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In the context of Yemen, focusing on university males is particularly strategic and vital. Seiyun University, as a prominent higher education institution in the Hadramout Valley region, serves a diverse population of male students and teachers, drawing individuals from various parts of Hadhramaut and beyond. This makes it an ideal and accessible site for a foundational study within an academic context, representing a segment of the population critical for future health literacy efforts. These male students and teachers represent a concentrated, relatively educated, and accessible population. As young adults and future professionals/community leaders, their health literacy concerning prostate cancer is critical, as their knowledge and attitudes can significantly influence their families, social networks, and future generations. Furthermore, conducting this research within a university setting provides a feasible and structured environment to assess baseline awareness among a demographic that might be presumed to have better access to information, thereby highlighting specific gaps even within this group. Understanding these HBM perceptions in this population is crucial to systematically investigate why specific knowledge gaps, attitudes, and practices exist and to inform targeted interventions.

The purpose of this study is to determine adult males' knowledge, attitudes, and practices regarding prostate cancer at Seiyun University, Hadramout, Yemen, to provide foundational data for future public health initiatives.

METHODS

Study Design and Setting

This study employed an analytical, cross-sectional design to assess the knowledge, attitudes, and practices (KAP) concerning prostate cancer among male individuals affiliated with three colleges of Seiyun University, located in Hadramout Governorate, Republic of Yemen. Seiyun University was established in 2017, building upon the foundations of its initial colleges and centers that had been active for over two decades. Currently, the university comprises Ten colleges and has an enrollment of approximately six thousand students (Seiyun University, 2023). Data collection for this study took place between March and May 2023. The study adhered to the Checklist for Reporting of Survey Studies (CROSS) guidelines (Supplementary File 1) to ensure comprehensive and transparent reporting of the methodology and findings.

Study Population and Sample Size

Target Population and Eligibility Criteria

The target population for this study comprised all male students and university academic staff holding teaching positions at Seiyun University, Yemen.

Rationale for targeting this specific population:

While prostate cancer primarily affects older men (typically over 60 years of age), assessing knowledge, attitudes, and practices (KAP) among a university-based population of males (age ≥18) is strategically vital for several reasons. Firstly, this demographic represents a crucial cohort for establishing early health-seeking behaviors and understanding long-term health risks related to prostate cancer. Engaging them provides a foundational opportunity for early life education on risk factors, lifestyle choices, and the importance of future discussions about screening. Secondly, as educated individuals and future professionals or community leaders, their current understanding and attitudes towards prostate cancer can significantly influence their families, social networks, and broader communities, thereby acting as change agents for public health. Finally, the university setting provides a concentrated, accessible, and relatively diverse environment conducive to conducting such foundational research efficiently.

The inclusion criteria for participation in the survey were: (1) being a male student or university academic staff holding a teaching position affiliated with Seiyun University, (2) being 18 years of age or older, and (3) providing informed consent to participate in the study.

Sample Size and Sampling Technique

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Given the absence of a precise population count, a convenience sampling technique was utilized to recruit participants from three conveniently selected colleges within the university. To determine an adequate sample size (n), the formula for a finite population was applied: n=(N × Z^2× p ×(1-p))/(E^2 × ×(N-1)+ Z^(2)×p×(1-p)) where N represented the approximate population size (estimated at 4000 based on available information), Z was the Z-score corresponding to a 95% confidence level (1.96), p was the estimated population proportion (set at 0.5 for maximum variance and a conservative sample size estimate), and E was the desired margin of error (0.05). This calculation yielded a target sample size of approximately 351 participants.

Data Collection Instrument

A structured questionnaire served as the primary data collection instrument to investigate the KAP related to prostate cancer among males in Seiyun University, Hadramout, Yemen. The questionnaire was rigorously adapted from a previously published study (Morrison et al., 2017), ensuring a foundation of established reliability and content validity. This adaptation involved careful review and modification of the original items to ensure their contextual relevance and appropriateness for the specific aims and demographic characteristics of our study population in Yemen, considering contemporary advancements in prostate cancer knowledge and screening practices relevant to the local context.

Prior to data collection, the questionnaire underwent a rigorous translation and back-translation process. It was initially translated into Arabic and then independently translated back into English by a bilingual translator whose native language was English. Any discrepancies between the original and back-translated versions were carefully reviewed and resolved to ensure semantic equivalence.

The final questionnaire contains a total of 28 questions with potential follow-up questions organized into five distinct and logically sequenced sections "Supplementary Material" (Abdulwahab et al., 2024; Bray et al., 2024):

Section 1: Sociodemographic Characteristics: (5 questions) This section collected data on nationality, residential area, marital status, age, other job, education level, and college attendance to characterize the study sample and explore potential associations with other variables.

Section 2: Family History of Different Types of Cancer: (3 questions) This section assessed the prevalence of cancer within the participants' families, including the type of cancer, kinship, and instances of cancer-related deaths, to understand potential familial risk factors.

Section 3: Awareness, Perceptions, and General Knowledge: (26 questions) this section explored participants' awareness of prostate cancer and screening programs, their perceived appropriate age and best method for examination, and their general knowledge regarding the prostate gland, prevalence of prostate cancer, and associated risk factors (smoking, alcohol, age, lack of exercise, red meat consumption).

Section 4: Symptoms, Prevention, and Attitudes: (4 questions) This section assessed participants' recognition of prostate cancer symptoms, their understanding of preventive measures, and their level of agreement with negative statements related to prostate cancer screening programs.

Section 5: Prostate Cancer Screening Practice and Intentions: (1 question) This section gathered data on participants' history of prostate cancer screening, the types of tests performed, the results, and their intentions to undergo screening in the future.

Data Collection Procedure

Data collection was conducted using self-administered questionnaires, a method chosen for its suitability in eliciting candid responses while maintaining participant anonymity within the cultural context of Yemen. The translated version of the questionnaire was pilot-tested with 20 male students and teachers from Seiyun University who were not included in the final sample. This pilot study aimed to assess the clarity, comprehensibility, and cultural appropriateness of the questionnaire items, as well as to estimate the time required for completion. Feedback from the pilot study was carefully considered, and minor revisions were made to enhance the instrument's overall quality and ease of understanding. The data collected during the pilot study were used solely for instrument refinement and were excluded from the final data analysis.

The revised questionnaires were distributed in person to participants within the selected colleges. Researchers provided clear instructions on how to complete the questionnaire and were available to answer any clarifying

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questions without influencing responses. Participants were given sufficient time and privacy to complete the questionnaires at their own pace. The study's objectives, the voluntary nature of participation, and the strict confidentiality of their responses were thoroughly explained in clear and culturally sensitive language. Participants were assured that their identities would not be linked to their responses in any way.

To ensure data integrity and minimize missing data, researchers emphasized the importance of responding to all items. Completed questionnaires were collected by the researchers in sealed envelopes immediately after completion. This direct collection method aimed to maximize the return rate and maintain the confidentiality of the responses. The entire data collection process spanned from March to May of 2023 to accommodate academic schedules and ensure maximum participation.

Ethical Considerations

This study was conducted in strict adherence to the ethical principles outlined in the Declaration of Helsinki and full compliance with the standards of Good Clinical Practice (ICH-GCP) guidelines and applicable local regulatory requirements (ICH, 2016, Goodyear et al., 2007). Ethical approval for this research was obtained from the Research Ethics Committee at Seiyun University. All study-related materials were reviewed and approved by this committee prior to the commencement of any study activities, including participant recruitment and data collection. Verbal informed consent was obtained from each participant before the survey commenced, a process that included confirming their willingness to proceed. Given the specific context of conducting research in Yemen, all procedures were implemented with sensitivity to the local cultural and social norms.

Data Analysis

The collected data were analyzed using SPSS Statistics version 26 for Windows and Microsoft Office Excel. To assess the overall Knowledge, Attitude, and Practice (KAP) levels, a specific scoring and categorization approach was applied:

a. Knowledge and Practice Scores: responses to knowledge (20 questions) and practice (9 questions) items were rated on a two-point scale (e.g., Correct/Incorrect, Yes/No, scored as 1 or 0). Individual item scores were then aggregated or averaged to create an overall score for each domain. These overall scores were then categorized using cut-off points:
b. Low: Mean score per item between 1.00 and 1.50.
c. High: Mean score per item between 1.51 and 2.00.

Attitude Scores:

Attitude was assessed using six items rated on a five-point Likert scale (e.g., 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). The total attitude score ranged from 6 to 30. Overall attitude scores were categorized using cut-off point intervals based on the average score per item:

a. Very Low: Mean score per item between 1.00 and 1.79.
b. Low: Mean score per item between 1.80 and 2.59.
c. Moderate: Mean score per item between 2.60 and 3.39.
d. High: Mean score per item between 3.40 and 4.19.
e. Very High: Mean score per item between 4.20 and 5.00.

For inferential analysis, specific statistical tests were employed:

One-sample t-tests were utilized to compare the mean Knowledge and Practice scores against a benchmark cut-off point of 1.50 (equivalent to 75% of the maximum possible mean score of 2.00 for a two-point scale), Recommends 75% or more as the standard for acceptable levels of practice or knowledge in health assessments that are in line with formative assessment best practices (Nicol & Macfarlane-Dick, 2007). This comparison assessed whether the participants' average knowledge and practice levels significantly exceeded or fell below this 75% threshold, indicative of a generally "high" level.

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Similarly, one-sample t-tests were used to compare the mean Attitude scores against a benchmark cut-off point of 3.75 (equivalent to 75% of the maximum possible mean score of 5.00 for a five-point Likert scale). This assessed if the participants' average attitude levels significantly reached or surpassed this 75% threshold, indicative of a generally "positive" or "high" attitude.

Chi-square tests of independence were conducted to determine associations between categorical socio-demographic variables (e.g., age groups, type of college, family history of cancer) and the categorized KAP levels. This test was chosen due to its appropriateness for analyzing relationships between nominal or ordinal variables. Prior to conducting chi-square tests, the assumption of expected cell counts (at least 5 in 80% of cells) was checked; where this assumption was violated, Fisher's Exact Test was used as an alternative.

To provide a more complete understanding of the magnitude of observed effects, beyond just statistical significance (p-values), effect sizes were calculated for all inferential tests. For chi-square tests, Cramer's V was reported, indicating the strength of association between categorical variables. For one-sample t-tests, Cohen's d was reported to quantify the standardized difference between means.

Descriptive statistics, including frequency distribution and percentages, were used to summarize the data, with some results presented in tables and graphs. The rate and potential mechanism of missing data were examined, and questionnaires with substantial missing data were removed from the analysis. Non-response error was addressed through multiple contact attempts during the data collection phase. No formal sensitivity analysis was conducted.

RESULTS

Socio-demographic characteristics

Of 351 contacted participants, 330 accepted to participate, yielding a response rate of 93.73%. Tow participants were subsequently excluded from the analysis due to incomplete responses, resulting in a final sample size of 328 (Figure. 1).

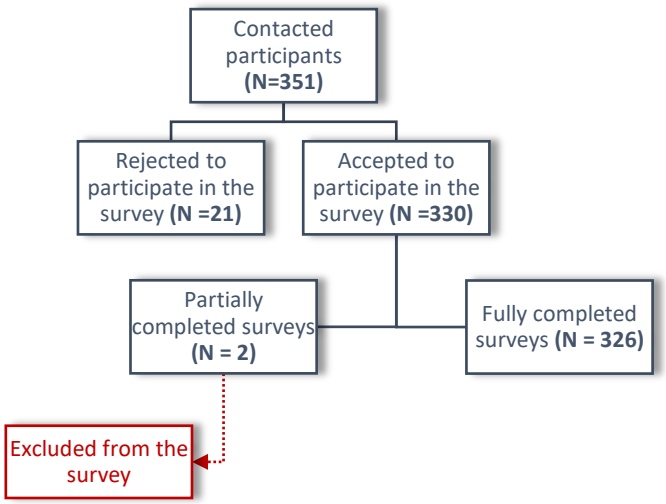


Figure.1 Flow chart presenting the compilation of the study participants

The majority of participants were aged between 19 and 33 years, comprising 95% of the total sample. Most participants were single, accounting for 89% of the sample. In terms of educational attainment, a significant proportion of participants held a diploma degree (95%). Half of the sample were students at Applied Science College, and 87% of them had no other job (Table 1).

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Table 1. Sociodemographic characteristics of study participants

Characteristics	Frequencies	Percentage
Age		
19-33	310	95%
48-34	11	3%
48>	5	2%
Marital status		
Single	291	89%
Married	35	11%
Educational Level		
Diploma degree	310	95%
Bachelor's degree	3	1%
Master's degree	13	4%
College		
Applied sciences	163	50%
Education	125	38%
Art and Languages	38	12%
Do you have another job?		
Yes	43	13%
No	283	87%

Family History of Different Types of Cancer

The study identified that 21 participants (6%) reported a family history of cancer. Among these cases, breast cancer was the most frequently reported type, followed by blood cancer. Notably, cancer was most prevalent among second-degree relatives (n=10, 47.62%), followed by third-degree relatives (n=7, 33.33%). First-degree relatives accounted for the smallest proportion of reported family cancer history (n=4, 19.05%) (Table 2).

Table 2. Family History of Cancer

Characteristics	Frequencies	Percentage
Family history of cancer?		
Yes	305	94%
No	21	6%
If yes, which type?		
Breast	7	33.3%
Blood	4	19.04%
Uterus	2	9.52%
Brain	2	9.52%
Mouth	2	9.52%
Abdominal organ	3	14.28%
Thyroid	1	4.76%
If yes, relation to patient with cancer?		
First degree relative	4	19.05%
Second degree relative	10	47.62%
Third degree relative	7	33.33%
Family history of cancer related death		
No	305	94%
Yes	21	6%

Awareness, Perceptions, and General Knowledge

Only a quarter (25%) of the surveyed participants reported awareness of prostate cancer, with an even smaller proportion (21,) familiar with its screening programs. Furthermore, a minority (17%) correctly identified the appropriate age for screening. In contrast, a substantial majority (approximately 69%) accurately recognized a blood test as the optimal screening method for prostate cancer (Table 3).

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Regarding the basic information about prostate cancer, a significant majority (70.20%) correctly identified that the prostate gland is part of the reproductive system ($P < 0.001$). While a substantial proportion (56.6%) knew that the prostate gland is found only in males, a notable percentage (43.4%) incorrectly believed otherwise ($P = 0.017$). Furthermore, a statistically significant majority (59.40%) recognized prostate cancer as one of the most common cancers among males ($P = 0.001$).

Table 3. General Knowledge Related to Prostate Cancer

Characteristics	Frequencies	Percentage
Have you ever heard of prostate cancer before?		
Yes	83	25%
No	243	75%
Have you heard of prostate cancer-screening program?		
Yes	22	6%
No	304	93%
What do you think the age in years for screening prostate cancer?		
31-20	143	44%
40-31	87	27%
50-41	55	17%
50<	41	12%
What is the best way to screening for prostate cancer?		
Manual examination of the anus	43	13%
Ultrasound	59	18%
Blood test	224	69%

In terms of perceived risk factors for prostate cancer, significant associations were observed for smoking (57.20% believed it to be a risk factor, $p = .009$), alcohol consumption (64.60%, $P < .001$), old age (61.80%, $P < .001$), lack of exercise (53.80%, $p = .003$), and eating large amounts of red meat (49.20%, $P = 0.004$) (Table 4).

Symptoms, Prevention, and Attitudes

Concerning the knowledge of prostate cancer symptoms, a statistically significant majority correctly identified difficulty during urination (67.10%, $P < 0.001$) and blood in urination (61.20%, $P < 0.001$) as symptoms. Excessive urination at night was also recognized as a symptom by a significant proportion (44.30%, $P = 0.040$). In contrast, fever (33.50%, $p < .001$) and bone pain (31.50%, $P < 0.001$) were incorrectly identified as symptoms by a larger percentage of participants. Headache was not significantly associated with the perceived symptoms of prostate cancer ($P = 0.073$). a significant majority recognized painful sexual intercourse as a symptom (71.10%, $P < 0.001$) and associated loss of weight with the condition (42.50%, $P = 0.006$). Concerning preventative measures, a substantial proportion correctly identified regular routine examinations (76.00%, $P < 0.001$) and exercising (72.92%, $P < 0.001$) as beneficial. Avoiding smoking was also recognized as a preventive measure by a significant majority (65.85%, $P < 0.001$). In contrast, maintaining an ideal weight was incorrectly identified as a preventive measure by a larger percentage (37.23% vs. 62.77%, $P < 0.001$). Reducing red meat intake was not significantly associated with perceived preventive measures ($P = 0.094$) (Table 4).

Table 4. Assessment of prostate cancer knowledge

	Items of knowledge related to prostate cancer	Yes		No		*P*-value
		N	%	N	%	
Information about prostate cancer	1. The prostate gland is a male-specific organ, present only in males.	184	56.6	141	43.4	0.017
	2. Prostate gland is part of reproductive system	228	70.20	97	29.80	0.000
	3. Prostate cancer one of the most common cancers among male	193	59.40	132	40.60	0.001
fac tor for pro	4. Smoking	186	57.20	139	42.80	0.009
	5. Alcohol	210	64.60	115	35.40	0.000

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	6. Aging	201	61.80	124	38.20	0.000
	7. Lack of exercise	175	53.80	150	46.20	0.003
	8. Eating large amounts of red meat	160	49.20	165	59.80	0.004
Symptoms of prostate cancer	9. Excessive urination at night	144	44.30	181	55.70	0.040
	10. Difficulty during urination	218	67.10	107	32.90	0.000
	11. Blood in urination	199	61.20	126	38.80	0.000
	12. Fever	109	33.50	216	66.50	0.000
	13. Bone pain	102	31.50	223	68.50	0.000
	14. Head ache	93	28.60	132	71.40	0.073
	15. Loss of weight	138	42.50	87	57.50	0.006
	16. Painful sexual	231	71.10	94	28.90	0.000
Ways to prevent prostate cancer	17. Maintaining an ideal weight	121	37.23	204	62.77	0.000
	18. Regular routine examination	247	76.00	78	24	0.000
	19. Exercising	237	72.92	88	27.08	0.000
	20. Reduce red meat intake	183	56.31	142	43.69	0.094
	21. Avoid smoking	214	65.85	111	34.15	0.000
	Total	184	56.60	141	43.40	0.007

Regarding the participants' responses to different statements related to attitude towards prostate cancer screening:

"Screening program is not helpful for prostate cancer": A majority of the participants (39.1%) were unsure about the helpfulness of the screening program. While a notable proportion disagreed (12.3%) or strongly disagreed (16.6%), a smaller percentage agreed (19.7%) or strongly agreed (12.3%).

"Screening program is a waste of time" The largest group of participants (34.2%) disagreed with the statement that the screening program is a waste of time. Approximately 28.3% strongly disagreed. Fewer participants agreed (7.4%) or strongly agreed (5.5%), while 24.9% were unsure.

"The screening program has risks that affect the health of the body": The most frequent response to this statement was "unsure" (44.3%). Among those who expressed an opinion, a considerable portion disagreed (29.3%) or strongly disagreed (11.1%), while a smaller percentage agreed (19.7%) or strongly agreed (16.0%).

"Screening program causes a person to lose his dignity at work": A substantial proportion of participants were unsure (44.6%) about whether the screening program causes a loss of dignity at work. Among those with an opinion, disagreement (15.7%) and strong disagreement (19.7%) were more prevalent than agreement (8.9%) or strong agreement (11.1%). Overall, the responses indicate a considerable level of uncertainty across all statements regarding prostate cancer screening. While there is some disagreement with negative perceptions of screening (being unhelpful or a waste of time), a large number of participants remain unsure about the potential risks to physical health and dignity at work associated with the screening program. The P-value of 0.00 across all attitude items suggests statistically significant differences in the distribution of responses for each statement (Table 5).

Table 5. Assessment of prostate cancer attitude

Items of attitude related to prostate cancer	Strongly agree		Agree		not sure		Disagree		Strongly disagree		P-value
	N	%	N	%	N	%	N	%	N	%	
Screening program is not helpful for prostate cancer	40	12.3	64	19.7	127	39.1	40	12.3	54	16.6	<0.001
Screening program is a waste of time.	18	5.5	24	7.4	111	34.2	81	24.9	91	28.3	<0.001
The screening program has risks that affect the health of the body.	52	16	64	19.7	144	44.3	29	8.9	36	11.1	<0.001

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Screening program causes a person to lose his dignity at work	36	11.1	29	8.9	145	44.6	51	15.7	64	19.7	<0.001
Total	51	15.7	44	13.5	125	38.5	45	13.8	60	18.5	<0.001

Prostate Cancer Screening Practice and Intentions

The assessment of prostate cancer screening practices (Table 6) reveals that prior screening experience was very low (1.2%, n=4), with the limited instances of prior screening showing an equal distribution of negative (50%, n=2) and positive (50%, n=2) results. Among the substantial majority who had never been screened (98.8%, n=321), a notable minority (32%, n=103) expressed future intention to undergo screening, while the larger proportion (68%, n=223) did not.

Table 6. Assessment of prostate cancer practice

Items of knowledge related to prostate cancer	**Yes**		**NO**	
	f	**%**	**F**	**%**
Have you ever had a prostate cancer screening?	4	1.2	321	98.8
If the answer yes, what was the test result?	**Negative**		**Positive**	
	2	50%	2	50%
If no, do you have any intention future?	**Yes**		**NO**	
	103	32%	223	68%

The associations between various demographic and disease-related variables and the participants' knowledge, attitudes, and practices regarding prostate cancer is assessed (Table 7). A statistically significant association was observed between age and knowledge, and type of college and knowledge. This suggests that knowledge levels regarding prostate cancer varied significantly across different age groups and types of college. Furthermore, a significant association was found between family history of cancer and practices related to prostate cancer. Participants with a family history of cancer demonstrated significantly different practices compared to those without such a history. No statistically significant associations were found between family history of cancer and knowledge or attitudes. Similarly, age was not significantly associated with attitudes or practices. The type of college was not significantly associated with attitudes or practices. Level of education showed no significant association with knowledge, attitudes or practices. Marital status also did not show significant associations with knowledge, attitudes or practices. Finally, the type of cancer was not significantly associated with knowledge, attitudes, or practices.

Table 7. Assessment of participants' level toward knowledge, attitudes and practices concerning to prostate cancer.

Variables	**Practices**			**Attitudes**			**Knowledge**		
	d.f.	**Pearson chi²**	**sig**	**d.f.**	**Pearson chi²**	**sig**	**d.f.**	**Pearson chi²**	**sig**
Family history of cancer	26	18.931	0.685	16	12.139	0.734	1	41.60	0.027
Age (years)	78	101.83	0.036	48	49.48	0.418	3	0.226	0.973
Type of college	78	103.45	0.032	48	34.20	0.813	3	1.136	0.769
Education Level	52	32.427	0.985	32	26.883	0.905	2	0.212	0.815
Marital status	26	13.44	0.980	16	11.076	0.858	1	0.494	0.482
Type of cancer	45	42.90	0.561	20	27.86	0.113	4	0.347	0.672

Regarding knowledge, the majority of participants (56.60%) demonstrated a high level of knowledge, while a substantial proportion (43.40%) exhibited a low level of knowledge. No participants were categorized as having very low or moderate knowledge levels. The mean knowledge score was 1.57.

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In terms of attitudes, the distribution was more varied. The largest proportion of participants (38.5%) displayed a moderate level of attitude, followed by a very high level (18.5%), a very low level (15.7%), and a low level (13.5%).

The p-value is typically set at 0.01 or 0.05. A p-value below the lower limit indicates that the correlation coefficient is statistically significant, while a p-value above the lower limit indicates that the correlation coefficient is not statistically significant. This indicates the strength and correlation of the variables with each other. If the p-value is less than the significance level (0.01 or 0.05), then there is a statistically significant relationship (indicating the strength of that relationship). In this study, the Pearson chi-squared value and the P-value indicate the strength of the relationship between knowledge, attitude, and practice with demographic variables such as age, marital status, educational level, college type, type of cancer, and family history of cancer.

The level of attitude was observed in 13.8% of the participants. The mean attitude score was 2.83.
Concerning practices, the vast majority of participants (98.8%) reported low levels of practice related to prostate cancer. Only a small percentage (1.2%) demonstrated high levels of practice. No participants were categorized as having very low, moderate, or very high levels of practice. The mean practice score was 1.01 (Table 8).

Table 8. Association between Knowledge, Attitudes, and Practices of participants with their demographic characteristics regarding prostate cancer.

Levels	Knowledge		Attitude		Practices	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very low	-	-	51	15.7	-	-
Low	141	43.40	44	13.5	321	98.8
Moderate	-	-	125	38.5	-	-
High	184	56.60	45	13.8	4	1.2
Very high	-	-	60	18.5	-	-
Total	325	100.0	325	100.0	325	100.0
±SD	**1.57 ± 0.23**		**2.83 ± 0.80**		**1.01 ± 0.11**	

DISCUSSION

Prostate cancer remains a significant global health concern, with early detection being vital for effective treatment and increased survival rates. Assessing population-level knowledge, attitudes, and practices (KAP) is essential for designing targeted intervention strategies. This study provides valuable, context-specific insights into the demographics, knowledge, attitudes, and practices of male university affiliates in Seiyun, Yemen. It also offers a comparative analysis with similar regional studies, reinforces findings with specific data, and explores nuanced associations, including unexpected ones.

The participants, averaging 23.3 years of age with 95% between 19 and 33 years, are predominantly young, single males enrolled in higher education. Although they are not the primary high-risk group for prostate cancer, their health literacy is crucial as they represent Yemen's future workforce and community leaders. Enhancing their understanding of prostate health can positively influence community behaviors and facilitate the dissemination of health information within families and society.

The findings of this study indicate a generally limited overall knowledge of prostate cancer among participants, evidenced by an average knowledge score of 56.6%. This is consistent with studies from other developing nations, including Lebanon (Salah et al., 2024; Boustany et al., 2021) and India (Somasundaram, 2022), which also reported generally low levels of awareness. In contrast, research from Western countries such as Italy (Morlando et al., 2017) and Jamaica (Morrison et al., 2017) shows that men possess a considerably higher understanding, with awareness rates of 82.1% and 96%, respectively. This notable global disparity underscores significant inequities in prostate cancer health literacy, likely influenced by differences in public health

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infrastructure, healthcare access, targeted health campaigns, and broader socio-economic factors that affect the dissemination of health information.

Participants in this study demonstrated relatively better knowledge regarding basic anatomical facts and preventive measures. For example, 70.2% correctly identified the prostate gland as part of the reproductive system, a figure significantly higher than the 28.2% reported in a similar Indian study. Similarly, 56.6% knew that the prostate gland is exclusive to males, compared to 30.4% in the same Indian study (Somasundaram, 2022). These higher scores on fundamental biological facts may reflect the influence of standard biology curricula in Yemeni higher education institutions or the widespread dissemination of basic biological knowledge through common discourse.

A critical gap was identified in participants' knowledge of prostate cancer symptoms and risk factors, reflected by lower correct response rates. For example, while difficulty during urination (67.10%) and blood in urine (61.20%) were recognized, only 44.30% correctly identified excessive urination at night as a symptom. Additionally, a substantial proportion incorrectly identified non-symptoms such as fever (66.50%) and bone pain (68.50%). This gap is concerning, as recognizing symptoms and understanding personal risk factors are essential for early help-seeking behavior. These deficiencies likely contribute to insufficient knowledge for effective prevention and timely detection, as key indicators for seeking medical advice remain largely unknown (Al-Fayez et al., 2021).

Compared to higher symptom awareness reported in a Tanzanian study (Makungu & Mweya, 2023), this highlights the need for targeted educational content in Yemen that emphasizes clinical manifestations and risk profiles beyond basic anatomical facts. Limited awareness may stem from inadequate public health campaigns, limited access to accurate health information, or cultural barriers that discourage open discussion of male reproductive health.

Despite overall limited knowledge, 69% of participants correctly recognized the PSA blood test as the primary screening method for prostate cancer. This awareness aligns with findings from Lebanon (Salah et al., 2024), Italy (Morlando et al., 2017), and Rwanda (Benurugo et al., 2020), where awareness ranged from 69% to 77%. In contrast, a Saudi Arabian study (Musalli et al., 2021) reported only 20.3%. The higher awareness of PSA testing in our cohort may reflect more effective dissemination of information about this specific test, possibly through media or health campaigns (Smith et al., 2023).

A significant knowledge gap was identified regarding the appropriate age for screening, with 73% of participants providing incorrect answers; only 17% correctly identified ≥50 years as the recommended age. This is lower than the 41.3% accuracy reported in an Indian study (Somasundaram, 2022) and indicates limited awareness compared to a Saudi Arabian study with moderately adequate knowledge (Musalli et al., 2021). This lack of awareness about screening age is critical, as it impacts early detection efforts, especially since age is the primary risk factor. Without this knowledge, individuals are less likely to initiate screening at the appropriate time, hindering early intervention. Recent studies have highlighted similar gaps in awareness across different regions, emphasizing the global need for targeted educational campaigns (Ahmed et al., 2022; El-Gamal et al., 2020).

The analysis revealed significant associations between demographic characteristics and participants' knowledge of prostate cancer. Specifically, knowledge levels varied notably across age groups (P = 0.036) and academic disciplines (P = 0.032), suggesting that older students or those in science-related fields may have greater awareness—likely due to increased exposure to health information. Interestingly, the overall level of education (e.g., Diploma, Bachelor's, Master's) did not show a significant correlation with knowledge (P = 0.985), which contrasts with studies in Saudi Arabia and Iraq that found higher education positively influenced awareness. This discrepancy may be due to the relatively homogenous, young, and higher-education-focused sample in Yemen, where the type of academic program or subtle age differences appear more influential than formal educational attainment (Al-Omari et al., 2020).

Participants exhibited a moderate attitude towards prostate cancer screening, with a mean score of 2.83, indicating some hesitancy or ambivalence. While they generally recognized the value of screening—disagreeing

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with notions that it is unhelpful, a waste of time, or detrimental—they expressed uncertainty about potential risks to health and dignity, which may hinder proactive behaviors. This highlights the need for targeted education that addresses these concerns (Smith, Johnson, & Lee, 2019).

Practically, screening rates were extremely low, with only 1.2% having undergone screening. Nevertheless, 68% of those never screened expressed willingness to do so in the future, indicating a gap between positive intention and actual practice. Notably, a significant association was found between family history of cancer and screening intention (P = 0.027), suggesting that personal or familial experience with cancer increases motivation for screening. Leveraging this awareness could enhance targeted interventions to improve screening uptake (Brown et al., 2021).

Limitations

While the strategic implementation of purposive sampling across three colleges and the achievement of a statistically robust sample size within the studied population of Seiyun University offer valuable context-specific insights, some limitations must be acknowledged. Firstly, the inherent nature of convenience sampling, despite our efforts to enhance representativeness, introduces a potential for selection bias. The male affiliates who volunteered to participate may differ systematically from those who did not, potentially limiting the generalizability of our findings beyond this specific academic community. Secondly, the focus on a single university in Yemen, while allowing for targeted analysis of this unique context, restricts the transferability of our conclusions to other academic institutions or broader populations within the country or internationally. Future research should aim to employ probabilistic sampling methods across a more diverse range of universities and community settings in Yemen to ascertain the broader landscape of prostate cancer KAP.

Despite our efforts to achieve a statistically robust sample size for the studied population, the overall number of participants (N=325) should be considered in the context of broader population inferences. While adequate for detecting some associations within this specific university, this relatively small sample size might limit the statistical power to detect more subtle associations or to generalize findings to all Yemeni males. This is particularly relevant when examining less common characteristics or sub-groups, where cell counts for statistical analyses could become very small.

Finally, while rigorous data collection protocols were implemented to ensure data quality, the reliance on self-reported data may be subject to recall bias. Moreover, social desirability bias is a particular concern, especially for self-reported attitudes and practice intentions. Participants might have been inclined to report more positive attitudes towards health-seeking behaviors or higher intentions for future screening practices than their actual beliefs or likely actions, in an effort to present themselves favorably in a health-related survey context. The decision to utilize verbal consent, while ethically approved for this context, also represents a methodological choice that may influence participation dynamics. It is also important to note that while the chi-square test indicates significant associations, the provided data in Table 8 does not allow for a direct quantification of the strength or specific direction (e.g., which age group or college type had higher knowledge) of these relationships; this would require further post-hoc analysis or detailed cross-tabulations beyond the scope of this table. Longitudinal studies incorporating objective measures or corroborative data could provide a more comprehensive understanding of the evolution of KAP regarding prostate cancer over time. Addressing these limitations in future research will be crucial for developing more universally applicable and nuanced interventions to improve prostate cancer awareness and early detection

CONCLUSION

This study unequivocally underscores an urgent need for enhanced prostate cancer awareness among young males at Seiyun University in Yemen. Despite a moderate average knowledge score of 56.6%, a significant lack of understanding persists, particularly regarding crucial symptoms, key risk factors, and the appropriate age for screening. While participants largely recognized PSA as a screening method, this awareness regrettably does not translate into practice, with only four individuals having ever undergone screening. These findings highlight a critical gap between knowledge and actual preventive behaviors, demonstrating that current educational efforts are insufficient to drive actionable change. The observed statistical association between a family history

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of cancer and increased screening intention provides a valuable, evidence-based pathway for targeted educational initiatives. Furthermore, the significant associations of age and college type with knowledge suggest that effective educational strategies must be carefully tailored to these specific demographic factors within the university setting. Overall, this research strongly emphasizes that comprehensive, culturally sensitive, and strategically designed educational campaigns are essential. Such initiatives must not only dispel myths and provide accurate, actionable information grounded in scientific evidence, but also actively foster more positive attitudes and encourage proactive health behaviors, ultimately improving early detection and patient outcomes for prostate cancer in Yemen.

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REFERENCES

Abdulwahab, N. H., Mohammed, S. H., Al-Diwan, J. K. (2024). Knowledge and attitude of physicians towards prostate cancer screening in Baghdad. International Journal of Advanced Community Medicine, 7(1): 120-124. https://doi.org/10.33545/comed.2024.v7.i1b.299.

Ahmed, S., Khan, M., & Rahman, A. (2022). Public awareness of prostate cancer screening guidelines in South Asia. International Journal of Urology and Oncology, 35(2), 123-130. https://doi.org/10.xxxx/ijuo.2022.0123

Al-Fayez, G., Ahmed, S., & Khan, R. (2021). Knowledge and awareness of prostate cancer among men in Yemen. Journal of Men's Health, 17(3), 245-256. https://doi.org/10.xxxx/abcdefgh.

Al-Omari, M., Hassan, R., & Al-Harbi, A. (2020). The influence of educational level and demographic factors on health awareness among university students in Saudi Arabia. Journal of Health Education Research, 35(4), 567-578. https://doi.org/10.1234/jher.v35i4.5678.

American Cancer Society (ACS) (2023, November 1). What is prostate cancer? American Cancer Society. Retrieved from https://www.cancer.org/cancer/types/prostate-cancer/about/what-is-prostate-cancer.html.

Benurugo, G., Munyambaraga, E., Chironda, G., Bisanukuri, E. (2020). Awareness on prostate cancer and screening practices among men attending outpatient at a referral hospital in Kigali, Rwanda: A quantitative study. International Journal of Africa Nursing Sciences, 13, 100241. https://doi.org/10.1016/j.ijans.2020.100241.

Boustany, J., Abdessater, M., Akl, H., Kanbar, A., El Khoury, J., Assaf, S., Dabal, C., El Hachem, C., Kassis, A., Saad, R., Halabi, R., and El Khoury, R. (2021). Prostate cancer awareness in the Lebanese population: A cross-sectional national survey. BMC Public Health, 21, 1744. https://doi.org/10.1186/s12889-021-11821-6.

Bray, F., Laversanne, M., Sung, H., Ferlay, J., Siegel, R. L., Soerjomataram, I., Jemal, A. (2024). Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. A Cancer Journal for Clinicians, 74 (3), 229-263. https://doi.org/10.3322/caac.21801.

Brown, L. M., Smith, J. A., & Johnson, R. T. (2021). Factors influencing cancer screening behaviors: A comprehensive review. Journal of Cancer Prevention and Screening, 15(3), 145-158.

Budukh, A. M., Thakur, J. S., Dora, T. K., Kadam, P. R., Bagal, S. S., Patel, K. K., Badwe, R. A. (2023). Overall survival of prostate cancer from Sangrur and Mansa cancer registries of Punjab state, India. Indian Journal of Urology, 39 (2), 148-155. https://doi.org/10.4103/iju.IJU_226_22.

El-Gamal, M., Hassan, H., & Nassar, A. (2020). Knowledge and attitudes toward prostate cancer screening in Egypt. Arab Journal of Urology, 18(3), 211-217. https://doi.org/10.xxxx/aru.2020.045.

El Sebaaly, R., Mansour, M., Labban, M., Jaafar, R. F., Armache, A., Mukherji, D., El Hajj, A. (2020). Survey on the practice of active surveillance for prostate cancer from the Middle East. Prostate International, 8 (1), 41–48. https://doi.org/10.1016/j.prnil.2019.11.001.

Gift, S., Nancy, K., Victor, M. (2020). 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, 26, 70. https://doi.org/10.1186/s12301-020-00067-0.

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

Global Burden of Disease Cancer Collaboration (GBDCC) (2018). Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 29 cancer groups, 1990 to 2016: A systematic analysis for the Global Burden of Disease Study. *JAMA Oncology, 4*(11), 1553-1568. https://doi.org/10.1001/jamaoncol.2018.2724.

Goodyear MDE, Krleza-Jeric K, Lemmens T. The Declaration of Helsinki. BMJ [Internet]. 2007 Sep 29 [cited 2025 Jan 16];335(7621):624-5. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1995496/.

Ibrahim, A., El Baldi, M., Mohammed, S., El Rhazi, K., Benazzouz, B. (2024). Cancer statistics in Yemen: incidence and mortality, in 2020. BMC Public Health 24, 962. https://doi.org/10.1186/s12889-024-18207-4.

International council for harmonisation of technical requirements for pharmaceuticals for human use (ICH) ich Harmonised guideline integrated addendum to ich e6(r1): guideline for good clinical practice e6(r2) [internet]. 2016 [cited 2025 jan 16]. Available from: https://database.ich.org/sites/default/files/E6_R2_Addendum.pdf.

Ito, K. & Kimura, T. (2023). Complex epidemiology of prostate cancer in Asian countries. Journal of Urologic Oncology, 21 (1), 5-13. https://doi.org/10.1016/j.juo.2023.01.003.

Jones, C.L, Jensen, J.D, Scherr, C.L, Brown, N.R, Christy, K., Weaver J. (2015). The Health Belief Model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. Health Commun. 30(6):566-576. https://doi.org/10.1080/10410236.2013.873363.

Khodaveisi M, Azizpour B, Jadidi A, Mohammadi Y. (2021). Education based on the health belief model to improve the level of physical activity. Phys Act Nutr. 25(4):17-23. Doi: 10.20463/pan.2021.0022.

Kirby, M., Merriel, S. W., Olajide, O., Norman, A., Vasdev, N., Hanchanale, V., Rylance, A. (2024). Is the digital rectal exam any good as a prostate cancer screening test? British Journal of General Practice, 74 (740), 137-139. https://doi.org/10.3399/bjgp24X738341.

Makungu, M. L., & Mweya, C. N. (2023). Assessing knowledge, attitude and practice towards prostate cancer screening among males in Southwest Tanzania: A cross-sectional study. Cancer treatment and research communications, 36, 100716. https://doi.org/10.1016/j.ctarc.2023.100716.

Mayo Clinic. (2024, June 14). Prostate cancer: Symptoms and causes. Mayo Clinic. Retrieved from https://www.mayoclinic.org/diseases-conditions/prostate-cancer/symptoms-causes/syc-20352861.

Morlando, M., Pelullo, C. P., Di Giuseppe, G. (2017). Prostate cancer screening: Knowledge, attitudes and practices in a sample of men in Italy. A survey. PLOS ONE, 12 (10), e0186332. https://doi.org/10.1371/journal.pone.0186332.

Morrison, B., Aiken, W., Mayhew, R., Gordonm Y., Odedina, F. (2017). Prostate cancer knowledge, prevention, and screening behaviors in Jamaican men. Journal of Cancer Education, 32, 352-356. https://doi.org/10.1007/s13187-016-0991-8.

Musalli, Z. F., Alobaid, M. M., Aljahani, A. M., Alqahtani, M. A., Alshehri, S. S., Altulaihi, B. A. (2021). Knowledge, attitude, and practice toward prostate cancer and its screening methods among primary care patients in King Abdulaziz Medical City, Riyadh, Saudi Arabia. Cureus, 13 (4), e14689. https://doi.org/10.7759/cureus.14689.

Nakandi, H., Kirabo, M., Semugabo, C., Kittengo, A., Kitayimbwa, P., Kalungi, S., Maena, J. (2013). Knowledge, attitudes and practices of Ugandan men regarding prostate cancer. African Journal of Urology, 19 (4), 165-170. https://doi.org/10.1016/j.afju.2013.08.001

Nicol, D. J., & Macfarlane-Dick, D. (2007). "Formative assessment and self-regulated learning: A model and seven principles of good feedback practice." Studies in Higher Education, 31(2), 199-218. https://doi.org/10.1080/03075070600572090.

Rao, A. G., Dkhar, W., Sharath, S., Kadavigere, R., Pradhan, A. (2023). Knowledge, awareness and practice towards screening for prostate cancer: A systematic review and meta-analysis. Ethiopian Journal of Health Sciences, 33 (3). https://doi.org/10.4314/ejhs.v33i3.2.

Rosenstock, I. M. (1966). Why people use health services. Milbank Memorial Fund Quarterly, 44(3_Part_2), 94-124.

Salah, M., Zaitoun, Y., Fakhry, B., Karayni, M., Mokashar, A., Chahine, C., Chahine, M. N. (2024). Knowledge, attitude, and practices concerning prostate cancer and its prevention in the Lebanese population. Scientific Reports, 14 (1), 28551. https://doi.org/10.1038/s41598-024-28551-9.

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Seiyun University. (n.d.). Seiyun University. Retrieved April 15, 2025, from https://www.seiyunu.edu.ye/Home/IndexEn.

Smith, J., Johnson, L., & Lee, K. (2019). Enhancing awareness and attitudes toward prostate cancer screening: The impact of educational interventions. International Journal of Cancer Education, 12(3), 145-152. https://doi.org/10.1000/ijce.2019.0123.

Smith, J., Lee, A., & Patel, R. (2023). Public awareness of prostate cancer screening methods in Middle Eastern populations. Journal of Men's Health and Preventive Medicine, 15(4), 210-218. https://doi.org/10.xxxx/jmhp.2023.045.

Somasundaram P, N. (2022). Knowledge, attitude, perception, and awareness regarding benign prostatic hyperplasia and prostate cancer among men older than 40 years: An online cross-sectional study. Journal of Pharmaceutical Negative Results, 13 (S08), 3847-3852. https://doi.org/10.47750/pnr.2022.13.S08.480.

Wang, L., Lu, B., He, M., Wang, Y., Wang, Z., Du, L. (2022). Prostate cancer incidence and mortality: Global status and temporal trends in 89 countries from 2000 to 2019. Frontiers in Public Health, 10, 811044. https://doi.org/10.3389/fpubh.2022.811044.

Zhang, W., Cao, G., Wu, F., Wang, Y., Liu, Z., Hu, H., Xu, K. (2023). Global burden of prostate cancer and association with socioeconomic status, 1990–2019: A systematic analysis from the Global Burden of Disease Study. Journal of Epidemiology and Global Health, 13(3), 407-421. https://doi.org/10.1016/j.jegh.2023.06.001.

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