

## Factors Influencing Prostate Cancer Screening Intentions in Lebanese Men

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### Abstract

**Objective:** The objective of this study is to investigate the perceived obstacles and willingness of Lebanese men aged 40 and above to undergo screening for prostate cancer. **Material and Method:** A cross-sectional research design was employed. The study utilized a survey questionnaire to collect data on various factors influencing screening behaviors. The research instrument consisted of a comprehensive survey questionnaire that incorporated validated scales to assess barriers to prostate cancer screening, intention to screen, and the International Prostate Symptom Score (IPSS). **Results:** The study found that the 120 participants had an average IPSS score of  $7.20 \pm 2.23$ , most people (70%) had mild symptoms of prostate cancer, whereas others had moderate (20%) or severe symptoms (10%). The majority of the men indicated a low to moderate inclination to undergo screening through Prostate-specific antigen testing, or digital rectal examination (DRE) (PSA), with 76% considering DRE and 70% considering PSA. The main barriers to screening included the dread of receiving distressing outcomes (48%) and a lack of understanding about the screening procedure (54%). The study identified key factors affecting the intention to undergo a prostate cancer screening. Regarding DREs, these factors included the perceived danger of the illness and prior information from doctors about prostate conditions. When it came to the intention to undergo screening through the prostate-specific antigen test (PSA), determinants included the perceived threat of the disease, one's general health perception, and prior information from doctors about prostate-related issues. Additionally, a significant proportion of participants believed that prostate cancer was not a serious illness (56%) and 57% thought DRE was embarrassing. **Conclusions:** The participants displayed a low willingness to get screened for prostate cancer. Implementing interventions that focus on increasing awareness of the disease and its associated risks could potentially reduce the barriers and boost participation in prostate cancer screening.

**Keywords:** Prostate-specific antigen (PSA) testing- screening behavior- behavioral intentions- cancer screening

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### Introduction

Prostate cancer is on the rise among men globally, it is currently the second most commonly diagnosed disease, accounting for 15% of all cancer cases [1]. A study done by Freddie Bray et al. showed that prostate cancer mortality rates declined in most 36 countries over the study period 1980 to 2016, but that the rate of decline varied considerably between countries. For example, the age-standardized mortality rate (ASMR) for prostate cancer in the United States declined by 52% from 1980 to 2016, while the ASMR in Japan declined by only 13%. The study also found that prostate cancer mortality rates were highest in sub-Saharan Africa and lowest in East Asia [2].

Prostate cancer was responsible for an estimated 307,000 deaths, putting it as the fifth most common cause

of cancer-related mortality in males. Western nations have the highest incidence rates of prostate cancer [3].

Western nations with high prostate cancer incidence rates include Australia/New Zealand (111.6/100,000) and North America (97.2/100,000) [4]. This is largely due to the extensive screening process that employs the prostate-specific antigen test (PSA). The age-adjusted incidence and mortality in the United States rates for prostate cancer are 156/100,000 and 24.7/100,000 in men of all races, respectively. However, among African-American men, Both the mortality rate (54.2/100,000) and incidence (233.8/100,000) are significantly higher [4]. The age-standardized incidence and mortality rates in the Middle East rates for prostate cancer are relatively low, at 9.7/100,000 and 6.2/100,000, respectively [4]. However, certain countries in the region, such as Lebanon, Turkey,

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Bahrain, and Kuwait, have notably higher prostate cancer incidence rates [5]. Conversely, countries like Oman, Egypt, and Saudi Arabia have modest incidence rates since so few men who are asymptomatic are being screened [6]. Routine PSA screening is not widespread in the Middle East, and alternative screening methods like transrectal sonography are usually only available in small hospitals, with a large number of patients being diagnosed at more severe phases of the illness [7].

Prostate cancer is a significant public health concern in Lebanon. According to the Global Cancer Observatory (GCO), prostate cancer is the second most common cancer among men in Lebanon, with an estimated 1,200 new cases diagnosed each year. The age-standardized incidence rate (ASR) for prostate cancer in Lebanon is 49.6 per 100,000 men, which is higher than the global ASR of 32.8 per 100,000 men [8].

The reasons for the high incidence of prostate cancer in Lebanon are not fully understood, but they may be related to lifestyle factors such as diet and physical activity [9]. Lebanese men are more likely to consume a diet high in red meat and processed foods, which have been linked to an increased risk of prostate cancer. Additionally, Lebanese men are less likely to be physically active than men in other countries [9, 8].

Numerous Studies have shown that men encounter a number of obstacles that affect their willingness to undergo prostate cancer examination [10, 9, 11]. These barriers include elements including the perceived danger of the illness, its benefits, outside influences, and general health. Additionally, ethnicity, income level, and fear have been identified as key predictors of screening, as shown in a study conducted on men of various ethnicities [12]. Other contributing factors encompass concerns about privacy invasion, embarrassment, apprehension about the screening process, religious beliefs, ignorance, little engagement from healthcare providers, and limited hours for the screening clinic [13].

According to the literature review, a physician's decisions regarding PSA testing were influenced by their opinions on the test, patient requests, and physical symptoms. Despite high screening rates in some countries, barriers to prostate cancer (PCa) screening persist [14, 13, 15]. Up to the research knowledge, there are no studies in the Middle East. address the intentions and barriers of men related to PCa screening. This study in Lebanon aims to identify these barriers and assess the level of desire to screen for prostate cancer, with the aim of directing actions to enhance prostate cancer screening and lower the disease's related morbidity and death.

#### *The current guidelines and suggestions regarding prostate cancer screening*

While there isn't a general agreement on prostate cancer (PCa) screening recommendations, it's vital to recognize that aggressive PCa cases can lead to early mortality but have a better prognosis when detected early [16]. In order to make an informed decision about PCa screening, it is crucial to encourage men 40 years of age and older to speak with their healthcare providers [17]. PCa examination involves medical tests conducted in the

absence of symptoms, with the main objective being the early detection of cancer to enhance treatment success and improve patients' quality of life [16, 17].

Prostate cancer (PCa) screening typically involves the digital rectal examination (DRE) and the prostate-specific antigen (PSA) test. A higher PSA level (usually above 3.0 ng/mL) and/or abnormal DRE findings may lead to a prostate biopsy. In some cases, For PCa screening, a transrectal ultrasound-guided biopsy is employed [18-20].

The European Urological Association advises well-informed men to start prostate cancer detection at the age of 40, with a baseline PSA test. If the PSA reading at baseline is less than 1 ng/mL, subsequent screenings should occur every 8 years, but screening is not advised following the age of 75 [18]. The American Cancer Society (ACS) advises men to discuss prostate cancer (PCa) screening decisions in-depth with their healthcare providers. This decision should consider the unknown dangers and possible advantages of PCa screening [21]. The recommended age for these discussions is 45 for average-risk men, 50 for high-risk individuals (e.g., 40 for men who are even more at risk, or African-Americans or those who have a first-degree relative who was diagnosed with PCa before the age of 65. Depending on their initial PSA level, men with PSA levels below 2.5 ng/mL should be done every two years, and testing for higher levels should be done annually [21].

In the context of the American Urological Association's (AUA) guidelines advocating shared decision-making for PSA screening among men aged 55 to 69 [22], this study aims to explore the factors influencing the decision-making process of Lebanese men aged 40 and above regarding prostate cancer screening. The objective is to gain insights into how cultural, demographic, and individual factors shape the adherence to or deviation from these guidelines in a Lebanese population.

Furthermore, the study seeks to investigate the awareness and understanding of the recommended screening intervals, specifically focusing on the two-year screening interval endorsed by the AUA [22]. By examining the knowledge and perceptions of Lebanese men regarding the advantages and potential drawbacks of routine PSA screening, the research aims to contribute to the development of targeted interventions and educational programs aimed at fostering informed decision-making and aligning screening practices with evidence-based guidelines.

## **Materials and Methods**

In the current study, a descriptive research design was used to get information from Lebanese men aged 40 and above who reside in the community. This age group aligns with the American Cancer Society's (ACS) recommendation to start discussions about prostate cancer (PCa) screening at age 40, especially for high-risk men. Participants were recruited from barber shops in the two largest cities in Lebanon, Beirut and Tripoli. Twenty barber shops in total were carefully chosen from each city. for this study, as they are easily accessible locations for most Lebanese men and provide a culturally

suitable environment for disseminating customized PCa information. Barber shops are often considered venues that are appropriate, useful, and culturally relevant for PCa education in the community.

The study involved participants who fulfilled specific requirements, including being citizens of Lebanon, aged 40 and above (regardless of their prostate cancer history), and not working as healthcare professionals. Healthcare Professionals were not allowed to participate in the study because of their background. The sample size was determined using the G\*Power software. A power level of 0.80 was aimed for, along with a medium effect size (0.3), and a conventional significance criterion of  $\alpha = 0.05$ , two-tailed. The minimum sample size needed was 96 participants. The higher the rate of attrition, the greater the risk of bias. Biases are usually of concern if the rate exceeds 20%. Thus, an expected attrition rate is 25%. Thus additional 24 participants were included to give 120 participants in the total sample.

Prior Understanding health problems and prostate cancer may have an impact on the study's findings. Among the 300 males invited to participate, 120 (40%) consented to partake in the data collection interviews. Reasons for non-participation included time constraints and discomfort when discussing illnesses pertaining to the sexual organs. The research ultimately collected data from a convenience 120 Lebanese men as a sample.

#### *Instrument for collecting data*

The data collection involved the use of a survey questionnaire (SQ), which is divided into seven items designed to collect information about Men's prostatic cancer experiences. These items focused on the history of prostate illness, the existence of close relatives who have prostate cancer, and previous interactions with digital rectal examinations (DRE) or prostate-specific antigen (PSA) tests.

To determine whether someone plans to get screened for prostate cancer, an intention-to-screen scale [23] was employed. This scale measures an individual's readiness to undergo a prostate cancer screening, often considered a direct precursor to actual behavior when behavior itself is challenging to observe. The intention to screen was assessed through five items, such as asking participants how likely they were to within the next 12 months, undergo a DRE or blood test for prostate cancer, or when recommended by a doctor. Responses were provided with a Likert scale of 5 points ranging from "Definitely will not" to "Definitely will." The intent level for each item (blood test or DRE) was added up to create a total score that ranged from 5 to 25. Higher scores suggested a more determined intention behind the relevant procedure. Cronbach's alpha was used to measure the reliability of this 5-item intention scale, and the results showed that it was 0.94 [23].

The presence and intensity of symptoms related to the prostate were evaluated using the International Prostate Symptom Score (IPSS) [24], which included issues like incomplete evacuation of the bladder, frequent urination, a feeble stream, urgency, straining, and nocturia. Every symptom was scored by participants using a 6-point Likert

scale, ranging from "not at all = 0" to "almost always = 5." Each symptom's score was added up, and the results were divided into three categories: mild, moderate, and severe based on their total values. The IPSS also included an additional item that measured the effect on the participants' quality of life, on a scale of "0" (happy) to "6" (worrisome) of these urinary symptoms. The IPSS is a popular instrument that has demonstrated good reliability, with the range of Cronbach's alpha 0.71 to 0.80 [24].

The study assessed obstacles to screening for prostate cancer (PCa) using a combination of 14 barrier-related items from previous research [25, 24]. Participants rated their level of agreement with these claims on a 4-point Likert scale of "strongly disagree" to "strongly agree" [25]. In addition, the study employed the Prostate Cancer Testing Behavior Questionnaire (PCTBQ) [12]. The PCTBQ has multiple subscales. that measure factors such as Perceived overall health, perceived risk of prostate cancer, and outside factors influencing screening choices. Take Part rated their agreement with items on a 5-point Likert scale, scores can range from "strongly disagree (1)" to "strongly agree (5)." The total scores of each domain were calculated by summing the results of individual items. Higher scores on these scales indicated a greater presence of the relevant component. Strong internal consistency was shown by the PCTBQ scales, with Cronbach's alpha values higher than 0.79 [12].

The survey questionnaire components were professionally translated from English into Arabic. The Arabic text was then translated into English by a second qualified translator to identify and resolve any discrepancies or differences between the original English text. This meticulous process aimed to maintain the accuracy and consistency of the items in the version of the questionnaire in Arabic.

The completed Arabic rendition of the questionnaire was carefully scrutinized before being considered complete. To ensure its effectiveness and suitability, a pilot test involving ten Arabic-speaking men was conducted. This pilot test's objective was to evaluate the participants' responses to evaluate their comprehension and interpretation of the survey questions.

#### *Ethical consideration*

The research obtained approval from the Ethical Committee of Holistic Health Care Resources with a reference number (HHCR-059 -2022). Signing an Arabic-language consent form was mandatory for all participants. Before the data collection process began, they were also given the chance to ask questions and were made aware of their right to withdraw from participation at any time without facing consequences.

#### *Data collection procedure*

The study involved preliminary visits to the study locations in an effort to locate and speak with the proprietors of barber shops. This allowed for obtaining the necessary permissions for the study activities and gathering essential information. The insights from these pre-visits were then used to create a schedule for data collection and to verify whether a private space is available

for data collection. Any Lebanese man at the barber shop who fit the inclusion criteria was asked if he would be interested in participating in the study during the actual days of data collection. Participants were led to a private area where they could finish the questionnaire after giving their consent.

*Statistical analysis*

The study utilized version 22 of the Statistical Package for Social Sciences data management and analysis [26]. Descriptive statistics were employed to summarize the characteristics of the participants, symptoms related to the prostate, plan to be screened, and perceived obstacles to prostate cancer (PCa) screening.

To identify the factors influencing the plan to perform a PCa screening, several statistical methods were applied, including the Multivariate regression analysis, Pearson’s correlation, and the Chi-square test,  $P \leq 0.05$  (two-sided) was the significance level for all statistical tests.

**Results**

*Attributes of the participants*

The study included 120 participants where Table 1 displays the participants and their attributes. The participants’ average age was 52 years old, with a standard deviation of 9. Eighty-two percent of the participants were married, ninety-six percent had completed a Bachelor’s degree and above, and sixty-five percent regularly saw a doctor. The majority of participants (70%) reported having mild symptoms related to their prostates, and high levels of general well-being.

The majority of participants reported being in good overall health (92%), impacted by outside variables (83%), and having concerns about the potential threat of prostate cancer (70%). However, a substantial portion (38%) felt conflicted and unhappy or dissatisfied with the results of prostate symptoms on their quality of life.

*Experiences of the participants regarding prostate cancer and prostate cancer screening*

Most attendees had no prior personal experiences with prostate cancer, as indicated in Table 2. Table 2 findings show that the majority of participants did not have a history of prostate cancer diagnosis (4%), received information from a doctor regarding any prostate disease (11%), or had undergone within the previous 12 months to do a prostate-specific antigen (PSA) test (12%) or digital rectal examination (DRE) (10%).

*Perceived barriers to prostate cancer screening*

The obstacles that participants perceived regarding prostate cancer (PCa) examination are shown in Table 3. The top five most typical obstacles to screening for PCa were concerns about potential harm from a digital rectal examination (DRE) (46%), fear of receiving unsettling results from PCa screening (48%), uncertainty about what will be done during PCa screening (54%), belief that PCA is not a serious illness (56%), and think a DRE could be embarrassing (57%).

Table 1. Characteristics of the Participants (n=120)

| Characteristics  | Category                       | Frequency (%) |
|--|--------------------------------|---------------|
| Age in years<br>(mean±SD: 52.20±9.54)                                  | 40-50                          | 92 (77)       |
|  | 51-60                          | 18 (14)       |
|  | ≥61                            | 10 (8)        |
| Marital status   | Single                         | 12 (10)       |
|  | Married                        | 98 (82)       |
|  | Separated/widowed              | 10 (8)        |
| Level of education attained  | School                         | 12 (10)       |
|  | Diploma                        | 12 (10)       |
|  | Bachelor’s degree and above    | 96 (80)       |
| Employment status  | Not employed or retired        | 12 (10)       |
|  | Part-time                      | 24 (20)       |
|  | Full time                      | 84 (70)       |
| Access to a regular physician  | No                             | 42 (35)       |
|  | Yes                            | 78 (65)       |
| The main source of healthcare  | Government facility            | 94 (78)       |
|  | Private facility               | 26 (22)       |
| Perceived general health on a scale of 1-10<br>(mean±SD: 7.24±1.07)    | 1-5                            | 10 (8)        |
|  | 6-10                           | 110 (92)      |
| The perceived threat of PCa on a scale of 1-10<br>(mean±SD: 7.22±1.06) | 1-5                            | 16 (30)       |
|  | 6-10                           | 84 (70)       |
| External influences on a scale of 1-15<br>(mean±SD: 9.01±2.02)         | 1-7                            | 20 (17)       |
|  | 8-15                           | 100 (83)      |
| IPSS (mean±SD: 6.10±6.21)  | Mild symptoms                  | 64 (70)       |
|  | Moderate symptoms              | 24 (20)       |
|  | Severe symptoms                | 12 (10)       |
| Quality of life associated with IPSS                                   | Delighted                      | 21 (17)       |
|  | Pleased                        | 28 (23)       |
|  | Mostly satisfied               | 2 (2)         |
|  | Mixed                          | 24 (20)       |
|  | Mostly dissatisfied or unhappy | 45 (38)       |

SD, Standard deviation; PCa, Prostate cancer; IPSS, International prostate symptom score

Table 2. Personal Experiences Related to Prostate Cancer and Prostate Cancer Screening (n=120)

| Reported experience  | Response | Frequency (%) |
|--|----------|---------------|
| Was informed by the doctor that he has any disease of the prostate | No       | 107 (89)      |
|  | Yes      | 13 (11)       |
| Had a rectal examination for PCa                                   | No       | 110 (92)      |
|  | Yes      | 10 (8)        |
| Had a digital rectal examination for PCa in the past 12 months     | No       | 118 (90)      |
|  | Yes      | 12 (10)       |
| Had a blood test for PCa   | No       | 105 (87)      |
|  | Yes      | 15 (12)       |
| Had a blood test for PCa in the past 12 months (PSA)               | No       | 106 (88)      |
|  | Yes      | 14 (12)       |
| Has been diagnosed with PCa  | No       | 116 (95)      |
|  | Yes      | 4 (5)         |
| Has an immediate family member who had PCa                         | No       | 110 (92)      |
|  | Yes      | 10 (8)        |

PCa, Prostate cancer

Table 3. Barriers to Prostate Cancer Screening (n=120)

| Perceived major barriers   | Response             | Frequency (%) |
|--|----------------------|---------------|
| Lack of transportation to reach the healthcare facility              | Agree/strongly agree | 28 (23)       |
| I believe that I am at higher risk for PCa than other men            | Agree/strongly agree | 30 (25)       |
| Working hours prevent me from getting PCa screening                  | Agree/strongly agree | 41 (34)       |
| There is nothing I can do to prevent me from getting PCa             | Agree/strongly agree | 42 (35)       |
| PCa will threaten the relationship with my partner                   | Agree/strongly agree | 46 (38)       |
| I fear that I might become impotent                                  | Agree/strongly agree | 47 (39)       |
| PCa screening will take a lot of time                                | Agree/strongly agree | 49 (41)       |
| Procedures for PCa screening will be painful                         | Agree/strongly agree | 49 (41)       |
| I do not know where to go for screening                              | Agree/strongly agree | 53 (44)       |
| The digital rectal examination will be harmful to me                 | Agree/strongly agree | 55 (46)       |
| I fear that they might find something wrong during the PCa screening | Agree/strongly agree | 58 (48)       |
| I do not understand what will be done during PCa screening           | Agree/strongly agree | 65 (54)       |
| PCa is not a serious disease   | Agree/strongly agree | 67 (56)       |
| Digital rectal examination is embarrassing                           | Agree/strongly agree | 68 (57)       |

PCa, Prostate cancer

Table 4. Participants' Intention to Screen for Prostate Cancer (n=120)

| Variable                      | Category                  | Frequency (%) |
|-------------------------------|---------------------------|---------------|
| Intention to screen using DRE | Low-to-moderate intention | 91 (76)       |
|                               | High intention            | 29 (24)       |
| Intention to screen using PSA | Low-to-moderate intention | 84 (70)       |
|                               | High intention            | 36 (30)       |

PSA, Prostate-specific antigen; DRE, Digital rectal examination; SD, Standard deviation

*Intention to screen for prostate cancer*

Table 4 provides information that the majority of participants had a low-to-moderate intention to undergo screening using both digital rectal examination (DRE) (76%) and prostate-specific antigen (PSA) (70%), even though a significant portion of them had moderate-to-severe prostate symptoms. The average

intention levels for both DRE and PSA screening fell within the moderate range, at 13.2 and 11.1, respectively.

Bivariate correlation analysis revealed several significant associations. The goal of employing DRE to screen for prostate cancer (PCa) was linked to factors such as receiving medical advice regarding any prostate disease ( $r = 0.124$ ;  $p = 0.002$ ), working hours ( $r = 0.152$ ;  $p = 0.023$ ), concerns about the embarrassment of DRE ( $r = -0.298$ ;  $p = 0.022$ ), the convenience of clinic or health center hours ( $r = 0.174$ ;  $p = 0.011$ ), the uncertainty of where to go for screening ( $r = -0.12$ ;  $p = 0.0033$ ), perceived general health ( $r = 0.11$ ;  $p = 0.002$ ), and the perceived threat of PCa ( $r = -0.37$ ;  $p = 0.01$ ), were all strongly correlated with the intention to use PSA screening for PCa.

Intention to screen for PCa using PSA was significantly associated with being informed by a doctor that one has any disease of the prostate gland ( $r = 0.5$ ;  $P = 0.002$ ), perceived general health ( $r = 0.141$ ;  $P = 0.001$ ), perceived threat of PCa ( $r = -0.281$ ;  $P = 0.001$ ), and external

Table 5. Distribution of Intention to Screen and Selected Participants' Characteristics

| Characteristics                         | Response | Intention to screen with DRE (n=120)" |      |         | Intention to screen with PSA (n=120) |      |         |
|---|----------|---------------------------------------|------|---------|--------------------------------------|------|---------|
|   |          | Low to moderate                       | High | p-value | Low to moderate                      | High | p-value |
| International Prostate Symptom Score    | Mild     | 28                                    | 18   | P=0.345 | 30                                   | 8    | P=0.86  |
|   | Moderate | 32                                    | 10   |         | 24                                   | 10   |         |
|   | Severe   | 25                                    | 17   |         | 26                                   | 22   |         |
| Had a DRE for a PCa                     | No       | 50                                    | 50   | P=0.004 | 60                                   | 30   | P=0.011 |
|   | Yes      | 10                                    | 10   |         | 15                                   | 15   |         |
| Had a DRE for PCa in the past 12 months | No       | 40                                    | 40   | P=0.002 | 35                                   | 35   | P=0.245 |
|   | Yes      | 20                                    | 20   |         | 25                                   | 25   |         |
| Have you ever had a PSA for PCa         | No       | 55                                    | 35   | P=0.002 | 65                                   | 35   | P=0.079 |
|   | Yes      | 15                                    | 15   |         | 10                                   | 10   |         |
| Had a PSA for PCa in the past 12 months | No       | 45                                    | 35   | P=0.003 | 42                                   | 32   | P=0.350 |
|   | Yes      | 20                                    | 20   |         | 23                                   | 23   |         |
| Past medical history of PCa             | No       | 51                                    | 24   | P=0.002 | 60                                   | 25   | P=0.002 |
|   | Yes      | 24                                    | 21   |         | 15                                   | 20   |         |

FET, Fisher's exact test; PSA, Prostate-specific antigen test; DRE, Digital rectal examination; PCa, Prostate cancer

Table 6. Determinants of Intention to Screen for Prostate Cancer

| Screening procedure | Variables   | Unstandardized coefficients |       | $\beta$ | t     | P     | 95% CI       |
|---------------------|---|-----------------------------|-------|---------|-------|-------|--------------|
|                     |   | B                           | SE    |         |       |       |              |
| DRE                 | Constant  | 15.32                       | 6.32  |         | 1.65  | 0.076 | 0.63-33.61   |
|                     | Been informed by a doctor that he has a disease of the prostate gland | 2.55                        | 2.33  | 0.1     | 1.21  | 0.007 | 0.67-6.11    |
|                     | Perceived threat of PCa   | 0.34                        | 0.12  | 0.16    | 1.42  | 0.002 | 0.22-2.14    |
|                     | Perceived general health  | 0.22                        | 0.11  | 0.1     | 1.3   | 0.213 | -0.04-0.65   |
|                     | Do not know where to go for screening                                 | -0.32                       | 0.55  | -0.03   | -0.34 | 0.55  | -1.90-1.33   |
|                     | Digital rectal examination is embarrassing                            | -0.44                       | 0.53  | -0.04   | -0.52 | 0.135 | -1.56-1.12   |
| PSA                 | Constant  | 1.231                       | 4.15  |         | 0.14  | 0.434 | -12.65-15.25 |
|                     | Been informed by a doctor that he has a disease of the prostate gland | 1.612                       | 1.322 | 0.11    | 1.21  | 0.021 | 0.35-3.62    |
|                     | Perceived threat of PCa   | 0.201                       | 0.113 | 0.92    | 1.13  | 0.044 | 0.03-0.53    |
|                     | Perceived general health  | 0.22                        | 0.332 | 0.12    | 0.88  | 0.031 | -0.03-0.41   |
|                     | Do not know where to go for screening                                 | 0.23                        | 0.556 | 0.03    | 0.26  | 0.343 | -1.32-1.10   |

PSA, Prostate-specific antigen test; DRE, Digital rectal examination; CI, Confidence interval; SE, Standard error; PCa, Prostate cancer

influences ( $r = -0.22$ ;  $P = 0.001$ ).

#### *Participants' characteristics associated with intention to screen for prostate cancer*

Table 5 outlines the qualities of the participants that exhibited significant associations with the goal of undergoing testing using digital rectal examination (DRE) and prostate-specific antigen (PSA) testing. When considering the intention to use DRE for screening, significant factors included prior receipt of a DRE ( $P = 0.004$ ), a DRE within the last 12 months ( $P = 0.002$ ), prior receipt of a PSA test ( $P = 0.002$ ), a PSA test within the last 12 months ( $P = 0.003$ ), and a past medical history of PCa ( $P = 0.002$ ) are all significant factors. In relation to the desire to screen using PSA, significant factors were having previously received DRE for prostate cancer ( $P = 0.011$ ) and prostate cancer history ( $P = 0.002$ ) are both significant.

#### *Determinants of intention to screen for prostate cancer*

According to Table 6, the outcomes of the multivariate regression analysis showed that significant factors influencing the intention to undergo prostate cancer (PCa) screening through digital rectal examination (DRE) include the perceived threat of the disease ( $\beta = 0.16$ ,  $P = 0.002$ ) and receiving information from a doctor about any prostate disease ( $\beta = 0.10$ ,  $P = 0.007$ ).

Similarly, for the purpose of receiving PCa screening via prostate-specific antigen (PSA) testing, significant determinants include the sense of overall health ( $\beta = 0.12$ ,  $P = 0.031$ ), the knowledge of any prostate disease ( $\beta = 0.11$ ,  $P = 0.021$ ), and the perceived threat of the condition ( $\beta = 0.92$ ,  $P = 0.044$ ).

## Discussion

The main objective of the current study is to explore prostate screening practices for cancer (PCa) in Lebanese men. It reveals that the majority of men in Lebanon had not encountered PCa personally. However, a significant portion reported experiencing prostate symptoms that are mild (70%), moderate (20%), or severe (10%) warranted

medical attention and possible screening. This study provides valuable insights into PCa screening behaviors in Lebanon, shedding light on an area previously unexamined.

The research underscores a deficiency in the health knowledge of Lebanese men, as a significant number may not have realized that experiencing prostate-related symptoms could be a sign of prostate-related health issues. This aligns with a recent study in Lebanon, which uncovered a lack of general cancer awareness among most people. Consequently, the study underscores the significance of introducing public education initiatives to boost understanding of cancer risk, cancer symptoms, and the value of regular screening.

The study's findings reveal that the most significant barriers to prostate cancer (PCa) screening are associated with healthcare facility accessibility, own beliefs, and PCa knowledge. The most common obstacles include unfavorable clinic or health center hours, concerns about the potential harm of the anxiety of a digital rectal examination (DRE), receiving alarming results from PCa screening, a lack of understanding about the screening process, the perception of the idea that DRE is unflattering and that PCa is not a serious illness. These limitations closely align with those observed in the literature [27-29].

Promisingly, interventions are available to address and reduce barriers to prostate cancer (PCa) screening. A study showed in Turkey that online instruction and reminders can be highly effective in significantly decreasing the perception of barriers, increasing susceptibility perception, and encouraging PSA screening [30].

The study found that Prostate cancer (PCa) screening intent was typically low, likely due to the discussed barriers or a lack of knowledge about PCa. A low to moderate level of intentions to undergo screening prostate-specific antigen (PSA) and digital rectal examination (DRE) testing. These findings are consistent with the broader literature on cancer screening in the Middle East, which reveals that societal and health-related beliefs have an impact on people's perceptions of cancer and their involvement in screening programs [4].

The results of the current study, which reveal a low intention among Lebanese men should get screened for prostate cancer (PCa), are of significance in understanding the rising issue of late PCa diagnosis, morbidity, and mortality in this population. The study identifies determinants of screening intention, such as the assessment of PCa's threat, perceptions of general health, and receiving information from a doctor about prostate conditions, emphasizing that providing eligible men with health information and risk factors for PCa by healthcare providers can increase their willingness to undergo screening. These results align with prior research indicating that a doctor's recommendation and positive attitudes significantly influence men's plans to be screened for PCa [31].

Improving the knowledge and attitudes of males toward prostate cancer screening for (PCa) is essential to increasing screening intentions, especially among those who have prior knowledge and an in-depth comprehension of the condition. Taking into account the rising PCa morbidity and death, interventions should emphasize educating men about PCa and addressing their attitudes towards screening. These efforts can lead to higher screening intentions, increased participation in PCa screening, and ultimately result in earlier diagnoses and treatment.

#### Study Limitation

The sample size of 120 participants in the study may indeed limit the generalizability of the findings to the broader population of Lebanese men. While the sample size was determined using statistical power analysis and aimed to meet the study's objectives, it's important to acknowledge that a larger and more diverse sample would enhance the generalizability of the results. When interpreting the findings, it's crucial to consider the potential limitations associated with the sample size and to exercise caution when applying the results to the entire population of Lebanese men. Additionally, future research with larger and more diverse samples could provide a more comprehensive understanding of prostate cancer screening behaviors in Lebanon.

In conclusion, the study highlights the participants' limited Prostate cancer (PCa) screening intention, impacted by personal beliefs, experiences, and healthcare system barriers. These findings serve as a foundational point for future research testing interventions to enhance PCa awareness. Improving through interventions, PCa disease, and risk awareness can help lower perceived barriers, boost screening participation, and result in early diagnoses and treatment.

#### Author Contribution Statement

Mr. Rami Hejase: Conceived, designed the experiments, performed the experiments; and wrote the paper. Dr. Ahmad Mahmoud Saleh: Analyzed and interpreted the data and wrote the paper. Dr. Hassanat R. Abdel-Aziz: Contributed reagents, materials, analysis tools, or data and wrote the paper.

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#### Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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