KNOWLEDGE, ATTITUDE AND PERCEPTION STUDY TOWARDS AWARENESS OF PROSTATE CANCER AMONG MEDICAL & NON-MEDICAL STUDENTS OF PUNJAB, PAKISTAN: A CROSS-SECTIONAL STUDY

Original Research

Umeed Ullah Ghaznawi[1]*, Muhammad Imran[1], Nimra Naseem[2], Laiba Akhtar[1].

[1]University College of Pharmacy, University of the Punjab, Lahore, Pakistan.

[2]Forman Christian College University, Lahore, Pakistan.

Corresponding Author: Umeed Ullah Ghaznawi, University College of Pharmacy, University of the Punjab, Lahore, Pakistan, umeedjan06@gmail.com

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ABSTRACT

Background: Prostate cancer is one of the most common malignancies affecting men worldwide, with rising incidence in developing countries due to aging populations and changing lifestyles. Despite its clinical significance, awareness of prostate cancer, its risk factors, and early detection strategies remains limited among younger populations. University students represent a critical group for preventive health education, as their knowledge and attitudes can influence future health-seeking behavior and community awareness.

Objective: To assess and compare the knowledge, attitudes, and perceptions regarding prostate cancer and its screening among medical and non-medical university students in Punjab, Pakistan.

Methods: A descriptive cross-sectional study was conducted among 579 male university students aged 18–35 years, including 323 medical and 256 non-medical students. Data were collected using a structured, self-administered online questionnaire covering demographics, knowledge, attitudes, and perceptions related to prostate cancer. Statistical analysis was performed using IBM SPSS Statistics, with descriptive statistics expressed as frequencies and percentages, and inferential analysis conducted using Chi-square and Mann–Whitney U tests. A p-value <0.05 was considered statistically significant.

Results: Overall awareness of prostate cancer was reported by 80.2% of medical students compared with 38.7% of non-medical students. Knowledge of screening methods such as prostate-specific antigen testing or digital rectal examination was low in both groups (30.3% medical vs. 15.2% non-medical). Poor to fair self-rated knowledge was reported by 78.3% of medical students and 87.5% of non-medical students. Embarrassment related to screening was reported by 16.1% of medical students and 9.4% of non-medical students. Most respondents indicated they would pursue screening only if recommended by a healthcare professional rather than independently.

Conclusion: University students in Punjab demonstrated substantial gaps in knowledge and suboptimal attitudes toward prostate cancer, particularly among non-medical students. These findings emphasize the need for structured, culturally sensitive educational interventions at the university level to improve awareness, reduce stigma, and promote early detection practices.

Keywords: Awareness, Early Detection of Cancer, Prostate Cancer, Prostatic Neoplasms, Screening, Students, Universities.

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INTRODUCTION

Prostate cancer is among the most prevalent malignancies affecting men worldwide and remains a growing public health concern. Globally, approximately 1.4 million new cases were reported in 2020, placing prostate cancer as the second most frequently diagnosed cancer in men after lung cancer (1). Earlier estimates indicated over 1.2 million new diagnoses and nearly 359,000 deaths in 2018, accounting for approximately 3.8% of all male cancer-related mortality (2). In Pakistan, prostate cancer contributed to about 5.5% of all reported cancer cases in 2020, reflecting a rising trend that highlights the need for improved awareness and preventive strategies, particularly among younger populations who will shape future health behaviors and policy directions (3). The prostate is a walnut-sized gland located inferior to the urinary bladder and plays a crucial role in male reproductive function by producing seminal fluid. Prostate cancer typically develops slowly and may remain localized for many years; however, a subset of tumors exhibits aggressive behavior with potential for local invasion and distant metastasis if not detected and managed in a timely manner (4). Like other malignancies, prostate cancer is characterized by uncontrolled cellular proliferation driven by a complex interplay of genetic mutations, hormonal influences, and environmental factors. Androgen signaling, particularly involving testosterone and its more potent metabolite dihydrotestosterone, is central to prostate physiology and carcinogenesis, as evidenced by the rarity of prostate cancer in men who undergo castration before puberty, underscoring the critical role of androgens in disease development (5). Several non-modifiable and modifiable risk factors contribute to prostate cancer development. Advancing age remains the strongest risk factor, with incidence increasing markedly after the age of 50 and peaking in men older than 70 years. Ethnic disparities are well documented, with higher incidence and mortality rates observed among African American and Caucasian men, and comparatively lower rates among East Asian populations. Notably, East Asian men who migrate to Western countries experience increased incidence, suggesting that environmental and lifestyle factors interact with genetic susceptibility (6,7). Family history further elevates risk, pointing to hereditary components in disease etiology.

Dietary and environmental exposures have also been implicated, although evidence remains mixed. Diets rich in red meat, saturated fats, and dairy products—common in Western dietary patterns—have been associated with increased risk, whereas soy-based diets containing isoflavones, prevalent in East Asian cultures, may exert protective effects through modulation of hormonal and cellular signaling pathways. Additionally, exposure to environmental toxins such as cadmium, pesticides, heavy metals, and industrial chemicals has been proposed as a contributing factor in prostate carcinogenesis (8). With increasing life expectancy and aging populations, the global burden of prostate cancer is expected to rise further, intensifying the need for effective prevention and early detection strategies. Despite advances in diagnostic tools, early detection of prostate cancer remains controversial. Prostate-specific antigen testing is widely used and has led to increased detection rates, particularly in countries such as the United States. However, concerns regarding overdiagnosis, false-positive results, psychological distress, and unnecessary treatment have limited the adoption of population-based screening in several regions, including the United Kingdom, where routine screening is not currently recommended due to insufficient evidence of net benefit (9,10). The disease often progresses through premalignant stages such as high-grade prostatic intraepithelial neoplasia, which may precede invasive cancer by several years. Because many individuals remain asymptomatic, a substantial proportion of cases are diagnosed incidentally, further complicating screening and management decisions.

Within this context, public awareness and understanding of prostate cancer play a critical role in shaping health-seeking behavior, screening uptake, and early diagnosis. Knowledge, Attitudes, and Perceptions studies provide a structured framework to assess awareness levels, beliefs, and misconceptions that influence preventive practices and health-related decision-making. Such studies are particularly valuable in identifying sociocultural and informational barriers that hinder early detection and effective disease control (11). In Pakistan, available evidence suggests that awareness of prostate cancer remains limited, and attitudes toward screening are often unfavorable, reflecting significant gaps in health education and public engagement (12). University students represent an important yet underexplored population in this regard. Medical students, as future healthcare professionals, are expected to demonstrate adequate knowledge and positive attitudes toward cancer prevention, while non-medical students represent a broader segment of educated youth who may influence community perceptions despite limited formal health training. Understanding differences in knowledge and attitudes between these groups can provide insight into educational gaps and inform targeted interventions. Therefore, this study aims to assess and compare the knowledge, attitudes, and perceptions regarding prostate cancer among medical and non-medical university students in Punjab, Pakistan, and to examine how educational background, access to health information, and personal experiences shape these

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perspectives, with the objective of identifying gaps that can guide the development of targeted awareness and early-detection education strategies.

METHODS

A descriptive cross-sectional survey design was employed to evaluate the level of awareness, attitudes, and perceptions regarding prostate cancer among university students in Punjab, Pakistan. The study population comprised male students enrolled in public and private universities across the province, representing medical, pharmacy, and non-medical academic disciplines. Eligible participants were males aged 18–35 years who were currently registered students and able to comprehend and respond to an online questionnaire. Females, individuals younger than 18 years or older than 40 years, and illiterate individuals were excluded to maintain focus on the intended demographic and ensure reliability of self-administered responses. Participants were recruited using a stratified random sampling approach, with stratification based on age group, educational discipline, and self-reported socioeconomic background to enhance representativeness across key variables. Data were collected using a structured, self-administered questionnaire developed after an extensive review of relevant literature and previously published Knowledge, Attitude, and Perception studies on prostate cancer. The questionnaire was disseminated electronically via email and social media platforms to facilitate access among university students within the target age group. Prior to full deployment, the tool was reviewed for clarity and content relevance. The questionnaire consisted of four interconnected sections: demographic characteristics (including age, weight, area of residence, academic discipline, year of study, marital status, and self-perceived health status), factual knowledge related to prostate cancer, awareness and attitudes toward screening and learning about prostate health, and scenario-based items designed to assess perceptions, risk interpretation, and decision-making related to prostate cancer screening and prevention.

Independent variables included age, educational background, socioeconomic status, and self-reported family history of prostate cancer, while dependent variables comprised levels of knowledge, attitudes, and perceptions regarding prostate cancer, including understanding of risk factors, screening modalities, and emotional comfort with discussing prostate health. Ethical approval was obtained from the Human Ethical Committee of the University College of Pharmacy, University of the Punjab (Ref: HEC/PUCP/099/2025). Participation was voluntary, and informed consent was obtained electronically from all participants prior to data collection. The consent process clearly explained the study objectives, assured confidentiality and anonymity of responses, and emphasized the participants' right to withdraw at any stage without penalty. Data were coded and analyzed using IBM SPSS Statistics version 22, with Microsoft Excel 2019 and Word 2019 used for data organization and presentation. Descriptive statistics, including frequencies and percentages, were calculated to summarize demographic characteristics and response distributions. For inferential analysis, the Mann–Whitney U test was applied to compare non-parametric Likert-scale variables between medical and non-medical students, while the Chi-square test was used to assess associations between categorical variables such as yes/no and multiple-choice responses. Fisher's combined probability test was applied to integrate findings across thematic domains and generate an overall aggregated p-value. A threshold of $p < 0.05$ was considered statistically significant. The study tested a null hypothesis proposing no significant difference in prostate cancer awareness between medical and non-medical students and an alternative hypothesis suggesting higher awareness among medical students, with statistical comparisons conducted accordingly using appropriate parametric or non-parametric tests based on data distribution.

RESULTS

A total of 579 male university students from Punjab participated in the study, including 323 medical and 256 non-medical students. The majority of participants belonged to the younger age group of 18–23 years, representing 78.0% of medical students and 69.1% of non-medical students, with a statistically significant difference in age distribution between the two groups ($p = 0.014$). All respondents were male by study design. Most participants resided in urban areas (73.4% medical vs. 69.5% non-medical), and the majority were unmarried (95.4% medical vs. 91.8% non-medical). Self-reported health status was predominantly rated as good by both groups (75.9% medical and 77.0% non-medical), although a small proportion of non-medical students reported poor health more frequently than medical students (3.9% vs. 0.9%), with a significant difference observed ($p = 0.034$). Knowledge-related findings demonstrated marked disparities between medical and non-medical students. Awareness of prostate cancer was reported by 80.2% of medical students compared with only 38.7% of non-medical students ($p < 0.001$). Knowledge of signs and symptoms was identified in 50.2% of medical students, whereas 80.9% of non-medical students reported no such awareness ($p < 0.001$). Awareness of screening methods such as prostate-specific antigen testing or digital rectal examination remained low overall, reported by only 30.3% of medical students and

15.2% of non-medical students (p < 0.001). Poor or fair self-rated knowledge of prostate cancer was reported by 78.3% of medical students and 87.5% of non-medical students, while good to excellent knowledge was more frequent among medical students (21.6% vs. 12.5%), showing a statistically significant difference (p < 0.001). Knowledge of available treatment options in Pakistan was also limited, with poor knowledge reported by 46.1% of medical and 56.3% of non-medical students (p = 0.003). Social media emerged as the most common source of information among both groups (27.2% medical and 30.5% non-medical), while a substantial proportion of non-medical students reported having no information at all (41.8%). Correct identification of older age as the highest-risk group for prostate cancer was more frequent among medical students, whereas uncertainty was common among non-medical students (43.8%), with a significant difference between groups (p < 0.001).

Attitudinal assessment revealed variable comfort levels and beliefs. Comfort in discussing prostate cancer with health professionals was reported by 42.4% of medical students and 33.2% of non-medical students, while approximately one-quarter of respondents indicated discomfort discussing prostate cancer with anyone. A positive inclination toward considering treatment options if symptoms developed was reported by 66.9% of medical students and 50.5% of non-medical students (p < 0.001). Nearly half of medical students (43.3%) and over one-third of non-medical students (36.7%) agreed that smoking could contribute to prostate cancer risk. Misconceptions regarding sexual activity were evident, with 30.0% of medical and 23.8% of non-medical students agreeing that sexual activity increases prostate cancer risk, and a notable proportion declining to disclose sexual practices. Urinary symptoms such as discomfort or weak flow were reported by 28.5% of medical and 35.9% of non-medical students, yet a considerable proportion of symptomatic respondents reported reluctance to discuss these issues. Perception-based findings indicated persistent misconceptions and conditional health behaviors. Approximately 40.2% of medical students and 54.3% of non-medical students were uncertain whether vasectomy is the only cure for prostate cancer. Adherence to a healthy lifestyle as a preventive measure was reported by 44.3% of medical and 41.0% of non-medical students (p < 0.001). Embarrassment was identified as a barrier to screening in 16.1% of medical and 9.4% of non-medical students. Active engagement in prostate cancer screening was low and comparable between groups (17.3% medical vs. 17.6% non-medical), while most students expressed willingness to screen if recommended by a health professional rather than initiating screening independently. Lack of information emerged as the leading barrier to screening in both groups, followed by embarrassment and perceived risk. Physical inactivity was reported by 10.2% of medical and 17.6% of non-medical students (p = 0.035). When presented with symptomatic scenarios, 71.8% of medical and 52.0% of non-medical students favored screening as the first step, whereas a higher proportion of non-medical students opted for no action or alternative approaches (p < 0.001). Inferential analysis demonstrated statistically significant differences between medical and non-medical students across knowledge, attitude, and perception domains. Mann–Whitney U and Chi-square testing consistently yielded p-values below 0.05, leading to rejection of the null hypothesis. Fisher's combined probability test further confirmed highly significant aggregated differences across all three domains, with combined p-values well below conventional significance thresholds, indicating a substantially higher overall awareness level among medical students compared with non-medical students.

Table 1: Demographic Characteristics of Medical and Non-Medical Students (n = 579)

Characteristic	Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
Age (years)	18–23	252 (78.0%)	177 (69.1%)	0.014
	24–29	68 (21.1%)	70 (27.3%)	
	30–35	3 (0.9%)	9 (3.5%)	
Gender	Male	323 (100%)	256 (100%)	—
	Female	0 (0%)	0 (0%)	
Residence	Rural	86 (26.6%)	78 (30.5%)	0.308
	Urban	237 (73.4%)	178 (69.5%)	
Marital Status	Married	15 (4.6%)	21 (8.2%)	0.078
	Unmarried	308 (95.4%)	235 (91.8%)	

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Characteristic	Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
Self-Reported Health	Good	245 (75.9%)	197 (77.0%)	0.034
	Fair	75 (23.2%)	49 (19.1%)	
	Poor	3 (0.9%)	10 (3.9%)	

Table 2: Knowledge of Prostate Cancer Among Medical and Non-Medical Students (n = 579)

Statement	Response Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
Have you ever heard of prostate cancer?	Yes	259 (80.2%)	99 (38.7%)	<0.001
	No	64 (19.8%)	157 (61.3%)	
Are you aware of any signs and symptoms of prostate cancer?	Yes	162 (50.2%)	49 (19.1%)	<0.001
	No	161 (49.8%)	207 (80.9%)	
Have you ever known someone (family member/friend) with prostate cancer?	Yes	41 (12.7%)	36 (14.1%)	0.630
	No	282 (87.3%)	220 (85.9%)	
Are you aware of prostate cancer screening methods (PSA/DRE)?	Yes	98 (30.3%)	39 (15.2%)	<0.001
	No	225 (69.7%)	217 (84.8%)	
Have you attended any prostate cancer awareness campaigns/events?	Yes	43 (13.3%)	28 (10.9%)	0.387
	No	280 (86.7%)	228 (89.1%)	
Are you aware of anyone who has undergone prostate cancer screening?	Yes	41 (12.7%)	36 (14.1%)	0.630
	No	282 (87.3%)	220 (85.9%)	
How would you rate your knowledge of prostate cancer?	Poor	119 (36.8%)	149 (58.2%)	<0.001
	Fair	134 (41.5%)	75 (29.3%)	
	Good	65 (20.1%)	26 (10.2%)	
	Excellent	5 (1.5%)	6 (2.3%)	
Knowledge of available treatment options in Pakistan	Poor	149 (46.1%)	144 (56.3%)	0.003
	Fair	106 (32.8%)	82 (32.0%)	
	Good	65 (20.1%)	25 (9.8%)	
	Excellent	3 (0.9%)	5 (2.0%)	
Source of information about prostate cancer	Social Media	88 (27.2%)	78 (30.5%)	<0.001
	Lectures (online/physical)	92 (28.5%)	16 (6.3%)	
	Health Professionals	51 (15.8%)	14 (5.5%)	
	Family/Friends	27 (8.4%)	41 (16.0%)	
	No information	65 (20.1%)	107 (41.8%)	

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Statement	Response Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
Age group with highest prostate cancer susceptibility	Under 20	10 (3.1%)	11 (4.3%)	<0.001
	20–40	67 (20.7%)	47 (18.4%)	
	40–60	112 (34.7%)	64 (25.0%)	
	60+	70 (21.7%)	22 (8.6%)	
	Don't know	64 (19.8%)	112 (43.8%)	

Table 3: Attitudes and Behaviors Toward Prostate Cancer Among Medical and Non-Medical Students (n = 579)

Statement	Response Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
Sexual activity can increase prostate cancer risk	Strongly disagree	27 (8.4%)	15 (5.9%)	0.088
	Disagree	83 (25.7%)	38 (14.8%)	
	Neutral	90 (27.9%)	112 (43.8%)	
	Agree	97 (30.0%)	61 (23.8%)	
	Strongly agree	26 (8.0%)	30 (11.7%)	
Family history increases prostate cancer risk	Strongly disagree	4 (1.2%)	26 (10.2%)	<0.001
	Disagree	12 (3.7%)	30 (11.7%)	
	Neutral	81 (25.1%)	95 (37.1%)	
	Agree	169 (52.3%)	100 (39.1%)	
	Strongly agree	57 (17.6%)	26 (10.2%)	
Smoking can be a cause of prostate cancer	Strongly disagree	53 (16.4%)	7 (2.7%)	0.073
	Disagree	34 (10.5%)	29 (11.3%)	
	Neutral	91 (28.2%)	89 (34.8%)	
	Agree	140 (43.3%)	94 (36.7%)	
	Strongly agree	53 (16.4%)	37 (14.5%)	
Open to considering different treatment options	Strongly disagree	1 (0.3%)	32 (12.5%)	<0.001
	Disagree	12 (3.7%)	14 (5.5%)	
	Neutral	94 (29.1%)	107 (41.8%)	
	Agree	158 (48.9%)	97 (37.9%)	
	Strongly agree	58 (18.0%)	32 (12.5%)	
Regular screening is crucial for early detection	Strongly disagree	1 (0.3%)	2 (0.8%)	<0.001
	Disagree	14 (4.3%)	9 (3.5%)	
	Neutral	60 (18.6%)	95 (37.1%)	

Statement	Response Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
	Agree	155 (48.0%)	106 (41.4%)	
	Strongly agree	93 (28.8%)	44 (17.2%)	
Value of conveying prostate cancer knowledge gaps	Strongly disagree	1 (0.3%)	3 (1.2%)	<0.001
	Disagree	5 (1.5%)	9 (3.5%)	
	Neutral	61 (18.9%)	93 (36.3%)	
	Agree	152 (47.1%)	104 (40.6%)	
	Strongly agree	104 (32.2%)	47 (18.4%)	
Urinary symptoms experienced most of the time	Blood in urine	16 (5.0%)	33 (12.9%)	0.004
	Discomfort	33 (10.2%)	32 (12.5%)	
	Weak/Interrupted flow	43 (13.3%)	27 (10.5%)	
	Nothing unusual	231 (71.5%)	164 (64.1%)	
Comfortable discussing prostate cancer risk with	Family	36 (11.1%)	32 (12.5%)	0.153
	Friends	71 (22.0%)	63 (24.6%)	
	Health professionals	137 (42.4%)	85 (33.2%)	
	None	79 (24.5%)	76 (29.7%)	
Red meat & dairy consumption	Less	50 (15.5%)	45 (17.6%)	<0.001
	Moderate	230 (71.2%)	140 (54.7%)	
	Excessive	25 (7.7%)	32 (12.5%)	
	Not at all	18 (5.6%)	39 (15.2%)	
Frequency of sexual activity	Weeks	27 (8.4%)	31 (12.1%)	0.095
	Months	23 (7.1%)	23 (9.0%)	
	Fortnights	17 (5.3%)	17 (6.6%)	
	Don't want to disclose	70 (21.7%)	67 (26.2%)	
	Never	186 (57.6%)	118 (46.1%)	

Table 4: Perceptions and Practices Related to Prostate Cancer Among Medical and Non-Medical Students (n = 579)

Statement	Response Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
Vasectomy (removal of prostate) is the only cure of prostate cancer	Strongly disagree	11 (3.4%)	3 (1.2%)	0.243
	Disagree	66 (20.4%)	29 (11.3%)	
	Neutral	130 (40.2%)	139 (54.3%)	

Statement	Response Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
	Agree	84 (26.0%)	62 (24.2%)	
	Strongly agree	32 (9.9%)	23 (9.0%)	
It is important to screen for prostate cancer more than once	Strongly disagree	2 (0.6%)	4 (1.6%)	<0.001
	Disagree	5 (1.5%)	12 (4.7%)	
	Neutral	80 (24.8%)	108 (42.2%)	
	Agree	186 (57.6%)	111 (43.4%)	
	Strongly agree	50 (15.5%)	21 (8.2%)	
I actively engage in prostate cancer screening	Strongly disagree	42 (13.0%)	22 (8.6%)	0.020
	Disagree	84 (26.0%)	44 (17.2%)	
	Neutral	116 (35.9%)	123 (48.0%)	
	Agree	56 (17.3%)	45 (17.6%)	
	Strongly agree	25 (7.7%)	22 (8.6%)	
I involve my family in talks about prostate cancer management	Strongly disagree	31 (9.6%)	17 (6.6%)	0.576
	Disagree	80 (24.8%)	53 (20.7%)	
	Neutral	111 (34.4%)	117 (45.7%)	
	Agree	82 (25.4%)	54 (21.1%)	
	Strongly agree	19 (5.9%)	15 (5.9%)	
I am diligent in reporting signs related to prostate cancer	Strongly disagree	11 (3.4%)	5 (2.0%)	0.164
	Disagree	44 (13.6%)	28 (10.9%)	
	Neutral	104 (32.2%)	121 (47.3%)	
	Agree	130 (40.2%)	78 (30.5%)	
	Strongly agree	34 (10.5%)	24 (9.4%)	
I adhere to a healthy lifestyle to reduce prostate cancer risk	Strongly disagree	1 (0.3%)	7 (2.7%)	<0.001
	Disagree	14 (4.3%)	21 (8.2%)	
	Neutral	101 (31.3%)	99 (38.7%)	
	Agree	143 (44.3%)	105 (41.0%)	
	Strongly agree	64 (19.8%)	24 (9.4%)	
Reasons for not willing to screen	Can't afford	37 (11.5%)	38 (14.8%)	0.031
	Lack of information	194 (60.1%)	148 (57.8%)	
	Too risky	40 (12.4%)	46 (18.0%)	
	Embarrassment	52 (16.1%)	24 (9.4%)	

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Statement	Response Category	Medical Students (n = 323)	Non-Medical Students (n = 256)	p-value
Frequency of physical activity (exercise, gym, running)	Occasionally	58 (18.0%)	49 (19.1%)	0.035
	Sometimes	156 (48.3%)	100 (39.1%)	
	Mostly	76 (23.5%)	62 (24.2%)	
	Never	33 (10.2%)	45 (17.6%)	
Suggested action if symptoms suggest prostate cancer	Screening	232 (71.8%)	133 (52.0%)	<0.001
	Anti-cancers	41 (12.7%)	47 (18.4%)	
	Allopathy	17 (5.3%)	14 (5.5%)	
	Nothing	33 (10.2%)	62 (24.2%)	
Response if DRE is recommended by a health professional	Consider it	185 (57.3%)	138 (53.9%)	0.002
	Refuse it	26 (8.0%)	42 (16.4%)	
	Go for other methods	29 (9.0%)	32 (12.5%)	
	Get it done as soon as possible	83 (25.7%)	44 (17.2%)	

Table 5: Combined Statistical Significance of Knowledge, Attitude, and Perception Domains Between Medical and Non-Medical Students

Knowledge	Attitude	Perceptions
0.00000000000257864	0.0000000000216992	0.00000000125666
2.57864×10−12	**2.16992×10−12**	**1.25666×10-9**
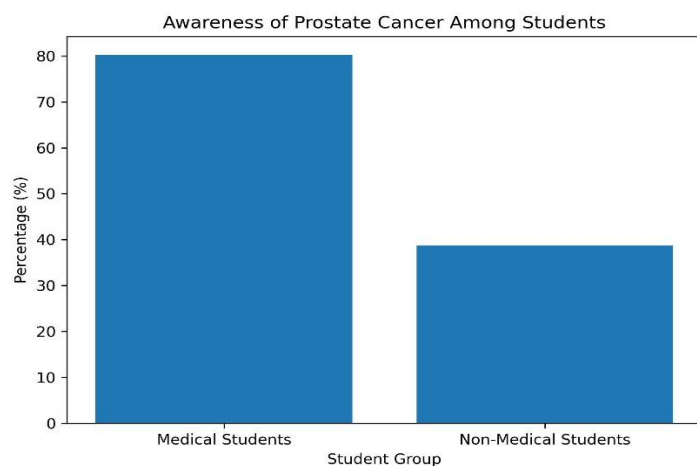
*Figure 2 Awareness of Prostate Cancer Among Students*
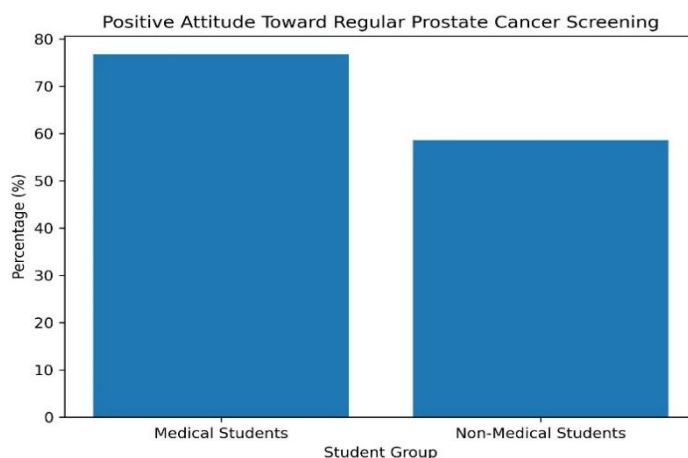
Figure 2 Positive Attitude Toward Regular Prostate Cancer Screening

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DISCUSSION

This study evaluated knowledge, attitudes, and perceptions regarding prostate cancer among medical and non-medical university students in Punjab, Pakistan and identified substantial gaps across all three KAP domains. Although familiarity with the term "prostate cancer" was relatively common—particularly among medical students—detailed understanding of symptoms, risk factors, screening methods, and locally available treatment options remained limited in both groups. The largest disparities consistently favored medical students, which was expected given their curricular exposure, access to health-related learning resources, and greater interaction with clinical and academic medical content. Even so, the observed proportion of medical students rating their knowledge as good or excellent remained modest, indicating that passive exposure to information did not reliably translate into confident, usable knowledge for personal health decisions or peer education. The pattern of higher awareness among medical students aligned with findings from other university-based studies in which students with health-science backgrounds demonstrated better prostate cancer literacy than non-health disciplines (13). However, the present findings also echoed an important recurring theme in the literature: general awareness of the disease name may be high, while knowledge of actionable elements—such as symptoms, appropriate age-risk understanding, and screening methods—remains inadequate. In a study from South Africa, a large majority of participants had heard of prostate cancer, yet a smaller proportion demonstrated acceptable knowledge of symptoms, reinforcing that awareness does not necessarily reflect comprehension or readiness for preventive behavior (14). Similarly, in a university setting in Sudan, final-year medical students showed higher knowledge levels than junior cohorts, supporting the concept that knowledge improves with increasing academic seniority and clinical exposure (15). In the current study, the comparatively stronger understanding reported among senior medical students was consistent with that trajectory, suggesting that progression through professional curricula contributed to better recognition of prostate cancer and its health implications (16).

Attitudinal findings were notable for showing generally favorable beliefs toward the value of screening and health education, despite limited concrete knowledge. A substantial proportion of medical students agreed or strongly agreed that regular screening was important for early detection, and these proportions were broadly comparable to prior literature assessing similar beliefs among medical trainees (17). At the same time, the low proportion of respondents who had attended awareness activities highlighted a critical implementation gap: positive attitudes did not translate into engagement with campaigns or structured learning opportunities. This mismatch suggested that university environments may not be providing consistent, accessible programming on male cancers, and that prostate cancer awareness may be competing with other public health priorities that receive greater visibility. The finding that social media was a leading information source further supported the view that many students relied on unstructured, potentially inconsistent channels rather than formal teaching or verified health communication. Several perception-related results underscored the persistence of misconceptions and sociocultural barriers. Misunderstanding around screening methods and confusion regarding treatment concepts indicated that many students lacked foundational health literacy on prostate cancer pathways from risk to detection and management. The perception and disclosure patterns around sexual activity reflected cultural sensitivity and privacy concerns, which likely influenced how students responded to survey items and how comfortably they would engage in real-world conversations about prostate health. International evidence has remained mixed regarding the relationship between sexual activity and prostate cancer risk, with some studies suggesting patterns consistent with increased risk in highly sexually active early adulthood and other large datasets proposing protective associations with higher ejaculation frequency (18). In the current context, the more salient finding was not the direction of belief but the tendency toward discomfort and nondisclosure, indicating that stigma and taboo may limit open discussion, education uptake, and future help-seeking for urinary or sexual health symptoms.

Risk perception regarding age susceptibility also appeared to be suboptimal. While prostate cancer risk rises with advancing age, a sizeable portion of respondents identified midlife age bands rather than older age groups as the highest-risk categories, mirroring findings from a U.S. college-based study in which a large proportion of students incorrectly believed middle-aged men were at greatest risk (19). Such misperceptions can reduce the perceived relevance of screening guidance and weaken the rationale for preventive counseling, particularly if young adults interpret prostate cancer as primarily a concern of earlier age groups or believe risk is driven mainly by lifestyle alone. The findings carried practical implications for campus-based health promotion. The overall pattern suggested that universities represent a high-yield setting for structured, culturally sensitive education initiatives that differentiate between general awareness and actionable knowledge. Integrating brief modules into general education, student wellness programs, and health-science curricula could address gaps in symptom recognition, risk factor understanding, and screening literacy, while also correcting misconceptions about treatment. The observed openness among many students toward conveying knowledge gaps indicated readiness for peer-led interventions and interdisciplinary outreach, particularly if content is framed in a stigma-reducing manner and delivered

through trusted channels. This study had several strengths. It included a comparatively large sample and directly compared medical and non-medical cohorts, allowing clearer identification of educational gradients in prostate cancer literacy. The inclusion of knowledge, attitude, and perception domains enabled a broader understanding of why awareness may not translate into preventive practices, and scenario-style items provided a closer approximation to decision-making tendencies rather than relying solely on factual recall. Ethical oversight and standardized statistical testing strengthened the credibility of inferences drawn from group comparisons.

Important limitations required careful consideration. The online, self-administered approach likely introduced selection bias, as students with higher interest in health topics or better internet access may have been more likely to participate, potentially inflating awareness estimates. Responses were based on self-report and therefore susceptible to social desirability bias, particularly for sensitive items related to sexual activity, urinary symptoms, and screening embarrassment. The cross-sectional design prevented causal inference, meaning differences between medical and non-medical students could not be attributed solely to education without considering confounding factors such as prior exposure to patient experiences, family influence, or differential social media use. In addition, the results would have benefited from reporting composite KAP scores with measures of central tendency and dispersion, as well as multivariable modeling to adjust for age, residence, and socioeconomic status, which could clarify whether academic discipline independently predicted knowledge and attitudes. The exclusive enrollment of male participants aligned with the study objective, yet it limited understanding of how female students—often influential in family health decisions—might shape awareness and stigma in the broader community. Future research could build on these findings by validating the questionnaire formally, expanding the sampling frame to additional provinces, and using mixed-methods designs that incorporate qualitative interviews to explore stigma, embarrassment, and barriers to screening discussions in greater depth. Longitudinal or interventional studies evaluating the impact of targeted educational sessions, peer-led campaigns, or curriculum-based teaching on KAP outcomes would be particularly valuable, especially if coupled with objective measures of knowledge retention and behavioral intentions (20). Overall, the study reinforced that early adult populations in Pakistan, including future healthcare professionals, required more structured and culturally appropriate education on prostate cancer to close the gap between general awareness and practical readiness for prevention and early detection behaviors.

CONCLUSION

This study concluded that awareness of prostate cancer among university students in Punjab remains insufficient, with notable gaps in knowledge, attitudes, and perceptions, particularly among non-medical students, despite a general willingness to acknowledge and address these deficiencies. Medical students demonstrated comparatively better understanding and more favorable attitudes, reflecting the influence of academic exposure, yet misconceptions, hesitation toward screening, and discomfort in discussing symptoms were evident across both groups. These findings underscore the importance of integrating structured, culturally sensitive educational initiatives within universities and clinical training environments to promote accurate understanding, reduce stigma, and encourage proactive health behavior. Strengthening institutional support through endorsed seminars, awareness campaigns, and targeted educational programs may play a pivotal role in fostering informed decision-making and improving future prostate cancer prevention and early detection efforts.

AUTHOR CONTRIBUTIONS

Author	Contribution
Umeed Ullah Ghaznawi*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Muhammad Imran	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Nimra Naseem	Substantial Contribution to acquisition and interpretation of Data

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	Has given Final Approval of the version to be published
Laiba Akhtar	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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