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Prostate Cancer Knowledge Among Male Postgraduate Students In The UK: Domain-Specific Knowledge Gaps And Socio-Demographic Differentials

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ABSTRACT:

Background: Prostate cancer knowledge is important for informed risk perception, recognition of possible symptoms and engagement with diagnostic services. However, relatively high educational attainment may not translate into

comprehensive disease-specific knowledge, and aggregate knowledge scores can conceal important gaps across individual knowledge domains.

Aim: To examine the pattern and socio-demographic distribution of prostate cancer knowledge among male postgraduate students at a UK university, with particular attention to domain-specific knowledge gaps.

Methods: A quantitative cross-sectional survey was conducted among male postgraduate students at the University of Sunderland, North East England. The minimum calculated sample size was 349, with recruitment increased to 400 to accommodate anticipated non-response. A total of 367 completed questionnaires were analysed. The questionnaire assessed general prostate cancer knowledge, symptoms and treatment, risk factors, and socio-demographic characteristics. Knowledge was examined at item and cumulative levels. Frequencies and percentages were calculated, and Pearson's Chi-square tests assessed associations between cumulative knowledge and age, marital status, academic faculty and ethnicity. Statistical significance was set at $p < .05$.

Results: Of the 367 participants, 58.0% were classified as having high cumulative prostate cancer knowledge and 42.0% as having low knowledge. Knowledge varied substantially across individual items. Difficulty urinating (75.2%), family history (73.6%), surgical treatment (73.1%), older age (72.5%) and bloody urine (72.2%) were among the more frequently recognised items. In contrast, only 32.4% recognised ethnicity as a prostate cancer risk factor. Academic faculty was significantly associated with cumulative knowledge, $\chi^2(4) = 44.396$, $p < .001$, with the proportion classified as having high knowledge ranging from 29.3% among Technology students to 76.2% among Health Sciences and Wellbeing students. Age approached but did not reach statistical significance, $\chi^2(4) = 8.812$, $p = .051$. No significant associations were observed for marital status ($p = .104$) or ethnicity ($p = .323$).

Conclusion: Prostate cancer knowledge among male postgraduate students was uneven despite a majority being classified as having high cumulative knowledge. The aggregate classification concealed important domain-specific gaps, particularly in recognition of ethnicity as a risk factor, while knowledge differed substantially across academic faculties. University-based prostate cancer education should therefore address specific knowledge deficits rather than assume that postgraduate educational attainment is accompanied by comprehensive disease-specific knowledge.

KEYWORDS: Prostate cancer; knowledge; awareness; risk factors; postgraduate students; health literacy; United Kingdom

INTRODUCTION

Prostate cancer remains a major public health concern, with its burden expected to increase considerably over the coming decades. Globally, approximately 1.47 million new cases were estimated in 2022, placing prostate cancer among the most frequently diagnosed cancers in men (Bray et al., 2024). Projections published by the *Lancet* Commission on prostate cancer suggest that annual cases could rise to approximately 2.9 million by 2040, driven principally by population ageing and growth (James et al., 2024). In the UK, prostate cancer is the most commonly diagnosed cancer in men, making informed public understanding of the disease an important component of cancer control.

The distribution of prostate cancer risk is not uniform. Age, family history and ancestry are among the established determinants of risk, while substantial

inequalities in incidence and outcomes persist between population groups (Benafif et al., 2018; Dess et al., 2019). Black men are particularly important in this respect because prostate cancer incidence is considerably higher in this population than among White and Asian men in the UK (Benafif et al., 2018). These differences give knowledge of personal risk practical significance. Knowing that prostate cancer exists is not equivalent to understanding who is at increased risk, what features of the disease warrant attention, or how diagnostic and treatment pathways operate.

This distinction is particularly important in prostate cancer because public messages concerning detection are more complex than a simple recommendation to undergo routine screening. The prostate-specific antigen (PSA) test can contribute to earlier investigation, but population-wide PSA screening involves recognised trade-offs, including false-positive results,

overdiagnosis and subsequent overtreatment (Martin et al., 2018). Although PSA is most commonly discussed in relation to prostate cancer detection, it is also widely used as a marker of prostate health in broader clinical and biochemical research (Dada et al., 2026). Informed decision-making therefore depends on more than general disease awareness. Men require sufficiently accurate knowledge to interpret risk, understand the limitations and potential benefits of testing, and engage meaningfully with healthcare professionals when decisions concerning prostate health arise.

Health literacy provides a useful conceptual basis for examining this problem. Health literacy concerns people's capacity to access, understand, appraise and use health information in ways that support health-related decisions (Sørensen et al., 2012). Disease-specific knowledge represents only one component of health literacy, but it is an important prerequisite for informed action. Crucially, educational attainment cannot be assumed to provide equivalent competence across health domains. A postgraduate student may possess advanced academic knowledge while remaining poorly informed about particular diseases, risk factors or healthcare decisions. Formal education and disease-specific health knowledge should therefore be treated as related but conceptually distinct.

This distinction also raises a measurement problem in studies of cancer knowledge. Reliance on a single cumulative score may conceal substantial differences between knowledge domains. A person who correctly identifies the prostate and recognises prostate cancer as a male disease may still misunderstand important risk factors. Similarly, familiarity with symptoms does not necessarily indicate an adequate understanding of treatment or susceptibility. A favourable aggregate knowledge classification can therefore coexist with potentially important item-specific or domain-specific deficits.

That issue is especially relevant to the population examined here. The participants were male postgraduate students drawn from different age groups, ethnic groups and academic faculties. The questionnaire assessed general knowledge of prostate cancer, knowledge of symptoms and treatment, and knowledge of risk factors before deriving a cumulative knowledge classification. The sample therefore permits knowledge to be examined not merely as a single prevalence

estimate, but as a multidimensional pattern. The source data also permit assessment of whether knowledge differs across socio-demographic characteristics.

The importance of examining these dimensions is already apparent in the empirical pattern underlying this paper. Although 58% of respondents were classified as having higher cumulative knowledge, leaving 42% in the lower-knowledge category, the source findings show that knowledge was not uniform across the individual domains. General knowledge was comparatively strong, while important deficits remained in risk-factor recognition. The source also reports statistically significant relationships between knowledge and socio-demographic characteristics. Treating the 58% figure as the principal finding would therefore obscure the more analytically important question of *what participants knew, what they did not know, and how those differences were socially patterned*.

Evidence specifically addressing prostate cancer knowledge among postgraduate university populations in the UK remains limited. University populations are analytically useful precisely because relatively high educational attainment reduces the plausibility of treating low knowledge simply as a consequence of limited formal education. Where substantial knowledge gaps persist within such a population, attention shifts towards the content and distribution of disease-specific information and differences in exposure associated with age, ethnicity and field of study.

This paper therefore examines the patterning of prostate cancer knowledge among male postgraduate students at a UK university. Three related questions are addressed: *how knowledge varies across general prostate cancer information, symptoms and treatment, and risk factors; whether cumulative knowledge masks important domain-specific deficits; and whether knowledge differs according to socio-demographic characteristics*. This analytical approach moves beyond estimating how many students possess adequate knowledge and instead considers the internal distribution of that knowledge and the characteristics associated with its variation.

2. Methods

2.1 Study design and setting

A quantitative cross-sectional survey was conducted

among male postgraduate students at the University of Sunderland in North East England. A cross-sectional design was appropriate because prostate cancer knowledge and socio-demographic characteristics were measured within the same study period, permitting both description of knowledge patterns and examination of associations between categorical variables. Reporting of the study was informed by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations for cross-sectional research (von Elm et al., 2007).

The study was conducted at the Sunderland campus of the University of Sunderland. The university serves a diverse postgraduate population across several academic disciplines. Restricting recruitment to male postgraduate students provided a defined population in which general prostate cancer knowledge, knowledge of symptoms and treatment, risk-factor knowledge, and socio-demographic differences in knowledge could be examined within the same analytical framework.

2.2 Study population and eligibility

The target population comprised male postgraduate students enrolled at the Sunderland campus. Participants were eligible if they were male, registered on a postgraduate programme, aged 18 years or older, and willing to provide informed consent. Undergraduate students, female students, students enrolled at the University's London campus, male postgraduate students younger than 18 years, and individuals who declined participation were excluded.

Participants were recruited using convenience sampling. This non-probability approach allowed eligible students who were accessible during the recruitment period and willing to participate to enter the study. Consequently, the achieved sample was not treated as a probability sample of all male postgraduate students at the University.

2.3 Sample size

The sample size was determined using the single-population proportion formula with finite population correction (Cochran, 1977). Assuming a 95% confidence level and a 5% margin of error, a minimum sample size of 349 participants was obtained. To accommodate anticipated non-response and incomplete

questionnaires, the recruitment target was increased to 400 participants. This adjustment was intended to preserve an adequate analytical sample despite potential losses during data collection (Charan& Biswas, 2013).

Following data collection and questionnaire completion checks, 367 completed questionnaires were available and included in the final analysis. The achieved analytical sample therefore exceeded the calculated minimum requirement of 349 participants.

2.4 Recruitment and data collection

Recruitment combined electronic and on-campus approaches. The survey link was circulated through social media platforms used by University of Sunderland students, including WhatsApp and Telegram groups. On-campus recruitment was supported through a QR code generated from Qualtrics, which directed prospective participants to the online survey. Individuals accessing the survey were first presented with participant information and consent materials before proceeding to the questionnaire.

Qualtrics was used to administer the self-completed online questionnaire. Online surveys can facilitate efficient data collection from geographically or organisationally dispersed populations, although transparent reporting of recruitment, self-selection and completion is important when interpreting web-based survey findings (Eysenbach, 2004). No names, addresses or other direct identifying information were requested.

2.5 Survey instrument and study variables

Data were collected using a pre-approved and tested questionnaire covering socio-demographic characteristics and prostate cancer knowledge. The questionnaire comprised four substantive sections. The first collected socio-demographic information, including age, marital status, ethnicity and academic faculty. The second assessed general knowledge of prostate cancer. The third examined knowledge of prostate cancer symptoms and treatment, while the fourth assessed knowledge of prostate cancer risk factors.

Age was recorded in five categories: <25 years, 26-35 years, 36-45 years, 46-55 years, and ≥56 years. Marital

status was classified as single, married, civil partnership, divorced or widowed. Academic faculty was categorised as Technology; Art and Creative Industries; Education and Society; Business, Law and Tourism; or Health Sciences and Wellbeing. Ethnicity was recorded as Black, Asian, White or other.

The analytical outcome was prostate cancer knowledge. Rather than relying exclusively on a single summary measure, knowledge was examined across general prostate cancer information, symptoms and treatment, and risk factors. This domain-based approach allowed the analysis to identify areas in which comparatively favourable general awareness coexisted with more specific knowledge deficits.

A cumulative knowledge variable was also constructed from responses across the three knowledge components. Responses were combined using the average value across general prostate cancer knowledge, symptoms and treatment, and risk-factor knowledge. The resulting measure was classified into *high knowledge* and *low knowledge*, with correct responses contributing to the high-knowledge category and incorrect or "I don't know" responses contributing to the low-knowledge category. No additional weighting of individual items was applied.

The questionnaire is described as pre-approved and tested, but no psychometric coefficients, validation sample, reliability statistic or detailed validation procedure were available for reporting. Such properties were therefore not retrospectively assigned to the instrument.

2.6 Statistical analysis

Data were analysed using IBM SPSS. Descriptive statistics were used initially to characterise the sample and examine the distribution of prostate cancer knowledge. Categorical variables were summarised using frequencies and percentages. Knowledge responses were examined at item and domain levels before the cumulative knowledge classification was considered. This analytical sequence was intended to distinguish the proportion classified as having high or low cumulative knowledge from the specific areas in which knowledge was comparatively strong, weak or uncertain.

Bivariate associations between socio-demographic characteristics and cumulative prostate cancer knowledge were examined using Pearson's Chi-square test. Age group, marital status, ethnicity and academic faculty were treated as categorical explanatory variables, while the high versus low knowledge classification constituted the categorical outcome. The Chi-square approach was used to determine whether the distribution of knowledge differed across the categories of each socio-demographic characteristic.

Statistical significance was evaluated at $p < .05$. Results were reported using frequencies, percentages, Chi-square statistics, degrees of freedom and p -values where available. Interpretation was based on the reported statistical estimates rather than on direction alone. Accordingly, associations with $p \geq .05$ were not treated as statistically significant.

No multivariable regression model was fitted. The analysis therefore identifies unadjusted associations and should not be interpreted as establishing independent socio-demographic predictors of prostate cancer knowledge. Similarly, the cross-sectional design permits assessment of statistical relationships but does not establish temporal ordering or causality.

2.7 Ethical considerations

Ethical approval was obtained from the University of Sunderland ethics committee before participant recruitment commenced. Prospective participants received information about the study before providing informed consent. Participation was voluntary.

Privacy and anonymity were protected by excluding names, contact details and other direct personal identifiers from the Qualtrics questionnaire. Study data were password-protected and stored securely. The approved data-management procedure specified secure retention for six months followed by permanent disposal.

An ethics approval/reference number is not reported here because no such identifier was available in the study records used for preparation of the article. Similarly, a specific calendar period for data collection has not been stated because the exact recruitment dates were not documented.

3. Results

A total of 367 completed questionnaires were included in the analysis, exceeding the calculated minimum sample requirement of 349. Participant characteristics

are presented in Table 1. The largest age group was 36-45 years (37.1%), followed by 26-35 years (35.1%); 55.3% were married. Health Sciences and Wellbeing contributed the largest faculty group (35.4%), and 76.3% of participants identified as Black.

Table 1: Socio-demographic characteristics of participants (N = 367)

Characteristic	Category	n	%
Age (years)	<25	28	7.6
	26-35	129	35.1
	36-45	136	37.1
	46-55	55	15.0
	>=56	19	5.2
Marital status	Single	101	27.5
	Married	203	55.3
	Civil partnership	26	7.1
	Divorced	29	7.9
	Widowed	8	2.2
Faculty	Technology	41	11.2
	Art and Creative Industries	58	15.8
	Education and Society	59	16.1
	Business, Law and Tourism	79	21.5
	Health Sciences and Wellbeing	130	35.4
Ethnicity	Black	280	76.3
	Asian	27	7.4
	White	49	13.4
	Other	11	3.0

Note: Percentages are based on N = 367. Percentages may not sum to 100.0 because of rounding.

General awareness and domain-specific responses are summarised in Table 2. Most participants had heard of prostate cancer (70.6%), and 70.3% selected the statement that prostate cancer affects men only.

Knowledge was less consistent for anatomical location: 50.4% rejected the statement that prostate cancer is always located in the bladder and 45.5% rejected the corresponding statement about the scrotum.

Table 2: Prostate cancer awareness, symptoms/treatment and risk-factor responses (N = 367)

Domain / item	Agree/Yes n	%	Disagree/No n	%	Uncertain n	%
General awareness						
Heard about prostate cancer	259	70.6	70	19.1	38	10.3
Prostate cancer affects men only	258	70.3	29	7.9	80	21.8
Prostate cancer affects both men and women	47	12.8	270	73.6	50	13.6

Prostate cancer is always located in the bladder	76	20.7	185	50.4	106	28.9
Prostate cancer is always located in the scrotum	85	23.2	167	45.5	115	31.3
Symptoms and treatment						
PC has no known cause	147	40.0	100	27.3	120	32.7
May not present signs/symptoms at early stages	240	65.4	46	12.5	81	22.1
Difficulty urinating may be a warning sign	276	75.2	77	21.0	14	3.8
Weakness/numbness in legs and feet may be a warning sign	183	49.9	123	33.5	61	16.6
Bloody urine may be a warning sign	265	72.2	21	5.7	81	22.1
Pain in waist and back may occur	234	63.8	35	9.5	98	26.7
PSA and DRE are screening methods	252	68.7	97	26.4	18	4.9
PC can be treated through surgery	268	73.1	19	5.1	80	21.8
Risk factors						
Lack of adequate exercise causes PC	131	35.7	96	26.2	140	38.1
Old age increases chances of PC	266	72.5	41	11.2	60	16.3
Excessive alcohol use is a risk factor	218	59.4	52	14.2	97	26.4
Family history predisposes individuals to PC	270	73.6	38	10.3	59	16.1
STDs are risk factors of PC	132	36.0	91	24.8	144	39.2
Excessive smoking predisposes individuals to PC	38	10.3	255	69.5	74	20.2
Obesity predisposes individuals to PC	228	62.1	55	15.0	84	22.9
Ethnicity is a risk factor of PC	119	32.4	176	48.0	72	19.6

Note: Response labels were Yes/No/I don't know for general awareness items and Agree/Disagree/Uncertain for symptom/treatment and risk-factor items. PC = prostate cancer; PSA = prostate-specific antigen; DRE = digital rectal

examination.

Within the symptoms and treatment domain, agreement was highest for difficulty urinating as a warning sign (75.2%), surgical treatment (73.1%) and bloody urine as a warning sign (72.2%). Agreement was lower for weakness or numbness in the legs and feet (49.9%) and for the statement that prostate cancer has no known cause (40.0%). PSA and DRE were identified as screening methods by 68.7% of participants.

Risk-factor responses showed greater dispersion. As illustrated in Figure 1, agreement was highest for family history (73.6%) and old age (72.5%), followed by obesity (62.1%) and excessive alcohol use (59.4%). Agreement was substantially lower for sexually transmitted diseases (36.0%), inadequate exercise (35.7%), ethnicity (32.4%) and excessive smoking (10.3%).

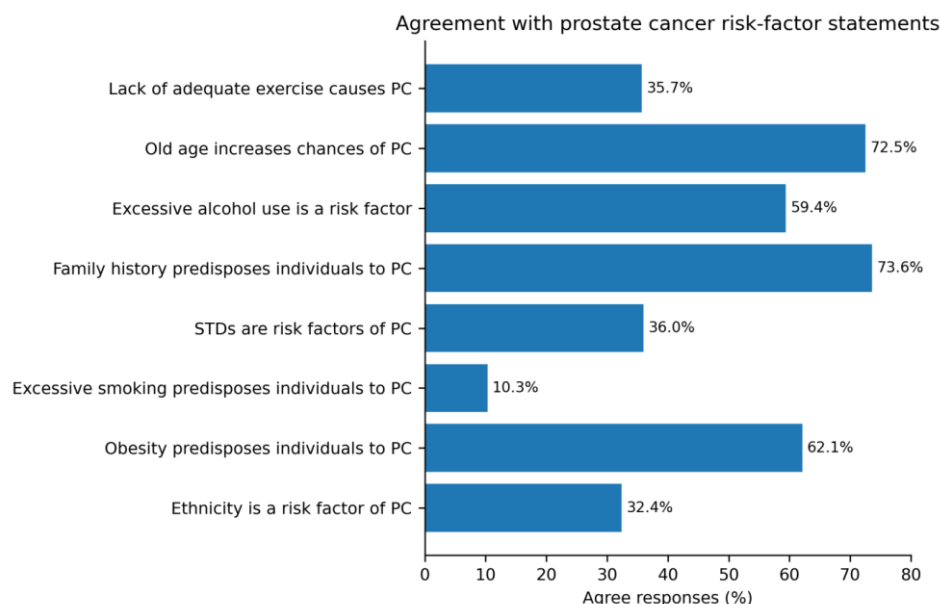


Figure 1: Agreement with prostate cancer risk-factor statements (N = 367). Values represent the percentage selecting Agree. The cumulative knowledge classification is shown in **Figure 2**. High knowledge was recorded for 212 participants (58.0%), while 155 (42.0%) were classified as having low knowledge.

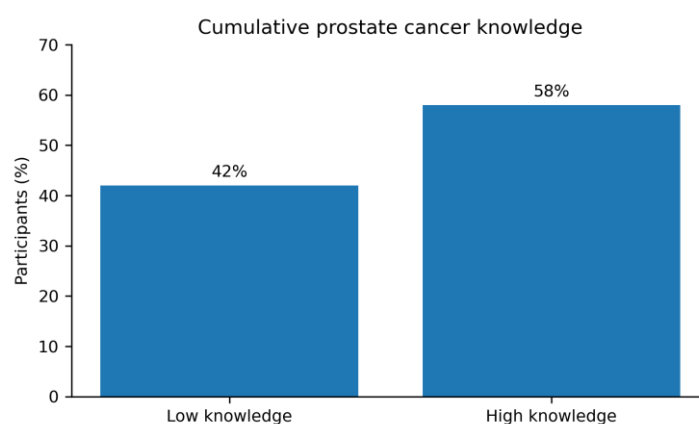


Figure 2: Cumulative prostate cancer knowledge classification (N = 367).

Associations between socio-demographic characteristics and cumulative knowledge are presented in Table 3. Faculty was associated with knowledge, $\chi^2(4) = 44.396$, $p < .001$. Age approached, but did not reach, the

prespecified .05 threshold, $\chi^2(4) = 8.812$, $p = .051$. Marital status, $\chi^2(4) = 7.674$, $p = .104$, and ethnicity, $\chi^2(3) = 3.481$, $p = .323$, were not statistically significant.

Table 3: Association between socio-demographic characteristics and cumulative prostate cancer knowledge (N =

Characteristic	Category	Low n	%	High n	%	χ^2 (df)	p
Age	<25	25	16.1	3	1.4	8.812 (4)	.051
	26-35	58	37.4	71	33.5		
	36-45	54	34.9	82	38.7		
	46-55	11	7.1	44	20.7		
	>=56	7	4.5	12	5.7		
Marital status	Single	40	25.8	61	28.8	7.674 (4)	.104
	Married	86	55.5	117	55.2		
	Civil partnership	11	7.1	15	7.1		
	Divorced	16	10.3	13	6.1		
	Widowed	2	1.3	6	2.8		
Faculty	Technology	29	18.7	12	5.7	44.396 (4)	<.001
	Art and Creative Industries	34	21.9	24	11.3		
	Education and Society	22	14.2	37	17.4		
	Business, Law and Tourism	39	25.2	40	18.9		
	Health Sciences and Wellbeing	31	20.0	99	46.7		
Ethnicity	Black	114	73.5	166	78.3	3.481 (3)	.323
	Asian	11	7.1	16	7.6		
	White	22	14.2	27	12.7		
	Other	8	5.2	3	1.4		

Note. Column percentages are reported within the low-knowledge (n = 155) and high-knowledge (n = 212) groups, matching the analysed cross-tabulation. Pearson's chi-square test was used. Statistical significance was set at $p < .05$.

The faculty-specific distribution is displayed in Figure 3. The proportion classified as high knowledge ranged from 29.3% in Technology and 41.4% in Art and Creative Industries to 62.7% in Education and Society and 76.2%

in Health Sciences and Wellbeing; Business, Law and Tourism was 50.6%. These percentages were calculated directly from the faculty cross-tabulation reported in Table 3.

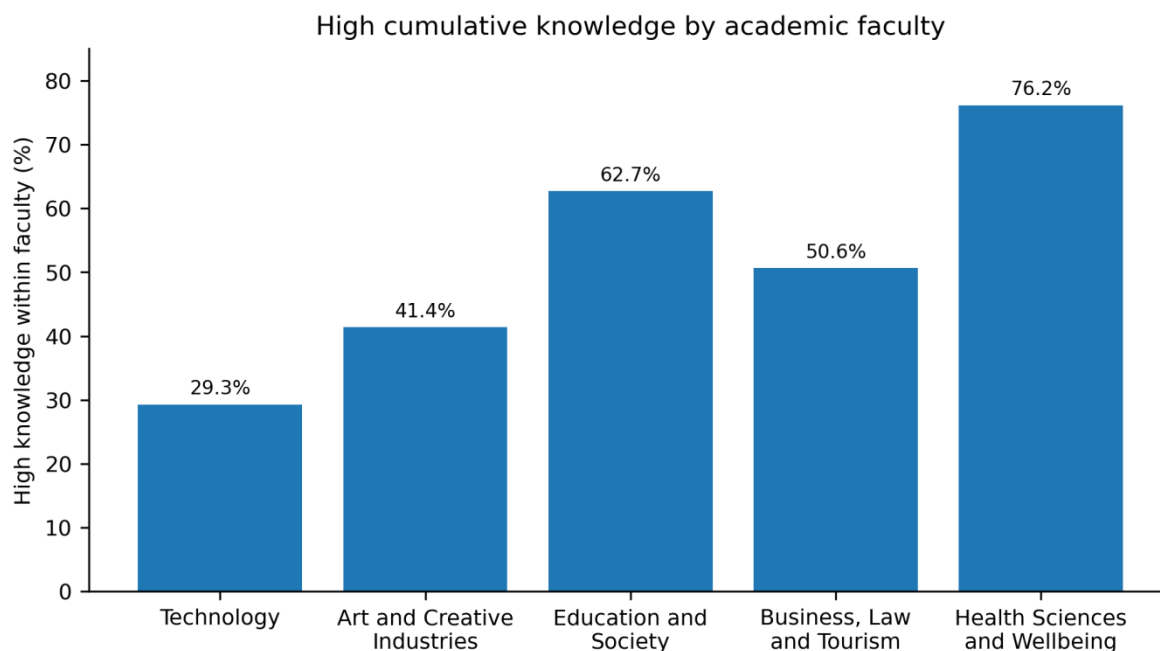


Figure 3: Proportion classified as high cumulative prostate cancer knowledge within each academic faculty (N = 367). Percentages use the total number of participants in each faculty as the denominator.

4. Discussion

This study examined prostate cancer knowledge among male postgraduate students by considering both cumulative knowledge and the distribution of knowledge across specific domains. Although 58.0% of participants were classified as having high cumulative knowledge, the item-level findings revealed a less uniform pattern. Knowledge was comparatively strong for several symptoms and treatment-related items, but substantial gaps were evident in recognition of some risk factors. Academic faculty was significantly associated with cumulative knowledge, whereas age, marital status and ethnicity were not statistically significant at the 5% level. These findings indicate that a binary knowledge classification alone provides an incomplete account of prostate cancer understanding within an educated male population.

4.1 Cumulative knowledge and the importance of domain-specific assessment

The finding that 58.0% of participants had high cumulative knowledge suggests that prostate cancer was not an unfamiliar health issue within the sample. This level is broadly consistent with evidence that awareness can be moderate even where important deficiencies remain. Rao et al. (2023), in a systematic review and meta-analysis, reported a pooled prostate

cancer knowledge estimate of 65%, although considerable heterogeneity was observed across the included studies. The wide variation identified in that review cautions against treating a single knowledge percentage as directly comparable across populations, particularly where questionnaires, scoring criteria and demographic composition differ.

A more important finding was the disparity between cumulative knowledge and responses to individual questions. More than two-thirds of participants recognised several prostate cancer symptoms and treatment-related statements, including difficulty urinating, bloody urine, PSA and digital rectal examination, and surgical treatment. At the same time, substantial proportions were uncertain or incorrect about other aspects of prostate cancer. This distinction supports an analytical separation between general awareness and actionable disease-specific knowledge. Knowledge sufficient to recognise the term prostate cancer does not necessarily indicate an accurate understanding of susceptibility, presentation or diagnostic pathways.

Comparable heterogeneity has been reported in the broader evidence base. Coughlin et al. (2021) found that knowledge among African American men varied substantially across prostate cancer risk, early detection and screening concepts, with important deficiencies

persisting even where some disease awareness was present. More recent evidence from the UK similarly suggests that prostate cancer information is acquired and interpreted through social and cultural contexts rather than simply through exposure to factual information. Fry et al. (2022) found differences in socially acquired knowledge of prostate cancer risk between cultural groups, indicating that awareness may be shaped by family experience, community conversations and culturally embedded understandings of susceptibility.

The present findings therefore add an important dimension to the interpretation of knowledge in highly educated populations. Postgraduate educational status did not correspond to uniformly accurate prostate cancer knowledge. Academic attainment should not be treated as interchangeable with disease-specific health literacy. The findings are particularly relevant because they demonstrate that knowledge deficits can persist within a population with substantial formal educational exposure.

4.2 Knowledge of symptoms and treatment

Recognition of several possible manifestations of prostate cancer was comparatively high. Difficulty urinating was recognised by 75.2% of participants, bloody urine by 72.2%, and pain in the waist and back by 63.8%. In addition, 65.4% recognised that prostate cancer may not produce signs or symptoms during its early stages. These responses indicate stronger knowledge in this domain than was observed for several risk-factor items.

Symptom knowledge nevertheless requires careful interpretation. Prostate cancer can remain asymptomatic during its earlier stages, while urinary symptoms are common and may arise from conditions other than malignancy. Consequently, awareness campaigns that rely heavily on symptom recognition can inadvertently encourage the perception that absence of symptoms implies absence of risk. Recent UK qualitative evidence is informative in this respect. Shaw et al. (2023) found that men presenting with possible prostate cancer symptoms sometimes interpreted those symptoms as unimportant, contributing to delays in help-seeking. Poor prostate cancer awareness was particularly relevant among some Black participants. The relationship between factual symptom knowledge and

actual help-seeking is therefore not automatic.

Knowledge relating to diagnostic investigation was also reasonably high, with 68.7% identifying PSA testing and digital rectal examination as methods used in prostate cancer assessment. This is relevant because prostate cancer detection involves decisions that require more than awareness that a test exists. Mumuni et al. (2023), in a scoping review of 67 studies, identified variable knowledge and uptake of prostate cancer screening and diagnostic approaches, with communication, cultural, socioeconomic and health-literacy factors affecting engagement. The present questionnaire measured knowledge rather than testing behaviour or informed decision-making, so the findings cannot establish whether participants would seek testing or make informed decisions about PSA assessment. They do, however, show that approximately one-third did not affirmatively recognise PSA and digital rectal examination within the relevant item.

4.3 Risk-factor knowledge as the principal area of inconsistency

The clearest knowledge disparities occurred in the risk-factor domain. Family history and older age were recognised by 73.6% and 72.5% of participants, respectively. Recognition of ethnicity was substantially lower at 32.4%. This pattern is important because age, family history and race or ethnicity are among the better-established determinants of prostate cancer risk (Bergengren et al., 2023). Recognition of some established susceptibility factors alongside limited recognition of ethnicity demonstrates that risk knowledge was selective rather than uniformly low.

The finding concerning ethnicity is especially relevant given the demographic composition of the sample, in which 76.3% of participants identified as Black. It should not be inferred from the questionnaire that individual Black participants were unaware of their own risk, because the analysis did not cross-tabulate the individual ethnicity-risk item with respondents' ethnic group. Nevertheless, low recognition of ethnicity as a risk factor at sample level warrants attention. UK qualitative research has shown that knowledge of increased prostate cancer risk among Black men is socially patterned and not consistently internalised. Fry et al. (2022) demonstrated cultural differences in socially acquired risk knowledge, while Alexis et al. (2024)

found that targeted community engagement could improve prostate cancer awareness among Black communities in southern England. More recently, community-based prostate cancer awareness initiatives conducted among Black communities in southern England demonstrated that awareness campaigns could increase knowledge of prostate cancer risk factors, encourage lifestyle changes and empower participants to share prostate cancer information within their communities (Alexis et al., 2024). The geographical relevance of the latter study strengthens the case for locally responsive prostate cancer communication.

The risk-factor findings also require distinction between established and less certain associations. Participants showed variable agreement with statements concerning obesity, alcohol, exercise, sexually transmitted diseases and smoking. These items should not all be interpreted as equivalent indicators of correct knowledge because the strength and consistency of epidemiological evidence differ between potential lifestyle exposures. Bergengren et al. (2023) distinguished well-established risk determinants from associations for which evidence remains less definitive. Similarly, Leitão et al. (2025), in a systematic review of qualitative studies, found that public understanding of prostate cancer lifestyle risk factors was inconsistent and that uncertainty in the scientific evidence itself could complicate public perceptions. It would therefore be inappropriate to describe disagreement with every lifestyle-related questionnaire statement as a knowledge deficit.

This qualification is analytically important. The most defensible knowledge gaps are those involving established determinants, particularly ethnicity, rather than every item labelled as a risk factor in the questionnaire. Future prostate cancer knowledge instruments would benefit from distinguishing established non-modifiable risk factors from lifestyle exposures for which causal evidence remains uncertain.

4.4 Socio-demographic patterning of knowledge

Academic faculty was the only socio-demographic characteristic significantly associated with cumulative prostate cancer knowledge, $\chi^2(4) = 44.396$, $p < .001$. The proportion classified as having high knowledge varied substantially between faculties, from 29.3% among Technology students to 76.2% among Health Sciences and Wellbeing students. Education and Society also had

a comparatively high proportion at 62.7%, whereas Art and Creative Industries recorded 41.4% and Business, Law and Tourism 50.6%.

These findings suggest that educational context may be more relevant than educational level alone. All participants were postgraduate students, meaning that broad differences in level of formal education were comparatively restricted. The observed faculty variation is therefore consistent with differences in disciplinary exposure to health-related information. However, the cross-sectional data do not identify the mechanism underlying the association. It cannot be assumed that faculty membership caused higher prostate cancer knowledge, nor was previous healthcare training, professional background, exposure to cancer education or personal experience measured sufficiently to explain the difference.

Age approached but did not reach the conventional threshold for statistical significance, $\chi^2(4) = 8.812$, $p = .051$. This result should therefore be interpreted as non-significant rather than as evidence of an age effect. Marital status ($p = .104$) and ethnicity ($p = .323$) were also not significantly associated with cumulative knowledge. The absence of a significant ethnicity association is noteworthy but should not be interpreted as evidence that ethnicity has no relationship with prostate cancer knowledge more generally. The sample was predominantly Black, resulting in substantially smaller Asian, White and other ethnic groups, and the analysis was unadjusted.

The wider literature demonstrates that prostate cancer knowledge is embedded within multiple social and informational influences. Coughlin et al. (2021) identified age, education, income, marital status and healthcare access among factors associated with prostate cancer knowledge across studies involving African American men. UK evidence further indicates that cultural context, trust, social networks and the accessibility of relevant information shape how prostate cancer risk is understood (Fry et al., 2022; Shaw et al., 2023). More recent work has highlighted the importance of culturally recognisable communication and community engagement in addressing prostate cancer inequalities (Alexis et al., 2024; Christie-de Jong et al., 2025). The present findings add academic discipline as a potentially relevant dimension within a postgraduate population, although confirmation through

multivariable analysis and more representative sampling is required.

4.5 Implications for health promotion

The findings support a move away from generic awareness messaging towards more focused prostate cancer education. The principal educational need identified here was not complete unfamiliarity with prostate cancer. Rather, knowledge was uneven, with stronger recognition of several symptoms and treatment-related concepts than of particular established risk factors.

Risk communication should therefore clearly distinguish susceptibility from symptom recognition. Messages directed at university populations could emphasise established determinants such as increasing age, family history and Black ethnicity while avoiding overstatement of lifestyle associations that remain uncertain. This distinction is supported by contemporary reviews showing that inaccurate or poorly differentiated risk information can complicate public understanding of prostate cancer (Bergengren et al., 2023; Leitão et al., 2025).

The faculty differences also provide a practical basis for considering where educational interventions may be concentrated. Health-related students demonstrated higher knowledge, while substantially lower proportions were observed in some non-health faculties. This does not justify assuming that all health students are adequately informed or that non-health students are uniformly poorly informed. It does, however, indicate that university-wide health promotion should not presume that postgraduate educational attainment provides sufficient prostate cancer knowledge.

The demographic composition of the sample adds further relevance to culturally appropriate communication. Alexis et al. (2024) demonstrated the feasibility of community-based prostate cancer awareness initiatives among Black communities in England, while Christie-de Jong et al. (2025) found that communication designed in language and formats with which Black men can identify may facilitate engagement with early diagnosis. Digital information also requires attention to representation and trust. Loeb et al. (2024) found that Black patients with prostate cancer considered racial representation, reputable information

sources and professional presentation important when assessing the trustworthiness of online prostate cancer information. University-based interventions could therefore combine credible digital resources with culturally appropriate messaging rather than relying solely on general cancer-awareness materials.

4.6 Strengths and limitations

Several features strengthen the analysis. Knowledge was examined at both cumulative and item levels, allowing specific areas of uncertainty to be identified rather than reducing the findings to a single summary classification. The sample also included postgraduate students from five academic faculties and several age groups, permitting examination of socio-demographic variation within a population sharing a broadly similar level of higher education.

The findings should nevertheless be interpreted within important limitations. Convenience sampling limits representativeness and introduces the possibility of self-selection, particularly because students with greater interest in men's health or cancer may have been more inclined to participate. The sample was drawn from one university, restricting generalisation to postgraduate populations elsewhere in the UK. Ethnic representation was uneven, with Black participants comprising 76.3% of the sample, which reduced the comparative size of the other ethnic categories.

The questionnaire assessed reported knowledge rather than health behaviour. No conclusions can therefore be drawn about PSA uptake, healthcare attendance, intentions to seek help, or actual screening decisions. The cumulative knowledge measure also reduced heterogeneous questionnaire responses to high and low categories, potentially concealing variation between knowledge domains. No multivariable model was undertaken, meaning that the observed faculty association was unadjusted for potential confounding. Finally, several questionnaire items described lifestyle exposures as prostate cancer risk factors even where contemporary epidemiological evidence is not equally established. Interpretation of individual risk-factor responses should consequently distinguish recognised determinants from less certain associations.

5. Conclusion

Prostate cancer knowledge among male postgraduate students was characterised by a combination of relatively favourable cumulative knowledge and substantial item-specific variation. While 58.0% were classified as having high knowledge, this summary measure concealed important differences between knowledge domains. Recognition of several symptoms, treatment-related concepts, older age and family history was comparatively high, whereas ethnicity was much less frequently recognised as a prostate cancer risk factor.

Knowledge also varied significantly by academic faculty, with the highest proportion of high knowledge observed among Health Sciences and Wellbeing students and the lowest among Technology students. Age, marital status and ethnicity were not significantly associated with cumulative knowledge at the 5% level. These findings indicate that postgraduate educational attainment alone should not be assumed to confer comprehensive prostate cancer knowledge.

Health-promotion initiatives within university populations should therefore prioritise specific knowledge deficits rather than simply raising general disease awareness. Clear communication of established risk factors, particularly ethnicity, age and family history, should be accompanied by accurate information about asymptomatic disease, possible symptoms and routes to diagnostic assessment. Targeted and culturally appropriate approaches may be particularly valuable where student populations include substantial numbers of men from groups experiencing a higher prostate cancer burden.

Author Contribution

All authors played a substantive role in shaping this study and developing the manuscript. S.O. conceptualised the study and designed the overall research framework. Data analysis, interpretation and validation of findings were carried out collaboratively, with each author contributing to the discussions that informed the final results. F.N.I. and K.O.O. prepared the initial manuscript draft, covering the introduction, methods, results and discussion. Co-authors strengthened the analysis, offered detailed revisions and enhanced the clarity and coherence of the final document. Every author reviewed the complete manuscript, approved the final version and accepted

responsibility for the integrity of the work.

Conflict of Interest

The authors declare no conflict of interest.

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