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Socio-Demographic Characteristics in Relation to the Knowledge of Prostate Cancer Risk Factors and Preventive Measures among Male Civil Servants in Enugu State Nigeria

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Abstract

Prostate cancer is a major health problem affecting middle-aged and elderly men across the globe. Despite the efforts made in prostate cancer awareness and prevention, the disease metastasis is still unresolved. This study assessed socio-demographic characteristics in relation to the knowledge of prostate cancer risk factors and preventive measures among male civil servants in Enugu State Nigeria. A cross-sectional study was conducted between September and October, 2025 at various government establishments in Enugu State. A total number of 600 male civil servants participated. Data collection was done using self-structured Knowledge of Risk Factors and Preventive Measures for Prostate Cancer Scale. Descriptive statistics of frequency, percentage, and multivariate logistic regression were used for analyses. The findings reveal that overall, male civil servants in the study had good knowledge (50.0%) of risk factors and poor knowledge (57.5%) of preventive measures for prostate cancer in Enugu State South-East Nigeria. Level of education, place of residence, marital status, age, and annual income (p<.05) were statistically significantly associated with prostate cancer risk factors and preventive measures knowledge of male civil servants. This research proves that good risk factors and preventive measures knowledge of prostate cancer can help to reduce the incidence of the disease and the associated socio-demographic factors. However, Ministry of Health at national and State levels, health programme planners, health educators, and professionals should promote information dissemination on the risk factors and preventive measures of prostate cancer that would enhance further awareness and knowledge of prostate cancer among male civil servants.

Keywords: Prostate cancer, Risk factors, Preventive measures, knowledge, Civil servants

Introduction

Prostate cancer is a major health problem affecting middle-aged and elderly men in developed and developing countries. The disease is now the second most common type of cancer diagnosed in men, next to lung cancer, and the fifth leading cause of cancer-related deaths in men worldwide (Banerjee & Kaviani, 2016). Prostate cancer (PC) can kill if it is not detected early and treated.

Prostate cancer is a serious health problem for men and is rarely diagnosed before the age of 40 years, but the incidence and mortality from the disease increase exponentially thereafter.

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According to Okongo et al. (2019), PC is an important health burden among men across the globe, and the highest incidence rates are found in sub-Saharan Africa. It is also known to be the most commonly diagnosed cancer in over 50% of countries in the world, and its incidence varies substantially between countries with a high Human Development Index (HDI) and those with a low HDI, 37.5 vs 11.3 per 100,000 people, respectively (Giona, 2021). The authors further disclosed that prostate cancer is a heterogeneous disease with incidence rates that vary substantially across the world from 6.3 - 83.4 per 100,000 people. In addition, it is shown that the regions with the highest figures are Northern and Western Europe, the Caribbean, Australia/ New Zealand, North America and Southern Africa (Giona, 2021). Naji, et al. (2024) revealed that prostate cancer remains one of the most prevalent malignancies among men, affecting over 1.1 million individuals globally each year.

In Nigeria, prostate cancer appears to be on the increase. Evidence from the literature has shown that prostate cancer is one of the emerging epidemics in Nigeria as in other countries of the world. The report showed that the total death from all cancers or neoplasm in Nigeria was 78,700, and prostate cancer recorded 13,700 deaths (17.41%) while breast cancer recorded 10,600 deaths (13.147%), putting Nigeria in the eleventh position globally (Kolade, 2017). Also, in Nigeria, data on prostate cancer prevalence remain inconsistent due to lilited screening and reporting systems (Dozie et al., 2025). The implication of this observation is that prostate cancer appears to be more prevalent than breast cancer, and should be given some prominence than it is receiving now for the peaceful and harmonious existence of human well-being within Africa.

In Nigeria, men, especially those aged 40 years or above, appear to be at high risk of developing prostate cancer. Men constitute the bulk of employment at federal, State, and local government establishments. Due to the nature of PC disease in men, several agencies and organizations including World Health Organization (WHO) have organized seminars and awareness campaigns on prostate cancer in a bid to mitigate its spread and possibly prevent its occurrence.

Prostate cancer is the most commonly diagnosed cancer among men in Enugu State, as an estimated hospital prevalence of 192 per 100,000 was reported in Enugu State in 2007 (Aghaji, 2016). A published data on prostate cancer detected by screening in a semi- urban community in Southeast Nigeria showed that prostate cancer prevalence is high in Nsukka Local Government Area, Enugu State (Ugwumba et al., 2017). However, an individual therefore requires adequate knowledge to engage in healthy preventive measures that can reduce the risk of developing prostate cancer.

Facts from different literature have shown that the knowledge of prostate cancer can help to reduce the incidence of the disease. Early screening and detection of prostate cancer is one of the best ways of reducing related deaths of prostate cancer. A lot of Nigerians seem to have poor knowledge and wrong views of the PC, but recently, perhaps through discussions in seminars, conferences, workshops, and both print and electronic media, raising awareness of lifestyle modification, and recognizing the risk factors, improved awareness is being created and knowledge is enhanced on risk factors and preventive measures for prostate cancer.

Prostate cancer is a form of cancer that develops in the prostate; a gland in the male reproductive system. The prostate is a sex gland found in men, which is small, about the size of a walnut, and surrounds the neck of the bladder and urethra. According to National Cancer Institute (2016), prostate cancer is a cancer that occurs in the prostate - a small walnut-shaped gland in men that produces the seminal fluid that nourishes and transports sperm. Prostate

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cancer is considered a condition in which cells accumulate uncontrollably, and the ability to regulate cell growth or death is lost, so instead of dying as they should, its cells live longer than normal cells, and form masses of abnormal cells known as tumours (Kolade, 2017). Prostate cancer occurs in men aged 60 years and above, and rarely before the age of 50 years (Adibe et al., 2017). In a study conducted by Sung et al. (2021), prostate cancer is known to be the most frequently diagnosed cancer in 112 countries, and the leading cause of cancer death in 48 countries. Hence, men need to have knowledge of the risk factors and preventive measures for prostate cancer to be able to guard against the disease.

Inadequate knowledge about prostate cancer has widely been identified. Studies (Obiesie et al., 2022; Rekha et al., 2017) indicated that awareness and specific knowledge related to prostate cancer was high. In addition, Kolade (2017) and Ariyo et al. (2024) disclosed that men had moderate knowledge of prostate cancer, and, inadequate knowledge of signs, symptoms, and risk factors for prostate cancer. However, evidence from other studies reveals aging, family history, and race as some of the non-modifiable risk factors of PC, while physical inactivity, smoking, alcohol consumption, and overweight are the modifiable risk factors of prostate cancer among men (Pernar et al., 2018; Ariyo et al., 2024).

The death rate as a result of prostate cancer appears to be very high and occurs mostly among men that are 50 years and above in Nigeria. The current statistical data of mortality resulting from PC is on the increase. Notwithstanding the increased prevalence of PC in Nigeria, many men, more especially civil servants in Enugu State, Nigeria, who are highly at risk seem not to have good knowledge of the disease risk factors and preventive measures. The promising prevention practices of PC include lifestyle modifications, dietary interventions, and the use of chemopreventive agents (Obeagu, 2025). Some of these include maintaining a healthy weight, engaging in regular physical activity, adopting a plant-based diet, among others.

Limited research has been conducted on the knowledge of risk factors and preventive measures for prostate cancer. This study addresses this gap in the literature. In view of these facts, the study investigated the knowledge of risk factors and preventive measures for prostate cancer among male civil servants. Specifically, the study determined the level of knowledge of risk factors and preventive measures for prostate cancer possessed by male civil servants; and hypothesized that there is no statistically significant association between socio-demographic factors (education level, place of residence, marital status, age and annual income) and prostate cancer risk factors and preventive measures knowledge in a sample of male civil servants. The study findings would help to inform a more effective response from health education programme planners and policy makers in designing policies that emphasize the prevention of prostate cancer and reduce the incident of the disease among male civil servants. Moreover, the findings would inspire the government, health institutions and health professionals in planning health care interventions on prostate cancer risk factors.

Materials and Methods

Study design and setting
A cross-sectional study was conducted between September and October, 2025 at various government establishments in Enugu State South-East Nigeria. Enugu State has three Senatorial Districts otherwise referred to as Geopolitical Zones (Enugu North Senatorial District, Enugu East Senatorial District, and Enugu West Senatorial District); and the Senatorial Districts are made up of Local Government Areas (LGAs). In the various LGAs, there are autonomous communities and villages. The area was chosen for the study due to its

numerous federal, State, and local government institutions and agencies which account for the large number of civil servants in the area.

Participants

The study participants consisted of single, married, and divorced/separated/widowed male civil servants in the study area. Only male civil servants who are in good health and had no terminal health challenges were included in the study population. Male workers in non-governmental (private) establishments were excluded from the study.

Sampling procedures

A sample size of 600 male civil servants was used for the study. The sample size was determined using Cohen et al. (2018) Standardized Table for Sample Size, Confidence Levels and Confidence Intervals for Random Samples. Convenience sampling method was adopted in selecting 600 participants for the study; hence, 200 male civil servants were drawn from each of the three Senatorial Districts that make up Enugu State. Convenience in the sense that only male civil servants in various government establishments across the three Senatorial Districts in the State, who had time and expressed their consent in responding to our questionnaires, were used.

Measures

Data collection was done using a validated self-structured Knowledge of Risk Factors and Preventive Measures for Prostate Cancer Scale. The Test Scale consists of three parts: Part I consists of five socio-demographic variables (place of residence, age, education level, marital status, and annual income). Place of residence was dichotomized into urban and rural. Age was measured as a continuous variable (18-30years, 31-43years, and 44+years). Education level was categorized into three groups (primary education, secondary education, and tertiary education). Marital status was grouped into three categories (single, married, and divorced/separated/widowed). Annual income was categorized into three groups (<#360,000, #360,000-#959,000, and #960,000+). Part II consists of 13 questions with dichotomous response options covering knowledge of risk factors for prostate cancer, while Part III consists of 8 (eight) questions with dichotomous response options covering knowledge of preventive measures for prostate cancer.

Questions assessing knowledge of risk factors and preventive measures of prostate cancer were prepared by the researchers according to a literature review and had dichotomous response options (yes and no): thus for risk factors knowledge; do you know that: The risk of getting prostate cancer is higher in a man who has a family history of it?; drinking alcohol increases a man's risk of prostate cancer?, The risk of getting prostate cancer is higher in a man who is black/African American, rather than white?, Men who have someone in their family blood relative diagnosed with prostate cancer are more likely to get prostate cancer?, Prostate cancer is an infection that can be transmitted sexually?, Age over 50 years can lead to prostate cancer?, High intake of dairy products and fatty foods contribute to the development of prostate cancer?, Obesity contributes to the development of prostate cancer?, Sedentary lifestyle and lack of exercise contribute to the development of prostate cancer?, Exposure to certain chemicals, such as: cadmium, dimethylformamide and acrylonitrite contributes to the development of prostate cancer?, Sexually transmitted infections contribute to the development of prostate cancer?, Men who have vasectomy (a permanent male contraception or sterilization) are more likely to get prostate cancer?, and Cigarette smoking does not contribute to the development of prostate cancer?.

For preventive measures knowledge; Do you know that: Prostate cancer is preventable?, Going for regular prostate check-up at the age of 40 or 45 years helps in the prevention of

prostate cancer?, Prostate cancer can be prevented by exposing self to prostate cancer inflammation examination and blood test?, Prostate cancer can be prevented by sensitizing people about diseases of the prostate gland?, Prostate cancer can be prevented by educating people on what to do to prevent the disease or detect it early?, Prostate cancer can be prevented by eating low-fat diet such as vegetables and fruit, rice, beans etc?, Regular exercise reduces the risk of prostate cancer?, and Prostate cancer can be prevented by sensitizing men on the risk factors?.

Content validity of the questionnaire was evaluated by a professional board of seven specialists in medical and health sciences, and as well was tested for internal consistency.

Data collection procedure

This research was developed in accordance with the Ethical Principles of the World Medical Association Declaration of Helsinki for medical research involving human subjects (World Medical Association (2013), and the research was approved by the Research Ethics Committee of the Faculty of Education, University of Nigeria, Nsukka (UNN/FE/REC25/083).

After obtaining the various government establishments' permission for data collection, male civil servants who gave consent for participation were knowledge tested on prostate cancer risk factors and preventive measures by the researchers as soon as possible before leaving the selected public establishments. The researchers explained the objectives of research to the participants and they were reassured that their responses are confidential and no personal identifiers will be disclosed. The knowledge test was administered with the aid of well-trained interviewers. A total number of 600 questionnaires were filled out in the process. The 600 copies were all returned, duly filled out, and used for analyses.

Data analysis

The IBM Statistical Package for Social Sciences (SPSS) version 25.0 was used for all statistical analyses. The standard descriptive statistics were applied to describe the data patterns. Frequency counts and percentages were generated to compute the knowledge of risk factors and preventive measures of prostate cancer.

Knowledge of risk factors for prostate cancer has 13 questions, in which answering no question correctly implies no knowledge; answering 1-6 questions correctly implies poor knowledge, and answering 7-13 questions correctly implies good knowledge. Knowledge of preventive measures for prostate cancer has 8 (eight) questions in which answering no question correctly implies no knowledge; answering 1-4 questions correctly implies poor knowledge, and answering 5-8 questions correctly implies good knowledge.

In the multivariate logistic regression, prostate cancer risk factors and preventive measures' Knowledge were used as response variables. Socio-demographic and economic variables or covariates (education level, place of residence, marital status, age, and annual income) were considered as predictors. The internal consistency of the questionnaire was determined using a split half (Spearman's Brown Coefficient) with an index of .761. All tests were 2-tailed, and probability values less than or equal to 0.05 ($p \leq 0.05$) were considered significant.

Results

Table 1: **Frequency Table of Demographic Characteristics of Male Civil Servants (*n*=600)**

Variable	Frequency	Per cent
Place of Residence		
Urban	265	44.2
Rural	335	55.8
Total	600	100.0
Age		
18-30years	69	11.5
31-43years	264	44.0
44 + years	267	44.5
Total	600	100.0
Education Level		
Primary Education	63	10.5
Secondary Education	235	39.2
Tertiary Education	302	50.3
Total	600	100.0
Marital Status		
Single	110	18.3
Married	467	77.8
Divorced/separated/widowed	23	3.8
Total	600	100.0
Annual Income		
< #360,000	92	15.3
#360,000-#959,000	248	41.3
#960,000+	260	43.3
Total	600	100.0

The demographic characteristics of the participants in this study are presented in Table 1. The final sample was 600 male civil servants drawn as respondents. The mean age was 41 years (SD = .493). Most respondents 335 (55.8%) reside in a rural settings. Most respondents 531 (88.5%) were aged between 31 years and above. The vast majority of the respondents had attained at least secondary education 537 (89.5%). Most respondents 508 (84.6%) receive more than #360,000 income annually. The vast majority of the respondents 467 (77.8%) were married.

Table 2: **Knowledge of Male Civil Servants, Overall Prostate Cancer Risk Factors and Preventive Measures**

Variable	Overall
n(%)	600 (100.0)
Prostate Cancer Risk Factors' Knowledge	
No knowledge (0)	2 (.3)
Poor knowledge (1-6)	298 (49.7)
Good knowledge (7-13)	300 (50.0)
Prostate Cancer Preventive Measures' Knowledge	
No knowledge (0)	8 (1.3)
Poor knowledge (1-4)	345 (57.5)
Good knowledge (5-8)	247 (41.2)

Table 2 shows that overall, male civil servants in the study had good knowledge (50.0%) of risk factors and poor knowledge (57.5%) of preventive measures for prostate cancer in Enugu State South-East Nigeria.

Table 3: Multivariate Logistic Regression of Covariates Adjusted for Knowledge of Prostate Cancer Risk Factors

Factors	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I. for Exp(B)	
							Lower	Upper
Education Level			41.275	2	.000			
Primary Education[a]	-	-	-	-	-	-	-	-
Secondary Education	2.238	.758	8.709	1	.003**	9.372	2.120	41.428
Tertiary Education	3.615	.789	21.001	1	.000***	37.141	7.915	174.284
Place of Residence								
Rural[b]	-	-	-	-	-	-	-	-
Urban	1.685	.257	42.911	1	.000***	5.394	3.258	8.930
Marital Status			84.833	2	.000			
Single[c]	-	-	-	-	-	-	-	-
Married	-3.688	.402	84.223	1	.000***	.025	.011	.055
Divorced/ Separated/Wi	-3.332	.608	30.040	1	.000***	.036	.011	.118
Age Category			55.790	2	.000			
18-30years[d]	-	-	.-	-	-	-	-	-
31-43years	2.803	.601	21.769	1	.000***	.061	.019	.197
44+ years	-.528	.586	.813	1	.367	.590	.187	1.858
Annual Income			26.948	2	.000			
<#360,000[e]	-	.-	-	-	-	-	-	-
#360,000 - #959,000	.165	.684	.058	1	.810	1.179	.308	4.508
#960,000+	-1.618	.689	5.521	1	.019*	.198	.051	.765
Constant	1.695	.482	12.348	1	.000	5.449		

*p < 0.05; **p < 0.01; ***p < 0.001
Ref Groups: Level of Education = Primary Education[a] ; Place of Residence = Rural[b]; Marital Status = Single[c]; Age =18 -30yrs[d]; Annual Income = < #360,000[e]

Table 3 shows that level of education, place of residence, marital status, age ,and annual income (p < .05) were statistically significantly associated with prostate cancer risk factors' knowledge of male civil servants in Enugu State South East Nigeria. In a multivariate analysis, male civil servants with secondary (OR = 9.372, 95% CI [2.120-41.428], p< .01) and tertiary (OR = 37.141, 95% CI [7.915-174.284], p< .001) education were 9 times and 37 times more likely knowledgeable about prostate cancer risk factors respectively than those with primary education. Male civil servants residing in the urban settings were 5 times more

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likely knowledgeable about prostate cancer risk factors than those residing in the rural settings (OR = 5.394, 95% CI [3.258-8.930], p< .001). Male civil servants that are married (OR = .025, 95% CI [.011-.055], p< .001) and those divorced/separated/widowed (OR = .036, 95% CI [.011-.118], p< .001) were 75 per cent and 64 per cent less likely knowledgeable about prostate cancer risk factors respectively than those that are single. Male civil servants aged 31-43 years were 93.9 per cent less likely knowledgeable about prostate cancer risk factors than those aged 18-30 years (OR = .061, 95% CI [.019-.197], p< .001). Male civil servants that had an estimated annual income of #960,000+ were 80.2 per cent less likely knowledgeable about prostate cancer risk factors than those that had an estimated annual income of < #360,000 (OR = .198, 95% CI [.051-.765], p< .05).

Table 4: **Multivariate Logistic Regression of Covariates Adjusted for Knowledge of Prostate Cancer Preventive Measures**

Factors	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for Exp(B) Lower	Upper
Education Level			48.399	2	.000			
Primary Education[a]	-	-	-	-	-	-	-	-
Secondary Education	3.959	.686	33.347	1	.000***	52.415	13.673	200.931
Tertiary Education	4.777	.712	45.056	1	.000***	118.791	29.442	479.296
Place of Residence								
Rural[b]	-	-	-	-	-	-	-	-
Urban	1.535	.239	41.098	1	.000***	4.642	2.903	7.423
Marital Status			15.634	2	.000			
Single[c]	-	-	-	-	-	-	-	-
Married	-.919	.329	7.793	1	.005**	.399	.209	.761
Divorced/Separated/Wi	-2.624	.733	12.813	1	.000***	.072	.017	.305
Age Category			53.533	2	.000			
18-30years[d]	-	-	.-	-	-	-	-	-
31-43years	-2.291	.504	20.703	1	.000***	.101	.038	.271
44+ years	-.102	.513	.040	1	.842	.903	.330	2.469
Annual Income			29.416	2	.000			
<#360,000[e]	-	.-	-	-	-	-	-	-
#360,000 - #959,000	-.793	.575	1.907	1	.167	.452	.147	1.395
#960,000+	-2.433	.602	16.338	1	.000***	.088	.027	.286
Constant	-1.908	.507	14.146	1	.000	.148		

*p < 0.05; **p < 0.01; ***p < 0.001
Ref Groups: Level of Education = Primary Education[a]; Place of Residence = Rural[b]; Marital Status = Single[c]; Age =18 -30yrs[d]; Annual Income = < #360,000[e]

Table 4 shows that level of education, place of residence, marital status, age, and annual income (p < .05) were statistically significantly associated with prostate cancer preventive measures' knowledge of male civil servants in Enugu South East Nigeria. In a multivariate analysis, male civil servants with secondary (OR = 52.415, 95% CI [13.673-200.931], p< .001) and tertiary (OR = 118.791, 95% CI [29.442-479.296], p< .001) education were approximately 42 per cent and 79.1 per cent more likely knowledgeable about prostate cancer preventive measures respectively than those with primary education. Male civil servants residing in the urban settings were approximately 4 times more likely knowledgeable about prostate cancer preventive measures than those residing in the rural settings (OR = 4.642, 95% CI [2.903-7.423], p< .001). Male civil servants that are married (OR = .399, 95% CI [.209-.761], p< .01) and those divorced/separated/widowed (OR = .072, 95% CI [.017-.305], p< .001) were 60.1 per cent and 92.8 per cent less likely knowledgeable about prostate cancer preventive measures respectively than those that are single. Male civil servants aged 31-43 years were 89.9 per cent less likely knowledgeable about prostate cancer preventive measures than those aged 18-30 years (OR = .101, 95% CI [.038-.271], p< .001). Male civil servants that had an estimated annual income of #960,000+ were 91.2 per cent less likely knowledgeable about prostate cancer preventive measures than those that had an estimated annual income of < #360,000 (OR = .088, 95% CI [.027-.286], p< .001).

Discussion

The final sample was 600 male civil servants drawn as respondents. Most respondents 335 (55.8%) reside in a rural setting. Most respondents 531 (88.5%) were aged between 31 years and above. The vast majority of the respondents had attained at least secondary education 537 (89.5%). Most respondents 508 (84.6%) receive more than #360,000 income annually. The vast majority of the respondents 467 (77.8%) were married.

The finding shows that male civil servants in the study had good knowledge of risk factors and poor knowledge of preventive measures for prostate cancer (Table 2). The result was expected and therefore, not surprising given the fact that discussions on the risk factors for prostate cancer are just beginning to emerge recently in Nigeria, following increased cases of prostate cancer and late presentation of the disease for treatment. The finding on risk factors knowledge was not consistent with Abdurahman et al. (2016) and Gebru et al. (2023) who reported poor knowledge of prostate cancer and its risk factors among respondents in Nigeria and Addis Ababa respectively. However, the finding on knowledge of preventive measures was consistent with the findings of Adie et al. (2017) and Awosan et al. (2018) who in their various related studies reported low overall knowledge of preventive measures for prostate cancer among men in Nigeria. The finding is not consistent with Ariyo et al. (2024) who found that male staff had a good level of knowledge about prostate cancer. However, there was also disagreement between the present findings and those of some previous studies. The findings disagree with Morrison et al. (2017) who reported that the participants have moderate prostate cancer knowledge and a positive attitude towards screening and prostate cancer prevention in Jamaica. Prostate cancer can be prevented by the increase in the availability of diagnostic tests, agility in care, and differentiated schedules (Oliveira et al., 2019). The similarities in the finding could be because of the adoption of similar research designs by the researchers. However, the disparity in the findings of the study may be due to variations in the geographical context. For instance, while Morrison et al. (2017) conducted their study in Jamaica, the researchers of this study conducted it in Enugu State, Nigeria. The tenet of the reviewed health belief model (HBM) were applied in this finding to show a cue to

action, whereby civil servants are spurred to adopt the preventive behaviour by some additional element through discussions in seminars, conferences, workshops and through both print and electronic media, improved awareness is being created about the risk factors for prostate cancer.

The findings in Table 3 show that level of education, place of residence, marital status, age, and annual income were statistically significantly associated with prostate cancer risk factors' knowledge of male civil servants. The finding reveals that the odd rate of knowing about risk factors of PC was more likely in those with tertiary education than those with primary education. The finding on education was expected and hence, not surprising because education has consistently been found to be associated with men's knowledge of prostate cancer. The higher a man's level of education, the more likely he is to utilize health services and take care of himself. The finding is consistent with the findings of Aluh et al. (2018) and Benurugo et al. (2020) that highly educated men always have more values than lower educated respondents in Nigeria and Rwanda. This finding was not consistent with Asare and Ackumey (2021) who reported that level of education had no association with the knowledge of prostate cancer in Ghana. The inconsistent of this study may be because of the instrument used for analyses. The finding reveals that the odd rate of knowing about risk factors of PC was more likely in those residing in the urban area than those residing in the rural area. The finding of place of residence was not surprising and therefore, expected because place of residence can determine one's level of knowledge. Those living in urban settings naturally are more exposed to health-related issues and information more than those in rural settings. This finding is consistent with the finding of Jha and Thidwar (2022) and Ogunsanya et al. (2017) that most of the people in the rural community did not know about prostate cancer, lack adequate knowledge of its health consciousness, and scored significantly lower on their knowledge scores than those from suburban areas in India and USA. The finding is not consistent with Bassey et al. (2019) who indicated that place of residence was not significant with knowledge of prostate cancer. The disparity in this study may be because of geographical, economic, and cultural limitations.

The finding reveals that the odd rate of knowing about risk factors of PC was less likely in married male civil servants than those that are single. The finding on marital status was expected and therefore, not surprising. This is because married men are more susceptible to prostate cancer. The finding is consistent with Aluh et al. (2018) who disclosed that marital status affects the knowledge of prostate cancer in South-East Nigeria. The finding, however, is not consistent with Mofolo et al. (2015) who reported no statistically significant relationship between marital status and knowledge of prostate cancer in South Africa. The disagreement in this study may be because, the previous studies did not focus on marital status, and marital status was not analysed with other variables. The finding reveals that the odd value of knowing about risk factors of PC was less likely in those aged 31-43years than those aged 18-30years. The finding of age was expected and hence, not surprising because it is believed that, the more one adds years to life, the more knowledge one acquires. This finding is consistent with Leonard et al. (2017) who found in Ireland where the majority of respondents who were aware of prostate cancer ranged between 60 and 75 years old. The finding, however, is not consistent with Abdurahman et al. (2016) who reported a higher knowledge of prostate cancer among younger men. Moreover, the finding contradicts the finding of Mofolo et al. (2015) that age is not statistically significant for the knowledge of prostate cancer in South Africa. The disparity in the findings may be because of the difference in location and use of different research methods. The finding reveals that the odd

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value of knowing about risk factors of PC was less likely in those that receive annual income of #960,000+ than those that receive <#360,000. The finding on annual income was not surprising but therefore expected. Ideally, income and wealth directly support better health because wealthier people can afford resources that protect and improve health. In contrast to many low-income people, they tend to have jobs that are more stable, flexible and provide good benefits, such as: paid leave, health insurance, and worksite wellness programmes; and have fewer occupational hazards. More affluent people have more disposable incomes and can more easily afford medical care and healthy lifestyle-benefits that also extend to their children. The finding is in line with Gebru et al. (2023) who found that Ethiopian men with more income were more concerned and encouraged to learn more about their health and health-related status than those with lower incomes.

The findings in Table 4 show that level of education, place of residence, marital status, age, and annual income were statistically significantly associated with prostate cancer preventive measures' knowledge of male civil servants. The finding reveals that the odd rate of knowing about preventive measures of PC was more likely in those with tertiary education than those with primary education. The finding on education was expected and hence, not surprising. This is because studies have shown that men with higher education were more likely to have prostate examination knowledge and preventive measures than less educated men in the USA and Italy (Morlando et al., 2017; Pudrovska & Anishkin, 2015). The finding is consistent with Alothman et al. (2022) who found that age and family history are the well-known risk factors of prostate cancer. However, this finding is in contrast with the finding of Ogunsanya et al. (2017) that participants who had positive health screening experiences, were more highly educated and majored in health care and natural sciences, had higher PC knowledge compared with their counterparts in USA. The finding is not in line with the finding of Opondo et al. (2022) that participants with diploma level of education in Kenya were more likely to self-report uptake of screening services than those with graduate and postgraduate education level. This finding contradicts the finding of the previous studies; most of the participants were those with Diploma level of education. The tenets of the HBM were applied in this study to explain that perceived vulnerability, perceived severity, and perceived benefits are fundamental determinants of preventive behaviour. The finding reveals that the odd rate of knowing about preventive measures of PC was more likely in those residing in the urban area than those residing in the rural area. The finding of place of residence was expected and therefore, not surprising. This is because the majority of participants from rural settings are less likely to screen for prostate cancer compared to those from urban settings in Kenya (Opondo et al., 2022). Moreover, the finding is in line with the finding of Nair-Shalliker et al. (2018) that urban residents are more likely to report screening than those from rural areas in Australia. This contradiction may be because of the difference in location and lack of accessibility of PC screening sites in the rural setting. The finding reveals that the odd rate of knowing about preventive measures of PC was less likely in divorced/separated/widowed male civil servants than those that are single. The finding on marital status was surprising and not expected. This is because studies have shown that married men tend to screen for prostate cancer than their counterparts in Tanzania (Bugoye et al., 2019). However, the finding disagrees with the finding of Opondo et al. (2022) that marital status is not associated with the screening of prostate cancer in Kenya. The disagreement between these studies may be because this study focused on male civil servants, while the previous studies focused on male health care workers from different health service cadres.

The finding reveals that the odd value of knowing about preventive measures of PC was less likely in those aged 31-43years than those aged 18-30years. The finding on age was expected and thus, not surprising because an older male tends to be more conscious of their health due to aging. The finding is consistent with the finding of Bugoye et al. (2019) that males above 60 years were screened for prostate cancer than the younger counterparts in Tanzania. The finding is not consistent with the finding of Opondo et al. (2022) that age is not associated with prostate cancer screening in Kenya. The contradiction in age may be explained by a function of age distribution influence of events. The finding reveals that the odd value of knowing about preventive measures of PC was less likely in those that receive an annual income of #960,000+ than those that receive <#360,000. The finding on annual income was expected and therefore, not surprising. This is because studies revealed that respondents with more income were more concerned and encouraged to learn more about their health and health-related status in Ethiopia (Gebru et al., 2023). The finding is in line with the finding of Baobaid et al. (2020) that people with higher income levels will be more willing to undergo screening and treatment for prostate cancer as they will be able to afford it compared to those with lower income levels. The disparity in the findings may be because of the difference in location of the researchers.

The study was conducted only among male civil servants, which may not be representative of males in other sectors in Enugu State. The use of a questionnaire alone to collect data may lack precision to quantify low levels of PC risk factors and preventive measures knowledge, and are subject to recall and reporting bias, which may result in some degree of misclassification. False reporting or over/under reporting are potential limitations of using questionnaires, since the data sets were cross-sectional, cause-effect relationships could not be interfered, which would require clinical trials and longitudinal studies. In addition, the statistical analyses were somewhat limited in that they did not account for potential confounding variables in multivariate analyses.

Implications of the Study to Public Health Education
The findings of the study have a positive implication on educational institutions in organizing in-service training for civil servants as a way of increasing men's knowledge of risk factors for prostate cancer. The finding would help Ministry of Health and health agencies in organizing health measures aimed at promoting specific knowledge levels on prostate cancer, and calls for encouraging behavioural changes towards risks for the development of prostate cancer in men. It would help health educators/professionals and health agencies in carrying out prostate cancer education-based programmes at different locations where civil servants can be reached, to optimize their level of knowledge on risk factors for prostate cancer through the use of counseling, seminars, sensitization, prostate cancer screening, and awareness programmes, and how to control it through adopting preventive measures. The government, health institutions and health professionals would be properly guided in planning health care interventions on prostate cancer for the prevalent age. The finding would assist health agencies in sensitizing the government to appreciate the need for improving the income of civil servants as an implicating factor.

The findings from good knowledge of risk factors and poor knowledge of preventive measures for prostate cancer have implications for adoption by the Ministry of Health, health agencies/institutions and policy makers in designing policies that emphasize the prevention of prostate cancer. Moreover, it demonstrates the impact of health educators in sensitizing men about possible preventive measures for prostate cancer. In addition, it would assist health

educators in organizing awareness campaigns on prostate cancer for male civil servants in Nigeria.

Conclusion

Our findings have shown that male civil servants had good knowledge of risk factors and poor knowledge of preventive measures for prostate cancer. Level of education, place of residence, marital status, age, and annual income were greatly associated with prostate cancer risk factors and preventive measures' knowledge of male civil servants. However, Ministry of Health at national and State levels, health programme planners, health educators, and professionals should promote information dissemination on the risk factors, treatment, and preventive measures of prostate cancer that will enhance further awareness and knowledge of prostate cancer among male civil servants. Moreover, the Ministry of Health at national, State, and local government levels and cancer stakeholders should promote an awareness campaigns on prostate cancer to increase men's knowledge of self-vulnerability towards the disease, and hence increase prostate cancer screening uptake amongst men at risk in Nigeria. In developing prostate cancer sensitization and awareness programmes for male civil servants in Nigeria, demographic variables of level of education, place of residence, age, marital status, and level of income should be considered.

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