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Prostate Health Risks among Taxi Drivers in Ghana: Prevalence of Elevated PSA Levels, Awareness, and Screening Barriers

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Abstract:

Background: Prostate cancer is a leading cause of cancer-related morbidity and mortality among men worldwide, with a disproportionately high burden in low- and middle-income countries such as Ghana. Men working in informal occupations, including taxi drivers, may be at increased risk due to prolonged sedentary work, occupational stress, unhealthy dietary patterns, and limited access to preventive health services.

Objective: This study assessed the prevalence of elevated Prostate-Specific Antigen (PSA) levels among taxi drivers at the Accra Madina Station and examined their awareness of prostate health, lifestyle and occupational risk factors, and perceived barriers to PSA screening.

Methods: A cross-sectional descriptive study was conducted among 94 male taxi drivers aged ≥40 years. Data were collected using a structured interviewer-administered questionnaire and laboratory-based PSA testing using the Wamfo® Immunoassay Analyzer. Descriptive statistics summarized participant characteristics, awareness, and risk factors. Associations between socio-demographic variables, awareness, lifestyle factors, barriers, and PSA status were examined using Chi-square tests. Statistical significance was set at $p < 0.05$. Ethical approval and written informed consent were obtained.

Results: The prevalence of elevated PSA levels (>4.0 ng/mL) was 33%. Elevated PSA levels were more common among older drivers and those with longer driving experience. Awareness of prostate cancer was relatively high; however, specific knowledge of PSA testing and access to prostate health information were limited. No significant associations were observed between socio-demographic characteristics and awareness, lifestyle risk factors, or perceived barriers to screening. Major barriers identified included financial constraints, limited access to screening services, and social stigma, while language barriers were minimal.

Conclusion: A substantial proportion of taxi drivers exhibited elevated PSA levels, indicating a high potential burden of undiagnosed prostate-related disorders within this occupational group. Despite moderate general awareness, significant gaps in actionable knowledge and access to screening persist. Targeted, occupation-focused interventions—such as subsidized PSA screening, mobile clinics at taxi stations, and culturally appropriate health education—are urgently needed to improve early detection and prostate health outcomes among taxi drivers in Ghana.

Keywords: *Prostate-specific antigen, prostate cancer, taxi drivers, occupational health, screening barriers, Ghana.*

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Introduction

Prostate cancer (PCa) is one of the most common malignancies and a significant public health issue among men worldwide, and is a leading cause of mortality and disability (W. Zhang et al., 2023). In developing nations, prostate cancer shows lower incidence rates than in developed nations, but mortality rates from prostate cancer are higher in developing countries (Arigbede et al., 2024). According to the World Health Organization (WHO), it is the second most frequent cancer among men worldwide, after lung cancer, accounting for 14.1% of new male cancer cases globally (Sung et al., 2021). It is also the most common cancer among men in 112 countries (Wang et al., 2022). In 2020, PCa incidence was estimated at 1.41 million new cases worldwide, leading to 375,304 deaths (Arigbede et al., 2024). Research shows that new global cancer incidence will reach 2.9 million cases in 2040, while annual mortality rates will approach 700,000 people, primarily in developing countries (The Lancet Oncology, 2024).

In Africa, PCa emerged as the most frequently diagnosed cancer and the leading cause of cancer mortality among males in 2020 (Bray et al., 2024). This increase in diagnosis is linked to more medical consultations, improved healthcare infrastructure, and greater use of prostate-specific antigen (PSA) testing (Sung et al., 2021). According to the 2020 GLOBOCAN report, Africa

recorded a prostate cancer incidence of 36.8 per 100,000 and mortality of 18.3 per 100,000, compared to 23.2 and 17.0 per 100,000 in 2012 (Ferlay et al., 2015). Southern Africa had the highest incidence (65.1/100,000), while North Africa had the lowest (16.6/100,000). Middle and Central Africa reported a high death rate of 24.8 per 100,000—the second highest worldwide—excluding North Africa, where the rate was 8.2 per 100,000 (Sung et al., 2021). West Africa, in particular, bears a heavy burden, with 31,231 new cases and 18,787 deaths, and an age-standardized incidence rate of 36.9/100,000 men, marking a major public health concern (Bray et al., 2024).

In Ghana, prostate cancer remains a major health issue, with an incidence rate of 32 per 100,000 men, accounting for 36.4% of all prostate-related conditions (Kofi et al., 2021). However, the availability of prostate cancer services in healthcare facilities is alarmingly low, at only 5% (GHHFA, 2023). Many men are diagnosed at advanced stages due to limited awareness, misconceptions about the disease, and reliance on alternative medicine (Kofi et al., 2021). A 2007 retrospective analysis from Korle Bu Teaching Hospital reported a high mortality rate—800 out of every 1,000 diagnosed men—highlighting the importance of early diagnosis and timely intervention (Boafo et al., 2023).

Prostate cancer develops in the prostate gland, a small walnut-shaped organ responsible for producing seminal fluid that nourishes sperm (Srinivasulu & Ali, 2023). The disease is influenced by a complex array of epidemiological and etiological factors, with age being the most significant risk factor; over 85% of cases are diagnosed in men aged 60 or older (García-Fuentes et al., 2023). Other modifiable factors include diet, physical activity, weight management, and PSA levels, with PSA screening playing a key role in both early detection and monitoring disease progression (Tan & Naylor, 2022). Metabolic conditions, such as metabolic syndrome (MetS), are associated with the carcinogenesis and increased aggressiveness of prostate cancer (Sousa et al., 2022a; Wanjari et al., 2023), while the relationship between Type 2 Diabetes Mellitus (T2DM) and prostate cancer remains paradoxical (Sousa et al., 2022a). Common symptoms among men aged 40 and above include a weak urinary stream, frequent urination, incomplete bladder emptying, and loss of libido (Boafo et al., 2023).

PSA testing is primarily used for early detection of prostate-related diseases such as prostate cancer and benign prostatic hyperplasia (BPH) (Pathirana et al., 2022). However, PSA screening uptake remains low in low- and middle-income countries (LMICs) such as Ghana (Abila et al., 2022; Osei et al., 2022). While awareness of prostate cancer is relatively high among Ghanaian men, it does not necessarily translate into increased participation in screening programs (Laweh & Manortey, 2021; Agyemang et al., 2022). Only 10.2% of men report having ever undergone prostate cancer screening (Osei et al., 2022). This gap between awareness and action calls for targeted education, improved accessibility, and encouragement for men to undergo screening.

Taxi drivers, who form a significant portion of Ghana's informal workforce, are particularly vulnerable to prostate health issues due to sedentary lifestyles, poor diets, exposure to vehicle emissions, and high stress levels (Adei et al., 2022). Despite these risks, awareness and uptake of PSA screening remain low among this group, leading to undetected cases and higher mortality rates (Mumuni et al., 2023). Given these challenges, this study aims to assess PSA levels in Taxi drivers at the Accra Madina Station and evaluate their awareness of prostate health. The findings will provide crucial insights to guide interventions promoting PSA testing and enhancing prostate health education in this population.

Methodology

Study Design

This study adopted a cross-sectional descriptive design to assess prostate-specific antigen (PSA) levels and prostate health awareness among taxi drivers at the Accra Madina Station. Cross-sectional studies are observational and provide a snapshot of the population's characteristics at a single point in time. This design was appropriate for estimating the prevalence of elevated PSA levels and understanding associated knowledge, attitudes, and practices regarding prostate health and screening. While cross-sectional designs do not establish causality, they are efficient and suitable for exploratory research in resource-limited settings (Zuleika & Legiran, 2022). Potential limitations such as recall bias and temporal ambiguity were acknowledged and mitigated through careful questionnaire design and data triangulation.

Study Site

The study was conducted at the Accra Madina Taxi Station, located in the La Nkwantanang Madina Municipal District of Greater Accra Region, Ghana. Madina is a densely populated urban district with an estimated population of over 100,000, known for its vibrant markets and significant commercial activity. The district is a key transportation hub, hosting a large number of taxi drivers operating both short- and long-distance routes within Accra and neighboring regions.

Taxi drivers in Madina face occupational health risks related to prolonged sitting, exposure to traffic-related air pollution, work stress, irregular meal patterns, and limited access to healthcare services. These factors potentially increase their vulnerability to chronic diseases, including prostate disorders. The setting provided a unique environment for studying prostate health in a high-risk working population with diverse socio-economic backgrounds.

Study Population

The target population comprised male taxi drivers operating at the Accra Madina Station. This included drivers engaged in various taxi services, covering intra-city short routes and longer inter-city routes. Both formally registered and informal taxi drivers who met the inclusion criteria were eligible. Drivers with secondary occupations were included provided they met the criteria and consented to participate.

Eligibility Criteria

Inclusion Criteria

Participants were eligible for inclusion if they met all of the following criteria:

- Male taxi drivers aged 40 years and above, reflecting the age group at increased risk for prostate-related conditions.

- Actively operating at the Accra Madina Taxi Station for a minimum of one year prior to the study, ensuring sustained occupational exposure.
- Willingness to participate in the study and provide written informed consent.

Exclusion Criteria

Participants were excluded if they met any of the following conditions:

- Taxi drivers below 40 years of age.
- Individuals with a previously confirmed diagnosis of prostate cancer or those currently receiving treatment for prostate-related malignancies, to avoid confounding PSA measurements.
- Drivers who declined participation or withdrew consent at any stage of the study.
- Individuals with severe illness, acute medical conditions, or cognitive impairment that could interfere with questionnaire administration or blood sample collection.

Laboratory Analysis of Prostate-Specific Antigen (PSA)

Serum Prostate-Specific Antigen (PSA) levels were determined using the Wamfo® Immunoassay Analyzer, an automated fluorescence immunoassay system designed for quantitative in vitro diagnostic testing. The analyzer operates on the principle of a sandwich immunoassay, utilizing antigen–antibody reactions with fluorescence-based detection to quantify PSA concentrations in human serum.

Approximately 5 mL of venous blood was collected aseptically from each participant into plain vacutainer tubes by trained phlebotomists. Blood samples were allowed to clot at room temperature and subsequently centrifuged at 3,000 rpm for 10 minutes to obtain serum. The separated serum samples were analyzed promptly or stored at 2–8 °C for a short duration prior to testing, in accordance with manufacturer recommendations.

For analysis, a measured volume of serum was dispensed into the PSA test cartridge compatible with the Wamfo Analyzer. The cartridge contained pre-coated monoclonal antibodies specific to PSA. During incubation, PSA present in the sample formed immune complexes with fluorescently labeled antibodies. The analyzer automatically measured the fluorescence signal generated, which is directly proportional to the PSA concentration in the sample. PSA values were calculated by the instrument using an internal calibration curve pre-programmed by the manufacturer.

Internal quality control procedures were performed daily using manufacturer-supplied low and high PSA control materials to ensure analytical accuracy and precision. The analyzer was calibrated according to the manufacturer's instructions prior to commencement of testing and periodically throughout the study period.

Serum PSA concentrations were reported in nanograms per milliliter (ng/mL). Elevated PSA levels were defined as values greater than 4.0 ng/mL, consistent with commonly accepted clinical reference thresholds. Age-related clinical interpretation was applied during result evaluation. Participants with elevated PSA levels were counseled and referred to appropriate health facilities for further urological assessment.

Data Analysis

Data were entered into Microsoft Excel and subsequently exported to IBM SPSS Statistics (version 27) for statistical analysis. Data cleaning and validation were performed prior to analysis to ensure accuracy and completeness.

Descriptive statistics were used to summarize participant characteristics and study variables. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations. Serum PSA levels were categorized based on clinical reference thresholds, with values >4.0 ng/mL classified as elevated.

The distribution of continuous variables was assessed for normality using the Shapiro–Wilk test. Depending on data distribution, comparisons of continuous variables across groups were conducted using independent samples t-tests or one-way analysis of variance (ANOVA) for normally distributed data, and appropriate non-parametric alternatives where assumptions were not met.

Associations between categorical variables, including socio-demographic characteristics, awareness levels, lifestyle factors, and PSA status, were examined using the Chi-square test of independence. Where cell counts were small, Fisher's exact test was applied as appropriate.

To identify independent predictors of elevated PSA levels and low prostate health awareness, binary logistic regression analysis was performed. Variables with a p-value <0.20 in bivariate analysis were entered into the multivariable models to control for potential confounding. Adjusted odds ratios (AORs) with corresponding 95% confidence intervals (CIs) were reported.

Missing data were handled using listwise deletion where minimal, and statistical significance was set at $p < 0.05$ for all analyses.

Ethical Considerations

Ethical approval was obtained from the Research Review Committee of the Department of Medical Laboratory Science, Baldwin University College, and the Ghana Health Service Ethics Review Board. Written informed consent was obtained from all participants. Confidentiality was ensured, participation was voluntary, and individuals with elevated PSA levels were referred for further clinical evaluation. The study adhered to the Declaration of Helsinki.

Results

Socio-demographic Characteristics

Table 1 presents the socio-demographic and occupational profile of the 94 taxi drivers included in the study. The age distribution shows that a substantial proportion of participants were older adults, with nearly half (45.8%) aged 55–69 years and close to one-third (29.8%) aged 50–54 years. This age pattern is epidemiologically relevant, as the risk of prostate-related disorders increases with advancing age, thereby justifying the focus on this population.

More than half of the participants were married (56.4%), while smaller proportions were single, divorced, or widowed. Educational attainment was generally moderate, with almost half

(48.9%) having completed Senior High School, Technical, or Vocational education. However, a notable proportion had only primary education or no formal education, which may influence health literacy, awareness of prostate health, and health-seeking behavior.

Religious affiliation was predominantly Christian (78.7%), reflecting the broader religious composition of urban populations in southern Ghana. Participants resided across several communities within and around Accra, indicating a geographically diverse but urban-centered sample.

Occupationally, most drivers were experienced, with 44.7% reporting more than 10 years of driving experience. This suggests prolonged exposure to occupational risk factors such as sedentary work patterns and work-related stress. Slightly over half of the drivers mainly undertook short-distance journeys (55.3%) and worked primarily during the day (52.1%), patterns that may influence physical activity levels and access to healthcare services.

Only a small proportion of participants (4.3%) reported a prior diagnosis of prostate cancer, despite the older age distribution of the sample. This finding may reflect underdiagnosis or limited access to prostate health screening services within this occupational group.

Overall, Table 1 highlights a predominantly older, experienced, and moderately educated population of taxi drivers, characteristics that are important for interpreting PSA prevalence, awareness levels, and barriers to screening reported in subsequent analyses.

Table 1 Socio-demographic Characteristics of Study Participants

Variable	Frequency(n)	Percentage (%)
Age		
40-44	10	10.6
45-49	13	13.8
50-54	28	29.8
55-69	43	45.8
Marital Status		
Single	20	21.3
Married	53	56.4
Divorce	10	10.6
Widower	11	11.7
Level of Education		
No formal Education	12	12.8
Primary	19	20.2
JHS	14	14.9
SHS/Tech/Voc	46	48.9
Tertiary	3	3.2
Religion		
Christian	74	78.7
Muslim	16	17.0
Traditionalist	3	3.3
Others	1	1.0
Residence		
Madina Zongo	17	18.1
Oyarifa	15	16.0
Danfa	11	11.7
Adenta	10	10.6
Ogbojo	5	5.3
Botwe	16	17.0
New Legon	6	6.4
Haatso	11	11.7
Spintex	3	3.2
Tema	17	18.1
Prostate cancer Diagnosis Status		
Yes	4	4.3
No	90	95.7
Years of Driving Experience		
<1 year	4	4.3
1–5 years	20	21.3
6–10 years	28	29.8
More than 10 years	42	44.7

Journey Type		
Long Journey (Over 5 km)	42	53.3
Short Journey (Below 5 km)	52	44.7
Working Shift		
Day	49	52.1
Night	25	26.6
Both	20	21.3

Table 2 Distribution of PSA Status by Socio-demographic and Occupational Characteristics

Table2 presents the distribution of serum Prostate-Specific Antigen (PSA) status across socio-demographic and occupational characteristics of the taxi drivers. Overall, a substantial proportion of participants exhibited elevated PSA levels (>4.0 ng/mL), highlighting a potentially increased burden of prostate-related abnormalities within this occupational group.

Age showed a clear gradient in PSA elevation, with the highest proportion of elevated PSA observed among participants aged 55–69 years. This finding is consistent with well-established evidence that PSA levels and the risk of prostate disorders, including benign prostatic hyperplasia and prostate cancer, increase with advancing age due to cumulative hormonal changes and prostate tissue remodeling (Barry, 2021; Rawla, 2019). The relatively lower prevalence among younger age groups further supports age as a dominant non-modifiable risk factor.

Marital status analysis revealed that married participants accounted for the majority of elevated PSA cases. This pattern likely reflects the older age distribution within the married subgroup rather than a direct causal relationship. Similar observations have been reported in population-based studies where marital status acts as a proxy for age and social stability rather than an independent biological determinant of PSA elevation (Galvão et al., 2020).

With respect to educational level, elevated PSA levels were most frequent among drivers with Senior High, Technical, or Vocational education. While higher educational attainment is often associated with improved health awareness and screening uptake, studies have shown that PSA elevation does not necessarily correlate with education but rather with biological risk and age distribution within educational categories (Agyemang et al., 2022; Jamieson et al., 2022). The presence of elevated PSA across all educational strata underscores that prostate health risks cut across socio-educational boundaries.

Religious affiliation did not show meaningful variation in PSA status, suggesting that biological risk factors outweigh cultural or religious influences in determining PSA elevation. This aligns with prior Ghanaian and sub-Saharan African studies reporting no consistent association between religious affiliation and prostate cancer risk (Boafo et al., 2023).

Occupational characteristics revealed notable trends. Drivers with more than 10 years of driving experience and those undertaking short-distance journeys accounted for a sizable proportion of elevated PSA cases. Prolonged years of driving may reflect long-term exposure to occupational risk factors such as sedentary behavior, whole-body vibration, and chronic stress, all of which have been linked to adverse prostate health outcomes (Sritharan et al., 2019; Ledda et al., 2023). Short-distance driving, often characterized by frequent stops and extended periods of sitting within congested urban traffic, may further exacerbate physical inactivity.

Regarding work schedules, participants who worked both day and night shifts demonstrated a relatively higher proportion of elevated PSA compared with those working exclusively day or night shifts. Irregular work patterns and circadian disruption have been associated with hormonal dysregulation and increased cancer risk, including prostate cancer (Papantoniou et al., 2018).

Importantly, all participants with a previous diagnosis of prostate cancer had elevated PSA levels, which is clinically expected and reinforces the validity of PSA as a biomarker for disease monitoring rather than definitive diagnosis (Mottet et al., 2023). However, the low proportion of previously diagnosed cases despite the observed PSA elevation suggests possible underdiagnosis and limited access to routine prostate health screening among taxi drivers.

Table 2 demonstrates that elevated PSA levels are more common among older, long-serving taxi drivers and those with prolonged occupational exposure, reinforcing age and occupational lifestyle as key contributors to prostate health risk. These findings support the need for targeted, occupation-specific prostate screening and health promotion interventions.

Table 2 Distribution of PSA Status by Socio-demographic and Occupational Characteristics

Variable	**PSA Test Results**	
Age	**Negative n (%)**	**Positive n (%)**
40-44	7 (11.1)	3 (9.7)
45-49	5 (7.9)	8 (25.8)
50-54	21 (33.4)	7 (22.6)
55-69	30 (47.6)	13 (41.9)
Marital Status		

Single	17 (27.0)	3 (9.7)
Married	32 (50.8)	21 (67.7)
Divorce	6 (9.5)	4 (12.9)
Widower	8 (12.7)	3 (9.7)
Level of Education		
No formal Education	10 (15.9)	2 (6.5)
Primary	14 (22.2)	5 (16.1)
JHS	7 (11.1)	7 (22.6)
SHS/Tech/Voc	30 (47.6)	16 (51.6)
Tertiary	2 (3.2)	1 (3.2)
Religion		
Christian	50 (79.4)	24 (77.4)
Muslim	9 (14.3)	7 (22.6)
Traditionalist	3 (4.7)	0 (0.0)
Others	1 (1.6)	0 (0.0)
Residence		
Madina Zongo	10 (15.9)	7 (22.6)
Oyarifa	9 (14.3)	6 (19.4)
Danfa	8 (12.7)	3 (9.7)
Adenta	7 (11.0)	3 (9.7)
Ogbojo	4 (6.4)	1 (3.2)
Botwe	12 (19.0)	4 (12.9)
New Legon	2 (3.2)	4 (12.9)
Haatso	9 (14.3)	2 (6.5)
Spintex	2 (3.2)	1 (3.0)
Prostate cancer Diagnosis Status		
Yes	0 (0.0)	4 (12.9)
No	63 (100.0)	27 (87.1)
Years of Driving Experience		
<1 year	3 (4.8)	1 (3.2)
1–5 years	12 (19.0)	8 (25.8)
6–10 years	17 (27.0)	11 (35.5)
More than 10 years	31 (49.2)	11 (35.5)
Journey Type		
Long Journey (Over 5 km)	29 (46.0)	13(41.9)
Short Journey (Below 5 km)	34 (54.0)	18(58.1)
Working Shift		
Day	32 (50.8)	17 (54.8)
Night	20 (31.8)	5 (16.2)
Both	11 (17.4)	9 (29.0)

Total Prevalence of Elevated PSA Levels among Taxi Drivers at Accra Madina Station

Figure 1 illustrates the overall prevalence of elevated Prostate-Specific Antigen (PSA) levels among taxi drivers at the Accra Madina Station. The figure shows that approximately 33% of the study participants had PSA levels above the clinical threshold of 4.0 ng/mL, indicating that about one in three drivers may be at increased risk of prostate-related abnormalities.

This prevalence is notably high for a community-based occupational group and highlights a substantial underlying burden of potential prostate pathology among taxi drivers. Elevated PSA levels are commonly associated with conditions such as benign prostatic hyperplasia, prostatitis, and prostate cancer, particularly in older men (Rawla, 2019; Barry, 2021). Given that the study population largely comprised men aged 50 years and above, the observed prevalence is biologically plausible and consistent with age-related increases in PSA levels reported in the literature.

The finding also suggests possible underdiagnosis and delayed detection**,** as only a small proportion of participants reported a prior diagnosis of prostate cancer despite the relatively high PSA positivity rate. Similar trends have been documented in Ghana and other low- and middle-income countries, where limited access to screening services and late presentation contribute to a high proportion of undetected prostate disease (Kofi et al., 2021; Boafo et al., 2023).

Furthermore, the prevalence depicted in Figure.1 underscores the relevance of occupational and lifestyle factors common among taxi drivers, such as prolonged sitting, physical inactivity, and work-related stress, which have been linked to adverse prostate health outcomes (Sritharan et al., 2019; Ledda et al., 2023).

Overall, Figure.1 provides compelling visual evidence of the need for targeted prostate health screening, awareness campaigns, and accessible diagnostic services for taxi drivers and

similar informal-sector workers. Early identification through PSA testing, followed by appropriate clinical evaluation, could significantly improve prostate health outcomes in this high-risk population.

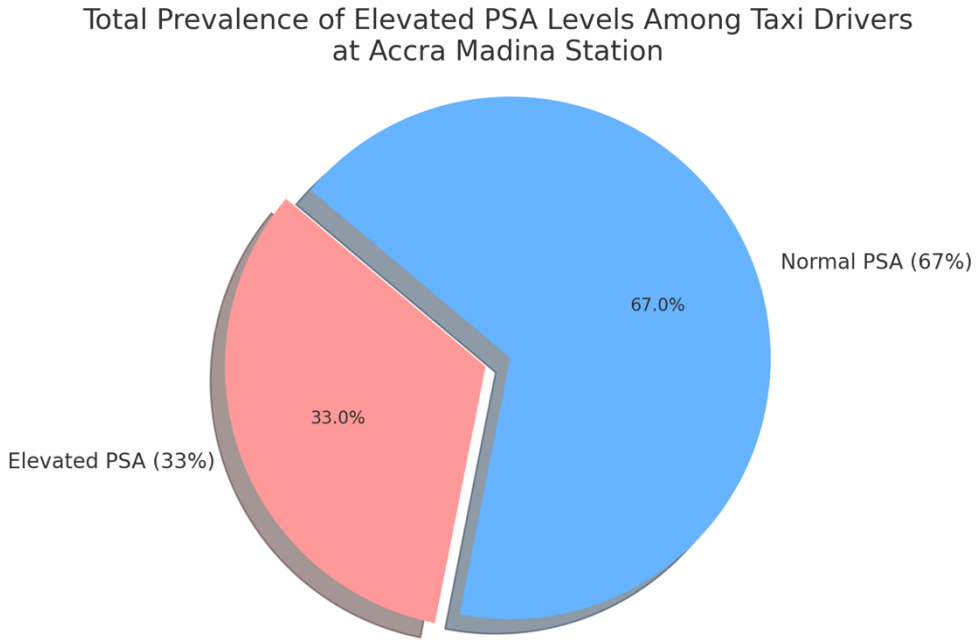

Figure.1 illustrates the overall prevalence of elevated PSA levels among taxi drivers at Accra Madina Station, indicating a total prevalence rate of 33%.

Awareness and Knowledge of PSA Testing and Prostate Health

Table.3 presents the level of awareness and knowledge of prostate health and Prostate-Specific Antigen (PSA) testing among taxi drivers at the Accra Madina Station. Overall, the findings indicate a moderate level of awareness, with notable gaps in specific knowledge related to PSA testing and access to prostate health information.

A large majority of participants (87.2%) acknowledged that prostate cancer constitutes a significant health risk for men. This high level of general awareness is consistent with previous studies in Ghana and other sub-Saharan African countries, which have shown that while men may be broadly aware of prostate cancer as a serious disease, this awareness does not always translate into detailed knowledge or proactive screening behavior (Laweh & Manortey, 2021; Agyemang et al., 2022). Similarly, 85.1% of respondents agreed that early screening for prostate-related conditions is important, suggesting positive attitudes toward preventive health in principle.

Despite this general awareness, knowledge of PSA testing was comparatively lower. Only 61.7% of participants reported having heard of the PSA test, and 62.8% recognized its role in detecting prostate-related health problems. This gap between general awareness of prostate cancer and specific understanding of PSA screening has been widely reported in the literature and is considered a key barrier to early detection in low- and middle-income countries (Abila et al., 2022; Osei et al., 2022). Limited understanding of screening modalities may result in delayed presentation and diagnosis.

Interestingly, a relatively high proportion of participants (73.4%) reported having undergone a PSA test. This finding suggests that PSA testing may sometimes occur opportunistically—such as during hospital visits or outreach programs—rather than as a result of informed, routine screening decisions. Similar observations have been made in other Ghanaian studies, where men undergo PSA testing without comprehensive counseling or adequate understanding of the test's purpose and limitations (Benurugo et al., 2020; Boafo et al., 2023).

Access to prostate health information was reported by less than half of the respondents (48.9%), indicating a substantial information gap. Limited access to reliable health information has been identified as a major contributor to poor prostate health literacy and low screening uptake among men in the informal sector (Jamieson et al., 2022; Davidson et al., 2020). Occupational constraints, such as long working hours and limited engagement with formal healthcare systems, may further restrict opportunities for health education among taxi drivers.

The aggregate responses in Table. 3 show that while general perception of prostate cancer risk and the importance of screening is relatively high, specific knowledge and access to information about PSA testing remain inadequate. These findings highlight the need for targeted, occupation-focused health education interventions that emphasize not only the risks of prostate cancer but also practical information on PSA testing, screening intervals, benefits, and limitations. Such interventions could improve informed decision-making and promote earlier detection of prostate-related conditions among taxi drivers.

Table.3 Awareness and Knowledge of PSA Testing and Prostate Health

Statements on awareness and knowledge of PSA testing and prostate health	Agree n (%)	Disagree n (%)
Prostate cancer as a health risk for men	82 (87.2%)	12 (12.8%)
PSA screening can help detect prostate-related health issues	59 (62.8%)	35 (37.2%)
Heard of the Prostate-Specific Antigen (PSA) test	58 (61.7%)	36 (38.3%)
Early screening for prostate-related issues is important	80 (85.1%)	14 (14.9%)
I have undergone a PSA test for prostate health	69 (73.4%)	25 (26.6)
PSA screening is important for men over 40 years old	77 (81.9%)	17 (18.1%)
Access to information about prostate health	46 (48.9%)	48 (51.1%)
Overall		
Response	**Frequency n (%)**	
Agree	471 (72.5%)	
Disagree	179 (27.5)	

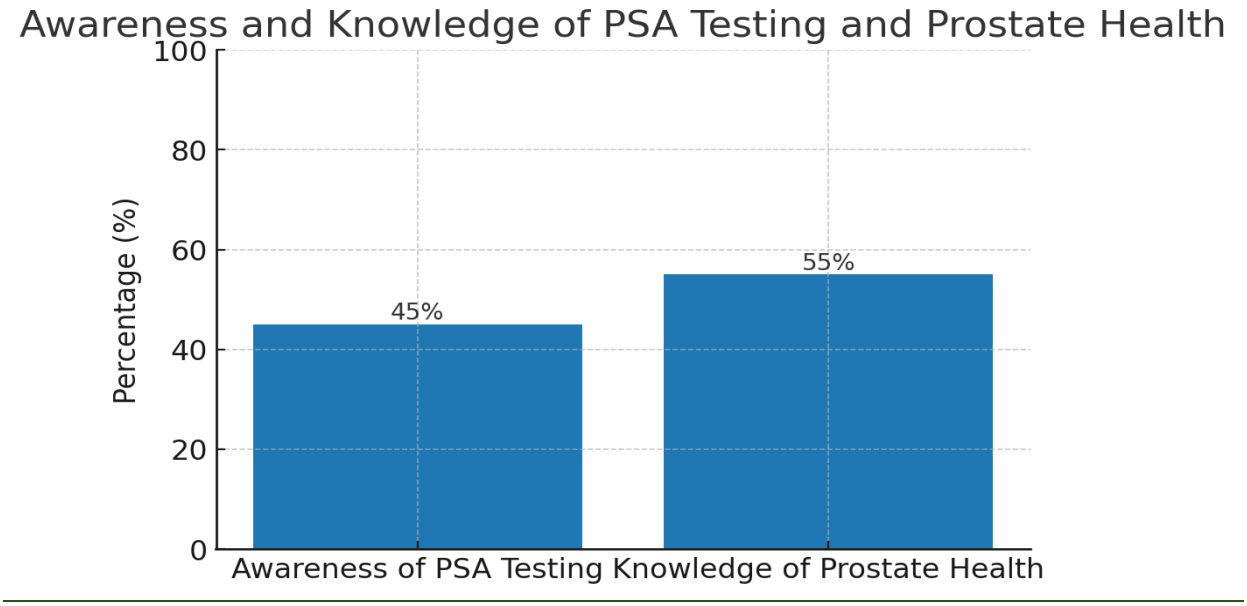

Figure. 2 Perception of PSA Testing and Prostate Health

Figure. 2 illustrates the overall perception and knowledge of Prostate-Specific Antigen (PSA) testing and prostate health among taxi drivers at the Accra Madina Station. The figure shows that approximately 72% of respondents expressed agreement, indicating a generally positive perception and moderate awareness, while 28% disagreed, reflecting persistent gaps in knowledge and understanding.

The predominance of positive responses suggests that most participants recognize prostate cancer as an important health concern and acknowledge the value of screening. This pattern is consistent with studies conducted in Ghana and other sub-Saharan African settings, which report relatively high general awareness of prostate cancer but uneven understanding of specific screening modalities such as PSA testing (Laweh & Manortey, 2021; Agyemang et al., 2022). Such findings indicate that awareness campaigns may have succeeded in highlighting prostate cancer as a public health issue, even if detailed knowledge remains limited.

However, the substantial minority of respondents with negative perceptions highlights a critical gap between general awareness and informed knowledge. Previous research has shown that limited understanding of PSA testing—including its purpose, benefits, and limitations—can reduce informed decision-making and contribute to delayed screening and late presentation (Abila et al., 2022; Osei et al., 2022). This is particularly relevant in informal occupational groups such as taxi drivers, who often face time constraints, irregular work schedules, and limited access to structured health education.

The findings depicted in Figure. 2 also align with evidence suggesting that perception alone does not necessarily translate into screening uptake or sustained preventive behavior (Jamieson et al., 2022). Without adequate access to accurate and culturally appropriate information, positive attitudes may not result in consistent or timely PSA testing. This gap underscores the

importance of targeted health education interventions that move beyond general awareness to emphasize practical knowledge, risk stratification, and shared decision-making in prostate cancer screening.

Figure. 2 reinforces the need for occupation-focused and context-specific prostate health education, particularly for men in the informal transport sector. Strengthening knowledge about PSA testing through workplace outreach, mobile health programs, and collaboration with transport unions could improve informed screening decisions and contribute to earlier detection of prostate-related conditions.

Association between Demographic Characteristics and Awareness and Knowledge of PSA Testing and Prostate Health

The Chi-square analysis presented in Table. 4 examined the association between selected socio-demographic characteristics and participants' awareness and knowledge of Prostate-Specific Antigen (PSA) testing and prostate health. The findings indicate that no statistically significant associations were observed between awareness and knowledge levels and variables such as age, marital status, educational level, religion, place of residence, prostate cancer diagnosis status, years of driving experience, journey type, and working shift ($p > 0.05$ for all comparisons).

The absence of a significant association between age and awareness suggests that knowledge gaps regarding PSA testing are present across all age groups. This finding contrasts with studies conducted in high-income settings where older age has been associated with greater awareness due to increased healthcare engagement (Barry, 2021), but aligns with evidence from Ghana and other low- and middle-income countries (LMICs), where limited access to targeted health education results in uniformly low or moderate awareness irrespective of age (Agyemang et al., 2022; Osei et al., 2022).

Similarly, educational level did not significantly influence awareness and knowledge, despite nearly half of the participants having attained secondary or technical education. This observation supports previous findings that formal education alone does not guarantee adequate health literacy or understanding of prostate cancer screening modalities in LMIC contexts (Jamieson et al., 2022; Abila et al., 2022). In occupational groups such as taxi drivers, health information is often obtained informally and inconsistently, limiting the impact of educational attainment on screening knowledge.

The lack of association with marital status and religion suggests that social and cultural affiliations did not significantly shape awareness levels in this population. While some studies have reported that spousal influence and religious leadership can positively affect men's health-seeking behavior (Galvão et al., 2020; Foster et al., 2023), the present findings imply that such influences may be insufficient in the absence of structured, prostate-specific health education.

Occupational variables, including years of driving experience, journey type, and work shift, were also not significantly associated with awareness and knowledge. This indicates that prolonged exposure to occupational risk factors does not necessarily translate into increased health awareness. Similar patterns have been reported among transport workers in other African urban settings, where long working hours and economic pressures limit engagement with preventive health information (Davidson et al., 2020; Sritharan et al., 2019).

Overall, the findings suggest that knowledge and awareness of PSA testing and prostate health are uniformly moderate to low across demographic and occupational subgroups of taxi drivers. This highlights the need for broad-based, occupation-focused health education interventions, rather than strategies targeted at specific demographic categories. Interventions delivered through taxi unions, workplace outreach, and mobile health (mHealth) platforms may be more effective in improving informed awareness and promoting early screening in this population.

Table 4. Chi-Square Analysis of Demographic Characteristics and the Level of Awareness and Knowledge of PSA Testing and Prostate Health

		p value
Age	12.1	.665
Marital Status	19.4	.194
Level of Education	14.1	.827
Religion	5.9	.981
Residences	12.4	.646
Prostate Cancer Diagnosis Status	4.8	.432
Years of Driving Experience	26.1	.955
Journey Type	2.4	.793
Working Shift	17.2	.070

Lifestyle and Occupational Risk Factors Associated with Elevated PSA Levels

Table 5 below summarizes lifestyle and occupational practices that may influence prostate health among taxi drivers at the Accra Madina Station. The findings reveal a mixed pattern of protective and adverse behaviors, reflecting the complex interaction between occupation-related constraints and individual lifestyle choices.

Just over half of the participants (56.4%) reported engaging in regular physical activity for at least 30 minutes per day. While this proportion suggests some level of health consciousness, it also

indicates that a substantial fraction of drivers do not meet recommended physical activity guidelines. Physical inactivity has been consistently linked to increased risk of prostate disorders and higher PSA levels, largely due to its association with obesity, metabolic dysfunction, and chronic inflammation (Mondul et al., 2020; Lavalette et al., 2020).

Dietary patterns observed in this study present a dual concern. Although a majority of respondents (69.1%) reported consuming fruits and vegetables regularly, a similarly high proportion (67.0%) also reported frequent consumption of fatty foods, including fried and processed items. Diets high in saturated fats have been associated with elevated PSA levels and increased prostate cancer risk, whereas diets rich in fruits and vegetables are thought to exert protective effects through antioxidant and anti-inflammatory mechanisms (Zuniga et al., 2020; Sousa et al., 2022). This coexistence of healthy and unhealthy dietary habits suggests inconsistent nutritional practices, possibly driven by the convenience and affordability of roadside food options available to taxi drivers.

Sedentary behavior remains a prominent occupational risk factor, with a large proportion of respondents reporting prolonged sitting during work hours. Prolonged sedentary time is a defining feature of taxi driving and has been linked to adverse prostate health outcomes through mechanisms such as impaired glucose metabolism, reduced testosterone regulation, and chronic pelvic congestion (Sritharan et al., 2019; Ledda et al., 2023). This finding reinforces concerns about the cumulative health impact of long-term driving occupations.

With regard to substance use, the majority of participants reported not smoking cigarettes (71.3%) and not consuming alcohol excessively (68.1%). These findings are encouraging, given the established association between tobacco use, heavy alcohol consumption, systemic inflammation, and cancer risk (Rehm et al., 2021). However, the presence of regular smoking and alcohol use among a notable minority still represents a relevant risk factor for prostate health and warrants targeted behavioral interventions.

Table. 5 highlights that while some protective lifestyle behaviors exist among taxi drivers, occupational sedentary patterns and unhealthy dietary practices remain significant concerns**.** These findings are consistent with previous studies on transportation workers, which have identified prolonged sitting, poor diet, and limited opportunities for structured physical activity as key contributors to chronic disease risk (Davidson et al., 2020; Adei et al., 2022). Addressing these modifiable risk factors through workplace health promotion, nutritional education, and structured physical activity initiatives could play a critical role in improving prostate health outcomes in this occupational group.

Table. 5 Lifestyle and Occupational Risk Factors Associated with Elevated PSA Levels

Statements on awareness and knowledge of PSA testing and prostate health	**Agree n (%)**	**Disagree n (%)**
Engage in regular physical activity for at least 30 minutes per day	53 (56.4%)	41 (43.6%)
Eat at least 1-3 servings of fruits/vegetables per day	65 (69.1%)	29 (30.9%)
Consume fatty foods (e.g., fried foods, processed meats) regularly	63 (67.0%)	33 (33.0%)
Have a sedentary lifestyle (e.g., sitting for long hours, minimal activity)	36 (38.3%)	58 (61.7%)
Smoke cigarettes or use tobacco products regularly	27 (28.7%)	67 (71.3%)
Consume alcohol regularly (more than 2 drinks per day)	30 (31.9%)	64 (68.1%)
Overall		
Response	**Frequency n (%)**	
Agree	274 (48.4%)	
Disagree	292 (51.6%)	

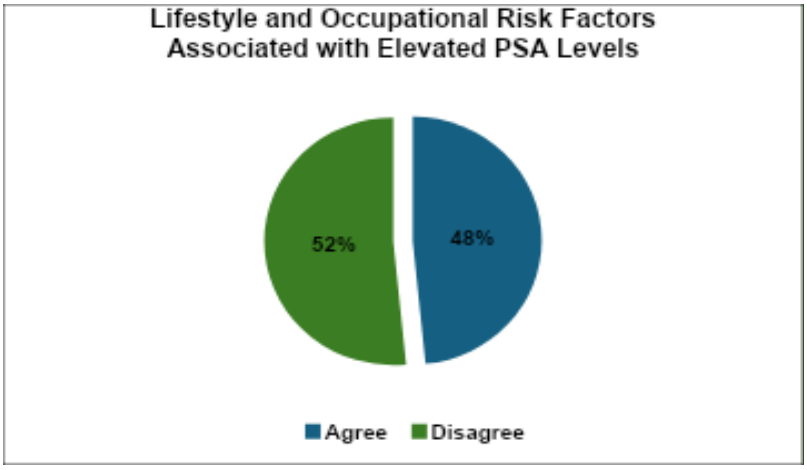

Figure. 3 Lifestyle and Occupational Risk Factors Associated with Elevated PSA Levels

Figure. 3 above illustrates participants' overall responses regarding lifestyle and occupational risk factors associated with elevated Prostate-Specific Antigen (PSA) levels. The figure shows that 48.4% of respondents agreed that such factors are relevant to prostate health, while 51.6% disagreed**,** indicating a near-equal split in perception among taxi drivers.

This finding suggests that although almost half of the participants recognize the potential impact of lifestyle and occupational practices on prostate health, a substantial proportion remain unconvinced or unaware of these associations. Similar gaps in risk perception have been reported among men in informal occupational groups in low- and middle-income countries, where health risks linked to sedentary work, poor diet, and stress are often underestimated or normalized as part of daily work life (Davidson et al., 2020; Adei et al., 2022).

The relatively low level of agreement is noteworthy given the well-documented evidence linking prolonged sitting, physical inactivity, unhealthy dietary patterns, and occupational stress to adverse prostate health outcomes and elevated PSA levels (Mondul et al., 2020; Sritharan et al., 2019). Transportation workers, including taxi drivers, are particularly exposed to sedentary behavior and irregular meal patterns, which contribute to metabolic dysfunction and chronic inflammation—pathways implicated in prostate disease progression (Ledda et al., 2023; Sousa et al., 2022).

The divided perception reflected in Figure. 3 also aligns with previous research indicating that awareness of prostate cancer does not necessarily extend to understanding modifiable lifestyle and occupational risk factors (Jamieson et al., 2022; Abila et al., 2022). Without targeted education, men may attribute prostate health problems primarily to aging or heredity, overlooking the role of preventable behaviors.

This highlights a critical knowledge gap regarding lifestyle- and occupation-related prostate health risks among taxi drivers. This underscores the need for comprehensive health education interventions that explicitly link daily work practices—such as prolonged sitting and limited physical activity—to prostate health outcomes. Workplace-based sensitization programs, delivered through taxi unions and supported by mobile health (mHealth) initiatives, could help improve risk perception and encourage healthier behavioral modifications within this occupational group.

Association between Demographic Characteristics and Lifestyle and Occupational Risk Factors Associated with Elevated PSA Levels

Table.6 presents the Chi-square analysis examining the relationship between selected socio-demographic characteristics and lifestyle and occupational risk factors associated with elevated Prostate-Specific Antigen (PSA) levels among taxi drivers. The results indicate that none of the demographic variables assessed showed a statistically significant association with lifestyle and occupational risk factors ($p > 0.05$ for all comparisons).

Specifically, factors such as age, marital status, level of education, religion, place of residence, years of driving experience, journey type, and working shift were not significantly related to the presence of lifestyle and occupational risk behaviors. This finding suggests that unhealthy lifestyle practices and occupational exposures are broadly distributed across all demographic subgroups, rather than being concentrated within specific age groups or socio-demographic categories.

The lack of association between age and lifestyle risk factors implies that sedentary behavior, dietary patterns, and other occupational exposures affect both younger and older drivers alike. This aligns with findings from studies among transportation workers, which report that prolonged sitting and limited physical activity are intrinsic to the occupation itself and persist regardless of age or duration of employment (Sritharan et al., 2019; Ledda et al., 2023). Similarly, the absence of a significant relationship between years of driving experience and risk factors suggests that occupational exposure begins early and remains relatively constant over time.

Educational level was also not significantly associated with lifestyle and occupational risk factors. This supports evidence from low- and middle-income countries indicating that higher formal education does not necessarily translate into healthier lifestyle choices when occupational constraints—such as long working hours and limited access to healthy food options—are present (Jamieson et al., 2022; Adei et al., 2022). In the context of taxi driving, work-related demands may override individual knowledge or intentions regarding healthy behavior.

Furthermore, the non-significant associations observed for marital status and religion suggest that social or cultural affiliations did not meaningfully influence lifestyle practices in this population. While some studies report that social support and cultural norms can shape health behavior, these effects may be attenuated in informal occupational groups facing economic pressures and limited workplace health regulation (Galvão et al., 2020; Davidson et al., 2020).

This Table indicates that lifestyle and occupational risk factors associated with elevated PSA levels are systemic and occupation-driven rather than demographically determined. These findings underscore the importance of implementing broad, occupation-focused health promotion interventions**,** rather than targeting specific demographic groups. Workplace-based strategies—such as scheduled physical activity breaks, nutrition education at taxi ranks, and occupational health outreach—may be more effective in mitigating prostate health risks among taxi drivers.

Table 6 Chi-Square Analyses of Demographic Characteristics, Lifestyle and Occupational Risk Factors Associated with Elevated PSA Levels

		p value
Age	13.5	.332
Marital Status	9.1	.695
Level of Education	14.1	.592
Religion	7.7	.804
Residences	17.5	.131
Prostate Cancer Diagnosis Status	2.4	.667
Years of Driving Experience	35.6	.303
Journey Type	2.3	.687
Working Shift	8.2	.412

Barriers to PSA Screening and Early Detection of Prostate Disorders among Taxi Drivers

Table 7 highlights several key barriers that hinder Prostate-Specific Antigen (PSA) screening and early detection of prostate disorders among taxi drivers at the Accra Madina Station. The findings indicate that structural, financial, and psychosocial factors play a substantial role in limiting access to prostate health services in this occupational group.

A majority of respondents reported difficulty accessing affordable prostate healthcare (63.8%) and indicated that the cost of PSA screening (61.7%) constituted a significant barrier. These findings are consistent with previous studies in Ghana and other low- and middle-income countries (LMICs), which have identified financial constraints as a primary obstacle to cancer screening uptake, particularly among men working in the informal sector (Osei et al., 2022; Abila et al., 2022). Given that taxi drivers rely on daily income and often lack health insurance coverage, out-of-pocket expenses for screening can discourage preventive healthcare utilization.

Limited availability of healthcare facilities offering PSA testing was reported by 50.0% of participants**,** underscoring persistent health system access challenges**.** Similar access-related barriers have been documented in urban and peri-urban Ghana, where diagnostic services are concentrated in tertiary facilities, making routine screening less accessible to working populations (Kofi et al., 2021; Marima et al., 2023).

Social and cultural factors also emerged prominently. A high proportion of respondents **(**70.2%**)** expressed concern about stigma associated with prostate health issues. Stigma and fear related to prostate disease, masculinity, and invasive diagnostic procedures have been widely reported as deterrents to screening among African men (Foster et al., 2023; Benedict et al., 2022). Such stigma may lead to delayed health-seeking behavior and contribute to late-stage presentation of prostate cancer.

In contrast, language barriers were minimal, with only 7.4% of respondents reporting difficulty accessing prostate health information due to language. This suggests that communication barriers may be less significant in this urban, multilingual setting, and that interventions can be effectively delivered in commonly spoken local languages without major linguistic constraints.

Generally, Table.7 demonstrates that economic limitations, healthcare access issues, and social stigma constitute the most significant barriers to PSA screening among taxi drivers, rather than language or informational accessibility alone. These findings emphasize the need for multifaceted interventions**,** including subsidized or free screening programs, mobile or workplace-based screening services, and culturally sensitive education campaigns aimed at reducing stigma. Addressing these barriers is critical for improving early detection and reducing prostate cancer morbidity and mortality in this high-risk occupational group.

Table 4: 7 Barriers to PSA Screening and Early Detection of Prostate Disorders

Statements on awareness and knowledge of PSA testing and prostate health	**Agree n (%)**	**Disagree n (%)**
Difficulty accessing affordable prostate healthcare	60 (63.8%)	34 (36.2%)
Difficult to access PSA screening services due to cost	58 (61.7%)	36 (38.3%)
Limited healthcare facilities offering PSA tests in my area	47 (50.0%)	47 (50.0%)
Lack of information about the benefits of PSA screening	36 (38.3%)	58 (61.7%)
Concerned about the stigma associated with prostate health issues	66 (70.2%)	28 (29.8%)
Language barriers in seeking prostate health information	7 (7.4%)	87 (92.6%)
Overall		
Response	**Frequency n (%)**	
Agree	274 (48.6%)	
Disagree	290 (51.4%)	

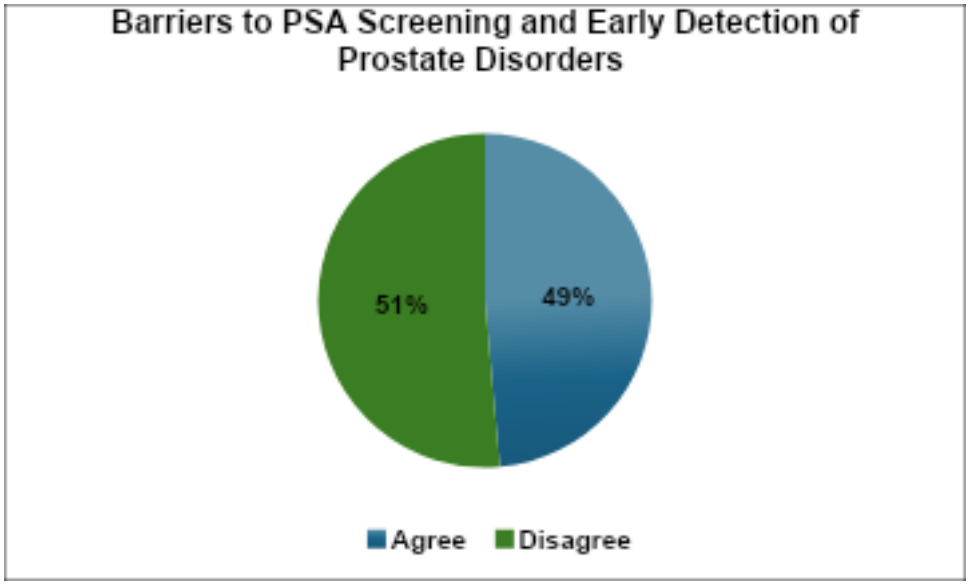

Figure. 4 Barriers to PSA Screening and Early Detection of Prostate Disorders

Barriers to PSA Screening and Early Detection of Prostate Disorders

Figure.4 presents the overall distribution of participants' responses regarding barriers to Prostate-Specific Antigen (PSA) screening and early detection of prostate disorders among taxi drivers at the Accra Madina Station. The figure indicates that 48.6% of respondents agreed that significant barriers exist, while 51.4% disagreed, suggesting a near-equal perception of barriers within the study population.

The proportion of respondents acknowledging barriers reflects the complex and sometimes competing realities faced by men in the informal transport sector. While nearly half of the participants perceived substantial obstacles to screening, the remaining respondents may either underestimate these barriers or have developed coping strategies, such as relying on occasional outreach programs or informal healthcare access. Similar mixed perceptions have been reported in other Ghanaian studies, where men recognize prostate cancer as a health concern but differ in how strongly they perceive barriers to screening (Laweh & Manortey, 2021; Osei et al., 2022).

The findings in Figure.4 should be interpreted alongside Table.7, which identifies financial constraints, limited access to screening facilities, and social stigma as the most prominent barriers. Prior research consistently shows that cost and accessibility are dominant deterrents to PSA screening in low- and middle-income countries (LMICs), particularly among informal workers who depend on daily income and lack comprehensive health insurance coverage (Abila et al., 2022; Kofi et al., 2021). Even when awareness exists, these structural barriers can significantly limit actual screening uptake.

The relatively balanced distribution of agreement and disagreement also highlights the role of individual perception and health-seeking behavior**.** Studies suggest that men who perceive themselves as asymptomatic or "healthy" are less likely to recognize barriers or prioritize preventive screening, despite being at biological risk due to age or occupation (Jamieson et al., 2022; Foster et al., 2023). This perception may contribute to delayed diagnosis and advanced disease presentation.

Figure. 4 reinforces the conclusion that barriers to PSA screening among taxi drivers are real but variably perceived, underscoring the need for interventions that address both structural obstacles (such as cost and service availability) and perceptual barriers (such as stigma and low risk perception). Integrated strategies—such as subsidized screening, mobile clinics at taxi ranks, and culturally sensitive education—may help reduce these barriers and improve early detection of prostate disorders in this high-risk occupational group.

Association between Demographic Characteristics and Barriers to PSA Screening and Early Detection of Prostate Disorders

Table.8 presents the Chi-square analysis examining the association between selected socio-demographic characteristics and perceived barriers to Prostate-Specific Antigen (PSA) screening and early detection of prostate disorders among taxi drivers. The results indicate that no statistically significant associations were observed between demographic variables and perceived barriers ($p > 0.05$ for all comparisons).

The absence of a significant association between age and perceived barriers suggests that challenges such as cost, access to screening facilities, stigma, and fear are experienced relatively uniformly across all age groups. This finding is consistent with previous studies in Ghana and other low- and middle-income countries (LMICs), which report that systemic barriers to prostate cancer screening tend to affect men broadly, regardless of age, particularly in informal occupational settings (Osei et al., 2022; Abila et al., 2022).

Similarly, educational level was not significantly associated with perceived barriers, indicating that higher formal education does not necessarily mitigate obstacles to PSA screening. This aligns with evidence showing that structural constraints—such as out-of-pocket costs, limited availability of diagnostic services, and competing work demands—often outweigh the potential benefits of education in influencing preventive health behavior (Jamieson et

al., 2022; Kofi et al., 2021). In the context of taxi drivers, long working hours and income dependency may limit healthcare utilization irrespective of educational attainment.

The lack of association between marital status and barriers further suggests that spousal or family support alone may be insufficient to overcome economic and health system constraints. Although some studies indicate that married men are more likely to seek healthcare due to spousal encouragement, this effect is often diminished when screening services are costly or inaccessible (Galvão et al., 2020; Foster et al., 2023).

Occupationally related demographic factors, including years of driving experience, journey type, and work shift, also showed no significant relationship with perceived barriers. This finding implies that barriers to PSA screening are not driven by specific work patterns but are instead embedded within broader healthcare access and affordability challenges faced by transport workers as a group (Davidson et al., 2020; Ledda et al., 2023).

This demonstrates that barriers to PSA screening and early detection of prostate disorders are systemic rather than demographically specific**.** These findings emphasize the need for population-wide and occupation-focused interventions**,** such as subsidized screening programs, mobile diagnostic services at taxi ranks, and stigma-reduction campaigns, rather than strategies targeted at particular demographic subgroups. Addressing these overarching barriers is essential for improving screening uptake and promoting early detection of prostate disorders among taxi drivers.

Table. 8 Chi-Square Analysis of Demographic Characteristics and Barriers to PSA Screening and Early Detection of Prostate Disorders

		p value
Age	8.5	.746
Marital Status	9.6	.650
Level of Education	8.6	.930
Religion	16.0	.191
Residences	5.7	.932
Prostate Cancer Diagnosis Status	**11.6**	**.021**
Years of Driving Experience	41.1	.128
Journey Type	5.5	.242
Working Shift	6.1	.633

Discussion

This study assessed the prevalence of elevated Prostate-Specific Antigen (PSA) levels among taxi drivers at the Accra Madina Station and examined their awareness, lifestyle practices, and perceived barriers related to prostate health and PSA screening. The findings provide important insights into prostate health risks within an understudied occupational group in Ghana's informal sector.

Prevalence of Elevated PSA Levels

The prevalence of elevated PSA levels (>4.0 ng/mL) among the taxi drivers was 33%, indicating that approximately one in three participants may be at increased risk of prostate-related abnormalities. This prevalence is comparatively high for a community-based occupational group and suggests a substantial underlying burden of undiagnosed prostate pathology. Similar studies in sub-Saharan Africa have reported elevated PSA prevalence rates ranging between 20% and 35% among men aged 40 years and above, particularly in settings with limited routine screening (Rawla, 2019; Barry, 2021; Boafo et al., 2023).

The high prevalence observed may be attributed to the age structure of the study population, as nearly half of the participants were aged 55–69 years. Age is the most significant non-modifiable risk factor for prostate disorders, with prostate enlargement and malignant transformation increasing due to cumulative hormonal changes and chronic inflammation (García-Fuentes et al., 2023). The findings reinforce existing evidence that older men in informal occupational settings are particularly vulnerable to undetected prostate disease.

Notably, only a small proportion of participants reported a prior diagnosis of prostate cancer, despite the high PSA positivity rate. This discrepancy strongly suggests underdiagnosis and delayed detection, a phenomenon widely reported in Ghana and other low- and middle-income countries (LMICs), where access to screening and diagnostic services remains limited (Kofi et al., 2021; Abila et al., 2022). PSA testing in this context therefore serves as a valuable early warning tool rather than a definitive diagnostic measure.

Socio-demographic and Occupational Patterns of PSA Elevation

Elevated PSA levels were more frequently observed among older drivers, married participants, and those with longer years of driving experience. While marital status and education showed no statistically significant associations with PSA levels, the observed patterns likely reflect age-related clustering rather than direct causal effects. Similar findings have been reported in population-based studies where marital status functions as a proxy for age and social stability rather than an independent biological determinant of prostate disease (Galvão et al., 2020).

Occupational characteristics appeared particularly relevant. Drivers with more than 10 years of driving experience and those engaged predominantly in short-distance journeys exhibited higher proportions of elevated PSA. Taxi driving is characterized by prolonged sitting, physical inactivity, exposure to traffic-related air pollution, and chronic psychosocial stress—factors that have been linked to metabolic dysfunction, systemic inflammation, and increased cancer risk (Sritharan et al., 2019; Ledda et al., 2023). Short-distance urban driving, in particular, involves frequent traffic

congestion and extended sedentary periods, which may exacerbate these risks.

Awareness and Knowledge of PSA Testing and Prostate Health

The study found moderate awareness of prostate cancer and PSA testing among participants. While the majority recognized prostate cancer as a health risk and acknowledged the importance of early screening, only about two-thirds had heard of the PSA test, and less than half reported adequate access to prostate health information. This disconnects between general awareness and detailed knowledge mirrors findings from other Ghanaian studies, where awareness does not consistently translate into informed screening behavior (Laweh & Manortey, 2021; Agyemang et al., 2022).

Interestingly, a relatively high proportion of participants reported having undergone PSA testing. This suggests that PSA screening may often occur opportunistically—during hospital visits or outreach programs—rather than as part of informed, routine preventive care. Similar patterns have been documented in Ghana, where men undergo PSA testing without comprehensive counseling regarding its benefits, limitations, or follow-up requirements (Benurugo et al., 2020; Boafo et al., 2023).

The absence of statistically significant associations between socio-demographic characteristics and awareness levels indicates that knowledge gaps are widespread across all subgroups. This finding highlights that education, age, or marital status alone are insufficient to improve prostate health literacy in informal occupational settings, emphasizing the need for structured, occupation-specific education interventions.

Lifestyle and Occupational Risk Factors

The study revealed a mixed pattern of lifestyle behaviors. Although a majority of participants reported consuming fruits and vegetables and engaging in some physical activity, high consumption of fatty foods and prolonged sedentary behavior were common. These findings reflect the constraints of taxi driving, where long working hours, limited food choices, and lack of opportunities for exercise shape health behaviors.

Sedentary behavior is of particular concern, as prolonged sitting has been associated with impaired glucose metabolism, hormonal dysregulation, and increased prostate cancer risk (Mondul et al., 2020; Lavalette et al., 2020). The divided perception of lifestyle risks observed in Figure. 3 further suggests that many drivers may underestimate the health impact of their occupational routines, a trend consistent with studies among transport workers in other African settings (Davidson et al., 2020; Adei et al., 2022).

Barriers to PSA Screening and Early Detection

Financial constraints, limited access to screening facilities, and social stigma emerged as the most significant barriers to PSA screening. These barriers are well-documented in LMICs, where out-of-pocket healthcare costs and centralized diagnostic services discourage preventive screening, especially among informal workers dependent on daily income (Osei et al., 2022; Abila et al., 2022).

Stigma related to prostate disease and screening procedures was particularly prominent. Cultural norms surrounding masculinity, fear of diagnosis, and misconceptions about prostate examinations have been shown to delay health-seeking behavior and contribute to late-stage presentation (Benedict et al., 2022; Foster et al., 2023). The lack of significant associations between demographic characteristics and perceived barriers further indicates that these challenges are systemic rather than individual, requiring structural solutions.

Implications for Public Health and Practice

The findings underscore the need for targeted, occupation-focused prostate health interventions. Mobile screening clinics at taxi ranks, subsidized PSA testing, collaboration with taxi unions, and culturally sensitive education campaigns could significantly improve screening uptake and early detection. Integrating prostate health education into existing occupational health outreach programs may help bridge the gap between awareness and action.

Conclusion

This study provides important evidence on prostate health among taxi drivers at the Accra Madina Station, revealing a substantially high prevalence of elevated Prostate-Specific Antigen (PSA) levels (33%). This finding indicates that a considerable proportion of men within this occupational group may be at increased risk of prostate-related disorders, underscoring a critical but under-recognized public health issue within Ghana's informal transport sector.

Although general awareness of prostate cancer and the importance of early screening was relatively moderate, specific knowledge of PSA testing and access to prostate health information were inadequate. This gap between general awareness and actionable knowledge highlights a persistent challenge in translating health awareness into informed preventive behavior. Additionally, the widespread presence of occupational and lifestyle risk factors—particularly prolonged sedentary work patterns and suboptimal dietary practices—further exacerbates prostate health risks among taxi drivers.

Notably, socio-demographic characteristics showed no consistent association with awareness levels, lifestyle risk factors, or perceived barriers to screening, suggesting that these challenges are systemic and occupation-driven rather than demographically specific. Financial constraints, limited access to screening services, and social stigma emerged as the most prominent barriers to PSA screening, even among individuals who recognized the importance of early detection.

In conclusion, taxi drivers represent a high-risk yet underserved population with respect to prostate health services. Addressing this gap requires targeted, occupation-focused interventions, including subsidized or free PSA screening, mobile screening services at taxi stations, and culturally appropriate health education delivered through transport unions and community-based platforms. Integrating prostate health promotion into occupational health frameworks could significantly enhance early detection, improve timely referral, and ultimately reduce prostate cancer morbidity and mortality among men in the informal transport sector in Ghana.

Recommendations

Based on the findings of this study, the following recommendations are proposed to improve prostate health outcomes among taxi drivers and similar informal occupational groups:

1. There is a need to implement targeted, occupation-focused prostate health programs for taxi drivers. Mobile PSA screening clinics should be introduced at major taxi stations, including Accra Madina, to improve accessibility and reduce time and transportation constraints. Subsidized or free PSA testing, supported by government agencies and non-governmental organizations, would help address financial barriers that currently limit screening uptake.

In addition, tailored health education campaigns should be developed to bridge the gap between general awareness and specific knowledge of PSA testing. These programs should emphasize the purpose, benefits, and limitations of PSA screening and be delivered through taxi unions, community health outreach teams, and mobile health (mHealth) platforms using culturally appropriate messaging.

2. Stakeholders within the transport sector should collaborate with public health authorities to integrate prostate health promotion into occupational health initiatives. Practical interventions may include encouraging regular physical activity breaks during work hours, promoting healthier dietary choices at taxi ranks, and providing education on the health risks associated with prolonged sedentary behavior. Such workplace-based strategies could help mitigate modifiable lifestyle and occupational risk factors associated with elevated PSA levels.

3. At the policy level, prostate cancer screening services should be strengthened within primary healthcare systems, particularly in urban and peri-urban settings with large informal workforces. Expanding coverage of PSA testing under national health insurance schemes would significantly reduce out-of-pocket costs and improve equitable access to early detection services. Furthermore, stigma-reduction initiatives addressing cultural misconceptions about prostate disease should be incorporated into national cancer control programs.

4. Further studies are recommended to build on the findings of this research. Longitudinal studies involving larger and more diverse populations of transport workers are needed to assess PSA trends over time and establish causal relationships between occupational exposure and prostate health outcomes. Future research should also incorporate clinical examinations, imaging, and histopathological confirmation to improve diagnostic accuracy and distinguish benign conditions from malignant disease. Evaluating the effectiveness of targeted screening and education interventions in reducing late-stage prostate cancer diagnosis would provide valuable evidence to guide policy and practice.

Limitations of the Study

Several limitations of this study should be considered when interpreting the findings.

1. The cross-sectional study design limits the ability to establish causal relationships between socio-demographic factors, lifestyle practices, occupational exposures, and elevated Prostate-Specific Antigen (PSA) levels. The observed associations therefore reflect correlations at a single point in time rather than temporal or causal pathways.
2. PSA testing alone was used as the primary biochemical indicator of prostate health. While PSA is a widely accepted screening biomarker, elevated PSA levels are not specific to prostate cancer and may also result from benign prostatic hyperplasia, prostatitis, recent ejaculation, or urinary tract infections. The absence of confirmatory diagnostic procedures such as digital rectal examination (DRE), imaging, or histopathological biopsy limits the ability to distinguish between benign and malignant prostate conditions.
3. The study was conducted at a single taxi station (Accra Madina), which may limit the generalizability of the findings to taxi drivers in other regions of Ghana or to other informal occupational groups. Variations in working conditions, healthcare access, and socio-cultural factors across different settings may influence prostate health outcomes.
4. Data on awareness, lifestyle behaviors, and perceived barriers were collected using self-reported questionnaires, which are subject to recall bias and social desirability bias. Participants may have overreported healthy behaviors or underreported risky practices, potentially affecting the accuracy of these measures.
5. The sample size, while adequate for descriptive and associative analysis, may have limited the statistical power to detect weaker associations between variables. Finally, potential confounding factors such as family history of prostate cancer, body mass index, comorbid conditions, and medication use were not comprehensively assessed and could have influenced PSA levels.

Despite these limitations, the study provides valuable preliminary evidence on prostate health risks, awareness gaps, and screening barriers among taxi drivers, an understudied population in Ghana.

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