Prevalence of Prostate Disease in Men Attending Urology Clinic at Federal Medical Centre Makurdi Using PSA as a Marker

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ABSTRACT

Prostate diseases remain a major public health concern worldwide, particularly among aging male populations. This study investigated the prevalence and associated risk factors of prostate disease in men attending the Urology Clinic at the Federal Medical Centre, Makurdi, Benue State, Nigeria, using serum prostate-specific antigen (PSA) levels as a diagnostic marker. A total of 100 male participants aged 50 years and above were recruited for PSA testing, while 200 participants completed structured questionnaires on demographic and lifestyle characteristics. Serum PSA levels were determined using enzyme-linked immunosorbent assay (ELISA). Elevated PSA was defined as ≥4.0 ng/mL. Elevated PSA levels were observed in 60% of participants tested, with the highest prevalence among the Hausa (33.3%) and Tiv (30%) ethnic groups, and in men aged 60–69 years (55%). Questionnaire data indicated that 66% of respondents reported a history of prostate disease, and 61% had a family history of the condition. Bacterial infections (45%) and diabetes mellitus (30.5%) were the most frequently reported comorbidities. The findings demonstrate a substantial burden of prostate disease among men in Makurdi, highlighting age, family history, and comorbidities as key risk factors. Routine PSA screening, particularly among high-risk groups, is recommended for early detection and intervention.

Key Words: Prostate, Cancer, Disease, Urology, public health.

INTRODUCTION

Prostate disease is one of the most common urological disorders affecting men globally and is strongly associated with aging. The prostate gland, a walnut-sized organ located below the bladder, plays a critical role in male reproductive health by producing seminal fluid. Disorders of the prostate, including prostatitis, benign prostatic hyperplasia (BPH), and prostate cancer, contribute significantly to morbidity and mortality among men, with prostate cancer ranking as the second leading cause of cancer-related deaths in men worldwide (Grönberg, 2003; Jemal et al., 2011; Bray et al., 2018). In sub-Saharan Africa, prostate disease presents a growing challenge due to increasing life expectancy, limited awareness, and constrained healthcare resources. Nigeria, in particular, reports a rising incidence of prostate disorders, with studies suggesting that up to 11% of all cancers in Nigerian men are of the prostate (Cooper et al., 2013; Ekwere et al., 2012; Adejumo et al., 2019). Despite this, early detection and treatment are often hindered by inadequate screening programs, sociocultural beliefs, and poor healthcare access. Prostate-specific antigen (PSA), a serine protease secreted by prostatic epithelial cells, has

become the most widely used biomarker for the detection of prostate abnormalities. While PSA testing is not specific to malignancy and may be elevated in non-cancerous conditions such as BPH or prostatitis, it remains a useful tool for screening, risk stratification, and monitoring (Chou et al., 2011).

This study was designed to determine the prevalence of prostate disease and associated risk factors in men attending the Urology Clinic at the Federal Medical Centre, Makurdi, Nigeria. By combining PSA testing with demographic and lifestyle data, the study aimed to provide both clinical and epidemiological insights into prostate disease patterns in this population. The findings are expected to contribute to improved awareness, early detection strategies, and public health interventions targeting high-risk groups in Nigeria and similar settings.

MATERIALS AND METHODS

Study Area

The study was conducted at the Urology Clinic of the Federal Medical Centre (FMC), Makurdi, Benue State, Nigeria. Makurdi, the state capital, is located in north-central Nigeria along the Benue River. FMC Makurdi is a tertiary health institution that serves as a referral center for patients across the state and surrounding regions, with a significant proportion of its outpatient population presenting with urological conditions.

Study Design and Population

This cross-sectional study involved two complementary components:

1. Biochemical screening of 100 men aged 50 years and above attending the Urology Clinic.

2. Questionnaire survey of 200 men attending the clinic to capture demographic, lifestyle, and family history variables related to prostate disease.

Participants were recruited using simple random sampling. Inclusion criteria were men aged 40 years and above attending the urology clinic who consented to participate. Biochemical PSA testing was conducted on participants aged 50 years and above, consistent with standard screening recommendations. Men with known chronic kidney disease or those receiving treatment for prostate cancer were excluded.

Ethical Approval

The study protocol was reviewed and approved by the Ethics Committee of the College of Health Sciences, Niger Delta University (the institutional affiliation of the lead researcher), and by the FMC Makurdi management board. Written informed consent was obtained from all participants.

Sample Collection and Preparation

For biochemical analysis, venous blood samples were collected into plain vacutainer tubes by standard venipuncture. Samples were allowed to clot, centrifuged at 3500 rpm for 5 minutes, and the serum separated. Aliquots were stored at –20°C until analysis.

Laboratory Analysis

Serum prostate-specific antigen (PSA) levels were quantified using a commercial enzyme-linked immunosorbent assay (ELISA) kit, following the manufacturer's protocol. The assay principle is based on a sandwich ELISA with monoclonal anti-PSA antibodies immobilized on microtiter wells. Optical density was measured at 450 nm, and PSA concentrations were extrapolated from standard calibration curves.

Reference Ranges

Age-specific reference ranges for PSA were applied as follows (Oesterling et al., 1993):

40–49 years: 0–2.5 ng/mL

50–59 years: 0–3.5 ng/mL

60–69 years: 0–4.5 ng/mL

≥70 years: 0–6.6 ng/mL

However, to define "elevated" PSA clearly and for consistency with common clinical practice in Nigerian studies, a uniform threshold of ≥4.0 ng/mL was primarily used. Both the uniform threshold and age-specific ranges were considered in prevalence reporting.

Questionnaire Survey

A structured questionnaire was administered to 200 consenting participants. The questionnaire collected information on age, education, occupation, marital status, religion, dietary habits, comorbidities, and family history of prostate disease.

Statistical Analysis

Data were analyzed using Microsoft Excel 2016. Descriptive statistics were computed as frequencies and percentages. Mean and standard deviation (SD) values were calculated for PSA levels. Differences in PSA distribution across age and ethnic groups were assessed using chi-square tests, with $p < 0.05$ considered statistically significant. A test of contrast for ethnic distribution (particularly comparing Hausa and Tiv versus other groups) was performed using the chi-square test to assess significance. For prevalence reporting, both the uniform PSA threshold of ≥4.0 ng/mL and the age-specific reference ranges were applied; elevated PSA was defined as exceeding the age-specific upper limit for each participant's age group.

RESULTS

Of the 200 respondents, 132 (66%) reported suffering from prostate diseases, while 68 (34%) had not. PSA measurements indicated that 60 (60%) had elevated PSA levels with a mean ± SD of 54.17 ± 32.4 ng/mL, while 40 (40%) were within the normal range (mean ± SD 1.47 ± 0.94). Elevated PSA levels were most prevalent among men aged 60–69 years (55%) followed by ≥70 years (23.3%). Ethnic group distribution showed that elevated PSA cases were highest among Hausa (33.3%), Tiv (30%), Idoma (23.3%), and Igbo (13.3%). Comorbidities such as bacterial infections (45%) and diabetes mellitus (30.5%) were commonly associated. Family history was significant, with 61% of respondents reporting parental prostate disease and 86% reporting affected siblings or relations.

Table 1. Total number of subjects and PSA levels

GROUP	**N**	**M ± S. D**
PSA NORMAL	40	1.472 ± 0.940
PSA ELEVATED	60	54.17 ± 32.4
TOTAL	100	_____

A total of 100 men underwent PSA testing. Among them, 60% had elevated (i.e. ≥4.0 ng/mL) PSA levels, while 40% fell within the normal range

Table 2. Elevated and normal PSA responses based on ethnic group

S/N	TRIBE	ELEVATED	PERCENTAGE	NORMAL	PERCENTAGE
1	TIV	18	30%	7	17.5%
2	HAUSA	20	33.3%	5	12.5%
3	IDOMA	14	23.3%	11	27.5%
4	IBO	8	13.3%	17	42.5%
	TOTAL	**60**	**100%**	**40**	**100%**

Elevated PSA was most frequent among Hausa (33.3%) and Tiv (30%) participants, while the Igbo recorded the lowest elevation (13.3%). Conversely, 42.5% of Igbo men had normal PSA values (Table 2).

Table 3. Elevated and normal PSA responses based on age

S/N	AGE (YRS)	ELEVATED	PERCENTAGE (%)	NORMAL	PERCENTAGE (%)
1	50-59	13	21.7%	17	43%
2	60-69	33	55%	18	45%
3	>70	14	23.3%	5	12%
	TOTAL	**60**	**100%**	**40**	**100%**

Participants aged 60–69 years accounted for the highest proportion of elevated PSA (55%), followed by those aged ≥70 years (23.3%). Men aged 50–59 years represented 21.7% of elevated cases (Table 3).

Table 4. Mean ± SD of PSA values by ethnic group and age

GROUPS		ELEVATED M ± S. D	NORMAL M ± S. D	P-VALUE	REMARKS
(Tribe)	**TIV**	**PSA=13.80±3.29**	**PSA=0.64±0.17**	**<0.05**	**S**
	HAUSA	**PSA=26.890±7.43**	**PSA=0.9320±0.13**	**<0.05**	**S**
	IDOMA	**PSA=56.0±12.42**	**PSA=1.24±0.35**	**<0.05**	**S**
	IBO	**PSA=19.05 ± 1.53**	**PSA=1.59±0.92**	**<0.05**	**S**
(Age)	**50-59**	**PSA=55.05±12.40**	**PSA=0.85±0.24**	**<0.05**	**S**
	60-69	**PSA=52.15±11.02**	**PSA=0.75±0.23**	**<0.05**	**S**
	>70	**PSA=23.164±3.4**	**PSA=0.932±0.12**	**<0.05**	**S**

Table 5. Demographic characteristics of respondents (n = 200)

	VARIABLES	FREQUENCY	PERCENTAGE
1	**Age Range**		
	Less than 40 years	18	9
	40-49 years	13	6.5
	50-59 years	61	30.5
	60-69 years	92	46
	70 and above	16	8
		200	**100**
2	**Level of education**		
	Primary	98	49
	Secondary	36	18
	Tertiary	27	13.5
	None	39	19.5
		200	**100**
3	**Occupation**		
	Farming	123	61.5
	Civil servant	32	16
	Self employed	27	13.5
	Unemployed	18	9
		200	**100**
4	**Marital status**		
	Single	15	7.5
	Married	162	81
	Divorced	23	11.5
		200	**100**
5	**Religion**		
	Christian	91	45.5

	Islam	107	53.5
	Traditional	2	1
		200	**100**

Results from Table 5 above show that 18 (9%) of the respondents are less than 40 years, 13 (6.5%) are between 40–49, 61 (30.5%) are between 50–59, 92 (46%) are between 60–69 years and finally 16 (8%) are above 70 years. On level of education, 98 (49%) of the respondents attended primary school, 36 (18%) attended secondary school, 27 (13.5%) attended tertiary institutions while 39 (19.5%) of the respondents did not go to school at all. From the questionnaire survey (n = 200), most respondents (46%) were aged 60–69 years, 61.5% were farmers, and 81% were married. Religious affiliation was predominantly Muslim (53.5%) and Christian (45.5%).

Table 6. Self-reported history of prostate disease

Option	**Have you suffered prostate disease**	**Percentage (%)**
YES	132	66
NO	68	34
Total	**200**	**100**

Out of 200 respondents, 66% reported having suffered from prostate disease, while 34% had not. The majority (61%) reported parental history of prostate disease, and 86% indicated that siblings or relatives had experienced it.

Table 7. Duration of self-reported prostate disease among respondents

Option	**If yes, how long have you been suffering from prostate disease**	**Percentage (%)**
2 years ago	121	61
3 years ago	55	28
More than 3 years ago	24	12
Total	**200**	**100**

Table 7 shows how long respondents suffer from prostate disease had. 121 (61%) of the respondents said 2 years ago, 55 (27%) said 3 years ago, while 24 (12%) said more than 3 years ago.

DISCUSSION

This study investigated the prevalence and risk factors of prostate disease among men attending the Urology Clinic at Federal Medical Centre, Makurdi, Nigeria, using serum PSA levels as a biomarker and supporting data from questionnaires. The findings demonstrate a high burden of prostate disease in this population, with 60% of tested participants exhibiting elevated PSA levels. The prevalence observed aligns with reports from other Nigerian and sub-Saharan African populations, where prostate disease is increasingly recognized as a major public health concern (Cooper et al., 2013; Hsing & Chokkalingam, 2006; Ukoli et al., 2003; Nwofor & Oranusi, 2004). Elevated PSA levels were most common among men aged 60–69 years, consistent with global evidence

that advancing age is the strongest risk factor for prostate disorders, including benign prostatic hyperplasia and prostate cancer (Grönberg, 2003; Jemal et al., 2011; Bray et al., 2018). This suggests that prostate disease in Makurdi follows the age-dependent trend observed worldwide.

Ethnic group distribution revealed higher PSA elevations among Hausa and Tiv participants compared to Igbo and Idoma. While this may reflect genetic, dietary, or cultural influences, it could also be due to clinic attendance patterns and should be interpreted cautiously. Further studies with larger, more representative samples are needed to clarify potential ethnic predispositions (Platz et al., 2000; Chu et al., 2011). Family history emerged as an important factor, with 61% of respondents reporting parental history of prostate disease and 86% reporting affected siblings or relatives. This strongly supports the role of hereditary susceptibility, as has been established in Western populations (Basch et al., 2015; Giovannucci et al., 2007). The high prevalence of reported family history in this study may also reflect greater awareness among participants who were already seeking care at a urology clinic. In terms of comorbidities, bacterial infections (45%) and diabetes mellitus (30.5%) were frequently reported. Both conditions may contribute to or exacerbate prostate pathology, either through chronic inflammation or metabolic dysregulation. PSA screening, while valuable in resource-limited settings such as Nigeria, carries the risk of over-diagnosis, particularly in older men. Many cases of elevated PSA may reflect benign conditions (e.g., benign prostatic hyperplasia or prostatitis) rather than clinically significant prostate cancer. In men over 70 years, indolent cancers that would never cause symptoms or affect life expectancy may be detected, leading to unnecessary anxiety, further invasive procedures (such as biopsy), and potential overtreatment with associated morbidity including urinary incontinence and erectile dysfunction. These findings highlight the importance of combining PSA testing with other clinical tools (e.g., digital rectal examination) and careful patient selection to minimize harm while maximizing benefit. These findings emphasize the importance of comprehensive clinical assessment of men with prostate disease, beyond PSA testing alone. The high proportion of farmers (61.5%) among participants may point to occupational or environmental risk factors. Pesticide exposure has been implicated in prostate cancer risk in other studies, although no direct causal link was explored in the present study. Additionally, dietary patterns dominated by carbohydrate and fatty foods, as reported by participants, may further influence risk.

Globally, debates continue over the utility of PSA testing, given its limited specificity and potential for overdiagnosis (Chou et al., 2011). However, in resource-limited settings such as Nigeria, PSA remains a valuable and accessible screening tool (Stamey et al., 1987; Catalona et al., 1994). The results of this study support routine PSA screening, especially for men aged 50 years and above, and particularly for those with positive family histories or comorbid conditions. Overall, this study contributes to both local and global understanding of prostate disease epidemiology. Locally, it highlights the urgent need for structured screening and public awareness programs in Nigeria. Globally, it adds to the body of literature documenting prostate disease patterns in African populations, where data remain scarce despite the high disease burden.

LIMITATIONS

This study has several limitations. First, the sample size for biochemical analysis (n=100) was relatively small compared to the questionnaire survey (n=200). Second, as a hospital-based study, the findings may not reflect community prevalence. Third, elevated PSA levels were not confirmed by digital rectal examination (DRE) or prostate biopsy; therefore, it was not possible to distinguish whether elevations resulted from prostatitis, benign prostatic hyperplasia, or prostate cancer. Fourth, reliance on self-reported data introduces possible recall bias. Finally, dietary and occupational exposures were not objectively measured.

CONCLUSION

The prevalence of elevated PSA among men attending the FMC Makurdi Urology Clinic was high, particularly among those aged 60–69 years, the Hausa and Tiv ethnic groups, and individuals with family histories of prostate disease. Comorbidities such as bacterial infections and diabetes mellitus were common and may contribute to the disease burden. These findings underscore the need for routine PSA screening, especially among high-risk groups, and the integration of prostate health education into public health strategies in Nigeria. Future studies

should employ larger, population-based samples and include confirmatory diagnostic tools beyond PSA to better characterize prostate disease burden in the region.

Conflict of Interest

Author Declare no Conflict of Interest

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