

# Prostate Specific Antigen Screening among Men in Abakaliki, South East Nigeria

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## Abstract

**Background:** Prostate cancer is the most common type of cancer among Nigerian men. Prostate specific antigen (PSA) is produced by the prostate gland and it is an important tumor marker in the screening and diagnosis of prostate cancer because the latter is often associated with elevated PSA levels. The aim of this study was to evaluate the profile and PSA levels of men presenting for prostate cancer screening at the National Obstetric Fistula Centre, Abakaliki, Nigeria. **Methods:** This was a retrospective study of 103 patients who were seen between January 2014 and December 2015 and screened for prostate cancer using PSA assay. Data was extracted from folders of patients using a proforma and analysed using the Statistical Package for Social Sciences (SPSS), version 21. **Result:** Out of the 103 clients studied, 67 (65%) were between the ages of 40 and 59 years. The mean age was  $54.38 \pm 12.5$  years. Eighty-one (78.6%) of the study population had PSA levels 4 ng/ml and below, 5 (4.9%) had PSA levels of 4.1 - 10 ng/ml, while 17 (16.5%) had PSA levels > 10 ng/ml. The mean PSA was  $4.75 \pm 8.2$  ng/ml. None of the patients with family history of cancer had PSA levels of >4 ng/ml. Those who were positive for HIV also had normal PSA results. **Conclusion:** The findings from this study showed that the prevalence of men with raised PSA (>4 ng/ml) was high (21.4%) especially in the 60 - 69 years age group. There is need to increase prostate cancer screening using PSA in our setting. The use of other parameters such as digital rectal examination, PSA density, PSA velocity and free PSA will be helpful to determine the need for histological diagnosis in these patients.

## Keywords

Prostate Cancer, PSA, Screening

## 1. Introduction

Prostate cancer is the number one cancer among men in Nigeria and globally

[1]. Prostate specific antigen (PSA) is currently considered to be a very important screening and diagnostic tool for prostate cancer as it is organ (prostate) specific and often elevated in men with this disease [2] [3]. PSA measurement can also be a useful tool in assessing response to treatment for prostate cancer [4]. However, PSA is not disease (prostate cancer) specific as it may also be somewhat raised in other prostatic diseases, such as benign prostatic hypertrophy (BPH) and prostatitis [5]. The morbidity and mortality associated with late presenting prostate cancer justifies screening to enhance early detection which significantly improves prognosis [6]. Part of the controversies surrounding the usefulness of PSA as a screening tool is the postulation that a good number of screen-detected prostate cancers are not likely to progress to clinically significant disease [7].

Although the absolute cut off for normal PSA levels varies, a value greater than 4 ng/ml is mostly considered abnormal and may require prostate biopsy for definitive diagnosis [4] [8]. Whereas PSA assay may occasionally be normal in some types of prostate cancer, it is commonly falsely elevated in conditions other than prostate cancer such as benign enlargement of the prostate, prostatitis, ischaemia, and following urethral instrumentation or digital rectal examination (DRE) [3] [5] [8].

A study done in North Western Nigeria among 106 men with an age range of 40 - 70 years observed a prevalence of PSA > 4.0 ng/ml in 6.6% of the study population, with the highest prevalence in men > 60 years of age [9]. The authors recorded a positive and significant correlation between age and raised PSA levels. In another study done among men in a rural community in Edo State, Nigeria, there was a 15.7% prevalence rate of PSA > 4 ng/ml among men 50 years and older [10]. Age and enlarged prostate were the main correlates of elevated PSA result in that study. PSA levels are known to vary from locality to locality, even within the same country.

Understanding of the pattern of PSA in our environment is important for proper patient management.

The aim of this study therefore, was to evaluate the profile and PSA levels of men presenting for prostate cancer screening at the oncology unit of the National Obstetric Fistula Centre, Abakaliki, Nigeria.

## 2. Patients and Methods

This retrospective study was conducted at the National Obstetric Fistula Centre, Abakaliki, South East Nigeria between January 2014 and December 2015 among men who presented for prostate cancer screening. Abakaliki is the administrative headquarters of Ebonyi state, South East of Nigeria. It is well known for agriculture. The study centre is primarily for management and research relating to obstetric fistula. However, it also has a dedicated urology and general surgery clinic. Approval for this study was obtained from the Hospital's Research and Ethics Committee. All patients seen within the period of review, and who were asymptomatic and had no abnormal digital rectal examination (DRE) findings were

recruited into the study. Men under the age of 40 years were excluded. Venous blood was used for PSA testing. The total PSA (tPSA) was determined using the Enzyme Linked Fluorescent Assay (ELFA) technique, which is a two step enzyme immunoassay sandwich method with a finer fluorescent detection. None of the patients seen within the period under review had prostate biopsy. Relevant data including age, tPSA levels, family history of prostate cancer, retroviral status were extracted from the medical records of patients using a proforma. The data was analyzed using the Statistical Package for Social Sciences, Version 21. The results were presented in tables.

### 3. Results

Out of the 103 clients studied, 67(65%) were between the ages of 40 and 59 years. The mean age was  $54.38 \pm 12.5$  years. Thirty-four (33%) were farmers, 33 (32%) were traders and 35 (34%) were civil servants (**Table 1**). Eighty-one (78.6%) of the study population had PSA levels 4 ng/ml and below, 5 (4.9%) had PSA levels of 4.1 - 10 ng/ml, while 17 (16.5%) had PSA levels > 10 ng/ml (**Table 2**). The mean PSA was  $4.75 \pm 8.2$  ng/ml. The highest prevalence of PSA >4ng/ml was found in age group 60 - 69 years (**Table 3**). Three (2.9%) were HIV positive and they all had normal PSA levels (**Table 4**). Five (4.9%) had positive family history of prostate cancer but non of these has PSA level >4ng/ml. Occupation did not influence PSA result.

**Table 1.** Sociodemographic variables of the patients.

Variable	Frequency (%)
Age range	
40 - 49	43 (41.7)
50 - 59	24 (23.3)
60 - 69	20 (19.4)
>69	16 (15.5)
Religion	
Christianity	101 (98.1)
Islam	2 (1.9)
Level of education	
No formal education	19 (18.4)
Primary	26 (25.2)
Secondary	22 (21.4)
Tertiary	36 (35)
Occupation	
Civil servant	35 (34)
Farming	34 (33)
Trading	33 (32)
None	1 (1)

**Table 2.** Categorization of PSA levels.

PSA level (ng/ml)	Frequency (%)
4 and below	81 (78.6)
4.1 - 10	5 (4.9)
>10	17(16.5)

**Table 3.** PSA levels among the various age groups.

Age	frequency	PSA levels		
		≤4 (%)	4.1 – 10 (%)	>10 (%)
40-49	43	34(79.07)	2(4.65)	7(16.28)
50-59	24	19(79.17)	1(4.17)	4(16.67)
60-69	20	13(65.00)	2(10.00)	5(25.00)
>69	16	15(93.75)	0(0.00)	1(6.25)

p = 0.614.

**Table 4.** PSA levels in relation to HIV status.

HIV status	PSA Levels			Total
	≤4	4.1 - 10	>10	
Negative	78	5	17	<b>100</b>
Positive	3	0	0	<b>3</b>
Total	81	5	17	<b>103</b>

#### 4. Discussion

In this study, the prevalence of PSA level >4ng/ml was 22(21.4%). In a study done in a rural community in southern Nigeria the prevalence of PSA result  $\geq 4$  ng/ml was 15.7% among men > 50 years [10]. Another study done in Abeokuta, Nigeria revealed a PSA > 4 ng/ml in 11.15% of the study population [11]. PSA is known to increase with age and size of the prostate with values over 10 ng/ml being suspicious for prostate cancer, especially after other factors that increase serum PSA are excluded [12]. The relatively high number of patients with raised PSA (>4 ng/ml) recorded in this study suggests that PSA screening for prostate cancer should be encouraged. Necessary awareness should be increased so that more men will come for screening. Prostate biopsy for histological diagnosis, where clearly indicated, will help determine the prostate lesions that are truly malignant.

The prevalence of raised PSA (>4ng/ml) was highest (35%) in age group 60 - 69 years. This corroborates the findings of other studies implicating age and prostate cancer as the strongest factors responsible for raised PSA. [1] [13] [14]

Occupation did not influence the PSA result in the study population. However, in a study done in North Western Nigeria a higher prevalence of PSA results > 4 ng/ml was observed among farmers (11.77%) compared to business men (6.67%) and civil servants (5.66%) [9]. Physical activity such as cycling has also been shown to cause an increase in PSA levels among healthy males [15]. This is at variance with another study that linked less physical activity to elevated PSA levels [16]. These differences may have been due to errors in the procedure. The effect of various occupations on PSA result is yet to be verified in our setting.

Family history of prostate cancer is an important risk factor in assessing pros-

tate cancer risk [17] [18]. Previous studies have shown that those with a family history of prostate cancer have an increased risk of developing the disease [17] [18]. This is however at variance with the observation in our study. Positive family history of prostate cancer did not influence the PSA result in the affected patients in the study population. Factors that may suggest an inherited form of prostate cancer are multiple affected first-degree relatives, early-onset (age  $\leq$  55 years) and family history of other cancers (e.g., breast, ovarian, pancreatic) [19]. These were however not ruled out as they were not assessed for in the study

HIV increases the risk for malignancies generally. This was however not suggested in this study as HIV positive patients did not have an elevated PSA result. Patients in this group need repeated screening at shorter intervals. Although some authors have documented that HIV positive men are at increased risk of prostate cancer [20], others have concluded that HIV positive men are not at increased risk of prostate cancer when compared to HIV negative men [21]. The observations and several explanatory postulations are therefore contradicting because the relationship between HIV and prostate cancer is still poorly understood. Some believe that HIV infection causes reduced androgen levels thereby preventing development of prostate cancer [22].

## 5. Conclusion

The findings from this study show that the proportion of men with PSA result  $>$  4ng/ml is high. Some elevated PSA levels may be a pointer to prostate malignancy especially after excluding other possible causes. There is need to increase prostate cancer screening using PSA assay in our setting. Family history of prostate cancer, occupation and the presence of HIV do not appear to have an influence on PSA levels in our study population. A larger volume of patients would however be required to authenticate the findings of this study. A close and prolonged follow up of the patients with raised PSA is also necessary to further justify PSA testing as a useful screening tool for prostate cancer. The use of other parameters such as DRE, PSA density, PSA velocity and free PSA will be helpful to determine the need for histological diagnosis in these patients.

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