

# A histopathological study of carcinoma of the prostate in port Harcourt, Nigeria

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## Abstract

**Objectives:** To determine the incidence of prostate cancer in Port Harcourt and the surrounding towns whose residents patronize the University of Port Harcourt Teaching Hospital for tertiary health care, histologically characterize the patterns of these cancers, and grade them according to the Gleason scheme.

**Materials and Methods:** Blocks and slides of prostate specimens received at the Department of Anatomical Pathology, University of Port Harcourt Teaching Hospital between January 1997 and December 2006 were retrospectively selected for this study. The slides were studied using a binocular Olympus light microscope. Patients' age at presentation, presenting symptoms, and clinical diagnosis were sorted out from the request cards and the department's archival register.

**Results:** Carcinoma was diagnosed in 198 specimens (37.4%) of the 529 cases reviewed. Of these, 164 (82.8%) were clinical carcinoma (having been found in clinically suspected carcinoma cases for which trucut biopsies were undertaken), while 34 (17.2%) were incidental carcinoma cases (being found in prostatectomy biopsy cases of patients clinically diagnosed with nodular hyperplasia). All of the clinical carcinomas were adenocarcinomas predominantly moderately differentiated and of large acinar pattern. Also, all of the incidental carcinomas were adenocarcinomas predominantly well differentiated and of large acinar pattern. The Gleason scores (GSs) were varied but predominantly of high values, particularly with clinical carcinoma cases. The age range was 42 to 90 years and the mean was 70 years with a peak of 70 to 79 years.

**Conclusion:** The incidence of prostate cancer in Port Harcourt is high relative to other Nigerian centers where similar studies have been carried out and compares well with the high incidence found among African American men. Histologically, all cases are acinar adenocarcinomas. Most patients present late with high GS carcinoma and therefore have poor prognosis. There is a need for enlightenment of the male populace on the high incidence of this deadly disease as well as for screening to reduce the number of patients presenting late and therefore improve prognosis.

**Key words:** Cancer, Gleason scoring, prostate

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## Introduction

Worldwide, prostate cancer is the most common male genital cancer.<sup>[1]</sup> Among blacks, it has been described as a public health epidemic.<sup>[2]</sup> In the United States of America, prostate cancer is the most common cancer of males and is second only to lung cancer as a cause of cancer death.<sup>[3]</sup> Various studies by eminent scholars in Nigeria have shown varying but relatively high incidence rates among Nigerians. In Ibadan,<sup>[4]</sup> a study ranked prostate cancer as

the number one cancer in Nigerian males, while another study in Enugu<sup>[5]</sup> noted that prostate cancer is the most common cancer of the urinary tract and is the second most common cancer of males, closely following cancer of the liver. Various histologic studies in different centers across Nigeria have shown prostate cancer incidences ranging from 14 to 24.6%.<sup>[6-10]</sup> Also, other studies within Africa have shown variable incidences ranging from 3.2

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per 100 000 in Zimbabwe to 4.3 cases per 100 000 men in Uganda to 4.4 in Senegal and 9.7 in Nigeria.<sup>[1]</sup>

Many studies have examined the risk factors associated with prostate cancer, but the results have been inconsistent and inconclusive. A genetic etiology has been proposed, based predominantly on the observation that the incidence is higher in men with first-degree relations having the disease. Consequently, it is recommended that men with positive family history should start early screening with Prostate specific antigen (PSA).<sup>[11]</sup> Prostate cancer cells are very sensitive to androgens; hence, their initiation and progression are markedly influenced by androgens. A study in the USA<sup>[12]</sup> showed that African Americans have high androgen levels, therefore high incidence of prostate cancer. However, a similar study in Nigeria<sup>[13]</sup> did not find high androgen levels among Nigerians despite high prostate cancer incidence. The study further suggested that there must be a common genetic predisposition between American blacks and Africans, particularly Nigerians who have the highest population of blacks in the world. Other epidemiological studies have shown a correlation between high dietary fat and beef intake with prostate cancer.<sup>[14]</sup> Also, regular intake of lycopene, an antioxidant found in tomatoes, is associated with reduced incidence of prostate cancer.<sup>[15]</sup>

Prostate cancer is rare before 50 years, after which it increases exponentially in incidence. Generally, in the USA and other Western countries, there is a steady rise in incidence with increasing age, whereas in most African countries, the incidence peaks in the seventh decade. A number of Nigerian and foreign studies have also shown slightly variable age factors, with a range of 20 to 100 years, peak of seventh to eighth decades and mean values ranging from 66.6 to 71.4 years.<sup>[4,7,16-19]</sup>

Histologically, most prostate carcinomas are adenocarcinomas with other forms of malignancies being rare.<sup>[5,7,20,21]</sup> The adenocarcinoma may be small acinar, large acinar, cribriform, or solid/trabeculae types with varying degrees of differentiation. A recent histopathologic study in Taiwan observed 100% adenocarcinoma among prostate cancer patients.<sup>[22]</sup>

The Gleason score (GS) is the most widely used system for grading prostate cancer; it is one of the most powerful predictors of prostate cancer progression and survival.<sup>[23]</sup> It is reproducible across different institutions. It is based on the most common glandular patterns with a consideration of the prognostically significant histologic heterogeneity that exists among cases of prostate cancer. Studies have shown that patients with a pathological GS of  $\leq 6$  have an excellent progress-free survival, which can be up to 90%. However, men with a GS  $\geq 7$  adenocarcinoma have a 29 to 43% risk of death from prostate cancer.<sup>[24]</sup> Underscoring the importance

of the grades, a study showed that patients with GS 4+3 are more likely to have metastases to regional lymph nodes than those with GS 3+4.<sup>[25]</sup> However, this scheme greatly depends on the skill and experience of the pathologist and is subject to some degree of individual variation.

Histologic studies have indicated that most patients have high scores.<sup>[22,25]</sup> Lack of awareness of the disease has been implicated as the cause of the high scores.<sup>[26]</sup>

This study is undertaken to determine the incidence of prostate cancer in Port Harcourt, histologically characterize the patterns of these cancers, and grade them according to the Gleason scheme.

## Materials and Methods

The tissue blocks and slides of all prostate specimens received in the department of Anatomical Pathology, University of Port Harcourt Teaching Hospital between January 1997 and December 2006 were selected for the study. These cases include prostate specimens from in-hospital patients and those from peripheral hospitals within Rivers State and surrounding states of Abia, Bayelsa, and Delta whose residents visit University of Port Harcourt Teaching Hospital for tertiary healthcare. All sections were stained with standard hematoxylin and eosin and studied using a binocular Olympus light microscope. Wherever necessary, new slides were prepared from blocks. The patients' age, presenting symptoms, and clinical diagnosis were obtained from request cards and tissue register.

Cases whose blocks and slides could not be traced as well as those whose tissue sections were inadequate for histologic diagnosis were excluded from the study.

The result obtained was analyzed using simple descriptive statistics.

## Results

Of the 529 reviewed specimens, 301 (56.9%) were trucut needle biopsies, while 228 (43.1%) were prostatectomies [Figure 1]. One hundred ninety-eight (37.4%) were carcinomas, while 331 (62.6%) were nodular hyperplasia [Figure 2]. Of the malignant cases, 164 (82.8%) were from trucut needle biopsy specimen, while 34 (17.2%) were from prostatectomy cases (incidental carcinoma).

The age range of our patients was 42 to 90 years with a mean of 70 years and peak age group of 70 to 79 years. Forty percent of cases occurred in the peak age group, while 99% of cases were clustered within the range of 50 and 90 years. Only 1% of the cases were found within 40 to 49 year age group [Table 1].

**Table 1: Age distribution**

Age range	40-49	50-59	60-69	70-79	≥ 80	Total
No.	2	26	58	80	32	198
%	1.0	13.1	29.3	40.4	16.2	100%

All of the carcinomas were adenocarcinoma. Of these, 106 (53.5%) were histologically of the large acinar pattern, followed by small acinar pattern with 35 (17.7%) cases, while solid/trabeculae pattern constituted 31 (15.7%) cases. Cribriform pattern was the least occurring patterns with 26 (13.2%) cases. One hundred twenty-three (62.1%) cases were moderately differentiated. This was followed by 33 (16.7%) cases of well-differentiated pattern. However, 24 (12.1%) cases were poorly differentiated, only 18 (9.1%) cases were undifferentiated [Table 2].

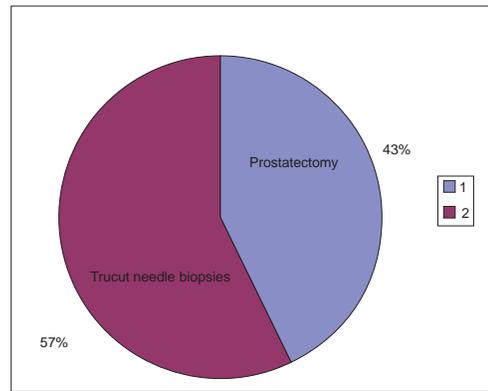
Gleason grading of the clinical carcinoma showed that patients with scores 2 to 4 constituted 6 (3.0%), those with 5 to 6 constituted 76 (38.4%) cases, while patients with scores 7 to 10 constituted 116 (58.6%) cases. Highest single score was 8, with 73 (36.9%) cases, of which 36 (49.3%) cases presented as 4+4, 29 (39.7%) cases as 3+5, and 8 (11.0%) cases as 5+3 [Figure 3].

### Discussion

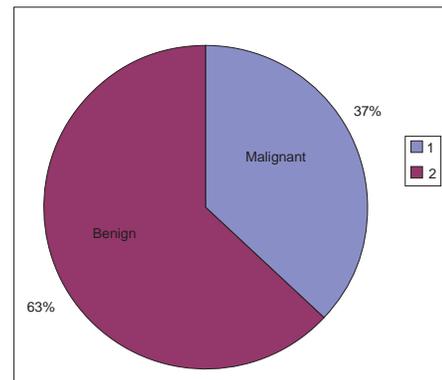
The incidence of prostate cancer in our study (37.4%) is high. It is higher than the findings of similar studies earlier carried out in other centers within Nigeria.<sup>[7-10,27]</sup> This finding is also higher than results from other African countries where similar studies have been carried out, and compares well with the high incidence rates obtained among black Americans<sup>[1-3]</sup> and reaffirms reports that prostate cancer is generally common in Nigeria.

This high incidence is consistent with Osegbe's<sup>[28]</sup> opinion that there must be a common genetic predisposition between American blacks and Africans, particularly Nigerians. Also, this high incidence supports possible presence of other environmental factors in our locality that may be augmenting the genetic and other factors advocated in earlier studies, which are thought to be responsible for prostate cancer.<sup>[11-15]</sup> This calls for more studies in our locality to ascertain if and what are the contributory environmental factors.

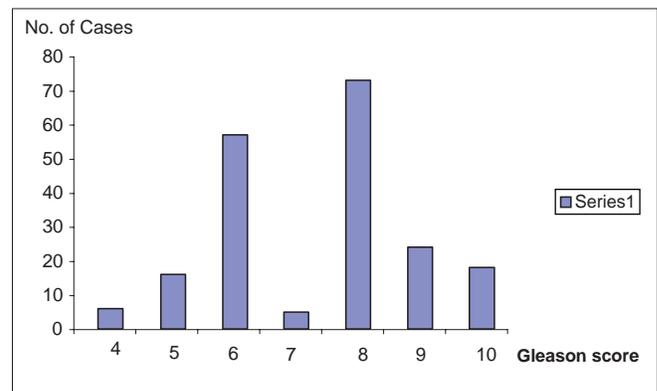
Majority (82.8%) of the malignancies were obtained from trucut biopsies because such biopsies were undertaken for cases with high clinical and investigative index of suspicion for carcinoma. Often, histologic evaluation of the trucut specimen confirms the clinical suspicion. Minority (17.2%) of the malignancies were obtained from prostatectomies. This is because the finding of carcinoma in prostatectomy specimens is an incidental finding.



**Figure 1: Specimen distribution**



**Figure 2: Disease pattern**



**Figure 3: Gleason scores**

Our study finding on the ages of the patients varies slightly from some previous studies but generally compares well with others. A study in Benin<sup>[7]</sup> obtained a slightly different age range of 45 to 85 years but same peak age group of 70 to 79 years, as our study. Both studies are similar in observing that the tumor is rare in the fifth decade and totally absent below 40 years. Also, another study in Calabar<sup>[16]</sup> observed a mean age of 66.6 years with 54% under 74 years. Although both study centers are within the same geographic region of South-south, our mean age is slightly higher but agrees with a study in Ibadan<sup>[4]</sup> which recorded a mean age of 71.4 years. Also, a study in Lagos<sup>[20]</sup> obtained a wider age range of 20 to 100 years

**Table 2: Morphology and differentiation pattern**

Morphology	Large acinar	Small acinar	Solid/Trabecula	Cribriform	Total
No	106	35	31	26	198
%	53.5%	17.7%	15.7%	13.2%	100%
Differentiation	Well differentiated	Moderately differentiated	Poorly differentiated	Undifferentiated	Total
No	33	123	24	18	198
%	16.7%	62.1%	12.1%	9.1%	100%

with peak age group of 60 to 69 years—a decade lower than ours. Similarly, additional studies in Ibadan<sup>[27]</sup> and Lagos<sup>[17]</sup> observed peak age groups in 60 to 69 years, contrary to our finding of 70 to 79 years. However, a study in Washington DC<sup>[18]</sup> reported peak age incidence within 70 to 79 years, which is similar to our finding. Also, Kirby *et al.*<sup>[19]</sup> stated that clinically manifested prostatic carcinoma occurs in the sixth to eighth decade and is therefore in agreement with our study.

This study also shows that all of the carcinomas were adenocarcinomas. This compares well with other findings, of 98.4% and 96% adenocarcinoma in Benin<sup>[7]</sup> and Lagos<sup>[20]</sup>, respectively. Similarly, a study in Zambia<sup>[29]</sup> also found 100% adenocarcinomas.

Majority (53.5%) of the adenocarcinomas was histologically of the large acinar variety, followed by small acinar pattern, which occurred in 17.68%. Solid/trabeculae and cribriform patterns occurred in 15.7% and 13.1%, respectively. This finding sharply contrasts with a study in Benin<sup>[7]</sup> which showed a predominance of small acinar pattern (40.6%) followed by large acinar pattern (16.7%) and mixed pattern making up the rest.

Also, 123 (62.1%) cases of the adenocarcinomas were moderately differentiated, followed by 33 cases (16.7%) of well-differentiated pattern, while poorly differentiated and undifferentiated patterns constituted 24 (12.1%) and 18 (9.1%) cases, respectively. This finding contrasts with earlier findings in Benin<sup>[7]</sup> and Lagos.<sup>[20]</sup>

The Gleason grading of the carcinoma showed that majority of the cases (60.6%) presented with high GSs of 7 to 10 with 8 as the peak score. This sharply contrasts with the findings in Zambia<sup>[29]</sup> and United States of America.<sup>[30]</sup> Although the Zambian study observed that majority of their cases scored between 3 and 5, the study at John Hopkins University showed that majority of their cases had GSs between 6 and 7, while scores 8 to 10 accounted for less than 10%. However, our study and that of John Hopkins University are similar in having 8 as the peak score.

Applying Freeman and Roase's<sup>[31]</sup> study deductions on prognostification of patients using Gleason grading, we infer that the majority of our cases (60.6%) who had scores 7 to 10 have poor prognosis. This assertion agrees with most Nigerian studies, which have found that majority of

prostate cancer patients present late and thus have poor prognosis.<sup>[16,28,32]</sup> It is also keeping with recent findings in a histopathologic study in Taiwan on Chinese population. This study concluded that prostate cancer among Chinese patients in Taiwan is common in the old, present with a more advanced stage and higher tumor grade.

The possible reasons for the high GS is lack of screening program in the population as well as the fact that most patients do not have symptoms which would have prompted them to seek medical treatment. Instead, patients wait till they become symptomatic, which often are symptoms related to complications of the disease. Lack of awareness about the disease could also be contributory to the predominant poor prognostic high GS. In a Nigerian study<sup>[22]</sup> on the knowledge and awareness of prostate cancer in men aged 40 years and above in Ibadan, a conclusion that the knowledge about prostate cancer, its risk factors, early detection, and treatment in men of 40 years and above in South-western Nigeria is low was made. This same low awareness may apply to our study region (South-south) as there is no possible reason for the high GS in most of our cases. This same reason of low awareness was advanced by the study in Taiwan as the reason for the predominant high GS.

There is therefore an urgent need for public enlightenment of the males, particularly those with positive family history on the need for PSA screening tests.

## Conclusions

The incidence of prostate cancer in Port Harcourt is high relative to other Nigerian centers where similar studies have been carried out and compares well with the high incidence found among African American men. Histologically, all cases are acinar adenocarcinomas.

Most patients present late with high GS carcinoma and therefore have poor prognosis. There is a need for enlightenment of the male populace on the high incidence of this deadly disease as well as for screening to reduce the number of patients presenting late and therefore improve prognosis.

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