

Epidemiology of Prostate Cancer in Nigeria: Observations at Lagos State University Teaching Hospital

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ABSTRACT

Prostate cancer is a leading cause of morbidity and mortality among men, especially of African descent. Over the years, there has been relative paucity of research work on the subject of prostate cancer in sub-Saharan Africa. The objective of the study is to examine records of prostate cancers diagnosed at Mayo Height laboratory, Lagos State University Teaching Hospital, Lagos, Nigeria between January 2015 and June 2018, with a view to studying the epidemiological variables and pattern seen. Histopathological slides were retrieved and reviewed; relevant data were extracted from the Laboratory Information Systems, Laboratory Requisition Forms and the Hospital records where necessary. The data were statistically analyzed.

A total of 333 cases of prostate cancer were diagnosed during the study period, representing 46.4% of all prostate specimens received. The median age of the patients at diagnosis was 70 years, with the lowest recorded age being 50 years, while the highest age was 90 years. Individuals in the 7th decade of life (61-70 years) were the most commonly affected. Overwhelming number of cases (97.3%) were diagnosed based on trucut biopsy specimens, compared to open prostatectomy specimen. Majority of the cancers were histologically adenocarcinomas (97.3%) and majority of the tumours were of high grade (Gleason grade 5) representing 37.5%. Prostate cancer is an obvious scourge in Nigeria. It is commonly seen in the 7th decade of life. Majority of the patients had high grade adenocarcinoma.

KEYWORDS: Prostatic carcinoma, histopathology, epidemiology, Lagos, Nigeria.

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INTRODUCTION

Prostate cancer is rated the second most common cancer and sixth leading cause of cancer deaths among men globally, making it an important cause of morbidity and mortality (Ferlay et al., 2012). Prostate cancer is the most frequent cancer in men in the United States. African American ancestry, family history, and increased age are the primary risk factors for prostate cancer (Haas et al., 2008). Prostate cancer is the most common urological malignancy affecting black Africans (Magoha, 2007 and Baade et al., 2009)

The incidence of prostate cancer has tripled during the past decade, chiefly because of increased diagnosis with the widespread use of serum Prostate-Specific Antigen (PSA) testing, digital rectal examination (DRE), transrectal ultrasound and needle biopsy of the prostate (Oluwole, et al., 2015 and Amin et al., 2005).

Cancer of the prostate is currently the most frequent malignancy of the adult Nigerian male with increasing incidence annually. Studies on prostate cancer from the Ibadan Cancer Registry showed that the relative ratio frequency for prostate cancer when compared to other male cancers increased from 4.45% to 10.5% over the last three decades (Okolo et al., 2008 and Ogunbiyi et al., 1999).

Most cases of prostate cancer occur after the age of 50 years and there is an exponential increase in incidence which peaks in the 70s. Worldwide, about three-quarters of all cases occur in men aged 65 or more (WHO, 2004). Various histologic studies on prostate specimens taken in different centres across Nigeria have shown prostate cancer incidences ranging from 22.4% to 37.4%

(Mohammed et al., 2003, Okeke et al., 2017 and Obiorah et al., 2011).

The incidence of prostate cancer has also been shown to vary across various African countries to include Gambia 2.5 per 100,000, South Africa 30.8 per 100,000 and Uganda 35.5 per 100,000 (Bah et al., 2001, Baab et al., 2014 and Parkin et al., 2010). The low incidence areas globally include the Asia-Pacific region and North Africa with 3 per 100,000 and 10.6 per 100,000 respectively (Baade et al., 2013).

The most common histologic type of prostate cancer type is adenocarcinoma with other histologic types being quite rare (Haaa et al., 2008).

The Gleason score system is the most widespread grading tool for prostate cancer. It is the system recommended by the 1993 WHO consensus conference on prostate cancer diagnosis due to its high reproducibility across different institutions (Murphy et al., 1994). It is one of the most reliable predictors of prostate cancer progression and survival (Seyed et al., 2004). The system is based on glandular architecture which is used to define five histological patterns or grades with decreasing differentiation (Gleason, 1966).

This study aims to examine the pattern of prostate cancer seen among men of Nigerian descent. The finding in this study will enrich the understanding of the characteristics of prostate cancer among African men which in turn will guide further effort at curbing the scourge.

MATERIALS AND METHODS

Laboratory reports on all cases of prostate samples (core biopsies and prostatectomy submissions) were retrieved from the Laboratory

Information System at Mayo Heights Laboratory of the Lagos State University Teaching Hospital. The laboratory receives and process samples from the teaching hospital where the department is located. Samples are also received from across the General Hospitals within Lagos State, and many of the private hospitals.

The formalin-fixed paraffin embedded samples of tissues of prostatic origin, and associated histological slides were retrieved from storage and reviewed independently by the authors to reach a consensus as to the diagnosis. Relevant clinical data were also retrieved from the requisition forms. Data were then specifically extracted for the malignant cases. Prostate cancer grading was done using the Gleason Score System.

The data compiled were analysed and also where indicated, subjected to statistical analysis, utilizing SPSS statistical package software version 19.

RESULTS

A total of 717 prostate specimens were received in Mayo Heights Laboratory, Lagos State University Teaching Hospital, over a 42-month period between January 2015 and June 2018. Of this number, 333 were prostate cancers, representing 46.4% (Table 1). The lowest age at diagnosis was 50 years, while 90 years was the highest age recorded at diagnosis (Figure 1). The mean age was 69 ± 8.0 years while the median age was 70 (24 cases). The most frequent age group was 61 – 70 years (141, 42.3%), followed by 71 – 80 years (112, 33.6%) while 26 (7.8%) was recorded for patients above 80 years.

Table 1. Annual Distribution.

Year	Number	Percentage
2015	63	19.0
2016	114	34.2
2017	122	36.6
2018 (6 months)	34	10.2
Total	333	100

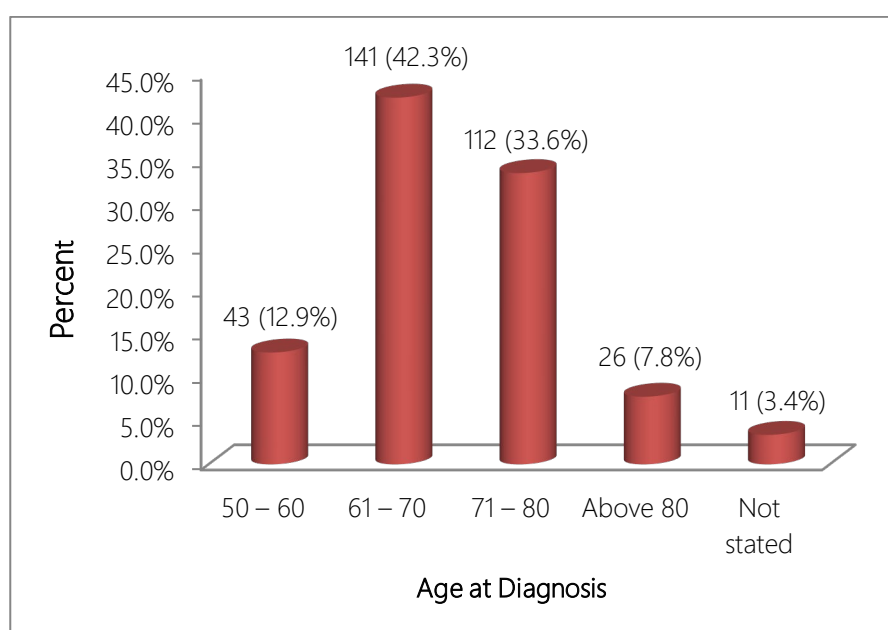


Figure 1. Age at Diagnosis.

Majority of the patients were Yorubas (247, 74.2%) followed by Ibos (77, 23.1%) while only 9 (2.7%) were from other ethnic groups (Table 2).

Ethnic group	Number of cases	Percentage
Yoruba	247	74.2
Ibo	77	23.1
Others	9	2.7
TOTAL	333	100

Prostate cancer diagnosis was made on 316 (94.9%) trucut biopsy specimens, while 17 (5.1%) were prostatectomy specimens (Figure 2).

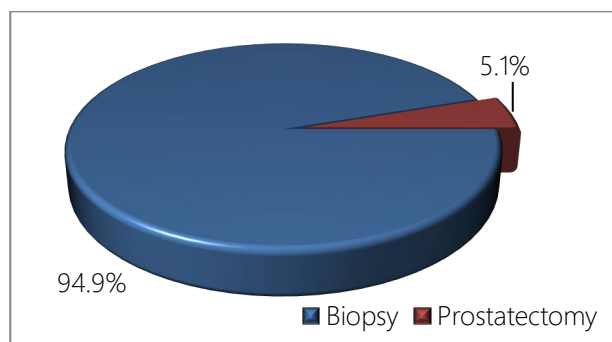


Figure 2. Showing type of tissue for diagnosis.

Majority (324, 97.3%) were diagnosed as adenocarcinoma; papillary carcinoma accounted for 7 (2.1%) of the cases, while clear cell carcinoma and mucinous carcinoma represented 0.3% each (Table 3).

Type	Number	Percentage
Adenocarcinoma	324	97.3
Papillary carcinoma	7	2.1
Clear cell carcinoma	1	0.3
Mucinous carcinoma	1	0.3

Adenocarcinomas were categorized according to the Gleason patterns observed. Figures 3-7 typifies Gleason patterns 1 to 5 as seen in this series. Most of the prostate cancers diagnosed at our Centre

were Gleason grade 5 (high grade, Figs. 6 and 7) which accounted for 125 (37.5%) of all the tumours, while grade 3 (Fig. 4 and 5) was the least with 34 (10.2%). Low grade tumour (grade 1) was observed in 37 (11.1%) of the cases (Figures 3 and 4).

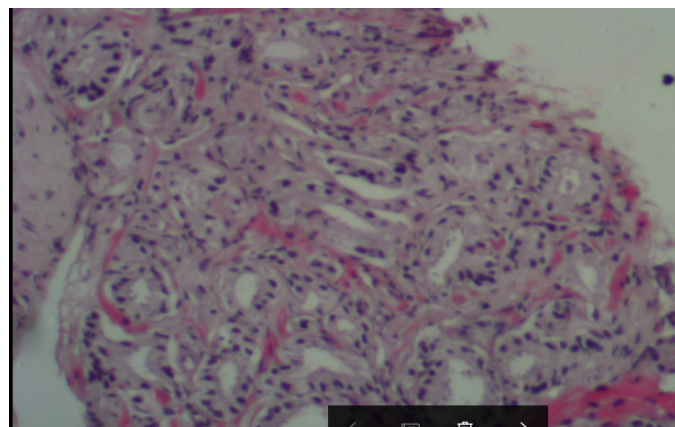


Figure 3. Photomicrograph (X 100, H&E) showing closely packed glands with little intervening stroma Prostatic adenocarcinoma Gleason pattern 1.

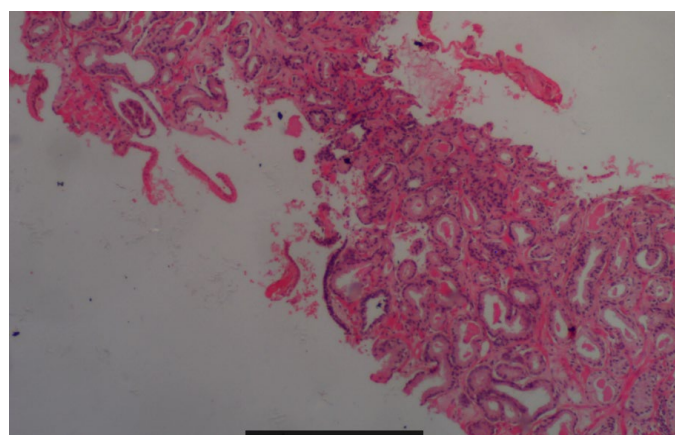


Figure 4. Photomicrograph (X40 H&E) showing infiltrating small-sized distinct neoplastic glands with appreciable amount of intervening stroma. Prostatic adenocarcinoma Gleason pattern 2.

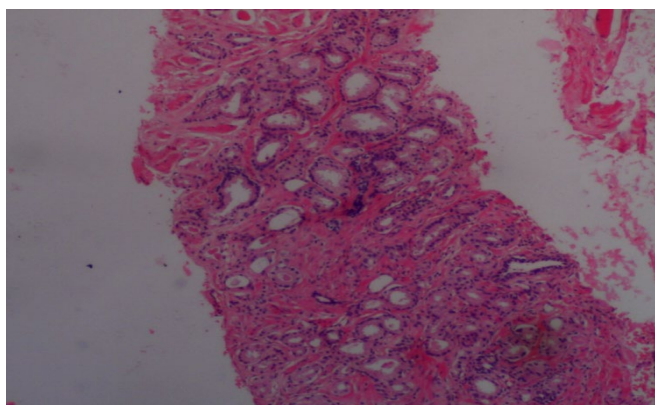


Figure 5. Photomicrograph (X40 H&E) showing infiltrating, irregular small-sized neoplastic glands. Prostatic adenocarcinoma, Gleason pattern 3.

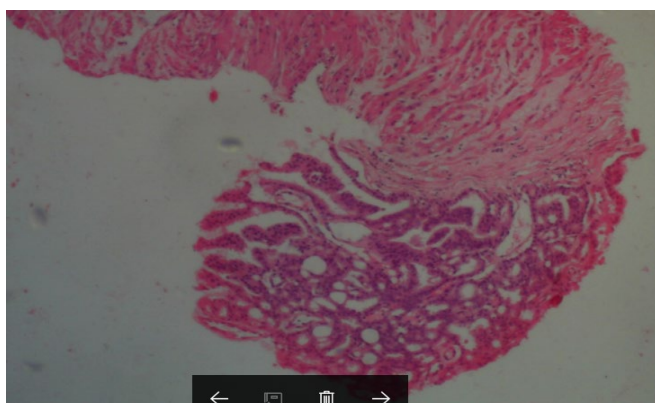


Figure 6. Photomicrograph (X40 H&E) showing fused neoplastic glands forming a cribriform

pattern. Prostatic adenocarcinoma Gleason pattern 4.

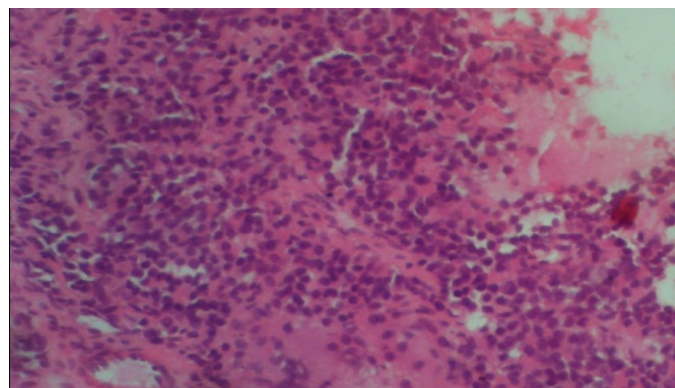


Figure 7. Photomicrograph (X100 H&E) showing sheet of neoplastic cells. Prostatic adenocarcinoma Gleason pattern 5.

Grade 1 tumour was most commonly observed in the 50-60 years age group (11, 28.2%), while grade 5 was most frequently seen in the 71-80 years group

This study showed that the commonest number of prostate biopsy cores sent to our laboratory by Surgeons is 10 (11.2%). In some cases, as few as 2 cores (2, 3.0%) and as many as 32 cores (1, 0.3%) were received (Table 5).

Table 4. Association between grades and age (P = 0.380).

Gleason Grade	Age group in years (%)			
	50 – 60	61 – 70	71 – 80	Above 80
Grade 1	11 (28.2%)	14 (10.6%)	11 (11.7%)	1 (4.5%)
Grade 2	4 (10.3%)	20 (15.2%)	10 (10.6%)	2 (9.1%)
Grade 3	4 (10.3%)	16 (12.1%)	10 (10.6%)	3 (13.6%)
Grade 4	5 (12.8%)	28 (21.2%)	19 (20.2%)	6 (27.3%)
Grade 5	15 (38.5%)	54 (40.9%)	44 (46.8%)	10 (45.5%)
Total	39 (100.0%)	132 (100.0%)	94 (100.0%)	22 (100.0%)

Table 5. Frequency of the Number of Cores.

Number of Cores	Frequency	Percent
1-5	30	17.2
6-10	129	74.1
11-15	106	60.9

16-20	16	9.2
Above 20	5	2.9
Not Stated	47	27.0
Total	174	100.0

DISCUSSION

This study revealed that prostate cancer accounted for 46.4% of all newly diagnosed prostate pathologies at our Centre. This is higher than a range of 22.4% to 37.4% reported from studies from other parts of Nigeria (Mohammed et al., 2003, Okeke et al., 2017 and Obiorah et al., 2011). The higher incidence reported in our study may be due to the considerably higher sample size in our study as compared to the works done in Kano, Port Harcourt and a previous study in Lagos (Okeke et al., 2017, Obiorah et al., 2011 and Bah et al., 2001). The higher sample size at our Centre may also be partly due to the fact that the Lagos State Government has in the recent years embarked on free prostate cancer screening exercise for some elderly citizens which resulted in a high turn-out of subjects, some of whom were diagnosed with prostate cancer. Besides, Lagos is Nigeria's commercial capital and the most populous City in the country.

The median age of men diagnosed with prostate cancer in our series is 70 years, with the lowest age being 50 years, while the highest was 90 years. This finding is consistent with a WHO report which states that majority of cases of cancer of the prostate occur after the age of 50 years and its incidence peaks in the 70s (WHO, 2004). The WHO report further stated that worldwide, about three-quarters of all cases occur in men aged 65 or more. Studies from other parts of Africa show that the incidence of prostate cancer rises from the age of 50 years (Bah et al., 2001 and Babb et al.,

2014). Oluwole et al in Zaria, Nigeria, reported that prostate cancer was seen in two subjects aged 30 and 32 years, with a peak age of diagnosis being the sixth decade and a mean of 64.5 years.

Majority of the subjects in this study are of the Yoruba ethnic extraction, representing 74.2%. The reason for this observation is that the study was done in Lagos, which is located in the South-West of Nigeria, home to the Yoruba ethnic group. The remarkable proportion of non-Yoruba men in this study, representing 25.8%, gives credence to the fact that Lagos is a cosmopolitan city, where people of all ethnic nationalities, including foreign nationals in Nigeria live and work.

Most of the cancer diagnoses in this study were made on trucut prostate biopsy specimens (94.9%) as against prostatectomy specimens which represent only 5.1%. This is similar to the report in a study done in Port Harcourt, Nigeria by (Obiorah et al., 2011) which also shows a much higher proportion of cancer diagnosis on trucut biopsy specimens (82.8%) compared to prostatectomy specimen (17.2%). On the other hand, a study in Zaria (Oluwole et al., 2015) revealed a much lower proportion of cancer diagnosis in trucut biopsies (57%) as compared to open prostatectomy (43%). Cases of carcinoma in prostatectomy specimen tend to be an incidental finding, as most prostatectomies are done on the grounds of an impression of benign prostate disease. This observation draws attention to the need for thorough histological examination of

prostatectomy specimens considering the possibility of finding a focus of cancer.

An important highlight of the present study is the fact that majority of the prostate cancer were adenocarcinoma (97.8%). This is similar to the observation of authors of similar studies both locally and around the world (Haas et al., 2008, Oluwole et al., 2015, Obiorah et al., 2011, Odedina et al., Gueye et al 2003, Elen et al., 1991 and Anunobi et al., 2011).

Our study shows that grade 5 prostate cancer is the most commonly diagnosed at our Centre (37.5%). This is followed by grade 3 disease, seen in 10.2% of cases. This is in contrast to the finding in Ibadan, Nigeria where it was observed that the commonest Gleason grade was 3 (Okolo et al., 2008). On the other hand, the study in Port Harcourt, south-south Nigeria, (Obiorah et al., 2011) shows that the majority of the cases in that series were of Gleason score of 8 (grade 4) which is similar to findings in Zaria (Oluwole et al., 2015) and another study in Lagos (Anunobi et al., 2011). However, a study in the United States shows that the commonest Gleason grade is 3 with an overall decline in scores from 8-10 to less than 6 in recent years (Gueye et al., 2003). A plausible explanation for the higher proportion of high grade cancers diagnosed at our Centre is that most of the patients present late to the hospital and already have advanced disease at diagnosis. The decline noted in the US study is as a result of improved early detection and diagnosis of prostate cancer in that country (Harget et al., 2016). Grade 1 tumour was most commonly observed in the 50-60 years age group (11, 28.2%). Conversely, high grade tumour (grade 5) was most frequently seen in the 71-80 years group. It is pertinent to note that

grade is not statistically dependent on age at diagnosis ($P > 0.05$).

Our study shows that the most frequent number of prostate biopsy cores sent to our laboratory is 10 (11.2%), with some surgeons rarely sending as few as 2 cores and as many as 32. Our observation is consistent with the finding in an Asian study which revealed that 6 to 12 cores of prostate biopsy provide similar efficacy as more biopsy cores (Tanaka et al., 2015). These authors also opined that the number of cores to be taken should be determined by the prostate volume. They further suggested that increasing the number of cores increases the rate of cancer detection; however, the optimal number of prostate cores to obtain is still an open question.

CONCLUSION

This study shows that most of the prostate cancer diagnoses made in the Mayo Height Laboratory, Lagos State University Teaching Hospital were on trucut biopsy specimen. Prostate cancer is more commonly seen in men in the 7th decade of life (61-70 years) with a median age of 70 years. Majority of these patients already have high grade adenocarcinoma at diagnosis. This observation calls for the need for early detection so as to reduce mortality from the disease. Public awareness on prostate cancer will enable men to recognize early symptoms and seek medical help before the disease advances. The need for routine screening for early detection is also very crucial. This study also shows that surgeons frequently sent between 6 to 10 prostate biopsy cores to our Centre. This number is shown to be adequate for diagnosis. The observation that carcinoma was diagnosed in some prostatectomy specimen which were believed to be benign, draws attention to the

need for Pathologists to thoroughly examine prostatectomy tissues as foci of cancer may present.

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Conflict of interest

The authors confirm that there is no conflict of interest and no funding was received for this work.

Authors' contributions

Emiogun EF, was responsible for study conceptualization, design and literature search. Williams OO, performed literature search and data collation. Obafunwa JO was involved in study conceptualization, data analysis and editing of final draft.

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