# FIVE YEARS RETROSPECTIVE STUDY OF PROSTATE CANCER IN PATIENTS ATTENDING USMANU DANFODIYO UNIVERSITY TEACHING HOSPITAL SOKOTO, SOKOTO STATE NIGERIA

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**Received:** 28th Nov., 2023 **Accepted**: 8th Jan., 2024 **Published**: 1st June, 2024

## ABSTRACT

**Background:** Prostate cancer forms when abnormal cells develop and proliferate in the prostate gland. Not all abnormal cells growth called tumors, are cancerous (malignant). Some tumors are not cancerous (benign). Benign prostatic hyperplasia (BPH) are benign growth of prostate gland and are not life threatening. Prostate cancer is very serious disease, most men with prostate cancer when diagnosed before it reaches beyond their prostate gland, the treatment at this level can eliminate the cancer.

**Aim:** This research aimed in collecting data and information on prostate cancer, also to find the distribution, pattern and types of prostate cancer in patients attending UDUS.

**Methodology:** Data was collected from the histopathological record book of the positive patients. The total number of biopsies received and number of requests for prostate tumor diagnosis over the study period was counted. The block of tissues was retrieved, cut, stained using H and E and photomicrographs were taken.

**Results:** The highest prostate tumor diagnosed during research period 163, 215 (7.0, 7.7) %. Men with age range between 60-69 years were found to have more prevalence of prostate tumor 297 (39.40%). Hausa Tribe was found with highest frequency of prostate tumor 518 (68.7%). BPH and AD has the highest frequency in prostate tumors 376, 231 (49.9, 30.6) %.

**Conclusion:** It was concluded that men within the age range of 60-69 has the highest prevalence of prostate tumor, Benign prostatic hyperplasia and adenocarcinoma were the most common diagnosed cases.

***Keywords:*** Prostate, Benign, Prostatic, Hyperplasia, Adenocarcinoma

## INTRODUCTION

Prostate is a gland that is walnut-sized situated between penis and bladder. Prostate was recognized as the largest accessory gland in the human being (Keneth, 2019). It was estimated that prostate was 3 cm long, 4 cm wide and anteroposterior 2 cm depth, which is the biggest accessory gland genital organ (Keneth, 2019). Prostate is fibromuscular capsule which encircled the urethra (Keith et al, 2018). Prostate possessed glandular as well as non-glandular portions (Oesterling, 1991). The glands are covered by fibromuscular stroma with smooth muscle fibers, elastic fibers as well as collagen fibers all distributed within the gland (Hassan *et al.*, 2013), these glands are responsible for producing as well as secreting seminal fluid, that known as semen fluid responsible for protection and nourishment of sperm, testosterone is a hormone that regulated the function of prostate (Tricia, 2019). It is situated to the neck of bladder inferiorly to the external urethral sphincter superiorly, infererolaterally with the levator ani muscle. While posteriorly lies the ampulla of rectum (Ghashghaei, 2019). Prostate has four different lobes that divided it in to four anatomically (inferoposterior, inferolateral, superomedial, and anteromedial).

Citation: I. Mohammed, M. O. Mohammed, I. A. Auta .(2024): Five Years Retrospective Study of Prostate Cancer In Patients Attending Usmanu Danfodiyo University Teaching Hospital Sokoto, Sokoto State Nigeria *BJMLS 9(1): 1- 8*

Prostate cancer (PCa) is a disease that occurred as a result of uncontrolled growth of cells within the prostate gland (Institute, 2007). Prostate cancer is among the types of cancers that affect men. It was revealed that the major cause of this cancer is not well understood but many researchers believed that this cancer start as a result of gene mutation (Mayoclinic, 2019). Globally prostate cancer was recognized as the most frequent cancer in men after lung cancer (Bray et al., 2018). Prostate cancer shows no specific symptoms mostly, the common symptoms may include frequent, urgent as well as hesitation in urination, other symptoms may be related to Benign Prostatic Hyperplasia (BPH). Sometimes this cancer may show symptoms such as urine retention, weight loss, back pain as a result of metastatic lesions that may have reached outside the prostate to other parts of the body (Ralston *et al.,* 2018).

Adenocarcinoma is one of the types of prostate cancer known as glandular prostate cancer (Maurie, 2021), this type of cancer account of 99% of the prostate cancers (Marijke, 2020). This cancer of two types; Acinar adenocarcinoma that proliferate in the gland cells within the prostate gland (Maurie, 2021, CRUK, 2020, Marijke, 2020). The second type is prostatic ductal adenocarcinoma; this is not common cancer but very aggressive, proliferate within the cells lining the ducts and tubes of prostate gland (Maurie, 2021). Squamous cell carcinoma, this is very uncommon prostate cancer but proliferates rapidly, proliferates more than adenocarcinoma, that covers the prostate gland (Maurie, 2021, CRUK, 2020). Transitional cell carcinoma, this is about 1 to 4% of prostate cancers, rarely originate from prostate, it start from bladder or urethra that spread to the prostate (Maurie, 2021, CRUK, 2020, Marijke, 2020). Prostate sarcoma, this is known as soft-tissue prostate cancer that originate outside the prostate gland usually develops from the soft tissues of nerves and muscle of prostate (Maurie, 2021). Neuroendocrine tumors, this is neoplasia of prostate that develops in the gland cell as well as nerve that release hormones to blood circulation (Maurie, 2021)..

## MATERIALS AND METHODS

This is a five (5) year retrospective study (from 1st January 2016-31st December 2020) of prostate disorders in Usmanu Danfodiyo University Teaching Hospital (UDUTH). The year, age, tribe and histopathological diagnosis of patients were recorded.

### Data Collection

Data was collected from histopathological record book (Register) of the positive patients. The total number of biopsies received over the study period was counted, the number of requests for prostate tumor diagnosis was also noted.

### Study Samples

Formalin fixed paraffinized tissue block processed, infiltrated and embedded in paraffin wax was used for study. 5µm was cut on rotary microtome, the sections were floated on 20% alcohol, and water bath preheated at 5ºC below melting point of the wax, the slides were dried on hot plate which was set at 3ºC above melting point of wax and kept until stained.

### Haematoxylin and Eosin (H&E) Staining

The sections were dewaxed in three changes of xylene, the sections were hydrated in different grades of alcohol, the sections were stained by Mayer's haematoxylin solution for 5 min, they were rinsed in water, the slides were differentiated by 1% acid alcohol for 1 min, blued with tap water, counter stained with 1% eosin for 1 min, the slides were dehydrated, cleared and mounted with DPX (Avwioro, 2010).

### Microscopy and Photomicrograph

Stained slides were viewed under light microscope at different magnification to select better slides (X100, X200 and X400), photomicrographs were snapped using digital microscope camera.

### Statistical Analysis

Data was analyzed by descriptive frequency using statistical package for social science SPSS version 20.

## RESULTS

**TABLE 1:** ANNUAL DISTRIBUTION OF PROSTATE TUMORS

| Year | Histopathological samples | Prostatic tumor | Percentage (%) |
|---|---|---|---|
| 2016 | 2326 | 163 | 7.0 |
| 2017 | 2307 | 102 | 4.4 |
| 2018 | 2147 | 150 | 7.0 |
| 2019 | 2788 | 215 | 7.7 |
| 2020 | 2060 | 99 | 4.8 |
| **TOTAL** | **11628** | **729** | **6.3** |

Table 1: A total of 11628 samples were sent to histopathology laboratory, Usmanu Danfodiyo University Teaching Hospital (UDUTH) from 2016 to 2020 754 of the sample were for prostatic tumor diagnosis which represent about 6.5% of the total biopsies received over the study period. Out of these 729 had prostatic tumor, the highest frequency of diagnosed sample was received in the year 2019, 215 (29.5%) while 2020 had the least frequency 99 (13.6%) of samples.

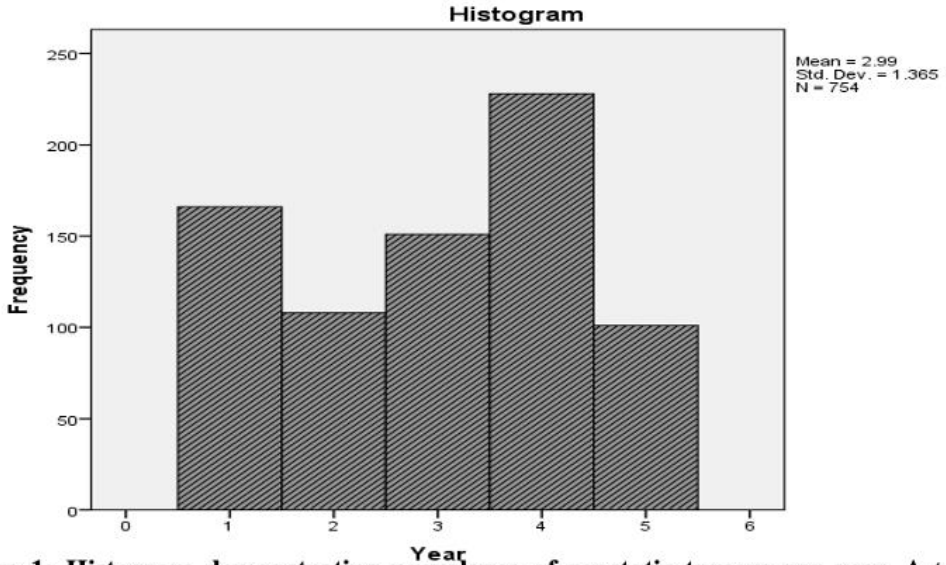


**Figure 1: Histogram demonstrating prevalence of prostatic tumors per year.** A total of 754 of the sample were for prostatic tumor diagnosis in Usmanu Danfodiyo University Teaching Hospital (UDUTH) from 2016 to 2020. Out of these 729 had prostatic tumor, the highest frequency of diagnosed sample was received in the year 2019, 215 (29.5%) while 2020 had the least frequency 99 (13.6%) of samples.

**TABLE 2:** AGE GROUP DISTRIBUTION OF PROSTATE TUMORS

| Age Group (years) | Frequency | Percentage (%) |
|---|---|---|
| 0 – 9 | 0 | 0.00 |
| 10 – 19 | 0 | 0.00 |
| 20 – 29 | 1 | 0.13 |
| 30 – 39 | 3 | 0.40 |
| 40 – 49 | 10 | 1.34 |
| 50 – 59 | 121 | 16.00 |
| 60 – 69 | 297 | 39.40 |
| 70 – 79 | 245 | 32.50 |
| 80 – 89 | 57 | 7.55 |
| 90 or more | 15 | 2.00 |
| Unspecified | 5 | 0.66 |
| **TOTAL** | **754** | **100.0** |

**Table 2:** The age range distribution of 754 samples, the most number of cases affected the age between 60 to 69 years with the frequency of 297 (39.40%), then followed by age group between 70 to 79 years with the frequency of 254 (32.50%). The least are age group between 1 to 9 years and 10 to 19 with 0 (0.00%) each then followed by age group between 20 to 29 years with the frequency of 1 (0.13%).

**TABLE 3:** DISTRIBUTION OF PROSTATE TUMORS IN RELATION TO DIAGNOSIS

| Diagnosis | Frequency | Percentage (%) |
|---|---|---|
| AD | 231 | 30.6 |
| AD and BPH | 7 | 0.9 |
| AD and MB | 2 | 0.3 |
| AD and MT | 41 | 5.4 |
| BPH | 376 | 49.9 |
| BPH and CP | 35 | 4.6 |
| BPH and DC | 1 | 0.1 |
| BPH and Schistosomiasis | 2 | 0.3 |
| BPH and high grade PIN | 3 | 0.4 |
| BPH and nonspecific prostatitis | 10 | 1.3 |
| BPH and systemic prostatitis | 1 | 0.1 |
| High grade PIN | 2 | 0.3 |
| Low grade PIN | 4 | 0.5 |
| Severe dysplasia | 1 | 0.1 |
| predominantly fibro muscular tissue | 1 | 0.1 |
| Schistosoniasis | 1 | 0.1 |
| inflamed granuloma tissue | 2 | 0.3 |
| Urothelial carcinoma | 1 | 0.1 |
| Nonspecific prostatitis | 5 | 0.7 |
| squamous cell carcinoma | 1 | 0.1 |
| | 2 | 0.3 |
| insufficient prostatic tissue | 25 | 3.3 |
| **TOTAL** | **754** | **100.0** |

**Table 3:** Out of the 754 request samples, 729 where diagnosed, benign prostatic hyperplasia and Adenocarcinoma had the highest frequencies. 435 had benign prostatic hyperplasia which account for 57.7%, 281 had Adenocarcinoma which account for 37.3%. While 25 (3.3%) could not be diagnosed due to insufficient samples.
**LEGEND:** AD= Adenocarcinoma, BPH= Benign prostatic hyperplasia, MB= metastasis to bladder, MT= metastasis to testis, CP= chronic prostatitis, DC= dystrophic calcification, PIN=prostatic intraepithelial neoplasia

**TABLE 4:** DISTRIBUTION OF DIFFERENT PROSTATE CANCER TYPE

| Malignant | Frequency | (%) |
|---|---|---|
| Adenocarcinoma | 231 | 81.1 |
| Transitional carcinoma | 2 | 0.7 |
| Urothelial carcinoma | 1 | 0.4 |
| AD and MT | 41 | 14.4 |
| AD and MB | 2 | 0.7 |
| AD and BPH | 7 | 2.5 |
| squamous cell carcinoma | 1 | 0.4 |
| **TOTAL** | **285** | **100.0** |

**Table 4:** Prevalence and percentage of the types of diagnosed prostate cancer. There were 281 (98.6%) cases of Adenocarcinoma, 41 (14.4%) metastasized to testis, 2 (0.7%) metastasized to bladder and 7 (2.5%) had Benign prostatic hyperplasia. 2 (0.7%) Transitional carcinoma, while Urothelial carcinoma and squamous cell carcinoma had 1 (0.4%) each.

**LEGEND:**
AD = Adenocarcinoma, UC = Urothelial carcinoma,
MT = Metastasis of testis, MB = Metastasis of bladder,
BPH = Benign prostatic hyperplasia, % = Percentage

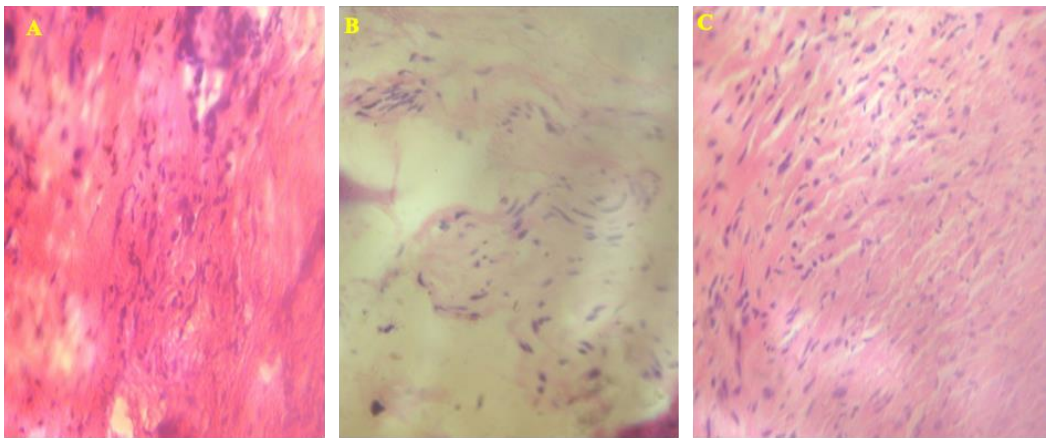


**PLATE 1:** A photomicrograph of prostate cancer, H and E, X 400. **(A)** Adenocarcinoma with distorted acini, hyperchromatic nuclei and foamy cytoplasm. **(B)** Benign prostatic hyperplasia (BPH) with myofibrous stroma and inconspicuous cell nuclei. **(C)** Prostatitis with polymorpho nuclear neutrophils

## DISCUSSION

A total of 754 number of prostatic tumor diagnosis were received from January 2016 to December 2020 in Histopathology Department, Usmanu Danfodiyo University Teaching Hospital Sokoto, Nigeria. This is about 8.5% of the total number of biopsies received during the study period out of which 729 of the requests were diagnosed.

In this study, the age range is between 0 to above 90 years were observed the age group with highest frequency of prostatic tumor is age between 60 to 69 years with the frequency of 297 (39.40%) followed by age between 70 to 79 with the frequency of 254 (32.50%).

This is in agreement with a report on Bookshelf (2020) in which it shows that the majority of new cases of prostate cancer are diagnosed in men from 65 to 74 years of age (Bookshelf, 2020), with a median age at diagnosis of 66 years by Nwafor *et al.,* (2015) peak incidence age group of 60-69 years (Nwafor *et al.,* 2015), closely followed by 70-79 years, respectively, while 29-30 and 39-40 has 1(0.13%) and 3(0.40%) respectively this is in agreement with Nwafor *et al.,* (2015) in which the youngest patient was 32 years old. Also follows the peak age at diagnosis was in the seventh decade, while two relatively young patients were found to have prostate cancer at the age of 30 and 32, respectively (Oluwole *et al.,* 2015). This might be due to, most symptoms of tumors are seen in advanced ages of 60 years and above, also 60-70 years is the average age of survival thus age group individuals are more likely to be screened and diagnosed.

It was also documented that prostate cancer incidence increases with age (Ferlay *et al.,* 2018). It was also seen that 1 in 350 men below the age of 50 years will be detected with the cancer of prostate (Perdana et al., 2017), this shows that there is increase in incidence up to 1 in every 52 men of 50-59 years of age. Nearly the incidence rate is 60% in men at the age of 65 year or higher than 65 years (Horner *et al.,* 1975). Also, a research conducted by Weiner *et al.,* (2016) shows that increase in yearly incidence of prostate cancer was among the ages of men 55-69 (Weiner *et al.,* 2016, Poyet *et al.,* 2023, van der Slot *et al.,* 2022), these are in line with the current study.

A study has shown that African-American men have the higher chances of developing prostate cancer globally, it was also shown that they may likely have chances of a disease compared with other ethnic and racial groups (Kheirandish and Chinegwundoh, 2011). This was also seen not only for African-American but Caribbean people as well as other black men in Europe, it was assumed that is as a result of possession of common genetic relationship more prone to have cancer. Chu *et al.,* (2011) revealed that higher incidence rates of prostate cancer may have relationship with the environmental factors (Chu *et al.,* 2011).

In the current study, out of the 729 number of prostatic tumors 428 (60.9%) were benign while 285 (39.1) were malignant. This is in agreement with Nwafor *et al.,* (2015) and Mohammed *et al.,* (2003) in which benign prostatic hyperplasia (BPH) has highest incidence, distantly followed by prostate cancer, this correlates to benign prostatic hyperplasia been earliest form of symptomatic tumor formed in the prostate and it is premalignant to prostate cancer (Nwafor *et al.,* 2015, Mohammed *et al.,* 2003).

The distribution of different type of prostatic cancer in this study shows that Adenocarcinoma had the highest incidence 281 (98.6%) of cases, while Transitional carcinoma has 2 (0.7%), Urothelial carcinoma and squamous cell carcinoma has 1 (0.4%), compare with the study conducted by Marijke and Druning (2020) in which adenocarcinomas are the most common type of prostate cancers, they make up about 99% of all prostate cancers, thus supporting the relative high frequency of these tumors. This reflects the fact that prostate is a glandular organ and most of its neoplasia originates from the central region occupied by secretory cells (Marijke, 2020).

## CONCLUSION

In general, the data presented in this study shows that Histopathology Department of Usmanu Danfodiyo University Sokoto received highest sample of prostate cancer in 2019 followed by 2016. It was concluded that men at the age of 60-69 are more prone to prostate cancer, also adenocarcinoma as well as adenocarcinoma and metastasis to testis are diagnosed more in this study.

**Recommendation**

There is need for awareness on prostate cancer, knowledge of early symptoms, also government should create a free screening on prostate cancer. Screening will give a small chance of reducing the possibility of death as a result of prostate cancer in men. Patients that are at lower risk should be screened every after 2 years. Patients at average risk should consider starting screening at age of 50.

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