

# Prostate Cancer: Prevalence, Histopathological and Biochemical Profile in Libreville, Gabon

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## Abstract

**Introduction:** The present work aimed to carry out a study of prostate cancer by determining the histopathological, biochemical profile and prevalence at the Laboratoire d'Anatomie Cytopathologique (LACP), Université des Sciences de la Santé (USS). **Material and Methods:** For this, a retrospective and descriptive study from January 2016 to July 2023 was carried out. The collection of cases was carried out by using manual registers and filing cabinets in the LACP library. The registers collected sociodemographic data, clinical data and biological data from patients. The prevalence of prostate cancer was determined by calculating the ratio of the number of cases diagnosed as cancer to the number of total cases received, multiplied by 100. XLSTAT 2015.4.01 software and Student's t-test were used. p values <0.05 were considered statistically significant. **Results:** During the study period, a total of 123 out of 191 patients received for the diagnosis of PCa presented with prostate cancer, or 64.4%. The average age was 66.5 years and the greatest age range was between 66 and 73 years or 33%. The patients had clinical signs: prostatic hypertrophy 60.2% of cases, dysuria 9.9%. High blood pressure 20.4%, diabetes 2.1% were the most important antecedents. PSA measurement was reported in 160 patients 83.8%. The average level was 208.4 ng/ml with extremes of 1.18 to 1430 ng/ml. The highest Gleason score was Gleason 7 with 36.6% and Gleason scores greater than or equal to 7 was 69.1%. The most represented tumors were moderately differentiated tumors with 52% of cases and poorly or undifferentiated tumors with 32.5% of cases. The histopathological profile showed that more than 92.7% of the tumors were adenocarcinomas. **Conclusion:** Prostate cancer is common in Gabon, annual monitoring is more than essential as is increasing the frequency of screening.

**Keywords:** Prostate cancer- Tumor- Prevalence- PSA- histopathological profile

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## Introduction

Cancer is a serious disease that has significant adverse personal, health, economic and social repercussions; there are approximately 9.9 million deaths worldwide in 2020 and is the second most common disease [1, 2]. This disease is characterized by abnormal and uncontrolled cell proliferation within normal body tissue, thus leading to the development of tumors that escape the body's control [3]. These cells all come from the same clone,

a cancer-initiating cell with certain characteristics allowing it to divide indefinitely. During the progression of the disease, certain cells can migrate from their place of production to another location, thus forming metastases [4].

In Latin, the word cancer means crab or crayfish, was designated by the Greek doctor Hippocrates (460-377 BC) looking at the appearance of certain skin cancers

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(melanoma) reminded him of the shape of a crab (Korkino) and gave it the name “carcinoma”, a word derived from “crab”, to lumps which gradually become fatal [5]. There are different types of cancer depending on the organ where this cancer occurs, such as prostate cancer (PCa) [6]. PCa is the most common cancer in men over 60 years of age worldwide and in Gabon [7] and the second cause of cancer death after lung cancer [8]. The incidence rate of PCa varies between regions and populations. In 2018, 1,276,106 new cases of prostate cancer were recorded worldwide, representing 7.1% of all male cancers [9].

The majority of PCas develop from precancerous lesions of the prostate epithelium. Prostatic intraepithelial neoplasia has been recognized as a precursor lesion of PCa. These are nucleocytoplasmic abnormalities present on a single cell layer in the glands and tubules of the prostate [10].

Although present in Africa it remains very little documented [11]. Thus, given the increasing damage caused by PCa, it is obvious that this cancer represents a real problem for public health. The main objective of this work is to carry out a study of prostate cancer by determining the prevalence, histopathological profile, and biochemical profile.

## Materials and Methods

### Study framework

The present study was carried out at the Laboratoire d'Anatomie Cytopathologique, Université des Sciences de la Santé (USS) according to the work plan shown in Figure 1.

### Study type, period and population

This was a retrospective and descriptive study on the prevalence of prostate cancer from 2016 to 2023 at Laboratoire d'Anatomie Cytopathologique, Université des Sciences de la Santé (USS) which took place over a period from August 7 to October 9, 2023 onwards. the 2021-2022 academic year. The study population affected by prostate cancer was composed solely of men of different nationalities, married or not, active or retired, and with a history (medical, family, surgical) or not.

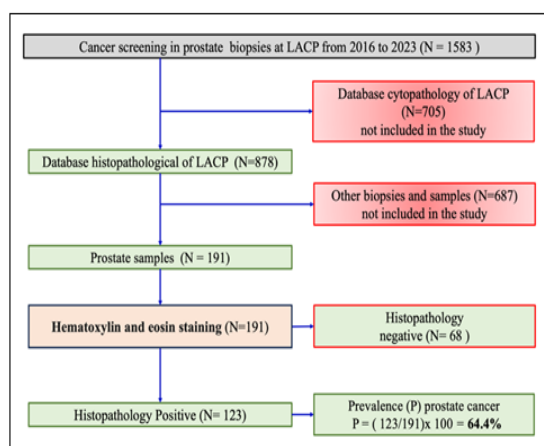


Figure 1. Study Organizational Chart

### Inclusion and non-inclusion criteria

Included in the present study was any request for biopsy examination, excision, excision biopsy, surgical specimen or trans-urethral resection, with the aim of detecting one or more tumors. On the other hand, any request for examination other than that of the prostate was not selected. Incomplete data was also not included.

### Data collection and sampling

The data was collected at the LACP library, using registers and filing cabinets. The registers made it possible to have the sociodemographic data of the patient, that is to say the last name, first name, age, with the anonymity code, the medical prescriber. The binders, for their part, provided information on the type of examination requested and the reports of these examinations. All biopsies, excisions, excisional biopsies, surgical specimens or trans-urethral resections requested were recorded during this period, and were classified by frequency according to the years, according to the prevalence of prostate cancer.

### Authorization and ethical consideration

Data collection was performed from the pathology laboratory records and files of the University of Health Sciences. The confidentiality of patients' personal information was respected. The work described was performed in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). The study was authorized by the Pathology Laboratory under number 003/2023/MERSTT/USS/R/DF/SP.

### Statistical analysis

The collected data were entered into an Excel file (Microsoft Office 2016). The data was divided into qualitative and quantitative variables. The results of qualitative (nominal) variables are given in numbers (n) and percentages (%). As for quantitative variables, data were expressed as mean  $\pm$  standard deviation (SD). The prevalence of prostate cancer was determined by calculating the ratio of the number of cases diagnosed as cancer to the number of total cases received, multiplied by 100. XLSTAT 2015.4.01 software and Student's t-test were used. p values  $<0.05$  were considered statistically significant.

## Results

### Sociodemographic characteristics

During the study period, a total of 123 out of 191 patients received for the diagnosis of PCa presented with prostate cancer, or 64.4%. The average age of patients at the time of diagnosis was 65.95 years with a range of 42 to 86 years. Frequency peaks were observed between 58 and 65 years, i.e. 31.9% (n=61) and between 66 and 73 years, i.e. 33% (n=63). Elderly patients ( $\geq 65$  years old) represented 56.5% of cases (n= 108) and patients under 50 years old represented 2.6% of cases (n= 5). Figure 2 shows patients by age group. Regarding positive cases of prostate cancer, the average age of positive patients diagnosed was

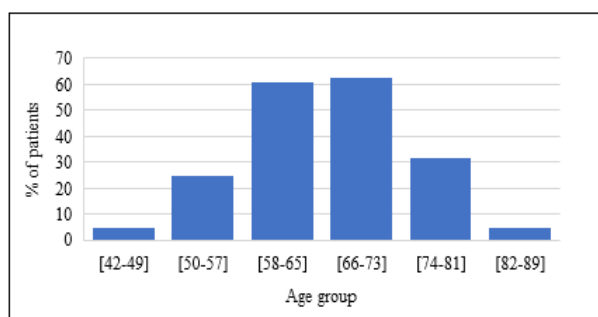


Figure 2. Distribution of Patients by Age Group

66.5% years with extremes of 50 to 83 years. Frequency peaks were observed between 58 and 65 years, i.e. 36.6% (n=45) and between 66 and 73 years, i.e. 30.9% (n=38).

Among the patients seen at the time of diagnosis, 16.2% of cases (n= 31) were married, 3.7% of cases (n= 7) were widowed, 2.6% of cases (n= 5) were single. 1.6% of cases (n= 3) and 75.9% of cases (n= 145) were not indicated. Regarding positive cases, 15.9% of cases (n= 18) were married, 3.5% of cases (n= 4) were widowed, 1.8% of cases (n= 2) were single and 78, 8% of cases (n= 89) were not indicated.

The year 2019 was the year with the most patients, i.e. 54 including 41 positive patients. Table 2 presents number of patients per year. The distribution of positive cases by year was as follows: 2016 represented 2.4% or 3 positive cases, 2017 represented 18.7% or 23 positive cases, 2018 represented 17.1% or 21 positive cases, 2019 represented 33.3% i.e. 41 positive cases, 2020 represented 8.9% or 11 positive cases, 2021 represented 4.1% or 5 positive cases, 2022 represented 13% or 16 positive cases and 2023 represented 2.4% or 3 positive cases (Table 1).

#### Clinical signs

Among the clinical signs presented by the patients, the highest frequency was that of prostate hypertrophy with 60.2% of cases (n= 115). Table 2 shows the clinical signs of the patients. Concerning only positive cases, 61.8% of cases (n= 76) had prostate hypertrophy, 12.2% of cases (n= 15) were not indicated, 10.6% of cases (n= 13) had dysuria, 4.9% of cases (n= 6) had dysuria associated with enlarged prostate, 3.3% of cases (n= 4) had adenomectomy, prostatic nodule and retention urine each represented 1.6% of cases (n= 2), 0.8% of cases (n= 1) had dysuria associated with pollakiuria.

#### Medical history

39.8% of cases (n= 76) did not have information on their medical history, 27.2% of cases (n= 52) had no medical history, 20.4% of cases (n= 39) had high blood pressure (hypertension), 3.7% of cases (n= 7) had diabetes and high blood pressure, 2.1% of cases (n= 4) had diabetes, asthma, high blood pressure and cerebrovascular accident (CVA) each represented 1.6% of cases (n= 3). Others such as renal failure or gout each represented 0.5% of cases (n=1). Concerning only positive cases, 37.2% of cases (n= 49) did not have information on their medical history, 28.3% of cases (n= 32), 20.4% of cases (n= 23) had high blood pressure. Asthma, diabetes, diabetes associated with high blood pressure each represented 1.8% of cases (n=2). Others such as gout, high blood pressure associated with renal failure represented 0.9% of cases (n= 1).

#### Surgical history

40.3% of cases (n= 77) did not have information on surgical history, 39.8% of cases (n= 76) had no surgical history, 7.9% of cases (n= 15) had hernia, 3.1% of cases (n= 6) had undergone prostatectomy. Cataract and hemorrhoids represented 2.1% of cases (n= 4), 1.6% of cases (n= 3) were cysts. Appendicitis, hip osteoarthritis and intestinal obstruction represented 0.5% of cases (n=1). Regarding positive cases, 45.1% of cases (n= 51) had no surgical history, 38.9% of cases (n= 44) did not have information on surgical history, 6.2 % of cases (n= 7) had a history of hernia, 2.7% of cases (n= 3) had a history of cataract. Hemorrhoids and prostatectomy each represented 1.8% of cases (n=2). Cysts and intestinal obstruction represented 0.9% of cases (n=1).

#### Collection type

62.8% of samples (n=120) were biopsies, 25.7% of samples (n=49) were excisions, 5.2% of samples (n=10) were trans-urethral resections, 3. 1% of samples (n= 6) were excisional biopsies, 1.6% of samples (n= 3) were surgical specimens, 1% of samples (n= 2) were not indicated and 0.5% of samples (n= 1) were prostatectomies. Concerning positive cases only, Table 3 presents the different types of samples.

#### Biochemistry: PSA

PSA measurement was reported in 160 patients (83.8% of cases). The average level was 208.4 ng/ml with extremes of 1.18 to 1430 ng/ml. The distribution of PSA

Table 1. Frequency of Patients Per Year

| Years | Positive cases | Total cases | Frequencies (%) |
|-------|----------------|-------------|-----------------|
| 2016  | 3              | 8           | 37.5            |
| 2017  | 23             | 32          | 71.9            |
| 2018  | 21             | 31          | 67.7            |
| 2019  | 41             | 54          | 75.9            |
| 2020  | 11             | 18          | 61.1            |
| 2021  | 5              | 12          | 41.7            |
| 2022  | 16             | 30          | 53.3            |
| 2023  | 3              | 6           | 50              |

Table 2. Clinical Signs of Patients

| Clinical signs                  | Effective | Frequencies (%) | p-value |
|---------------------------------|-----------|-----------------|---------|
| Adenectomy                      | 8         | 4.2             | 0.002   |
| Urine retention                 | 7         | 3.7             |         |
| Dysuria                         | 19        | 9.9             |         |
| Dysuria + prostatic hypertrophy | 16        | 8.4             |         |
| Dysuria + pollakiuria           | 1         | 0.5             |         |
| Prostatic hypertrophy           | 115       | 60.2            |         |
| Prostatic nodule                | 4         | 2.1             |         |
| Not indicated                   | 20        | 10.5            |         |
| Routine examination             | 1         | 0.5             |         |

Table 3. Frequencies of Different Types of Samples

| Types of samples         | Effective | Frequencies (%) |
|--------------------------|-----------|-----------------|
| Biopsy                   | 94        | 76.4            |
| Excision                 | 21        | 17.1            |
| Biopsy-Excision          | 1         | 0.8             |
| Operating room           | 2         | 1.6             |
| Prostatectomy            | 1         | 0.8             |
| Trans urethral resection | 4         | 3.3             |

levels was as follows: 37.7% of patients (n= 72) had a PSA value greater than 20 ng /ml, 22.5% of patients (n= 43) had a PSA value between 10 and 20 ng /ml, 20.4% of patients (n= 39) had a PSA value between 4 and 10 ng /ml and 3.1% of patients (n= 6) had a lower PSA value at 4 ng /ml. Concerning only positive patients, Table 4 presents the frequencies of the different PSA values.

#### Gleason score

Well differentiated tumors (Gleason 4 and 5) represented 15.4% of cases (n = 19), moderately differentiated tumors (Gleason 6 and 7) were observed in 52% of cases (n = 64) and poorly differentiated tumors (Gleason 8 and 9) or undifferentiated (Gleason 10) in 32.5% of cases (n = 40). Gleason scores greater than or equal to 7 represented 69.1% of positive cases (n = 85). Table 5 presents the frequencies of Gleason scores.

Table 4. Frequencies of Different PSA Values

| PSA (ng /ml) | Effective | Frequencies (%) | p-value |
|--------------|-----------|-----------------|---------|
| [4 - 10]     | 20        | 16.3            | 0.006   |
| [10 - 20]    | 37        | 30.1            |         |
| >20          | 66        | 53.7            |         |

Table 5. Frequencies of Gleason Scores

| Gleason scores | Effective | Frequencies (%) | p-value |
|----------------|-----------|-----------------|---------|
| Gleason 4      | 7         | 5.7             | 0.008   |
| Gleason 5      | 12        | 9.8             |         |
| Gleason 6      | 19        | 15.4            |         |
| Gleason 7      | 45        | 36.6            |         |
| Gleason 8      | 28        | 22.8            |         |
| Gleason 9      | 12        | 9.8             |         |

#### Histopathological profile

Adenocarcinomas were the predominant histological type 92.7% (n=114). Adenoleiomyomatous hyperplasia with small foci of glandular carcinoma represented 5.7% of cases (n = 7). Intraductal prostate carcinoma and epithelial neoplastic proliferations each represented 0.8% of positive cases (n=1).

#### Discussion

This study carried out reports the cases of PCa diagnosed at the Pathological Cytology Anatomy Laboratory of the Faculty of Medicine of Health Sciences located in Owendo. Although this laboratory is a reference in the diagnosis of PCa in Gabon, these data are far from exhaustive. Because some patients can consult in private laboratories.

The present study is one of the first studies carried out in Gabon on the prevalence of PCa based on register data.

The year with the highest number of patients received for the diagnosis of PCa was 2019 with 54 patients. Furthermore, the years with the lowest numbers of patients received are 2016 with 8 patients and 2022 with 12 patients. The low number of patients received during these years is certainly due to poor patient care compared to the Gabonese population. But this also adds to the limitations in all retrospective studies linked in particular

to poor record keeping. In fact, around twenty cases were excluded due to insufficient information.

The total number of positive patients found in the registers was 123 cases in 7 years. The number described by Ntama et al in 2023 in Cameroon was 542 cases in 10 years [12]. Togo and Senegal according to Tengue in 2016 et al and Ndiaye et al in 2020 was relatively similar, in Togo (232 cases in 3 years) and in Senegal (233 cases in 5 years) [8, 11].

The average age of prostate cancer patients in this study is 66.41% with a range of 50 to 83 years. This result is relatively similar to that of Troh et al (67.8%) [13]. In North Africa, the average age is between 71 and 72 years [14, 15]. In France, the average age was 70 years old [2]. In the United States, the age at diagnosis has become younger with an average of 66 years following the introduction of PSA screening [16]. Generally speaking, prostate cancer is a condition of the elderly. However, subjects under 50 years of age are rarely observed in Western literature [17].

86.39% of patients received for the diagnosis of PCa were of Gabonese nationality and for patients with CaP, patients of Gabonese nationality represented 91.1%. These frequencies are explained by the fact that the study was carried out in Gabon.

For marital status, 15.9% of patients were married, 3.5% of patients were widowed, 1.8% of patients were single and 78.8% of patients were not indicated. The different frequencies of married, widowed and single would have been much greater if all patient information was well documented.

Clinically, the medical history with the greatest frequency was hypertension with 20.4%. The study by Brureau et al in 2020 shows that the frequency of hypertension represented 63% of patients positive for prostate cancer [18]. No link has been established between prostate cancer and hypertension, but it may be due to age and other factors. The surgical history with the greatest frequency was hernia with 6.2% of cases. All these frequencies would have been much higher if all patient information was correctly provided.

Regarding clinical signs, the highest frequency was prostatic hypertrophy with 60.2%. Other clinical signs such as: dysuria represented 9.9%, dysuria associated with prostatic hypertrophy represented 8.4%. According to a study by Halidou et al in 2022, urinary frequency was the main clinical sign with 31.87% of cases followed by complete retention of urine in 23.92% of cases [19]. According to Ntama et al, acute retention of urine was the main clinical sign with 21.4% followed by dysuria with 18.4%.

The main type of sampling was biopsy with 76.4% followed by excision with 17.1% of cases. Biopsy is the most commonly used type of sample, especially ultrasound-guided transrectal biopsy. However, the pathological diagnosis must be supplemented by an immunohistochemical study for a correct classification of these tumors [20].

Paraclinically, the PSA level varied between 1.18 and 1430 ng/ml and is relatively high, with an average of 208.4

ng/ml. High PSA levels were also recorded in Ivory Coast by Troh et al with an average of 121.94 ng/ml [13] and in Cameroon by Ntama et al with an average of 412.162% [12]. But low PSA levels were found as in England with an average of 72.2 ng/ml [21]. The high PSA rate could be explained by an often late diagnosis of prostate cancers in our country. However, these values are not always a function of the degree of tumor differentiation [13].

The Gleason score is based on architectural aspects and makes it possible to predict the aggressiveness as well as the scalability of the tumor. Depending on the Gleason score, moderately differentiated tumors (Gleason 6 and 7) were the main tumors with more than 52% of cases followed by poorly or undifferentiated tumors (Gleason 8, 9 and 10) in 32.5% of cases. According to the D'Amico classification, PSA values between 4 and 10ng/ml are well differentiated tumors (Gleason 4 and 5), PSA values between 10 and 20ng/ml are moderately differentiated tumors (Gleason 6 and 7.) and PSA values above 20ng/ml are poorly or undifferentiated tumors (Gleason 8, 9 and 10) [22]. The presence of numerous moderately differentiated and undifferentiated forms is certainly due to the delay in treatment. Gleason scores greater than or equal to 7 represented 69.1% of cases. The frequency of Gleason scores greater than or equal to 7 and the elevated PSA level confirm the frequencies of the histopathological profiles of the patients' biopsies. Indeed, regarding histopathological profiles, prostate adenocarcinomas were predominant with 92.7% of cases. According to Munoz et al, the vast majority of prostate tumors are represented by prostatic adenocarcinoma up to 95% [23].

In conclusion, ultimately, this study aimed to establish the biological diagnosis, histopathological and biochemical profile and to evaluate the prevalence of prostate cancer over a period from 2016 to 2023 at the LACP of the USS. The results show a low overall prevalence of patients diagnosed with prostate cancer compared to studies carried out elsewhere and patient data was not always correctly reported such as clinical signs, PSA values, score by Gleason. According to the clinical signs, prostate cancer manifests itself mainly by symptoms of the genitourinary system including prostatic hypertrophy, urine retention or even urinary frequency. Prostate cancer mainly affects elderly people. Indeed, the risk of being diagnosed with prostate cancer increases with age and despite a low prevalence compared to studies carried out elsewhere, it constitutes a public health problem in an increasingly westernized population. In addition, the low frequency of patients received for diagnosis in this study makes the management of this cancer difficult. It is therefore imperative that the authorities encourage populations to be screened even after the so-called Blue November prostate cancer screening campaign with a view to increasing the frequency of screenings but also detecting prostate cancer early and better management of moderately and well-differentiated tumors before metastases occur.

#### Abbreviations

PCa: Prostate cancer, WHO: World Health Organization., PSA: Prostate specific antigen, LACP:

Pathological Cytology Anatomy Laboratory, USS: University of Health Sciences, Hypertension: Arterial Hypertension.

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### *Statement of Transparency and Principles*

- The authors declare no conflict of interest.
- The study was approved by the Research Ethics Committee of the authors' affiliated institution.
- The study data are available upon reasonable request.
- All authors contributed to the implementation of this research.

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