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# Urological Cancers in Burkina Faso: Epidemiological and Anatomopathological Aspects of 2204 Cases

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## Abstract

**Purpose:** To study the epidemiological and anatomopathological aspects of urological cancers in Burkina Faso from 1988 to 2018. **Patients and Methods:** A cross-sectional, retrospective and descriptive study of histologically confirmed cancers that are collected from pathological anatomy laboratory records. The aspects studied were age, sex, location and histological type. **Results:** A total of 2204 cases of urological cancer were collected. The predominance was male with a sex-ratio of 9.6. The average age was 63.32 years. We found 1602 cases of prostate cancer (72.68%), 361 cancers of the bladder and excretory tract (16.4%), 180 cancers of the kidney (8.16%), 33 testis cancers (1.5%) and 28 penile cancers (1.3%). The predominant histological type of prostate cancer was adenocarcinoma (96.4%) with a Gleason score 7 in 30.4% of cases. Bladder cancer consisted of 50% epidermoid carcinomas. Kidney cancer was mostly nephrotoblastomas with 42.2% of cases. We noted 42.4% of seminomas among testis cancers and 89.3% of epidermoid carcinomas within penile cancers. **Conclusion:** The incidence of urological cancers is increasing in Burkina Faso. These cancers occur at a relatively advanced age with male predominance. Prostate cancers are at the forefront of these urological cancers. The establishment of a cancer registry would allow better follow up of cancers in our countries.

## Keywords

Urological Cancers, Epidemiology, Burkina Faso

## 1. Introduction

Urological cancers are increasingly common in urological pathology and constitute a real public health problem [1]. They include a series of malignant tumors affecting the organs, the urinary tract ducts and the male genital system in particular. Today, epidemiological and histological data on these urological cancers are available in developed countries, dominated by prostate cancers, which constituted, according to Globocan 2018, the first urological cancer and the fourth location in terms of frequency in the world. Bladder cancer, the second most common urological cancer in the world, has a specificity related to urogenital bilharziosis in our countries. In fact, bladder epidermoid carcinomas are more common in parts of the world where bilharziosis is endemic [2].

In Africa in general and Burkina Faso in particular, data on urological cancers are scarce due to the unavailability of effective collection tools, notably a operational cancer registry [3]. In recent years, we have seen an increase in the frequency of urological cancers in the various urology divisions in Burkina Faso [4].

In order to obtain an estimate of the epidemiology and to study the anatomo-pathological aspects of urological cancers at the national level, our work consisted in identifying all histologically diagnosed cancer cases from 1988 to December 2018 in the various pathological anatomy laboratories in Burkina Faso.

## 2. Patients and Methods

This was a descriptive and cross-sectional retrospective study of all the urological cancers cases diagnosed between 1988 and December 2018 (31 years) in all the six pathological anatomy departments in Burkina Faso. These were three public laboratories. They are those of Yalgado Ouédraogo hospital, Tengandogo hospital and Sanou Souro hospital. The other three are private. These are the laboratories of Sandof, Schiphra and Philadelphia. All cases of cancer have been collected from the registries of these different pathological anatomy laboratories. Then all the cases of urological cancers whose results could be analyzed were selected. The variables studied were frequency, sex, age, location and histological type. Data analysis was performed using Epi-info software version 7.0.8. Then an export was made on the SPSS 2.0 software to perform statistical tests. The curves were formed from an Excel 2010 spreadsheet.

## 3. Results

### 3.1. Epidemiological Results

#### 3.1.1. Frequency of Urological Cancers Compared to Other Cancers

During our study, we collected 2204 cases of urological cancers from a total of 14,587 cases of cancers diagnosed in the pathological anatomy laboratories of Burkina Faso. These urological cancers accounted for 15.1% of the cases (Table 1).

The urogenital tract was the 3rd site of cancer localization in terms of frequency with 15.1% of the cancers diagnosed.

Table 1. Frequency of urological cancers compared to other cancers.

| Apparatus or systems | Number | Percentage (%) |
|---|---|---|
| Gyneco-mammary apparatus | 5595 | 38.4 |
| Digestive system | 2603 | 17.8 |
| **Urogenital apparatus** | **2204** | **15.1** |
| Skin and skin appendage | 1162 | 8.0 |
| ENT-HN System | 750 | 5.1 |
| Musculoskeletal | 710 | 4.9 |
| Spleen and lymphatic system | 520 | 3.5 |
| Stomatological system | 377 | 2.6 |
| Respiratory system | 290 | 2.0 |
| Eye and annex | 295 | 2.0 |
| Nervous system | 78 | 0.5 |
| Endocrine system | 3 | 0.1 |
| **General total** | **14,587** | 100.0 |

### 3.1.2. Evolution of Urological Cancers per Year

We collected 2204 cases of urological cancers over a 31-year period. There was an annual incidence of about 73 cases a year. There has been an increasing trend in urological cancers over the years. The largest number of cases was recorded in 2018 and 350 with a frequency of 15.9% (Figure 1).

### 3.1.3. Annual Incidence Rate of Urological Cancers

Table 2 shows the annual incidence rates of urological cancers collected in BURKINA FASO; according to the population estimates of the World Bank.

The results show abnormally increasing annual incidence rates of urological cancers. The highest incidences are recorded in 2018 with 1.77 per 100,000 inhabitants.

### 3.1.4. Age Distribution of Patients

Age was specified in 92.1% of cases. Figure 2 shows the representation of urological cancer cases according to age group (N = 2030).

The age group between 60 and 74 was the most represented with 1020 cases (50.24%). The average occurrence age of urological cancers was 63.32 years more or less 12.08 with 1 and 100 years.

### 3.1.5. Distribution of Prostate Cancers According to the Location

The distribution of urological cancers according to the location is shown in Figure 3.

In our study, we found 1602 cases of prostate or 72.68% of the cases of urological cancers collected. This cancer ranked first in terms of frequency compared to the other urological cancers and there was an annual incidence of about 53 cases per year.
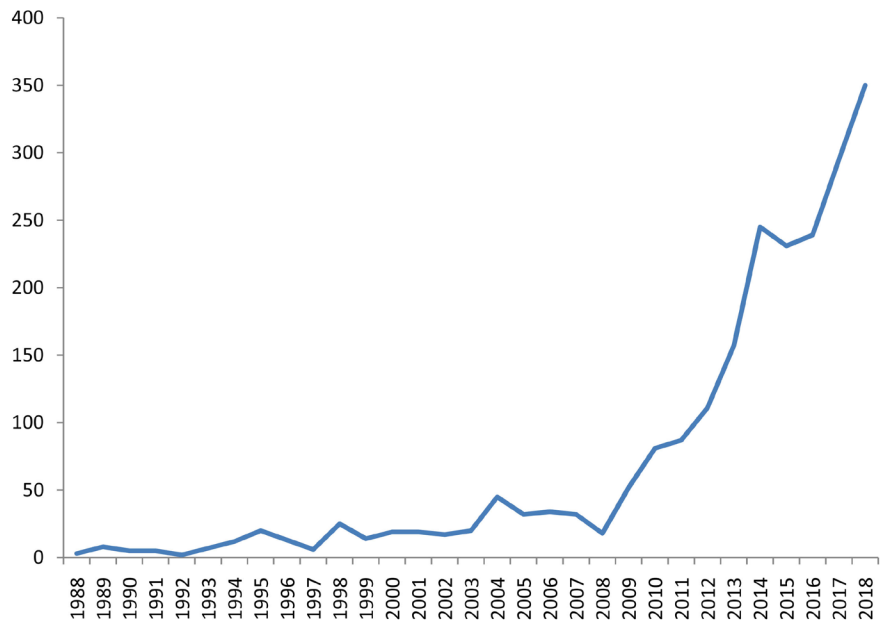
**Figure 1.** Dynamic evolution of urological cancers per year.

N=2030
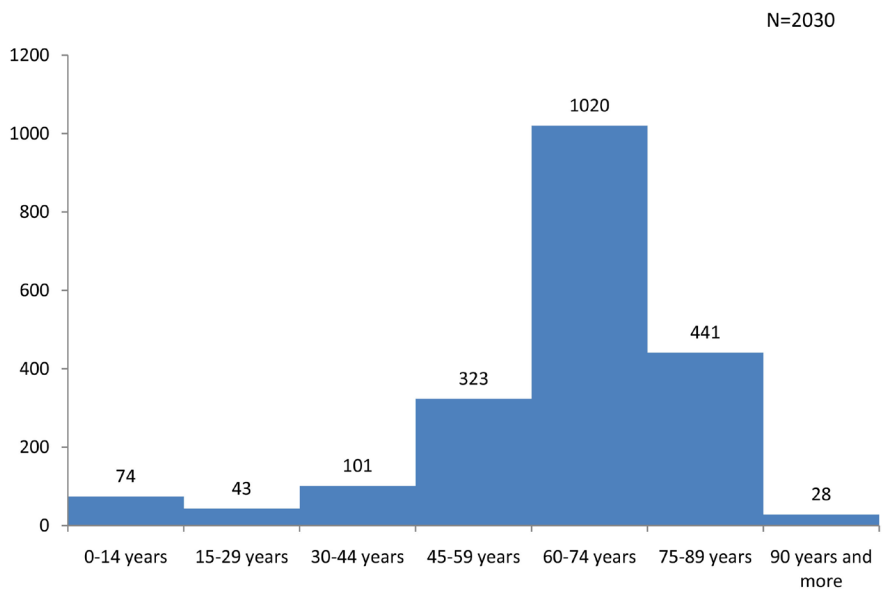


**Figure 2.** Distribution of patients according to age group.

**Table 2.** Annual incidence rate of urological cancers.

| Year of diagnosis | Number of cases per year | Annual estimate of population | Ratio | Incidence rate per 100,000 inhabitants |
|---|---|---|---|---|
| 1988 | 3 | 8,356,305 | 3.5901E−07 | 0.04 |
| 1989 | 8 | 8,579,823 | 9.3242E−07 | 0.09 |
| 1990 | 5 | 8,811,034 | 5.6747E−07 | 0.06 |
| 1991 | 5 | 9,050,084 | 5.5248E−07 | 0.06 |
| 1992 | 2 | 9,297,113 | 2.1512E−07 | 0.02 |
| 1993 | 7 | 9,552,476 | 7.3279E−07 | 0.07 |

Continued

| 1994 | 12 | 9,816,588 | 1.2224E−06 | 0.12 |
| 1995 | 20 | 10,089,878 | 1.9822E−06 | 0.20 |
| 1996 | 13 | 10,372,745 | 1.2533E−06 | 0.13 |
| 1997 | 6 | 10,665,546 | 5.6256E−07 | 0.06 |
| 1998 | 25 | 10,968,724 | 2.2792E−06 | 0.23 |
| 1999 | 14 | 11,282,701 | 1.2408E−06 | 0.12 |
| 2000 | 19 | 11,607,942 | 1.6368E−06 | 0.16 |
| 2001 | 19 | 11,944,587 | 1.5907E−06 | 0.16 |
| 2002 | 17 | 12,293,100 | 1.3829E−06 | 0.14 |
| 2003 | 20 | 12,654,621 | 1.5805E−06 | 0.16 |
| 2004 | 45 | 13,030,569 | 3.4534E−06 | 0.35 |
| 2005 | 32 | 13,421,930 | 2.3842E−06 | 0.24 |
| 2006 | 34 | 13,829,176 | 2.4586E−06 | 0.25 |
| 2007 | 32 | 14,252,021 | 2.2453E−06 | 0.22 |
| 2008 | 18 | 14,689,725 | 1.2253E−06 | 0.12 |
| 2009 | 52 | 15,141,098 | 3.4344E−06 | 0.34 |
| 2010 | 81 | 15,605,217 | 5.1906E−06 | 0.52 |
| 2011 | 87 | 16,081,9911 | 5.4098E−06 | 0.54 |
| 2012 | 111 | 16,571,246 | 6.6983E−06 | 0.67 |
| 2013 | 157 | 17,072,775 | 9.1959E−06 | 0.92 |
| 2014 | 245 | 17,586,017 | 1.3932E−05 | 1.39 |
| 2015 | 231 | 18,110,624 | 1.2755E−05 | 1.28 |
| 2016 | 239 | 18,646,378 | 1.2818E−05 | 1.28 |
| 2017 | 295 | 19,193,284 | 1.537E−05 | 1.54 |
| 2018 | 350 | 19,751,535 | 1.772E−05 | 1.77 |

The highest incidences are recorded in 2018 at 1.38 per 100,000 inhabitants (N = 272).

### 3.1.6. Distribution of the Cases Prostate Cancers According to Age Group

Age was specified in 92.9% of the cases. Figure 4 shows the distribution of prostate cancers according to age group (N = 1488).

The age group between 60 and 74 years was the most represented by 867 cases (58.3%). The average age was 69.48 years with extremes of 18 and 100 years.

### 3.1.7. Distribution of Prostate Cancers According to Sex

Sex was specified in 2183 cases. The male sex was predominant with 91% of the cases and we found a sex-ratio (M/F) of 9.6.

### 3.2. Anatomopathological Results

### 3.2.1. Prostate Cancer

Gleason's score was specified in 85.95% of the cases. Table 3 shows a distribution of prostate cancers according to the Gleason score (N = 1377).
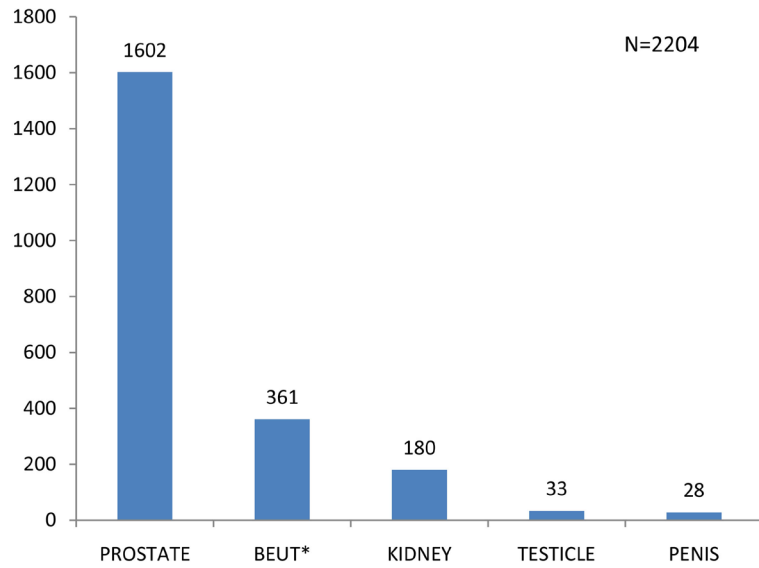
**Figure 3.** Distribution of prostate cancers according to the location. *BEUT. bladder-excretory urinary tract.
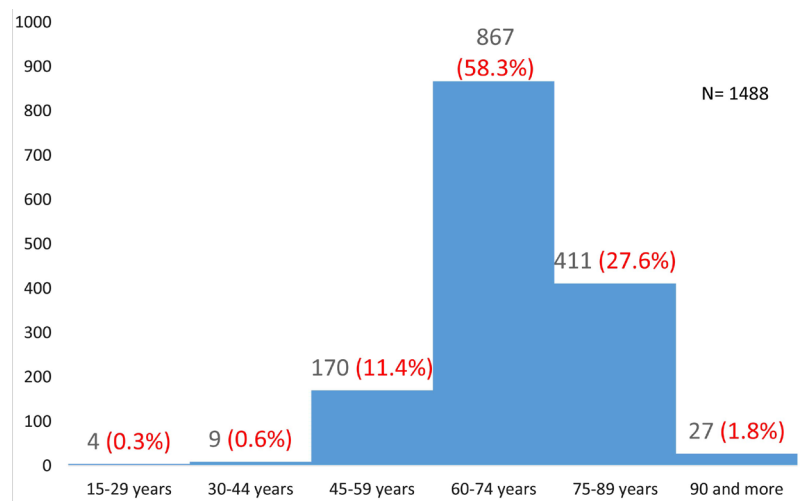


**Figure 4.** Distribution of prostate cancers according to age group.

**Table 3.** Distribution of prostate cancers according to Gleason score.

| Gleason score | number | Percentage % |
|:---:|:---:|:---:|
| SCORE 2 | 69 | 5.0 |
| SCORE 3 | 55 | 4.0 |
| SCORE 4 | 108 | 7.8 |
| SCORE 5 | 90 | 6.5 |
| SCORE 6 | 408 | 29.6 |
| SCORE 7 | 418 | 30.4 |
| SCORE 8 | 183 | 13.3 |
| SCORE 9 | 39 | 2.8 |
| SCORE 10 | 7 | 0.5 |
| **Total** | **1377** | **100.0** |

The Gleason score 7 was the most represented by 30.4%.

Table 4 shows a distribution of prostate cancers according to the histological grade ISUP.

The grades 2 and 3 corresponding to Gleason score 7 were the most represented by 30.4% of the cases.

Table 5 shows a distribution of the cases according to the histological type (N = 1602).

Adenocarcinoma was the most represented by 96.4% of the cases.

We performed a statistical test on the distribution of the histological types of prostate cancer according to age. The results are shown in Table 6. Age was specified in 1488 cases.

There was a very significant statistical association of histological types and patients age. Adenocarcinoma was frequent in patients over 45 years especially in the 60 to 89 age group with 1244 cases or 86.4%.

### 3.2.2. Bladder and Excretory Tracts Cancer

In our series, we noted 361 (16.4%) cases of bladder and excretory cancer distributed in 357 cases of bladder cancer and 4 cases of urethral cancers.

Bladder cancer came in second place in terms of frequency with 16.2% of urological cancers. There was an annual frequency of 12 cases per year. Urethral cancer was scarce with 4 cases in 30 years. Table 7 shows the distribution of histological types of bladder cancers according to age. Age was specified in 321 cases.

There was a very significant statistical association of histological types and age of the patients. Epidermoid carcinoma was frequent in patients over 30 years

Table 4. Distribution of the cases of prostate cancers according to the ISUP grade.

| Gleason score | Grade of ISUP | number | Percentage % |
|---|---|---|---|
| SCORE 6 | grade 1 | 408 | 29.6 |
| SCORE 7 | grade 2 and 3 | 418 | 30.4 |
| SCORE 8 | grade 4 | 183 | 13.3 |
| SCORE 9 et 10 | grade 5 | 46 | 3.3 |

Table 5. Distribution of the cases of prostate cancers according to the histological type.

| Histological types | Number | Percentage % |
|---|---|---|
| ● **Carcinoma** | **1600** | **99.8** |
| Adenocarcinoma | 1544 | 96.4 |
| Epidermoid carcinoma | 47 | 2.9 |
| Urothelial carcinoma | 9 | 0.5 |
| ● **Sarcoma** | **2** | **0.2** |
| Leiomyosarcoma | 1 | 0.1 |
| Rhabdomyosarcoma | 1 | 0.1 |

Table 6. Distribution of histological types of prostate cancers according to age.

| Histological types | 15 - 29 years | 30 - 44 years | 45 - 59 years | 60 - 74 years | 75 - 89 years | 90 years and more | TOTAL |
|---|---|---|---|---|---|---|---|
| ● Carcinoma | 2 | 9 | 170 | 867 | 411 | 27 | 1486 |
| Adenocarcinoma | 2 | 7 | 161 | 846 | 398 | 26 | 1440 |
| Epidermoid Carcinoma | 0 | 2 | 8 | 18 | 11 | 1 | 40 |
| Urothelial Carcinoma | 0 | 0 | 1 | 3 | 2 | 0 | 6 |
| ● Sarcoma | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| Leiomyosarcoma | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Rhabdomyosarcoma | 1 | 0 | 0 | 0 | 0 | 0 | 1 |

Statistical chi-2 test: P = 0.0001.

Table 7. Age distribution of histological types.

| Histological types | 0 - 14 years | 15 - 29 years | 30 - 44 years | 45 - 59 years | 60 - 74 years | 75 - 89 years | 90 years and more | TOTAL |
|---|---|---|---|---|---|---|---|---|
| ● Carcinoma | 0 | 10 | 61 | 95 | 121 | 21 | 1 | 300 |
| Carcinoma Epidermoid | 0 | 7 | 42 | 48 | 48 | 9 | 1 | 155 |
| Carcinoma urothelial | 0 | 3 | 16 | 40 | 61 | 12 | 0 | 132 |
| Adenocarcinoma | 0 | 0 | 3 | 7 | 12 | 0 | 0 | 22 |
| ● Sarcoma | 3 | 1 | 1 | 3 | 2 | 2 | 0 | 12 |
| Rhabdomyosarcoma | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 5 |
| Fibrosarcoma | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 |
| Leiomyosarcoma | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 3 |
| Angiosarcoma | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |

Statistic chi-2 test: P = 0.0001.

mostly in the age group of 45 to 74 years with 96 cases or 62.3%. Urethral carcinoma was mainly diagnosed in patients older than 45 years especially in the 60 to 74 years age group with 101 cases or 76.5%.

### 3.2.3. Other Urological Cancers

In our study, we found 180 cases of kidney cancer. This represented 8.16% of the cases of urological cancers collected. This cancer came in 3rd position in terms of frequency compared to the other urological cancers with an annual incidence of about 6 cases per year. The age group of 0 to 14 years was the most represented by 64 cases (38.3%). The average was 30.04 years with 1and 78 extremes. The female sex was the most represented by 55.4% of cases. The sex-ratio was 0.8. Nephroblastomas were represented by 42.2% of the cases. Nephroblastoma was frequent in the age group of 0 to 14 years with 62 cases or 88.6%. The epidermoid carcinoma was frequent in patients of more than 15 years, mostly in the age group of 45 to 59 years with 23 cases or 51.1%. The urethral carcinoma was mainly diagnosed in patients over the age of 15 and especially in the 15 to 74 age group with 6 cases or 60%. Neuroblastoma was present patients under 29 years

old with 3 cases in total including 2 cases in the age group of 0 to 14 years.

In our series, we had 33 cases of testis cancers. They consisted of 1.5% of the cases of urological cancers and ranked in the 4th place in terms of frequency compared to the other urological cancers with an annual incidence of about 1 case per year. The age group of 30 to 44 years was the most represented by 10 cases (33.3%). The average was 32.03 years with 1 and 70 years extremes. Seminomas (14 cases) and embryonic carcinomas (6 cases) were present in the under 59 years, especially in the age group of 30 to 44years. Non-Hodgkin's lymphoma was frequent in the under 14 years.

We totalled 28 cases of penile cancer or 1.3% of urological cancers. There was an annual incidence under one case per year. The age group of 45 to 59 years was the most represented by 9 (37.5%). The average was 58.5 years with 34 and 78 years extremes. The epidermoid carcinoma was the most represented by 89.3% of the cases.

## 4. Discussion

Urological cancers are a real public health problem [5] because of their worldwide frequency. Their frequency shows sensitive variations in the world. Indeed, data found in developed countries with high technical support center and functional cancer registries [6] [7] [8] are very difficult to compare with those in developing countries that do not have functional cancer registries [9] [10].

The continuous and exhaustive recording of all the cases of cancers (cancer registry) is a guarantee of the data quality and enables an approach to estimate the incidences as well as the different epidemiological parameters. In our series, we collected in 31 years; 2204 cases of urological cancer with a frequency of about 73 cases per year in average. These results are well above those observed by T. Darré *et al.* in Togo, of Ouattara A. *et al.* in Benin, R. Salah *et al.* in Algeria who obtained respectively in average, an annual frequency of 39.9 cases per year, 52.66 case per year and 29 cases per year [3] [10] [11]. This could be explained by our study period that was longer (31 years) therefore includes more cases, the different sensitizations campaigns to urological cancers, the improvement of the technical support centre within our laboratories and the increase in number of urologists. Throughout our study, we noted a growing trend over the years in urological cancers. The lower number was recorded between 1988 and 2008 with a slightly growing evolution curve. The highest number was recorded in 2018 or 350 (15.9%) cases of cancers. This is consistent with the literature. In fact, this increase was mentioned by Rébillard X. *et al.* in France [8] and Geolani Dy W. *et al.* in a study on the global burden of urological cancers [5]. Urological cancers may increase remarkably within an aging and increasing population. In Burkina Faso, according to the World Bank the population increased from 8.35 million in 1988 to 19.75 in 2018 and life expectancy from 49.55 years in 1988 to 60.77 in 2017. In our series, urological cancers were mainly present in the elderly. In fact, 89.3% of the patients were over 45 years. The average age in our series was 63.32

± 12.08 years and the most affected age group was the one between 60 and 70 with 1020 cases, or 50.24%. This is comparable to the results of many authors in the world. In the world T. Darré *et al.* in Togo, Ouattara A. *et al.* in Benin, R. Salah *et al.* in Algeria found respectively in their studies 62.89 ± 15.51 years; 65.53 years and 63.03 years [3] [10] [11]. In our study, there was a male predominance with a sex-ratio of 9.6, which is reported by several authors around the world including T. Darré *et al.* in Togo, Salah *et al.* in Algeria who found sex-ratio of 9.27 and 10.22 [3] [11].

Gleason's score gives a histoprognosis classification. It defines the degree of differentiation of the tumour and therefore its potential aggressiveness. In our context, a large proportion of patients were diagnosed at an advanced age. Gleason score was the most represented by 30.4% of the cases. There were 47% of patients with a prognosis higher or equal to 7. This result is slightly lower than the one observed in Côte d'Ivoire by E. Troh *et al.* that reported in their series 57.25% [12]. The Gleason score 7 gives fairly differentiated intermediate prognosis cancers of prostate and the scores 8 to 10 less differentiated cancers of poor prognosis. The ISUP (International Society of Urological Pathology) grade established through the correspondence with Gleason score, also gives a histoprognosis classification. In our series, the adenocarcinoma was the most represented histological type by 1544 (96.4%) cases followed by epidermoid carcinoma by 47 (2.9%) cases. These results are similar to those observed by NJP Engbang in the littoral region of Cameroon or 96.14% [9], T. Darré *et al.* in Togo and E. Troh *et al.* in Côte d'Ivoire with 94.86% and 93.67% [3] [12] respectively. The bladder cancer came in 2nd place in terms of frequency with 16.2% of urological cancers. There was an annual frequency of about 12 cases per year. The urethral cancer was scarce with 4 cases in 30 years. Our results are similar to those recorded by NJP Engbang In the littoral region of Cameroon in their study or 64 cases of bladder cancer in 10 years or 16.33% of urological 96 cases of bladder cancer in 20 years or 14.16% of urological cancers with an annual frequency of about 5 cases per year [3]. But in Algeria, R. Salah *et al.* in their study ranked bladder cancer in first place among urological cancers with 210 cases in 12 years or 60.3% [11]. Epidermoid carcinoma was the most represented in our study by 48.8% of the cases. These results are consistent with those recorded in Senegal by B. Diao *et al.* or 50.7%; in Cameroon by NJP Engbang or 40.63% [5] [9]. In our context this result could partially be justified by the fact we are in an endemic bilharzias area.

Bilharziasis is the main cause of squamous cell carcinoma of the bladder. B. Diao *et al.* in Senegal noted in series that Schistosoma haematobium eggs were found in 29.2% of the patients [5]. But our results contrasted with those obtained in Algeria by R Salah *et al.* who mostly gave urethral carcinoma (95.23%) [11]. The most represented histological types of kidney cancers were nephroblastoma with 42.2% and the epidermoid carcinoma with 26.7%. There was a distribution of the histological type of kidney cancers according to the age. Neph-

roblastoma, the most frequent histological type was present at paediatric age. Our results are similar to those observed in Cameroon and in Togo [3] [9].

Among testis cancers, germinal tumours were the most encountered histological types. There was 43.8% of seminoma, 18.75% of embryonic carcinoma. The distribution of histological types according to age showed significant results. In their series, R. Salah *et al.* in Algeria obtained similar results [4]. But T. Darré*et al.* in Togo and NJP Engbang in Cameroon obtained in their studies 5385% and 50% of lymphomas [3] [13].

Penile and scrotum cancers are known to be scarce in the literature, and the published series are sporadic [11]. Epidermoid carcinoma was the most represented by 89.3% of the cases. This is consistent with the literature. T. Darré *et al.* in Togo, Sow M. *et al.* in Cameroon and Gueyes M. *et al.* in Senegal reported in their series 100% of epidermoid carcinoma [3] [13] [14].

The weaknesses of our study are the lack of information on the age, sex, origin and occupation of some patients, as well as the retrospective nature of the study. Despite these limitations, these comments and discussions could be carried out.

## 5. Conclusion

Urological cancers were common in Burkina Faso and represented 15.1% of all cancers in the country. Urological cancers were common in elderly people. Prostate cancer was by far the most common. The establishment of a cancer registry would enable a better follow up of the evolution of cancers in our country.

## Conflicts of Interest

The authors do not declare conflict of interest.

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