Study of the Prevalence and the Incidence of the Prostate Cancer in the North-Cameroon: Means and Costs of Management

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Abstract: *Introduction*: The high mortality rate of prostate cancer in Cameroon, its high incidence, its prevalence, the lack of epidemiological data for the north which for the case is the poorest area of the country led us to conduct this study with for the purpose of presenting the epidemiological, clinical and para-clinical aspects, the cost and means of management with a view to setting up adequate management policies.

Patients and Methods: We conducted a cross-sectional analytical study in the city of Ngaoundéré for a period of 5 months. The data were obtained after a survey of patients and collection of results from the pathology registry of the Islamic clinic of Adamawa three months before the start of our study.

Results: The prevalence and incidence of prostate cancer were 28.7% and 24.32%, respectively. The average age of prostate cancer patients was 66.5 years. Gleason scores were less than 6 in 44.44% of cases. Risk factors related to familial cancer cases were difficult to determine. The symptoms were dominated in patients by urinary retention associated with polyuria, dysuria and pollakiuria. The means and costs of care were scalable depending on the difficulty of achieving the technique.

Conclusion: Prostate cancer remains a real health problem in the north because of its incidence and high prevalence and requires the implementation of a government policy of care.

Keywords: Cancer, prostate, Cameroon, epidemiology.

INTRODUCTION

Cameroon is a central African country in low- and middle-income countries. It covers an area of approximately 475,440Km^2 with a disparity of resources on its territory [1, 2]. These disparities can be observed for example after an analysis of its economic and demographic which shows an unequal distribution of people, wealth and even poverty. The country suffers from a number of ills in its health system that come in addition to these disparities reinforced an already deep ache, and this promotes the progression of the incidence of pathologies such as cancers [3-5]. According to the WHO, cancers are the fifth largest killer and non-communicable disease with a mortality rate of about 3%. The annual incidence would be 15 thousand new cases and its prevalence estimated at 25 thousand cases. The most deadly cancers in Cameroon are cancer of the cervix, breast, lung and prostate (PCa). Of these cancers, PCa is the second most deadly cancer in men in Cameroon does not benefit from any government policy of care. It is responsible for 23.5% of deaths recorded for all human cancer deaths in the country [6, 7]. In addition, the north, which is the poorest area of the country with a cumulative poverty rate of nearly 70% in these regions, has few structures empowered to make the diagnosis of PCa, to ensure its management; of only two urologist surgeon; no anatomo-cytopathologist and a lack of epidemiological data that could allow the establishment of a government policy of care adapted to the area [3, 8]. To follow the same logic of developed countries that have been able to reduce the incidence of PCa by the implementation of government policies, Cameroon must define an adequate care policy, and this requires the mastery of a number of tools. The work we did was aimed at providing its tools. For this, we presented the epidemiology, bring out risk factors, analyzed the clinical and para-clinical presentation, finally presented the means and cost of treatment of prostate cancer.

PATIENTS AND METHODS

This is a prospective cross-sectional and analytical study. It was carried out in the city of Ngaoundéré in the region of Adamawa Cameroon for a period of 5 months. The data collected here were obtained either after consultation with the patients and analysis of their medical file or in the pathology register (three months period preceding the beginning of the study) of the Islamic Clinic of Adamawa (ICA) in Ngaoundere. The means and costs of care were those of the structures that housed our study.

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ISSN: 1929-2260 / E-ISSN: 1929-2279/18

Patient Selection

The patients were selected according to a main criterion which is the realization of an anatomopathological study of the prostatic tissue. Based on this criterion, three categories of patients presented themselves to us: patients under treatment, patients registered in the pathology registry and finally the patients presenting themselves for this examination.

Data Sources

They Took into Account

The oldest data, which were available in the ICA pathology registry, had a duration of three months. These gave information on the age of the patients, the results of their histopathological examinations of the prostate tissue, as well as the type of sample taken. All these data were collected for exploitation.

Patients undergoing treatment or receiving for anatomopathology examination of prostate tissues were selected successively and submitted to a questionnaire that had three main areas of study:

The study of the antecedents and clinical parameters which consisted of the collection of information on the general state of health of the patients as well as to judge their knowledge on the means of diagnosis and treatment of the pathology. Here, it is a question of identifying the symptoms, the associated pathologies, the co-morbidities as well as the risk factors.

The paraclinical study aimed to present the results of biological analysis, to study the anatomopathological characteristics of the patients, to present the demographic distribution of the patients and finally to present the variations of the PSA level and the volume of the prostate gland.

The study of the costs and means of treatment was done by taking into consideration the pricing in force in the various structures that housed our study. These prices were the only ones available in the north.

Processing and Completion of Exams

The surgical specimens obtained (after biopsy, TURP, adenomectomy, etc.) were collected just after the sample was taken and then kept in containers with a volume of 10% formalin making at least 10 times the volume of the surgical specimen. The samples thus obtained were sent to a pathology laboratory in the city of Yaoundé. These followed the treatment intended for tissue operating parts. In fact, after the macroscopic study, dehydration, paraffin embedding, microtomy, H.E.S staining and assembly, the slides were read with an optical microscope at objectives by an anatomopathologist.

Sample and Statistical Analysis

A total of 53 patients were selected for this study. Of these, 12 were collected by retrospective analysis of the ICA registry, 41 were recruited and interviewed during our study among which 4 under treatment. The means and costs of care were those of the structures that housed our study. The data was obtained and analyzed using a questionnaire installed on the Sphinx Plus Version 5.0 software. The use of calculating tools of descriptive statistics by calculations of frequencies, averages, medians allowed us to obtain our results. The graphics and tables were made using the Microsoft Word version 2013 software.

RESULTS

a) Histological Types

Histological tissue sampling techniques for anatomopathological analysis were dominated by trans-rectal resections of the prostate in 94.34% of cases, followed by adenomectomy in 3.77% of cases and finally by biopsy in 1.89% of cases (Figure **1**). Prostate cancer patients accounted for 34% of our study population, in 18 cases (exclusively Adenocarcinoma), nodular hyperplasia of the prostate accounted for 52.83% or 28 cases, and 13.2% or 7 patients had intra-epithelial neoplasia of the prostate (6 cases either 85.71% of low grade PIN and 1 or 14.29% of high grade PIN). Figure **1** shows the distribution of these histological types according to numbers. The incidence of prostate cancer in our population is 9/37 or 24.32% (incidence in patients surveyed) and its prevalence of 14/49 or 28.7% (excluding patients on treatment).

b) Age

The ages of patients with prostate cancer were distributed as follows: 55.6% of patients or 10 cases in the interval [65-79], 22.2% of patients or 4 cases in the interval [50-64] and 22.2% of patients or 4 cases for ages over 80 years. The average for this series was 66.5 for a median of 63 (Figure **2**).

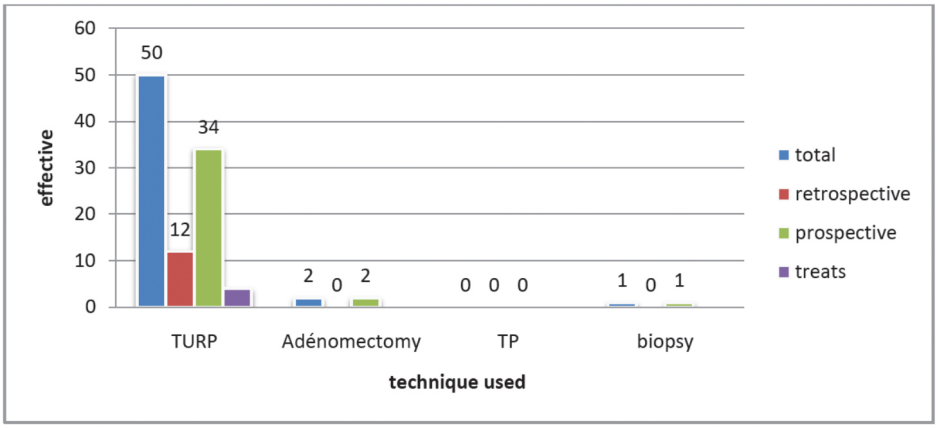

Figure 1: Distribution of techniques by size.

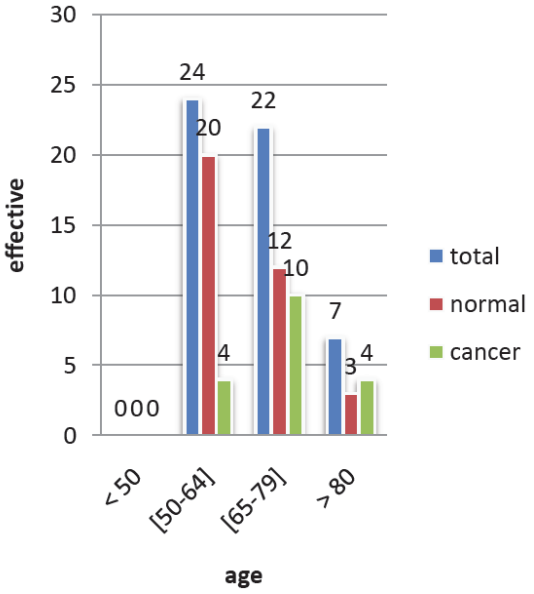

Figure 2: Age distribution.

c) Gleason Score

The majority Gleason score in patients was 8 or 6 cases or 33.33%. Scores 2, 5, and 7 represented 2 cases for each of 11.1% and score 4 with 22.2% and 6 with 13.6%. Only 9 cases of cancer out of 18 or 50% were eligible for classification according to the Gleason Grading as reviewed in 2014. However, 4 cases or 44.44% of these cases of cancer come from patients under treatment (Tables **1** and **2**).

d) Risk Factors

In this study, 32 or 86.5% admit to having heard of prostate cancer, 5 or 13.5% had never heard of it, and none had to be tested PCa early and voluntary. Of the 37 patients included in this study, only 7 cases (18.92%) admit to having been exposed during their various activities. Exposure factors were: pesticides, herbicides, fertilizers, sawdust and toxic fumes. These different factors were found among farmers and workers. Of patients with prostate cancer, only 2 cases, 22.22%, were exposed to a third-party factor. The BMI of patients was within normal limits in 64.9%. 13.5% of the patients were overweight**.**

Similarly, 13.5% were considered obese and 8.1% had a lower BMI than normal. However, only 1 patient with prostate cancer representing 2.7% of the total population was considered obese (Figure **3**).

Table 1: Presentation of Different Gleason Scores

	<50	[50-59]	[60-69]	[70-79]	>80	TOTAL
1+1	0	0	2	0	0	2
2+2	0	0	1	2	1	4
2+3	0	0	1	1	0	2
2+4	0	0	1	0	0	1
3+3	0	0	0	1	0	1
3+4	0	0	0	0	2	2
4+4	0	0	3	2	1	6
TOTAL	0	0	8	6	4	18

Table 2: Presentation of Gleason Grading

Groupes	total
Groupe 1	1
Groupe 2	2
Groupe 3	0
Groupe 4	score (4+4)=6
Groupe 5	0

The distribution of patients by residence shows us 56.8% of patients who lived in urban areas compared to 43.2% for the rural area. In patients with prostate cancer, however, 66.67% came from rural areas against 33.33% for urban areas (Figure **4**).

Subsequently, of the 37 patients surveyed, 36 cases (97.29%) admit to not smoking and only 1 case (2.70%) admits to smoking with a daily consumption of at least one cigarette per day. On the other hand, 25 patients (67.6%) admit to not consume alcohol, 12 or 32.4% consume it with consumption rates ranging from 1 to 6 glasses per day with 28.57% of cancer patients as a consumer. The evaluation of familial cancer cases was difficult in our study because of the many uncertainties. Indeed, although 16 patients (43.2%) admit that they have no other cases of prostate cancer in the family and 7 patients (18.9%) admit to having other cases of prostate cancer in the family; 15 patients or 49.5% had no idea. Moreover, for the other types of cancer, 17 patients or 45.9% had no other types of familial cancer cases, 15 patients or 40.5% had no idea of the presence or absence of any case of cancer in the family and only 1 case or 2.77% confirmed the presence of cancer in the family although none of the patients with prostate cancer is concerned.

e) Clinical and Para-Clinical Presentations

The symptoms experienced by our subjects during our investigation were dominated by the presence of urinary retention in all patients and associates in 83.78% of cases with other disorders of urination. The two main disorders encountered in cancer patients were urinary retention, which was most often associated with other voiding disorders in 88.89% of cases. Hematuria was also found in one case and urethralgia in another. The urinary disorders encountered were dominated by dysuria, polyuria, pollakiuria and nycturia respectively in 6, 5, 3 and 2 cancer patients. These symptoms had duration of onset ranging from less than one month to 60 months for an average of 14.58 months. Figures **5** and **6** below show these different symptoms and durations.

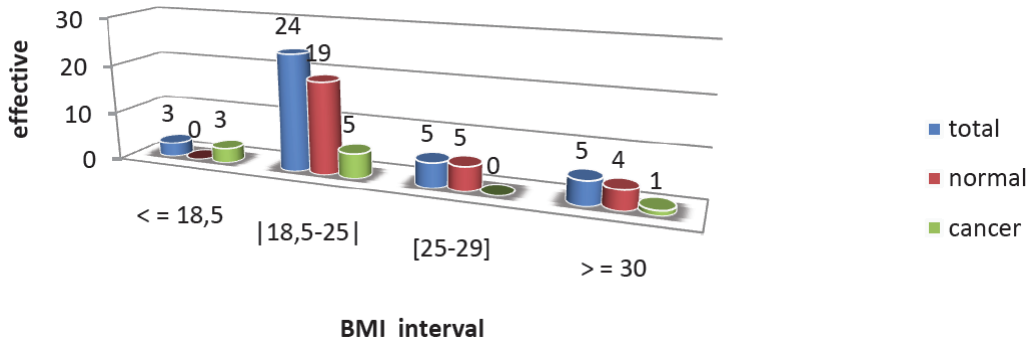

Figure 3: Showing changes in BMI.

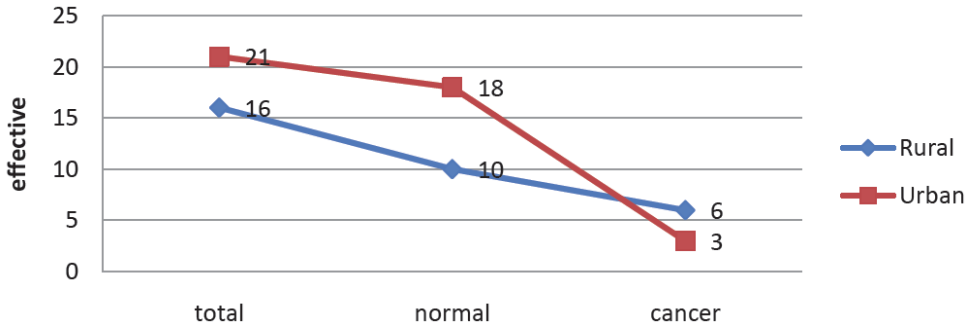

Figure 4: Breakdown by area of residence.

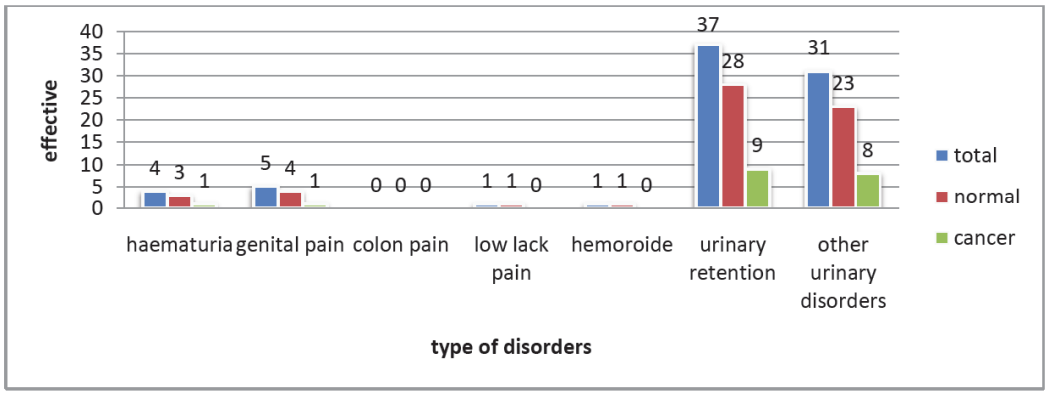

Figure 5: Presentation of symptoms.

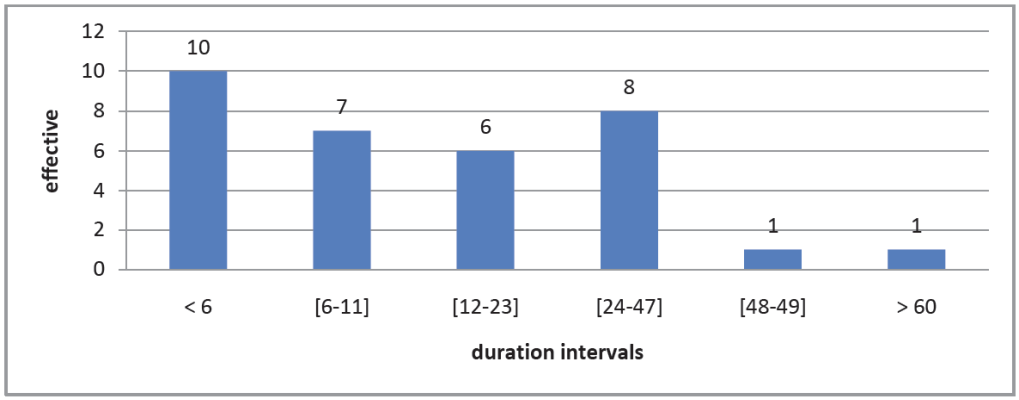

Figure 6: Presentation of duration of urinary disorders.

Among 23 patients (62.16%) the rectal examination was mentioned as done; among 30 patients, or 73.17%, the PSA assay was done and among 23 patients, or 62.16%, the ultrasound data were present. Nevertheless, only 25 patients, or 60.97%, had an association of TPSA with prostatic volume. Among patients with prostate cancer the association was 53.84%. However, prostate volumes on ultrasound as well as PSA levels were all higher than normal (Figures **7** and **8**).

e) Means and Costs of Care

The cost of diagnosis and treatment depends on the surgical technique used. The most expensive surgical technique is total prostatectomy, while the least expensive is pulpectomy. Biological exams record fluctuations with minimum and maximum costs representing the variability between test centers. The costs of surgical techniques do not fluctuate. These

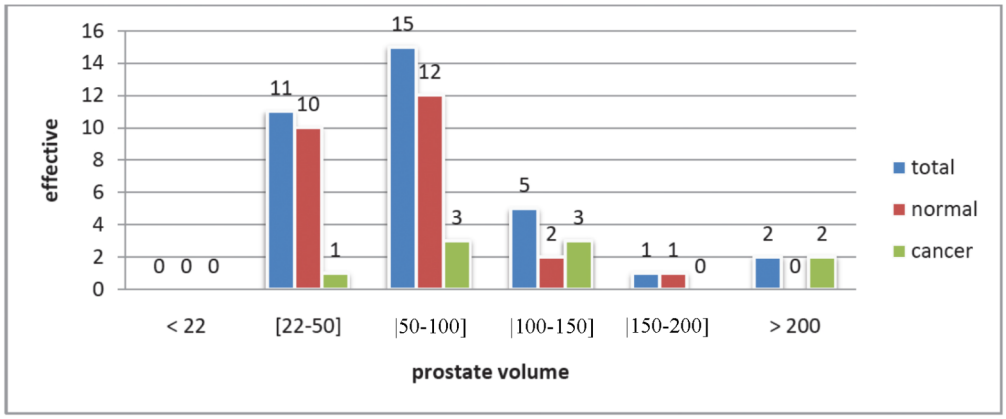

Figure 7: Presentation of ultrasound volumes.

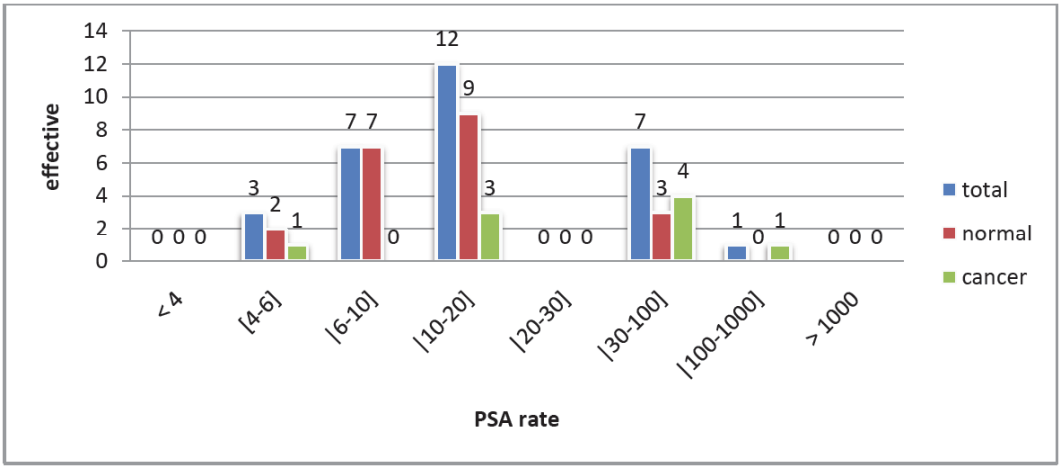

Figure 8: Presentation of PSA values.

Table 3: Presentation of Means and Costs of Care

	TECHNICAL	MINIMAL COST(FCFA)	MAXIMAL COST(FCFA)
EXAMS	TPSA	13000	15000
	ULTRASOUND	8000	10000
	ANAPATH	30000	40000
	OTHER BALANCE SHEET	15000	20000
DIAGNOSIS AND	TURP	580000	
	T.P	750000	
	BIOPSY	150000	
	ADENOMECTOMY	380000	
TREATMENT	T.P	750000	
	H.T	50000/MONTH	100000/MONTH
	PULPECTOMY	120000	

surgical costs include hospitalization, anesthesia, medication and pathology (Table **3**).

DISCUSSION

The work we conducted was aimed at analyzing epidemiology, clinical and para-clinical presentations; the means and costs of treating prostate cancer..

a) Discussion of the Results of the Survey with Patients

The surgical techniques used in our study for the diagnosis of PCa showed a clear dominance of the TURPs (in 94.3%) on Adenomectomies and Biopsies. This distribution could be explained by the clinical condition of the patients dominated by urinary retentions. By agreeing with some authors in their conclusions, we can therefore justify the involvement of TURP as the technique of choice in the management of lower urinary tract disorders with obstructive syndromes [9-11]. The low risk associated with this technique also gives it a privileged status and here the importance of endoscopy in the management of obstructive disorders. Nevertheless, the low rate of prostate biopsy may be a limiting factor in the diagnosis of prostate cancer in this sense or the cell types are different in the two types of sampling as demonstrated by Tibari *et al* (2014), Vladimir *et al* (2005), and simultaneous use of both techniques increases the chances of detecting prostate cancer [9, 12].

In our study, the prevalence of 28.57% for 14 cases fits well in the range [3-26] cases for an average of 10 cases of the study of Amégbor *et al* (2009) in Lomié and that from the Salamatou *et al* (2013) study which found an average of 10 cases [10, 13, 14]. Our incidence of 24.31 % when it is similar to those of the studies of Amani *et al* (2007) who found a prevalence

of 21.11%; from Salah *et al.* (2014) who found 28.1% and that of Amégbor *et al.* (2009) when they found 28.1% [13, 15, 16]. This high prevalence of the disease and its high incidence can be explained in our study by the high costs of diagnosis and treatment; the absence of patients who have been tested early to prevent a possible onset of the disease; the lack of awareness shown by the lack of information of patients about the presence of familial cancer cases. Similarly, post-symptom consultation delays that were dominated by urinary retentions associated with other lower urinary tract disorders such as dysuria and polyuria may explain the high incidence of the disease.

The exclusivity of adenocarcinoma as a histological type of cancer in our study is justified by the rarity of other histological types. Indeed, according to Bahloul *et al* (2016) when presenting primitive squamous cell carcinoma of the prostate in their article, they claim that only 24 cases of the cell type that they described were listed in the literature in 2014 [17, 18]. Similarly, the lack of means of investigation of other cell types could explain this exclusivity. Furthermore, in the context of our study, it is important to note that other histological types recorded (BPH in 54.7% of cases, PIN in 13.2%), PINs require effective management; because according to Bostwick *et al*., (1997) although the possibility of developing cancer after resection-negative chips is low, 21.43% of people with high-grade PIN will develop PCa after a minimum of 4 years. the average age of our study, which was 63,53 years old, is similar to the results obtained by Sow *et al* (2001), Vladimir *et al* (2005) and Antonio *et al* (2016) who found averages age of 66.62; 67.8 and 66.64 years respectively [9, 19, 20]. However, our results are somewhat different from those obtained by Bostwick *et al* (1997) who found an average age of 75.1 years [21]. This same variation in ages compared to our study can be observed with the results of other authors [15-17]. This variation in age averages could be due to means of life that differs according to the country, the geographical area and even the standard of living. Nevertheless all these results here confirm the fact that prostate cancer is cancer of the elderly.

b) Clinical and Para-Clinical Presentations

Nowadays most of the studies on risk factors for prostate cancer explore its genetic and hereditary aspects. The studies associating certain factor with prostate cancer are few in the literature and even exist are based on the assumption as presented by Fourier *et al* (2004) [22]. However, in their study Mbakop *et al* (1995) indicates that obesity may have an influence on the development of prostate cancer [23]. In our study only one case, or 11,11% of patients, was obese. The size of our sample and the type of study here could be the source of this difference. Patients' lack of information on familial cancer cases and the existence of early detection techniques could be considered as a risk factor for the occurrence and spread of the disease. The symptoms of the patients pronounced by a urinary retention, the delays of consultations after their appearance could explain the 33% of the patients received in an altered state. These results are similar to those of Konan *et al* (2015) who found in their study patients arriving in an impaired state in 34.25% of cases [10]. Our results in agreement with those of Ammani *et al* (2007) show that it is not uncommon to find Dysuria and pollakiuria among the symptoms accompanying prostate cancers as urinary disorders [10, 16]. Nevertheless, although Konan and his collaborators found that the mean duration of consultation after onset of symptoms was 25.87 months, their result different from ours which is of 14,56 months for the 33 patients who having been able to locate us in time the appearance of their urinary disorders. In their study Fall *et al* (2012) found in association with prostate cancer treated by pulpectomy co-morbidities in 26.2% of their patients that in the limit of our number of patients with prostate cancer we could not determine.

c) Discussion of Means and Costs of Care

Although the costs of diagnosis and management of PCa presented in our study are high; these are available in comparison with the costs of diagnosis and management presented by studies in Europe. Indeed, considering only total prostatectomy in the article by Bauvin *et al* (2003) which presented the costs / efficiencies of the treatment strategies, we realize that the cost presented is seven and a half times higher than those realized here. In the same logic as they, many authors have studied these economic medical aspects of the diagnosis and management of prostate cancer with each time variability in the results [24-26]. This financial aspect in addition to the area poverty rate leads us to believe that a very large number of cases of prostate cancer remain undetected, further reducing its prevalence and its rate of death Impact.

CONCLUSION

The incidence and prevalence of prostate cancer in the north is high. The lack of knowledge of the

populations on the pathology reflects a lack of awareness. As a result, prostate cancer remains a real health problem which, based on the data obtained in this study, will, to a certain extent, allow for the implementation of appropriate management policies.

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Received on 07-04-2018 Accepted on 19-04-2018 Published on 16-05-2018

DOI: http://dx.doi.org/10.6000/1929-2279.2018.07.02.2