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Factors associated with survival in patients with prostate cancer: A study conducted at the Kinshasa University Clinics

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ABSTRACT

The aim of this study was to identify the factors associated with survival in patients with prostate cancer.

This was a retrospective study conducted on 685 case records, of which 139 were from patients diagnosed with prostate cancer in a hospital setting.

The results show that certain factors, such as early diagnosis, the stage of the cancer at the time of diagnosis, the patient's age and the type of treatment administered, significantly influenced the survival of patients with prostate cancer.

Keywords: cancer, prostate, survival, factors, patients, treatment.

1. Introduction

Prostate cancer presents a major public health problem; despite improvements in diagnostic techniques and treatments, patient survival varies considerably depending on several factors such as the clinical stage of the disease, prostate-specific antigen (PSA) levels, the Gleason score, the type of treatment administered and the socio-economic characteristics of patients (Jens Klein and Olaf von dem Knesebeck, 2015).

The pathophysiology of prostate cancer refers to the biological and cellular mechanisms that lead to the transformation of normal prostate cells into cancerous cells and their uncontrolled proliferation (Richard J. Rebello et al., 2021). Prostate cancer is generally an adenocarcinoma, which develops from the glandular cells of the prostate (David A. Bader and Sean E. McGuire, 2020).

In developing countries, particularly in sub-Saharan Africa and the Democratic Republic of the Congo, late diagnosis and limited access to specialist care can affect patient survival. It is therefore important to identify the factors associated with survival in order to improve management and the quality of care.

It is against this backdrop that we ask the following question: what factors are associated with the survival of patients with prostate cancer treated in the urology department at the Kinshasa University Clinics?

In anticipation of the research question, we believe that the patient's advanced age, the advanced stage of the disease and the type of treatment received, are the factors associated with survival in patients with prostate cancer. The overall objective of this study was to identify the factors associated with survival in patients with prostate cancer treated at the Kinshasa University Clinics. We conducted a retrospective study on an exhaustive sample of 685 complete medical records (confirmed diagnosis, age, medical history, laboratory results) of patients followed up in the urology department between 2019 and 2024, over a period of 5 years.

2. Results

Table 1: Prevalence of prostate cancer.

Total number of records reviewed	Number of records for cancer cases	Prevalence of prostate cancer
685 records	139 records	20.3 per cent

Table 1 shows that the prevalence of prostate cancer was 20.3 per cent among patients admitted to the urology department of the Kinshasa University Clinics.

Table 2: Sociodemographic characteristics of the patients included in the study.

Parameters (n=139)	n(%)	Median (q25–q75)
Age (years)		64 (52–70)
< 64	36 (65)	
> 64	103 (74)	
Marital status		
Married	109 (79)	
Unmarried	30 (21)	
Level of education		
Low	14 (10)	
High	125 (90)	
Occupation		
In employment	108 (78)	
Unemployed	31 (22)	

Table 2 shows that the median age of participants was 64 years, with an interquartile range (Q25–Q75) of between 52 and 70 years.

With regard to marital status, 79 per cent of participants were married. The same table indicates that 90 per cent of participants had a high level of education, compared with only 10 per cent who had a low level of education. It is also noted that the majority of respondents (78 per cent) were in employment, whilst 22 per cent were unemployed.

Table 3: Breakdown of respondents by smoking status and allergy status.

Parameters (n=139)	n(%)
Smoking status	
Yes	108 (78)
No	31 (22)
Drug allergy	
Yes	8 (6)
No	131 (94)

Table 3 shows that 78 per cent of respondents were current smokers and that only 6 per cent of them reported a history of drug allergy.

Figure 1 below shows that haematuria (100%), dysuria (84.6%), polyuria (46.2%), urinary retention (46.2 per cent), urinary incontinence (46.2 per cent) and lower back pain (46.2 per cent) were the most common diagnoses on admission to hospital.

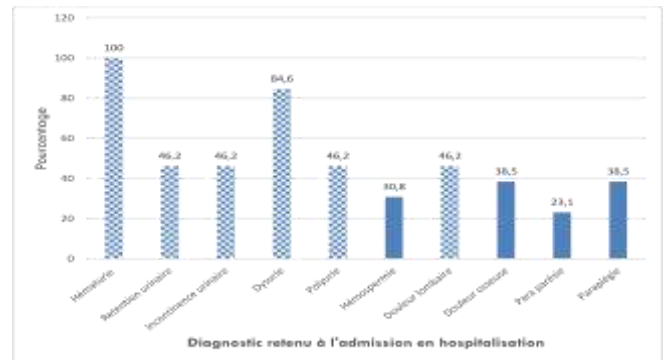


Figure 1: Diagnosis at the time of the patient's admission.

Figure 2 below shows that PSA (74 per cent), haemoglobin (89 per cent), renal function (63 per cent), prostate biopsy (49 per cent) and digital rectal examination (50 per cent) were the most frequently requested diagnostic confirmation tests on admission.

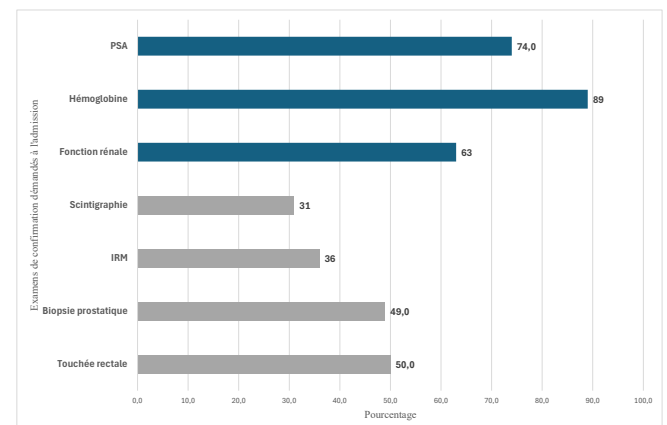


Figure 2: Confirmatory tests requested on patient admission.

Figure 3 below indicates that analgesics (94 per cent), antibiotics (94 per cent), surgery (81 per cent) and pre-operative blood transfusion (69 per cent) were the most commonly administered treatments to patients.

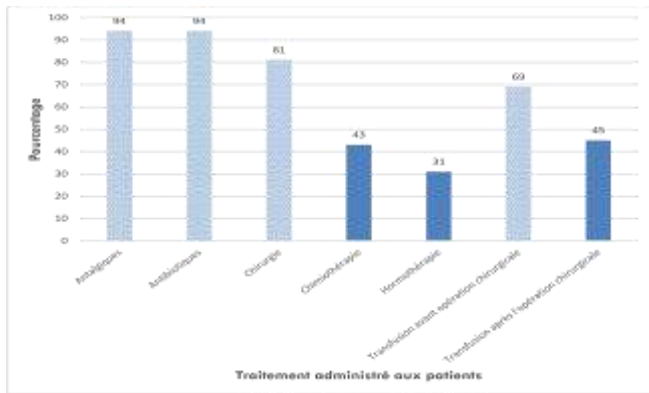


Figure 3: Treatment administered to patients.

Figure 4 below shows that the difference in median survival time according to smoking status was statistically significant ($p=0.001$). This means that patients who smoked had a shorter survival time compared with non-smokers.

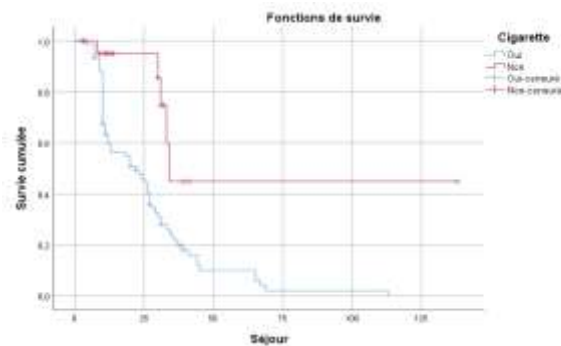


Figure 4: Comparison of median survival by smoking status.

Figure 5 shows that the difference in median survival time according to PSA was statistically significant ($p=0.030$). Patients who had undergone a PSA test had a longer survival time.

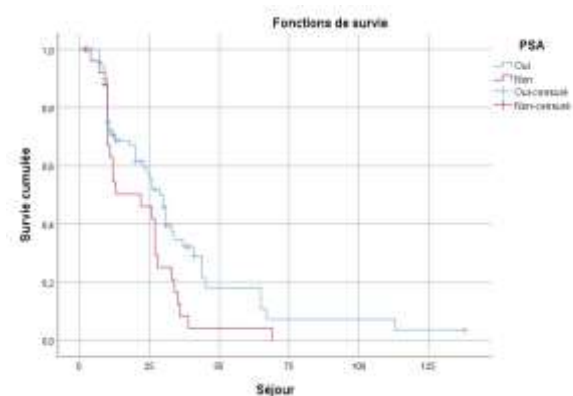


Figure 5: Comparison of median survival by PSA.

Table 4: Cox regression in univariate analysis.

Parameters	Hazard Ratio	95% CI	p-value
Smoking			0.003
No	1		
Yes	0.252	(0.101 – 0.628)	
Urinary retention			0.004
No	1		
Yes	2	(0.240 – 3.226)	
Dysuria			0.006
No	1		
Yes	3,026	(1,383 – 6,620)	
Paraparesis			0.006
No	1		
Yes	3,026	(1,383 – 6,620)	
Prostate biopsy			0.004
No	0.477	(0.289 – 0.787)	
Yes	1		
Patient's general condition			0.004
Good	1		
Poor	2,477	(1,325 – 4,629)	

Univariate Cox regression analysis shows that smoking (HR = 0.252; 95% CI [0.101–0.628]; $p = 0.003$), urinary retention (HR = 2.00; 95% CI [1.240–3.226]; $p = 0.004$), significant paresis (HR = 3.026; 95% CI [1.383–6.620]; $p = 0.006$), failure to undergo a prostate biopsy (HR = 0.477; 95% CI [0.289–0.787]; $p = 0.004$) and poor general health (HR = 2.477; 95% CI [1.325–4.629]; $p = 0.004$) were factors statistically significantly associated with the risk of the event under study (patient death).

Table 5: Cox regression in multivariate analysis.

Variables	Hazard Ratio	95% CI	p-value
Smoking			
No	1		
Yes	0.31	(0.121–0.803)	0.016
Urinary retention			
No	1		
Yes	1.76	(1.068–2.902)	0.026
Chemotherapy			
Yes	1		
No	1.87	(1.126–3.132)	0.016
Patient's general condition			
Good	1		
Poor	2.46	(1.285–4.725)	0.007

After multivariate adjustment, smoking (HR = 0.31; 95% CI [0.121–0.803]; $p = 0.016$), urinary retention (HR = 1.76; 95% CI [1.068–2.902]; $p = 0.026$), absence of chemotherapy (HR = 1.87; 95% CI [1.126–3.132]; $p = 0.016$) and poor general health (HR = 2.46; 95% CI [1.285–4.725]; $p = 0.007$) were factors significantly associated with patient survival.

3. Discussion of the results

In our study, 139 cases of prostate cancer were identified amongst 685 medical records reviewed at the Kinshasa University Clinics, representing a proportion of 20.3 per cent. This result highlights the significance of prostate cancer amongst patients treated in the urology department under study. It must, however, be interpreted as a hospital-based proportion rather than a prevalence in the general population, since the records relate to patients who attended a healthcare facility and do not necessarily represent all men in Kinshasa.

These finding forms part of the context of the growing burden of prostate cancer in Africa. According to estimates by the International Agency for Research on Cancer (IARC), approximately 111,533 new cases of prostate cancer were recorded across Africa in 2024. Prostate cancer therefore constitutes a significant public health issue, with considerable geographical variations in incidence and mortality (IARC, 2024).

A systematic review focusing on West and Central Africa also highlights that the diagnosis is frequently made at an advanced stage, with high PSA levels and management often geared towards palliative rather than curative treatments. These difficulties may contribute to the adverse outcomes observed in hospitals across the region (systematic review published in 2026).

The median age of patients in our study was 64 years, with an interquartile range of 52 to 70 years. This finding confirms that prostate cancer primarily affects middle-aged and elderly men. The National Cancer Institute reports a median age at diagnosis of 68 years for prostate cancer in the United States, which is relatively close to the age observed in our series (National Cancer Institute, n.d.).

The difference between the two findings could be explained by the characteristics of the populations studied, recruitment methods, access to diagnosis and the age distribution of hospitalised patients. Furthermore, the presence of relatively young patients in our series highlights the importance of not limiting clinical vigilance to very elderly men.

With regard to marital status, 79 per cent of participants were married. This proportion may reflect the marital structure of the recruited population. Family and spousal support can facilitate patient care, treatment adherence and access to care. However, our study does not allow us to conclude that marriage directly improves survival, as this relationship would require a specific analysis taking into account socio-economic and clinical factors.

Furthermore, 90 per cent of patients were reported to have a high level of education and 78 per cent were in employment. These characteristics could influence understanding of the disease, healthcare-seeking behaviour and the ability to afford the costs of tests and treatments. However, education and employment do not guarantee an early diagnosis, particularly where specialist services are difficult to access. In sub-Saharan Africa, financial barriers, difficulties in accessing diagnostic tests and certain socio-cultural factors contribute to diagnostic delays (Ofori et al., 2025).

In our cohort, 78 per cent of patients were identified as smokers, whilst 22 per cent were non-smokers. This high proportion warrants particular attention, even though it does not, on its own, establish a causal link between smoking and prostate cancer. Indeed, our study focuses on patients who already have the disease and do not include a control group drawn from the general population that would allow us to estimate the risk of developing this cancer based on smoking status.

However, smoking may play an unfavourable prognostic role following diagnosis. In their systematic review and meta-analysis, Darcey and Boyle (2018) analysed 28 studies and found that current smokers had a higher all-cause mortality rate than those who had never smoked (combined HR = 1.96; 95% CI: 1.69–2.28). Prostate cancer-specific mortality was also higher among smokers (HR = 1.79; 95% CI: 1.47–2.20).

These findings are consistent with the hypothesis that smoking may compromise the prognosis of patients with prostate cancer. Nevertheless, in our Cox analysis, the hazard ratio associated with smoking is less than 1, both in the univariate analysis (HR = 0.252) and in the multivariate analysis (HR = 0.31). If the event under study is indeed death and if the reference category is that of non-smokers, these values would suggest a protective association with smoking, which contradicts the interpretation of the survival curve and the findings of Darcey and Boyle. This discrepancy requires verification of the coding of smoking status, the reference category and the definition of the event before any conclusions can be drawn.

Haematuria was the most frequently reported diagnosis or clinical reason on admission (100 per cent), followed by dysuria (84.6 per cent), polyuria, urinary retention, urinary incontinence and lower back pain (46.2 per cent each). These manifestations highlight the significance of urinary disorders in the clinical presentation of hospitalised patients. It should be noted, however, that haematuria is a clinical sign and not, in itself, a specific aetiological diagnosis of prostate cancer.

The guidelines of the European Association of Urology state that localised prostate cancers are often asymptomatic, whilst advanced forms may cause urinary symptoms, retention, pain and, in the case of bone metastases, skeletal pain or spinal cord compression (European Association of Urology [EAU], 2026).

The frequency of urinary symptoms in our series could therefore be explained by the hospital-based recruitment of symptomatic patients. It may also suggest that some patients are referred for treatment only when the disease has already led to functional complications. Nevertheless, in the absence of detailed data on TNM staging, the Gleason score and the presence of metastases, it is not possible to state that all patients had advanced disease.

With regard to additional investigations, haemoglobin was the most frequently requested test (89 per cent), followed by PSA (74 per cent), renal function assessment (63 per cent), digital rectal examination (50 per cent) and prostate biopsy (49 per cent). The frequency of haemoglobin and renal function tests can be explained by the need to assess general health, screen for anaemia and detect any renal impairment, particularly in the presence of urinary retention or urinary tract obstruction.

PSA and digital rectal examination play a key role in the initial assessment of prostate cancer. However, PSA is not specific to cancer, as its levels may also rise in certain benign conditions, notably benign prostatic hyperplasia and prostatitis. Diagnostic confirmation usually relies on histopathological examination of samples obtained via prostate biopsy (EAU, 2026).

The fact that a biopsy was performed in only 49 per cent of patients could reflect access constraints, differences in clinical indications or the existence of incomplete records. These hypotheses must, however, be verified using individual patient records. The absence of a documented biopsy does not necessarily mean that the diagnosis was incorrect, but it limits the ability to precisely characterise the histological grade of the disease.

Painkillers and antibiotics were administered to 94 per cent of patients, whilst 81 per cent underwent surgical treatment and 69 per cent received a pre-operative blood transfusion. The high frequency of analgesic use is consistent with the need to manage pain and improve patients' comfort. The use of antibiotics may correspond to the treatment of associated infections or to certain perioperative indications. However, the available data do not allow for a precise determination of the indications for these prescriptions.

The high proportion of patients who received a blood transfusion prior to surgery could be linked to pre-existing anaemia, blood loss or other complications. This interpretation should be treated with caution, as the table does not provide individual haemoglobin levels or the indications for transfusion. Similarly, the mention of surgical treatment in 81 per cent of patients requires clarification of the nature of the procedures performed, particularly to distinguish palliative procedures from curative treatments.

In the survival analysis, urinary retention was associated with an increased risk of death after adjustment (HR = 1.76; 95% CI: 1.068–2.902; $p = 0.026$). This result suggests that urinary retention may be an indicator of clinical severity or obstructive complications. Poor general condition was also associated with an increased risk of death (HR = 2.46; 95% CI: 1.285–4.725; $p = 0.007$). This finding indicates that patients in poor general health had an estimated instantaneous risk of death approximately 2.46 times that of patients in good general health, holding all other variables included in the model constant.

These results highlight the importance of comprehensive clinical assessment, the management of urinary complications and the early identification of vulnerable patients. They must, however, be interpreted in light of the observational nature of the study and the possibility of confounding factors, including tumour stage, baseline PSA, comorbidities and access to treatment.

The absence of chemotherapy was also associated with a higher risk of death (HR = 1.87; 95% CI: 1.126–3.132; $p = 0.016$). This association may reflect a difference in access to treatment, but it does not demonstrate that chemotherapy, on its own, improves survival in this population. Patients who receive treatment may differ from those who do not in terms of general health, tumour stage, contraindications and medical follow-up. It is therefore essential to consider the exact nature of the treatment and the therapeutic indications before drawing a causal conclusion.

Finally, survival was statistically different depending on whether a PSA test was carried out ($p = 0.030$), with patients who underwent this test showing better survival in the reported results. This observation could be consistent with a more comprehensive diagnostic pathway and better-organised care. However, the performance of the PSA test may also be a marker of access to care rather than a direct cause of improved survival. The statistical significance observed is therefore not sufficient to establish a causal link.

The results of this study show that prostate cancer accounts for a significant proportion of the cases examined in the urology department of the Cliniques universitaires de Kinshasa. Patients had a median age of 64 years and frequently presented with urinary symptoms, whilst the diagnostic tests and treatments administered indicated that their management required a thorough clinical and biological assessment.

Multivariate analysis revealed significant associations between survival and urinary retention, the absence of chemotherapy, and poor general health. However, the observed association with smoking requires further verification before any definitive conclusions can be drawn. These results highlight the importance of a rigorous diagnosis, management tailored to clinical and tumour characteristics, and regular follow-up of patients. Prospective studies, accompanied by more comprehensive documentation of tumour stage and treatments, would enable a better characterisation of prognostic factors for prostate cancer in this context.

Conclusion

At the conclusion of this study conducted at the Kinshasa University Clinics, prostate cancer accounted for 20.3 per cent of the cases reviewed, representing 139 cases out of 685. Patients had a median age of 64 years and primarily presented with urinary symptoms, notably haematuria and dysuria. The most frequently performed diagnostic tests were haemoglobin measurement, PSA testing and assessment of renal function.

Multivariate analysis identified urinary retention (HR = 1.76; $p = 0.026$), absence of chemotherapy (HR = 1.87; $p = 0.016$) and poor general health (HR = 2.46; $p = 0.007$) as factors significantly associated with patient survival. These results highlight the importance of appropriate diagnosis, the management of urinary complications and the tailoring of treatment to patients' clinical condition.

In conclusion, this study highlights the prevalence of prostate cancer in the urology department under investigation and emphasises the need to strengthen screening and early diagnosis, improve access to further investigations and appropriate treatments, and ensure regular follow-up of patients. However, the interpretation of the findings relating to smoking requires verification of the statistical coding before any conclusions can be drawn regarding its effect on survival.

References

- Darcey, E., & Boyle, T. (2018). Tobacco smoking and survival following a diagnosis of prostate cancer: A systematic review and meta-analysis. *Cancer Treatment Reviews*, 70, 30–40. <https://doi.org/10.1016/j.ctrv.2018.07.001>
- David A. Bader and Sean E. McGuire (2020) — *Tumour metabolism and its unique properties in prostate adenocarcinoma*.
- European Association of Urology. (2026). *EAU-EANM-ESTRO-ESUR-ISUP-SIOG guidelines on prostate cancer: Diagnostic evaluation*. EAU Guidelines Office. <https://uroweb.org/guidelines/prostatecancer/chapter/diagnostic-evaluation>
- International Agency for Research on Cancer. (2024). *Prostate cancer*. World Health Organisation. <https://www.iarc.who.int/cancer-type/prostate-cancer/>
- Jens Klein and Olaf von dem Knesebeck (2015) — *Socioeconomic inequalities in prostate cancer survival: A review of the evidence and explanatory factors*.
- National Cancer Institute. (n.d.). *Age and cancer risk*. <https://www.cancer.gov/about-cancer/causes-prevention/risk/age>
- Ofori, B., Fosu, K., Aikins, A. R., et al. (2025). The intersection of culture and prostate cancer care in Sub-Saharan Africa: A systematic review. *African Journal of Urology*, 31, Article 41. <https://doi.org/10.1186/s12301-025-00512-y>
- Posite, C. M., Wabinga, H., Atwine, R., Leo, I., Tumwesigire, S., Legesse, B., Batista Santos, M., Ahmed, S. E., et al. (2026). Clinicopathological features, management, and treatment outcome of prostate cancer in West and Central Africa: A systematic review. *African Journal of Urology*, 32, Article 12. <https://doi.org/10.1186/s12301-026-00556-8>
- Richard J. Rebello and colleagues (2021) — ‘Prostate cancer’, published in **Nature Reviews Disease Primers**.