

How Far Are We Falling Short? A Single-Centre Retrospective Analysis of Prostate Cancer Detection Rate in a Low-Resource Setting.

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ABSTRACT

Prostate Cancer is the second most diagnosed cancer among men globally, and over 1.4 million men were diagnosed with the disease in 2022. Prostate biopsy practices have undergone significant evolution, transitioning from serum Prostate Specific Antigen (PSA) driven indications to multiparametric Magnetic Resonance Imaging (mpMRI) triage in many settings. Despite these, prostate cancer is still under-detected in many low-resource settings. We set out to determine the prostate cancer detection rate of our institution. **Materials and Methods:** We conducted a nine-year retrospective analysis (September 2017-July 2024) of patients undergoing digital-guided transrectal prostate biopsies at Federal Teaching Hospital, Lokoja. Medical abstraction was done for age, digital rectal examination (DRE) findings, PSA, and histopathological results. Biopsy indications included either suspicious DRE findings or elevated PSA (>4 ng/mL). Data analysis was performed using SPSS version 23, with descriptive statistics employed to determine detection rates. Results were presented in tabular formats. **Results:** A total of three hundred and sixty-three patients had prostate biopsies done over the period. The age range of patients who underwent prostate biopsy was 41 - 101 years, with a mean age of 67.8 +/- 10.4 (SD) years. The majority of patients who underwent prostate biopsies fell within the 61-70 age group; however, the cancer detection rate rose steadily with increasing age. None of the patients had their prostate biopsy done under transrectal ultrasound scan guidance, and neither did any of them have prebiopsy multiparametric Magnetic Resonance Imaging. Among the 363 biopsied patients, 234 patients had nodular hyperplasia while 129 had adenocarcinoma of the prostate, giving a prostate cancer detection rate of 35.5%. **Conclusion:** Prostate cancer was detected in slightly over a third of patients who underwent biopsy at our center, and detection rates rose steadily across increasing age groups.

Keywords- Cancer Detection Rate, Low-resource setting, Prostate biopsy, Prostate Cancer.

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INTRODUCTION

Prostate cancer (PCa) remains a significant global health burden, ranking as the second most frequently diagnosed malignancy in men, with over 1.4 million new cases reported in 2022, and this is projected to rise to 2.9 million by the year 2040.^{1 2}

The global incidence and mortality rates exhibit profound geographic and ethnic disparities, with men of African descent, particularly those in Sub-Saharan Africa, experiencing the highest mortality rates.³ These outcomes are often attributed to a combination of genetic predisposition and systemic barriers to early diagnosis and advanced therapeutic interventions.³

The diagnostic landscape for PCa has undergone a paradigm shift, transitioning from a singular focus on establishing the presence of malignancy to characterizing the tumor's potential clinical trajectory.⁴ Modern pathways aim to maximize the detection of clinically significant disease while minimizing overdiagnosis and the subsequent overtreatment of indolent tumors. In high-resource settings, Prostate-Specific Antigen (PSA) screening is now routinely followed by multiparametric Magnetic Resonance Imaging (mpMRI).⁴ This allows for the integration of targeted biopsies with systematic sampling or, in specific low-risk cohorts, the omission of biopsy altogether.⁵

In contrast, many low- and middle-income countries (LMICs) continue to rely on traditional methods. In these settings, transrectal prostate biopsies may be performed "blindly" via digital rectal guidance, as Transrectal Ultrasound scans (TRUS) are not widely available.⁶ In addition, the adoption of transperineal approaches and advanced imaging remains limited.

Microscopic histological assessment remains the gold standard for definitive diagnosis, often augmented by immunohistochemistry (IHC) or genomic profiling for precision oncology. The implementation of these standards in LMICs is

being hampered by structural constraints such as inadequate and high-cost of mpMRI equipment, shortage of specialized personnel, and the high out-of-pocket costs of care borne by patients.^{7 8} Such resource constraints are likely to result in suboptimal Cancer Detection Rates (CDR), yet this gap is poorly documented in the scientific literature. While international guidelines provide a benchmark for practice to achieve optimal and acceptable detection rates,⁹ there is a paucity of data regarding how far detection rates in resource-limited settings deviate from these global standards. Furthermore, the CDR achievable with the limited modalities currently available in a low-resource setting like ours is not systematically documented in the scientific literature. This study, therefore, aims to determine PCa CDR in a low-resource setting like ours over a determined period and compare this with the global literature to see how much we are falling short.

MATERIALS AND METHODS

This was a nine-year retrospective analysis of patients undergoing prostate biopsies at the Federal Teaching Hospital, Lokoja, a tertiary healthcare facility in North-Central Nigeria. The study involved all eligible patients who underwent prostate biopsy between September 2017 and July 2024. The study population consisted of men who presented with clinical suspicion of prostate cancer. In accordance with institutional protocols, the primary indications for biopsy were:

- Biochemical suspicion: Persistent elevation of serum Prostate-Specific Antigen (PSA) levels > 4ng /ml
- Clinical suspicion: Clinical presentations together with abnormal digital rectal examination (DRE) findings, such as the presence of nodules, induration, or asymmetry.

Patients with incomplete records regarding their PSA values, DRE status, or definitive

histopathological results were excluded from the analysis.

Clinical and demographic data were systematically retrieved from the medical records and the hospital's pathology database. Information was entered into a proforma, and the variables that were extracted were; patient age at the time of the procedure, DRE findings, Pre-biopsy serum PSA values and histological diagnosis

All biopsies were conducted using a digital-guided transrectal approach, with none done under real-time guidance with transrectal ultrasound scan. In addition, none of the patients had a prebiopsy MRI done. Patients were placed in the left lateral decubitus position under appropriate antibiotic prophylaxis and caudal anesthesia, and 10 mL of 2% plain xylocaine was administered.

The procedures were performed by urology residents or consultant urologists. Using digital palpation to identify suspicious areas or to orient the needle relative to the prostate lobes, 10 to 12 core samples were obtained per patient. Sampling was performed using 16G or 18G semi-automatic biopsy needles (Tru-Cut type). The specimens were fixed in 10% buffered formalin, submitted for microscopic histological evaluation, prepared and stained, and read by either of the two pathologists working in the hospital.

The extracted data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23.0. Descriptive statistics were the primary tool for data characterization; categorical variables, such as the DRE findings and the presence of malignancy, were expressed as frequencies and percentages. Continuous variables, particularly age and PSA levels, were summarized using means or medians. The CDR was calculated as the proportion of biopsies positive for malignancy relative to the total number of procedures performed. The final results were presented in tabular formats.

RESULTS

A total of three hundred and sixty-three (363) patients who had prostate biopsies done over the period had complete sets of data. The age range of patients who underwent prostate biopsy was 41 - 101 years, with a mean age of 67.8 +/- 10.4 (SD) years. The age distribution is shown in Table 1 below-

Table 1- Age Distribution of Prostate Cancer Patients

Age Distribution (Years)	Frequency	Percentages (%)
<50	9	2.48
51-60	80	22.04
61-70	135	37.19
71-80	105	28.93
81-90	24	6.61
>90	10	2.75
Total	363	100

The majority of patients who underwent prostate biopsies fell within the 61-70 years' age group; however, the cancer detection rate rose steadily with increasing age. The table below shows the cancer detection rate of the patients according to their age distributions.

Table 2- Prostate Cancer Detection Rate of Patients according to Age Distribution

Age (Years)	Number With Prostate Cancer	Number of Patients Biopsied	Detection Rate (%)
< 50	2	9	22
51-60	21	80	26
61-70	37	135	27
71-80	48	105	46
81-90	13	24	54
> 90	8	10	80
Total	129	363	

The DRE was suspicious for prostate cancer in about a third of the patients, as shown in Table 3. Among 107 patients with abnormal DRE findings, 103 were confirmed to have prostate cancer on histological assessment, yielding a detection rate of 96%.

Table 3- Findings on Digital Rectal Examination of the patients.

DRE findings	Frequency	Percentages
Benign features	256	70.52
Malignant features	107	29.48
Total	363	100

The serum PSA levels varied widely, from 6ng/ml to over 100ng/ml, with a higher proportion of prostate cancer diagnoses observed in patients with serum PSA levels exceeding 50ng/ml. The relationship between PSA values and cancer detection rates is shown in Table 4.

Table 4- Serum PSA Values with Cancer Detection Rates

PSA Values (ng/ml)	Detection Rate (%)
4-10	20.5
11-20	16.5
21-50	28
>50	48

Among the 363 biopsied patients, 234 patients had nodular hyperplasia while 129 had adenocarcinoma of the prostate, giving a prostate cancer detection rate of 35.5%.

DISCUSSION

The findings of this nine-year retrospective analysis reveal a PCa CDR of 35.5% among patients undergoing biopsy at our center. Our CDR of 35.5% was lower than the results from some Nigerian cohorts, which were also done without real-time imaging guidance. For instance, Ogbetere et al reported a CDR of 65% using a 12-core extended biopsy, while Ojewola et al in Lagos documented a CDR of 48.8% with an extended 10-core protocol.^{10 11} Oliyide et al, however, found an overall CDR of 24% but more importantly, was that the procedures in this instance were performed under TRUS. They found that the extended protocols improved the cancer detection rate, and

these findings were similar to what was reported by Fatuga et al.^{12 13}

Hodge et al in 1989 demonstrated the advantage of TRUS-guided systematic biopsies in improving the detection rate of prostate cancer over lesion-directed prostate biopsies that were done at that time.¹⁴ A multicenter survey conducted across 58 centers within Africa reported that finger-guided biopsies were the most common mode in which prostate biopsies were being performed in 41 of these centers.⁶ Similarly, three-quarters of respondents of a survey done by Jeje et al among more than 100 urologists practicing across Nigeria reported that they were still performing prostate biopsies by digitally guided means.¹⁵ It therefore implies that many centers in low-resource settings may still be stuck in the pre-TRUS era before Hodge et al advocated for TRUS-guided systematic prostate biopsies.¹⁴

Another finding in our study was the 96% detection rate among patients with suspicious findings on DRE. Closely related to this was the finding that detection rates rose to 80% in patients over 90 years old and were highest in those with PSA values exceeding 50 ng/ml. These suggest that many patients in our series presented with advanced disease. This high DRE accuracy is often a marker of advanced, late-stage disease presentation. In high-resource settings, DRE may be negative for early-stage, curable cancers and are often detected by imaging or PSA screening.¹⁶

While these rates provide a critical baseline for urological practice in low-resource settings, they must be interpreted within the context of our current diagnostic limitations. Technically, digital guidance is limited to the posterior and lateral peripheral zones—areas reachable by the examining finger. This approach systematically misses the anterior zone of the prostate, which may harbor up to 37% of clinically significant tumors.¹⁷ By remaining in the "pre-imaging era," we may be failing to detect a significant subset of the patients whose tumors are located in the anterior or apical regions, which are invisible to the finger but

accessible via TRUS or MRI.¹⁷ Unlike the contemporary global standard, which utilizes mpMRI for triage and TRUS for guided systematic or targeted biopsies, our procedures were performed using a "blind" digital-guided transrectal approach. The absence of real-time imaging guidance and pre-biopsy MRI reflects the structural and economic constraints typical of many LMICs.⁶ The global diagnostic landscape for prostate cancer (PCa) has undergone a paradigm shift, moving from PSA-driven "blind" biopsies to a pathway defined by multiparametric MRI (mpMRI) triage and targeted sampling. The landmark PRECISION Trial demonstrated that MRI-targeted biopsy is significantly superior to standard systematic biopsy for detecting clinically significant PCa, while the PROMIS Trial validated MRI as a vital tool to avoid unnecessary procedures.^{18 19}

Furthermore, our series showed that 100% of the biopsies were performed via the transrectal route as compared to the transperineal (TP) approach. In contemporary urological practice, particularly in high-income countries (HICs), there is a gradual shift away from transrectal ultrasound-guided (TRUS) biopsy toward the transperineal route.²⁰ This transition, which is primarily driven by the "sepsis advantage" since the transperineal approach involves passing the needle through the disinfected skin of the perineum rather than the rectum, it effectively eliminates the risk of introducing fecal flora into the highly vascular prostate gland and bloodstream.²¹ Besides, the TP route allows for better sampling of the anterior and apical regions of the prostate, which are often difficult to reach or missed during transrectal procedures.¹⁷

In our low-resource setting, the paucity in the number of TP biopsies that are being performed is a reflection of broader systemic challenges. Adopting the TP approach typically requires specialized equipment, such as brachytherapy-style grids or freehand needle guides, and can

involve a steeper learning curve for surgeons accustomed to the transrectal digit-guided or TRUS-guided techniques. The requirement for regional anesthesia will increase the cost for this procedure in a population that is already negatively impacted by the high cost of care.²⁰ As we look to modernize prostate cancer diagnostics in institutions in low-resource settings like ours, transitioning to or adopting transperineal techniques may represent a vital future direction to minimize the morbidity of biopsy-related sepsis while potentially improving cancer detection in non-palpable, anterior lesions.

Context is essential when responding to the rhetorical question on how far we are falling short. While we may be falling short based on global gold standards with respect to the use of technology, approach, and technique, we may not necessarily be falling short considering our current resource envelope. The 35.5% CDR may represent a baseline rate for institutions in low-resource settings like ours. The variable difference notable in our CDR when compared to others may be more of a reflection of external barriers impacting health, such as late presentation, high cost of care due to out-of-pocket payment for healthcare by the majority of the population, inadequate specialists to cater to a large population, and a lack of advanced imaging modalities.

The goal, however, is not to assign blame for these differences, but to advocate for the structural support needed to transition from this "pre-imaging era" towards more contemporary, evidence-based practice.

CONCLUSION

Prostate cancer was detected in over a third of patients who had digital guided prostate biopsy done at our center, with detection rates increasing progressively with age. A high detection rate was found among patients with suspicious DRE findings and those with PSA values exceeding 50

ng/ml, suggesting that many patients presented with advanced, late-stage disease.

While this CDR serves as a vital institutional baseline and a realistic reflection of what is achievable within our current resource envelope, it highlights a major challenge and departure when it is compared to global gold standards.

RECOMMENDATIONS

To align with contemporary, evidence-based practices, there is an urgent need for structural support to transition from the "pre-imaging era" toward TRUS-guided and mpMRI-targeted biopsy pathways. Furthermore, adopting transperineal approaches represents a critical future direction to improve detection in non-palpable lesions while minimizing the risk of biopsy-related sepsis. Ultimately, the goal is to bridge these gaps through systemic investment in diagnostic technology and specialized training to improve early detection and patient outcomes in low-resource settings.

Limitations

All biopsies were performed using a blind digital guided method without ultrasound or MRI guidance, likely missing cancers in certain prostate areas. This is part of what this article speaks to. In addition, the study was retrospective in nature and from a single hospital, so the results may not apply to other settings even within the country.

Conflict of Interest

None

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REFERENCES

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* [Internet]. 2024 May 1;74(3):229–63. Available from: <https://doi.org/10.3322/caac.21834>
2. James ND, Tannock I, N'Dow J, Feng F, Gillissen S, Ali SA, et al. The Lancet Commission on prostate cancer: planning for the surge in cases. *The Lancet* [Internet]. 2024 Apr 27;403(10437):1683–722. Available from: [https://doi.org/10.1016/S0140-6736\(24\)00651-2](https://doi.org/10.1016/S0140-6736(24)00651-2).
3. Jalloh M, Cassell A, Niang L, Rebbeck T. Global viewpoints: updates on prostate cancer in Sub-Saharan Africa. *BJU Int* [Internet]. 2024 Jan 1;133(1):6–13. Available from: <https://doi.org/10.1111/bju.16178>
4. Connor MJ, Gorin MA, Eldred-Evans D, Bass EJ, Desai A, Dudderidge T, et al. Landmarks in the evolution of prostate biopsy. *Nat Rev Urol*. 2023 Apr 1;20(4):241–58.
5. Lomas DJ, Ahmed HU. All change in the prostate cancer diagnostic pathway. *Nat Rev Clin Oncol* [Internet]. 2020;17(6):372–81. Available from: <https://doi.org/10.1038/s41571-020-0332>
6. Dieudonne ZOJ, Gebreselassie KH, Mohammed TO, Khalid A, Nedjim SA, Kifle AT, et al. Current Status of Prostate Biopsy in Africa: Are We Ready for a Targeted Biopsy? *Prostate*. 2025;85(7):638–45.
7. Magi-Galluzzi C. Prostate cancer: diagnostic criteria and role of immunohistochemistry. *Modern Pathology* [Internet]. 2018;31:12–21. Available from: <https://www.sciencedirect.com/science/article/pii/S0893395222011206>
8. Amaeshi LC, Okunade KS, Anorlu RI. Current landscape of cancer genomics research in sub-Saharan Africa – a review of literature. Vol. 15, *Frontiers in Oncology*. Frontiers Media SA; 2025.
9. EAU-EANM-ESTRO-ESUR-ISUP-SIOG-Guidelines-on-Prostate-Cancer-2025 updated.
10. Ogbetere FE, Irekpita E. Detection rate of prostate cancer following 12-core extended biopsy in a Semi-urban Nigerian Tertiary Hospital. *Urol Ann* [Internet]. 2021;13(2). Available from: https://journals.lww.com/urol/fulltext/2021/13020/detection_rate_of_prostate_cancer_following.1.aspx
11. Ojewola RW, Tijani KH, Jeje EA, Anunobi CC, Ogunjimi MA, Ezenwa E V, et al. Detection of Prostate Cancer: Comparison of cancer detection rates of Sextant and Extended Ten-core Biopsy

- Protocols. Nigerian Postgraduate Medical Journal [Internet]. 2012;19(3). Available from: https://journals.lww.com/npmj/fulltext/2012/19030/detection_of_prostate_cancer_comparison_of_cancer.3.aspx
12. Oliyide AE, Tijani KH, Jeje EA, Anunnobi CC, Adeyomoye AA, Ojewola RW, et al. The Role of Transrectal Ultrasound-Guided Fine-Needle Aspiration Biopsy in the Diagnosis of Prostate Cancer: Sextant Versus Extended Protocol. Nigerian Postgraduate Medical Journal [Internet]. 2017;24(4). Available from: https://journals.lww.com/npmj/fulltext/2017/24040/the_role_of_transrectal_ultrasound_guided.8.aspx
 13. Fatuga AL, Tijani KH, Ojewola RW, Annunobi CC, Adeyomoye AA, Jeje EA, et al. Transrectal Ultrasound-Guided Prostate Biopsy: Sextant versus 12-Core Protocol. Journal of West African College of Surgeons [Internet]. 9900; Available from: https://journals.lww.com/jwas/fulltext/9900/transrectal_ultrasound_guided_prostate_biopsy.125.aspx
 14. Hodge KK, McNeal JE, Terris MK, Stamey TA. Random Systematic Versus Directed Ultrasound Guided Transrectal Core Biopsies of the Prostate. J Urol [Internet]. 1989;142(1):71–4. Available from: <https://www.sciencedirect.com/science/article/pii/S0022534717386640>
 15. Jeje EA, Alabi TO, Ojewola RW, Ogunjimi MA. Survey of Prostate Biopsy Practices among Urologists in Nigeria. Nigerian Postgraduate Medical Journal [Internet]. 2020;27(4). Available from: https://journals.lww.com/npmj/fulltext/2020/27040/survey_of_prostate_biopsy_practices_among.18.aspx
 16. Van Poppel H, Albrecht T, Basu P, Hogenhout R, Collen S, Roobol M. Serum PSA-based early detection of prostate cancer in Europe and globally: past, present and future. Nat Rev Urol [Internet]. 2022;19(9):562–72. Available from: <https://doi.org/10.1038/s41585-022-00638-6>
 17. Kudlackova S, Kurfurstova D, Kral M, Hruska F, Vidlar A, Student V. Do not underestimate anterior prostate cancer. Biomedical Papers. 2021;165(2):198–202.
 18. Kasivisvanathan V, Rannikko AS, Borghi M, Panebianco V, Mynderse LA, Vaarala MH, et al. MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis. New England Journal of Medicine. 2018 May 10;378(19):1767–77.
 19. Ahmed HU, El-Shater Bosaily A, Brown LC, Gabe R, Kaplan R, Parmar MK, et al. Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study. The Lancet [Internet]. 2017 Feb 25;389(10071):815–22. Available from: [https://doi.org/10.1016/S0140-6736\(16\)32401-1](https://doi.org/10.1016/S0140-6736(16)32401-1)
 20. Chung Y, Hong SK. Shifting to transperineal prostate biopsy: A narrative review. Prostate Int [Internet]. 2024;12(1):10–4. Available from: <https://www.sciencedirect.com/science/article/pii/S2287888223000600>
 21. Stangl FP, Day E, Vallée M, Bilsen MP, Grossmann NC, Falkensammer E, et al. Infectious Complications After Transrectal Versus Transperineal Prostate Biopsy: A Systematic Review and Meta-analysis. Eur Urol Focus [Internet]. 2025; Available from: <https://www.sciencedirect.com/science/article/pii/S2405456925002093>