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Spectrum of Urological Procedures in Abubakar Tafawa Balewa University Teaching Hospital Bauchi

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Abstract

Background: Urologic diseases constitute a significant proportion of surgical workload in many tertiary hospitals in low- and middle-income countries. Regular audits of urologic procedures are essential for monitoring patterns of disease, workforce capacity, and resource availability. This article aims to determine the spectrum, relative frequencies, and annual trends of urologic procedures performed at Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi from 2019 to 2023. **Methods:** A 5-year retrospective review was conducted using data extracted from theatre registers in the main operating theatre, emergency complex, and endourology suite. Variables collected included demographics, diagnosis, procedure type, surgeon cadre, and case category (elective or emergency). Data were analyzed descriptively using SPSS version 24. Ethical approval was obtained prior to study commencement. **Results:** A total of 709 urologic procedures were recorded. Males constituted 89.4% of patients. The mean age was 51 years (range: 6 days–99 years). Prostate-related conditions accounted for 43.9% of all diagnoses, followed by urethral strictures (8%) and stone disease (8.4%). Prostate biopsy was the most common procedure performed (36.3%), while cystoscopy accounted for 19.2% of procedures. Endourologic interventions, such as DVIU (2.1%), laser lithotripsy (0.7%), and TURP (0.4%), were comparatively low. Most surgeries were elective (92.5%), and consultants performed over half of all procedures. **Conclusion:** Urologic practice at ATBUTH is dominated by prostate-related diseases, with prostate biopsy being the most frequently performed procedure. The low volume of minimally invasive surgeries underscores the need for improved endourologic capacity.

Keywords: Urologic procedures, clinical audit, prostate disease, endourology, ATBUTH Bauchi

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Introduction

Urology encompasses a wide range of diagnostic and therapeutic procedures, spanning outpatient interventions, minimally invasive endoscopic surgeries, and major open operations. The pattern of urologic procedures performed within a health facility often reflects disease epidemiology, availability of diagnostic and surgical equipment, workforce competency, and patient health-seeking behavior. In many parts of sub-Saharan Africa, limited access to advanced urologic technologies and specialist manpower continues to influence the types of procedures performed Mungadi & Khalid, 2021. Regular clinical audits are vital tools for quality assurance and health system strengthening. They enable hospitals to assess service delivery, identify gaps in capacity, guide resource allocation, and plan training needs Earnshaw & Whitman, 2018; Rose & Pang, 2021. In urology, auditing procedure patterns assists in understanding prevailing disease burdens, evaluating the utilization of endourology services, and estimating workforce requirements. Previous studies across Nigeria and other African countries have highlighted varying patterns of urologic disease and service capacity, with many centers still dominated by open procedures and basic endoscopic interventions Issa et al., n.d. Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) Bauchi is a tertiary facility serving Bauchi State and neighboring states in Nigeria's North-East geopolitical zone. During the study period (2019–2023), the urology unit operated with only two consultant urologists, one weekly theatre session, and limited endourology equipment. These constraints potentially shape the types and volumes of procedures performed. This audit aimed to describe the spectrum and frequency of urological procedures performed at ATBUTH over a five-year period, examine demographic characteristics of patients, and highlight opportunities for improving service delivery. The findings are intended to support hospital planning, training, and advocacy for improved urological care in the region.

Methods

Study Design and Setting

This study employed a retrospective, descriptive design reviewing all urologic procedures performed at Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), Bauchi, between January 2019 and December 2023. ATBUTH is the largest tertiary healthcare facility in Bauchi State, providing referral services for neighbouring states in North-East Nigeria. The urology unit manages a broad range of conditions, offering both elective and emergency services.

Study Population

The study included all patients who underwent urologic procedures—open, endoscopic, or minimally invasive—performed by the urology team within the review period. Procedures performed exclusively by other departments (e.g., routine pediatric circumcisions) were excluded unless conducted under the urology unit.

Inclusion Criteria

- All urologic procedures documented in theatre registers between 2019 and 2023.
- Procedures performed by consultants, senior registrars, or registrars in the urology unit.

Exclusion Criteria

- Procedures with incomplete documentation lacking diagnosis or procedure description.
- Non-urologic procedures performed on urology patients by other surgical subspecialties.

Data Collection

Data were extracted manually from theatre registers in the following locations:

- Main Operating Theatre
- Emergency Complex Theatre
- Endourology Theatre

Variables collected included:

- Patient age and sex
- Diagnosis
- Procedure performed
- Cadre of surgeon (consultant, senior registrar, registrar)
- Type of case (elective or emergency)

A structured and pre-tested Google Forms extraction tool was used to ensure uniformity. Double-entry verification was conducted for 10% of records to minimize transcription errors.

Data Management and Analysis

Extracted data were cleaned and analyzed using SPSS version 24. Analysis was descriptive, using frequencies, percentages, and summary statistics (mean, median, mode) where appropriate. Findings are presented in tables and narrative form. Trend patterns across the five years were noted qualitatively.

Ethical Considerations

Ethical approval for the study was obtained from the ATBUTH Health Research Ethics Committee. No patient identifiers were collected, ensuring confidentiality.

Results

A total of 709 urologic procedures were performed at Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH) between January 2019 and December 2023. The annual distribution showed notable fluctuations, with the highest volume recorded in 2019 (180 procedures, 25.4%), followed by a marked decline to 109 procedures (15.4%) in 2020, likely reflecting the impact of COVID-19–related restrictions. Activity increased thereafter, with 128 procedures (18.1%) in 2021, rising further to 157 procedures (22.1%) in 2022, before dropping slightly to 135 procedures (19.0%) in 2023.

Patients' ages ranged from 6 days to 99 years, demonstrating the wide range of urologic conditions managed at the centre. The mean age was 51 years, while the median and mode were 58 years and 70 years, respectively. The majority of patients were male, comprising 634 males (89.4%) compared with 75 females (10.6%).

Most procedures were performed by consultant urologists, who accounted for 384 surgeries (54.2%). Registrars performed 246 procedures (34.7%), while senior registrars conducted the remaining 79 procedures (11.1%). Elective procedures constituted the bulk of the cases (656, 92.5%), whereas emergency procedures accounted for 53 cases (7.5%).

Prostate enlargement—comprising benign prostatic hyperplasia and prostate cancer—was the leading diagnostic indication, representing 311 cases (43.9%). This was followed by urethral strictures with 57 cases (8.0%) and stone disease with 60 cases (8.4%), which included nephrolithiasis, bladder calculi, ureteric stones, and impacted urethral stones. DJ-stent–related problems accounted for 48 cases (6.8%), while bladder tumours and hypospadias contributed 31 cases (4.4%) and 26 cases (3.7%), respectively.

Prostate biopsy was the most frequently performed procedure, totalling 257 cases (36.3%). Cystoscopy, performed for both diagnostic and therapeutic purposes, was the second most common procedure with 136 cases (19.2%). Other frequently performed operations included orchidectomy (44 cases, 6.2%), urethroplasty (37 cases, 5.2%), and cystostomy (31 cases, 4.4%).

Table 1: **Demographic and Clinical Characteristics of Patients Undergoing Urologic Procedures at ATBUTH (2019–2023)**

Variable	Category	Frequency (n = 709)	Percentage (%)
Age (years)	Mean ± SD	51 ± —	—
	Median (IQR)	58	—
	Range	6 days – 99 years	—
Sex	Male	634	89.4
	Female	75	10.6
Admission status	Admitted	452	63.6
	Day-case	257	36.2
Nature of procedure	Elective	656	92.5
	Emergency	53	7.5
Cadre of surgeon	Consultant	384	54.2
	Registrar	246	34.7
	Senior Registrar	79	11.1

Table 2: **Distribution of Major Diagnoses and Procedures Performed at ATBUTH (2019–2023)**

Category	Diagnosis / Procedure	Frequency	Percentage (%)
Major diagnostic categories	Prostate enlargement (BPH/CaP)	311	43.9
	Stone disease (all types)	60	8.4
	Urethral stricture	57	8.0
	DJ stent–related conditions	48	6.8
	Bladder tumours	31	4.4
	Hypospadias	26	3.7
Most common procedures	Prostate biopsy	257	36.3
	Cystoscopy (diagnostic/therapeutic)	136	19.2
	Orchidectomy	44	6.2
	Urethroplasty	37	5.2
	Cystostomy	31	4.4
Endourologic procedures	Direct Vision Internal Urethrotomy (DVIU)	15	2.1
	Laser lithotripsy	5	0.7
	TURP	3	0.4
Open stone surgeries	Cystolithotomy	19	2.7
	Ureterolithotomy	13	1.8
	Nephrolithotomy	11	1.6

Minimally invasive endourologic procedures were infrequently performed during the study period. Direct vision internal urethrotomy (DVIU) accounted for 15 cases (2.1%), laser lithotripsy for 5 cases (0.7%), and transurethral resection of the prostate (TURP) for 3 cases (0.4%). In contrast, open stone surgeries were comparatively common, including cystolithotomy (19 cases, 2.7%), ureterolithotomy (13 cases, 1.8%), and nephrolithotomy (11 cases, 1.6%).

Regarding admission status, 452 procedures (63.6%) required inpatient admission, while 257 procedures (36.2%) were carried out as day-case surgeries.

Discussion

This 5-year audit provides insight into the spectrum of urologic procedures performed at ATBUTH Bauchi, revealing patterns influenced by both regional disease epidemiology and institutional capacity. The marked male predominance (89.4%) is consistent with reports from several Nigerian Mungadi & Khalid, 2021 and West African centres, where urologists predominantly manage both urinary and genital conditions in males, while genital tract diseases in females are largely managed within gynecology units Oyibo & Onwukwe, 2024. Similar male-to-female ratios have been documented in Zaria, Sokoto Mbibu et al., 2002, Kano, and Yobe . The age distribution reflects the rising burden of prostate disorders with advancing age. Patients aged 51–80 years constituted more than half of all cases, aligning with global evidence that benign prostatic hyperplasia and prostate cancer increase sharply among older men. The predominance of prostate-related conditions (43.9%) mirrors trends seen in other Nigerian populations Esomonu et al., 2024.

Trends over the study period showed a decline in surgical volume in 2020, most likely due to the COVID-19 pandemic, which resulted in nationwide suspension of elective surgeries. This pattern is comparable with findings from other Nigerian centres Onukwugha et al., 2023

The high frequency of prostate biopsies (36.3%) reflects increased clinical suspicion, diagnostic activity, and patient awareness regarding prostate cancer. In contrast, the very low number of transurethral resection of the prostate (TURP) procedures (0.4%) and limited uptake of minimally invasive procedures such as laser lithotripsy (0.7%) highlight significant endourologic gaps. A recent survey found that although many Nigerian urologists have basic endourology training, only a minority perform complex procedures routinely due to equipment and training limitations Buba et al., 2025.

Stone disease accounted for 8.4% of cases, similar to findings from Sokoto and comparable to regions with hot climates where dehydration increases the risk of stone formation Abdulkadir, 2016; Eke et al., 2007. The predominance of open stone surgeries, including cystolithotomy, ureterolithotomy, and nephrolithotomy, indicates limited access to advanced stone management techniques such as extracorporeal shockwave lithotripsy, flexible ureteroscopy, and percutaneous nephrolithotomy.

Urethral stricture disease represented 8% of diagnoses, reflecting the persistent burden of post-infective and post-traumatic strictures. This is comparable with findings from other Nigerian centres Onukwugha et al., 2023 but differs from some reports in other African settings where strictures are even more predominant. Overall, the findings illustrate a urologic service dominated by open procedures and basic endoscopy. These patterns reflect workforce shortages, limited equipment availability, and inadequate access to modern endourologic technologies. Improving infrastructure, expanding training opportunities, and strengthening referral systems will be critical to optimizing service delivery.

Conclusion

- The retrospective design may have introduced incomplete or missing data.
- Some theatre records were unavailable, reducing the number of analyzable cases.
- The study was conducted in a single centre and may not represent the broader region.
- Limited availability of endourologic equipment constrained the range of procedures performed.

Conclusion

Males constituted the overwhelming majority of patients undergoing urologic procedures over the study period. Prostate diseases were the most common diagnostic category, and prostate biopsy was the most frequently performed procedure. Urethrocystoscopy was the most common endourologic procedure. The low number of minimally invasive operations highlights critical gaps in endourologic capacity.

Recommendations

To enhance the quality and scope of urologic care at ATBUTH and similar centres, the following recommendations are proposed:

1. **Strengthen endourology capacity:**
   - Invest in essential endourologic equipment including cystoscopes, resectoscopes, ureteroscopes, and lithotripters.
   - Establish a functional endourology suite capable of offering TURP, PCNL, flexible ureteroscopy, and ESWL.
2. **Expand workforce and training:**
   - Recruit additional consultant urologists to reduce workload and improve service continuity.
   - Increase residency training positions and support subspecialty training, particularly in endourology.
   - Strengthen local and international training collaborations.
3. **Improve documentation and data systems:**
   - Introduce standardized electronic theatre registers to enhance data quality.
   - Conduct periodic audits (annually or biannually) to guide planning and resource allocation.
4. **Enhance prostate cancer screening and management:**
   - Promote early detection initiatives including PSA testing and public awareness campaigns.
   - Improve access to staging investigations and multidisciplinary oncology reviews.
5. **Promote multicentre collaboration:**
   - Conduct multicentre studies across the North-East region to obtain broader epidemiological perspectives.
   - Facilitate resource sharing among regional tertiary hospitals.
6. **Improve patient access and affordability:**
   - Advocate for inclusion of key urologic procedures in insurance coverage packages.
   - Support cost-reducing initiatives for high-burden conditions such as BPH and urolithiasis.

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Author Contributions

AO – conceptualization, study design, literature search, data analysis, supervision. MMM – study design, literature search, data collection, data analysis, manuscript drafting. HL – review, editing, supervision. BSM – review, supervision. ISM, HS, HY, SY – review, proofreading.

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Conflict of Interest

The authors declare no conflict of interest.

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