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ORIGINAL RESEARCH

Epidemiological profile of bladder outlet obstruction among adult males at a tertiary hospital in northern Tanzania

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Purpose: Bladder outlet obstruction (BOO) in men frequently causes emergency visits and negatively affects their quality of life (QoL). Its prevalence increases with longer life expectancy, yet limited research exists on its frequency and aetiological patterns in our local context, highlighting a knowledge gap.

Materials and methods: A three-year retrospective, hospital-based, cross-sectional study was conducted among 1 879 adult male patients who attended the urology clinic at Kilimanjaro Christian Medical Centre (KCMC) between January 2021 and December 2023. The extracted files were assessed to confirm the BOO diagnosis using clinical history, physical examination, and imaging investigations. Aetiological BOO patterns were recorded. All data were cleaned and analysed using IBM SPSS Statistics version 25. Ethical clearance was obtained from the College Research Ethics and Review Committee of the Kilimanjaro Christian Medical University College.

Results: Overall, 3 464 files were extracted and reviewed between January 2021 and December 2023, of which 1 879 males (54%) had urinary BOO. Patients had a median age of 72 years (interquartile range [IQR] 64–80), and most (73.5%) presented with lower urinary tract symptoms (LUTS). The most common BOO aetiology was benign prostatic hyperplasia (BPH) (57%), followed by urethral stricture disease (USD) (20%). USD was the most common aetiology among adult males aged < 60 years.

Conclusion: More than half of adult males attending our urology clinic may be experiencing BOO. The most common BOO aetiology in this population is BPH in men aged ≥ 60 years, and USD in adult men aged < 60 years. Adult men aged < 60 years should be screened for USD.

Keywords: bladder outlet obstruction, aetiological patterns, lower urinary tract symptoms

Introduction

The general name for obstructed voiding, defined by decreased urine flow rate and increased detrusor pressure, is urinary BOO.[1] BOO affects health and increases medical costs. It presents with haematuria, infections, stones, retention, and LUTS. LUTS in BOO are categorised as storage symptoms (urgency, nocturia) and voiding symptoms (weak stream, straining, incomplete emptying).[2,3]

In addition to its symptoms, BOO may lead to remodelling of bladder and upper urinary tract tissues, resulting in significant functional impairments in the process.[4,5] Bladder changes occur in three stages: hypertrophy, compensation, and decompensation. During hypertrophy, mechanical stress triggers signals for bladder wall thickening and angiogenesis due to localised hypoxia. This increases blood flow relative to bladder mass. As obstruction persists, the bladder enters the compensated phase, in which growth and angiogenesis stop. Prolonged obstruction leads to the decompensated phase, driven by repeated ischaemia-reperfusion injury during urination. This injury activates pathways that lead to smooth muscle loss, extracellular matrix buildup, and neuron loss.[6]

Men are more likely than women to experience BOO. Regardless of sex, it is possible to classify the origin of BOO as either functional or mechanical blockage. Men are more likely to be affected by mechanical causes, such as BPH, prostate cancer, and urethral stricture, while the most common functional cause is neurogenic bladder dysfunction.[7] In the initial assessment of patients presenting with BOO symptoms, it is crucial to examine the history and physical evidence of the development, extent, and severity of symptoms.

There is no universal consensus on evaluating patients with LUTS suggestive of BOO. The Key assessment tool include the International Prostate Symptom Score (IPSS) questionnaire and measurement of urine flow rate. These form the core of LUTS and BOO evaluation in men. However, neither uroflowmetry nor post-void residual volume alone can definitively determine the cause of BOO.[8,9] Urinary flow rate is a widely recognised and defined measure for evaluating flow patterns. A flow rate < 10 ml/s is consistent with obstruction, according to well-established flow rate criteria.[10]

Urodynamic studies, including filling cystometry and pressure-flow measurements, are the gold standard for evaluating suspected BOO in men.[11] Symptom severity can be classified as mild (0–7), moderate (8–19), or severe (20–35) using a standardised scale.[12] Reusing this tool to assess treatment effectiveness enhances its value. An additional question assessing QoL is particularly useful in practice and is sensitive to treatment outcomes.

The decision to initiate LUTS treatment depends on several factors, including symptom severity, impact on QoL, risk of disease progression, comorbidity presence, and any associated complications.[13] Conservative management, including reassurance and lifestyle changes (reducing fluid, alcohol, and caffeine intake), is effective for many with mild or non-bothersome LUTS. Most do not experience symptom progression or complications. If treatment is

needed, various medications are available, and the choice depends on the patient's symptom profile and risk of disease progression. Treatment should be individually tailored, considering patients' clinical condition and preferences, to achieve the best possible outcomes.

Surgery aims to resolve the urinary tract blockage completely. Renal function can be monitored with creatinine testing and reimaging to confirm obstruction removal. The length and severity of the obstruction determine when renal function returns. A variety of procedures can momentarily remove the barrier. Once radiographic imaging has located the blockage, surgical intervention is typically performed. Several methods provide varying absolute and relative indicators.[14]

The incidence of BOO is increasing worldwide. However, in Africa, few studies have been conducted, and only estimates of BOO prevalence are available. Countries like Tanzania lack comprehensive data in this regard. As life expectancy improves, the prevalence of BOO is expected to rise. Given the burden of BOO and its adverse impact on adult males' QoL, it is crucial to determine its prevalence and aetiological patterns. These findings can facilitate early diagnosis and treatment initiation and serve as valuable epidemiological tools.

Materials and methods

Study design

This was a retrospective hospital-based, cross-sectional study conducted at the urology clinic of KCMC, a zonal referral hospital located in Moshi, Tanzania, serving over 15 million people in northern Tanzania.[15]

Study population and data source

The study was conducted over three years. It assessed the medical records of all adult males who presented to the urology clinic of KCMC, from January 2021 to December 2023. All files with incomplete information, files of patients managed for other diagnoses, like renal tumours, upper tract malignancies, nephrolithiasis, and those without evidence of BOO after investigations, were excluded from the study.

Data collection methods and procedures

Data were collected using a structured data extraction form with 16 variables across four sections. The first section captured socio-demographic data and clinical presentations, such as LUTS, catheterisation, haematuria, lower back pain, and renal insufficiency. The second section documented medical conditions, like hypertension, diabetes, spinal cord injury, and Parkinson's disease. The third section recorded BOO diagnoses. The fourth section detailed BOO patterns, including BPH, prostate cancer, and urethral stricture.

Data were stored in KoboCollect before analysis in IBM SPSS Statistics. The tool was pretested using 10 non-sample files to ensure content validity. Before collection, all patient files from KCMC's urology clinic (January 2021 to December 2023) were listed with the help of an IT (information technology) specialist. Identification numbers were extracted into Excel and then used to retrieve files from the electronic health system (eHMS). Each file was coded and recorded on a separate extraction form. Completed forms were reviewed and securely stored (Figure 1).

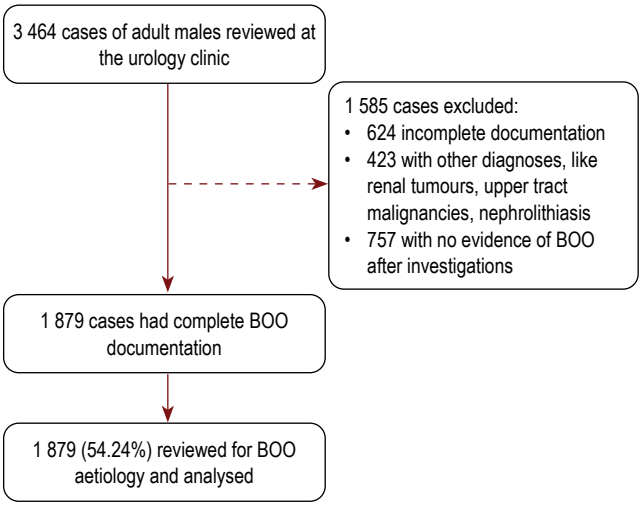

Figure 1: Study flow chart
BOO – bladder outlet obstruction

Data management and analysis

All the obtained data were entered, cleaned, and analysed using IBM SPSS Statistics version 25. The Kolmogorov–Smirnov test of normality was performed, and continuous data were summarised using measures of central tendency (median and measures of dispersion). Proportion and frequency tables were used to summarise categorical variables. Figures were used to summarise the prevalence of BOO.

Results

A total of 3 464 patients attended our institution between January 2021 and December 2023. Among these, 1 879 had complete documentation and evaluation of LUTS due to BOO, and their files were extracted. Most diagnoses were determined by history-taking, physical examination, and imaging, including KUB (kidney, ureter, bladder) ultrasound, urethrogram, and urethrocystoscopy.

Characteristics of adult males with bladder outlet obstruction

The median age of patients was 72 years (IQR 64–80). Of these, 510 (27.14%) were hypertensive at presentation, most (1 381, 73.5%) had LUTS, and only 498 (26.5%) had indwelling urethral or suprapubic catheters. All the baseline characteristics are summarised in Table I.

Prevalence of bladder outlet obstruction among adult males

Among the 3 464 male adults who attended the urology clinic at KCMC, the prevalence of BOO was 54.24%, as illustrated in the pie chart (Figure 2).

Table I: Characteristics of adult males with bladder outlet obstruction (*n* = 1 879)

Characteristic	*n* (%)
Age group (years)	
< 40	69 (3.7)
41–60	261 (13.9)
61–80	1 108 (59.0)
81–100	438 (23.3)
> 100	3 (0.2)
Median age	72 (IQR 64–80)
Comorbidity status	
Non-comorbid	1 151 (61.25)
Hypertension	510 (27.14)
Diabetes mellitus	161 (8.57)
Cerebrovascular accident	36 (1.92)
Spinal cord/back injury	13 (0.69)
Parkinson's disease	8 (0.43)
Clinical features at presentation	
BOO with LUTS	1 381 (73.5)
BOO with indwelling catheter	498 (26.5)
Coexisting systemic signs and symptoms	
None	1 482 (78.87)
Lower back pain	180 (9.58)
Lower limb numbness/weakness	113 (6.01)
Renal insufficiency	48 (2.55)
Constipation	40 (2.13)
Inguinal hernia	16 (0.85)

BOO – bladder outlet obstruction, IQR – interquartile range, LUTS – lower urinary tract symptoms

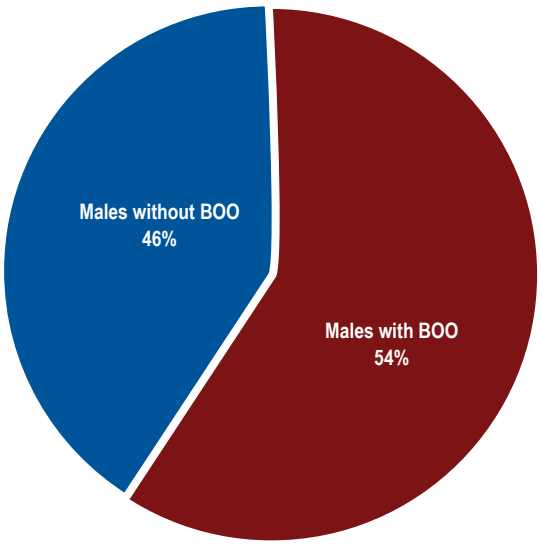

Figure 2: Prevalence of BOO (bladder outlet obstruction) among adult males who attended the urology clinic between 2021 and 2023 (target population, *n* = 3 464)

Aetiological pattern of bladder outlet obstruction among adult males

The most common cause of BOO among adult males who attended KCMC during the study period was benign prostatic obstruction (BPO)/BPH (57.69%). BPH was also the leading cause among males aged ≥ 60 years. USD was the second most common cause (20.01%); however, it was the leading cause of BOO among adult males aged < 60 years. Other causes of BOO were prostate cancer (15.75%), bladder cancer (4.31%), neurogenic bladder (3.35%), and bladder stone (0.53%) (Table II, Figure 3).

Table II: Aetiological pattern of bladder outlet obstruction among adult males (*n* = 1 879)

Aetiology pattern	*n* (%)
BPO/BPH	1 084 (57.69)
Urethral stricture disease	376 (20.01)
Prostate cancer	296 (15.75)
Bladder cancer	81 (4.31)
Neurogenic bladder	63 (3.35)
Bladder stone	10 (0.53)

BPH – benign prostatic hyperplasia, BPO – benign prostatic obstruction

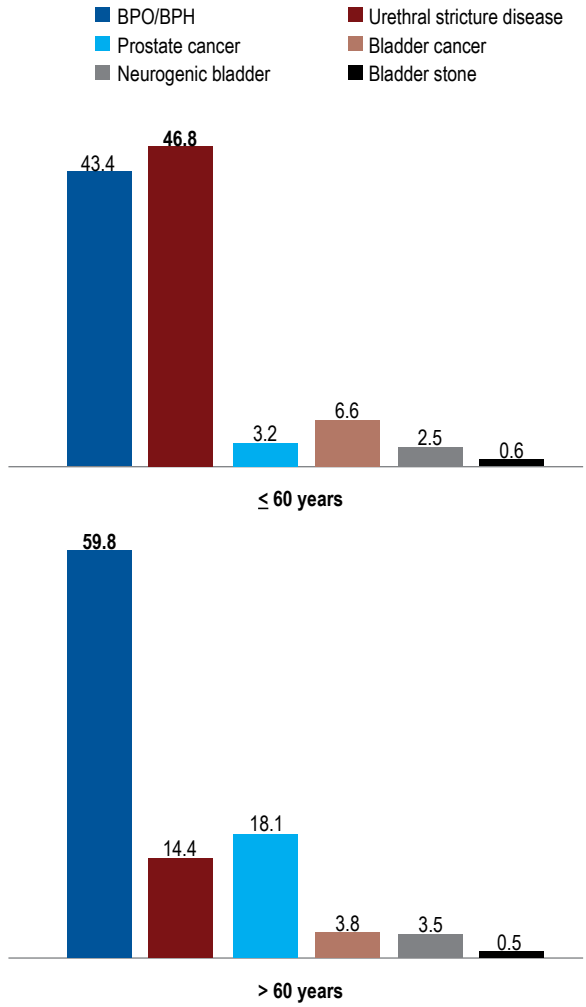

Figure 3: Distribution of aetiological patterns in age groups among adult males treated for bladder outlet obstruction (*n* = 1 879)
BPH – benign prostatic hyperplasia, BPO – benign prostatic obstruction

Discussion

In this study, most men attending the clinic for LUTS were ≥ 60 years old, with a 54% prevalence of BOO, the highest among men aged ≥ 60 years. The most common BOO aetiology was BPO, followed

by USD and prostate cancer. However, BPO was observed in men aged ≥ 60 years, and USD in adult men aged < 60 years.

Our observation is consistent with a Belgian epidemiological survey using the International Consultation on Incontinence Questionnaire Male Lower Urinary Tract Symptoms Module (ICIQ-MLUTS), which demonstrated a consistent rise in the prevalence of BOO symptoms in patients aged ≥ 60 years, with greater interference in their daily lives and compromised QoL.[16] This similarity in BOO occurrence in men as they age could be due to the increasing likelihood of having benign prostatic enlargement caused by the hyperplastic process and prostate cancer diagnoses as men grow older, together with detrusor underactivity.[11] Moreover, the chances are reported to be 50% for BOO and Detrusor Underactivity(DUA) in this age group.[11]

A systematic review on the prevalence, burden, and treatment of LUTS in men aged ≥ 50 years found a BOO prevalence of 60–70% in developed countries (America and Europe).[17] Moreover, there are significant implications for men's QoL, worsening of quality of sexual life, clinically diagnosable anxiety and depression, and financial struggles.[17] From the 2008 estimates, Irwin et al.[18] predicted that the prevalence and burden of BOO will rise significantly in the developing countries of Africa (30%), South America (21%), and Asia (21%). The current observed rise in prevalence could be due to increased awareness over the last 10 years, driven by campaigns and training of urological surgeons in the African setting, alongside improved access.[19]

Our data suggest that most patients diagnosed with BOO in our setting are due to prostatic diseases, like BPO and prostate cancer, for those aged ≥ 60 years, while urethral stricture was the most common cause for adult men aged < 60 years. This observation is consistent with Nigerian data.[20] Prostatic diseases increase as men age, probably due to an increase in the hyperplastic process from ≥ 40 years, which may result in BPH.[7] Furthermore, maintaining a high concentration of androgen receptors in the prostate initiates the occurrence of prostatic diseases in ageing men.[21]

A single-centred, cross-sectional survey in western Kenya revealed a high occurrence of USD in men with LUTS.[22] Our observation is that most of the young men are affected by USD, possibly due to the high use of motorcycles in business platforms for transport and poor observation of road traffic accidents, leading to increased occurrences of pelvic fracture and urethral injury.[23] In a review of epidemiology and management of USD in sub-Saharan Africa, urethral catheterisation was the most common cause for this condition; however, a near-similar aetiological pattern was observed in some regions regarding urethritis and trauma as causes.[24]

The current study's findings are consistent with the body of knowledge and call for greater emphasis on evaluating adult males for BOO. A flowsheet/diagram may help urologists plan programmes to reach most of the population, as half of them may be at risk of BOO complications. This study is limited by its retrospective data collection from patient files; hence, some relevant information may be missing and could have led to patient omission. Furthermore, the lack of urodynamic equipment prevented us from providing detailed information on the causes of neurogenic bladder in our patients.

Conclusion

More than half of adult males who attended the urology clinic at KCMC had BOO. The most common BOO aetiology in this population is BPO in men aged ≥ 60 years and USD in adult men aged < 60 years. Adult males aged < 60 years should be screened for USD. We recommend that the Department of Urology undertake a prospective study of urodynamic parameters in BOO evaluation among adult men.

Conflict of interest

The authors declare no conflict of interest.

Funding source

None.

Ethical approval

Ethical clearance was sought from the College Research Ethics and Review Committee of the Kilimanjaro Christian Medical University College. Permission to conduct the study at KCMC hospital was obtained from the Executive Director of KCMC (certificate number: PG 26/2024).

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References

1. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. Urology. 2003;61(1):37-49. https://doi.org/10.1016/S0090-4295(02)02243-4.
2. Wei W, Wang J. A huge bladder calculus causing acute renal failure. Urol Res. 2010;38(4):231-2. https://doi.org/10.1007/s00240-009-0246-9.
3. Matsukawa Y, Yoshida M, Yamaguchi O, et al. Clinical characteristics and useful signs to differentiate detrusor underactivity from bladder outlet obstruction in men with non-neurogenic lower urinary tract symptoms. Int J Urol. 2020;27(1):47-52. https://doi.org/10.1111/iju.14121.
4. Fusco F, Creta M, Imperatore V, et al. Benign prostatic obstruction relief in patients with lower urinary tract symptoms suggestive of benign prostatic enlargement undergoing endoscopic surgical procedures or therapy with alpha-blockers: a review of urodynamic studies. Adv Ther. 2017;34(4):773-83. https://doi.org/10.1007/s12325-017-0504-0.
5. Fusco F, Palmieri A, Ficarra V, et al. α1-Blockers improve benign prostatic obstruction in men with lower urinary tract symptoms: a systematic review and meta-analysis of urodynamic studies. Eur Urol. 2016;69(6):1091-101. https://doi.org/10.1016/j.eururo.2015.12.034.
6. Levin R, Chichester P, Levin S, Buttyan R. Role of angiogenesis in bladder response to partial outlet obstruction. Scand J Urol Nephrol Suppl. 2004;(215):37-47. https://doi.org/10.1080/03008880410015156.
7. Patel ND, Parsons JK. Epidemiology and etiology of benign prostatic hyperplasia and bladder outlet obstruction. Indian J Urol. 2014;30(2):170-6. https://doi.org/10.4103/0970-1591.126900.
8. Sirls LT, Kirkemo AK, Jay J. Lack of correlation of the American Urological Association Symptom 7 Index with urodynamic bladder outlet obstruction. Neurourol Urodyn. 1996;15(5):447-56. https://doi.org/10.1002/(SICI)1520-6777(1996)15:5<447::AID-NAU2>3.3.CO;2-4.
9. Yalla SV, Sullivan MP, Lecamwasam HS, et al. Correlation of American Urological Association Symptom Index with obstructive and nonobstructive prostatism. J Urol. 1995;153(3 Pt 1):674-9. https://doi.org/10.1016/S0022-5347(01)67682-1.
10. Abrams PH, Griffiths DJ. The assessment of prostatic obstruction from urodynamic measurements and from residual urine. Br J Urol. 1979;51(2):129-34. https://doi.org/10.1111/j.1464-410X.1979.tb02846.x.
11. Abdelmoteleb H, Jefferies ER, Drake MJ. Assessment and management of male lower urinary tract symptoms (LUTS). Int J Surg. 2016;25:164-71. https://doi.org/10.1016/j.ijsu.2015.11.043.

12. Barry MJ, Fowler Jr FJ, O'Leary MP, et al. The American Urological Association Symptom Index for benign prostatic hyperplasia. J Urol. 1992;148(5):1549-57. https://doi.org/10.1016/S0022-5347(17)36966-5.
13. Sultana A, Speakman MJ. Initial management of lower urinary tract symptoms and bladder outlet obstruction. Medicine. 2023;51(4):234-8. https://doi.org/10.1016/j.mpmed.2023.01.001. https://doi.org/10.1016/j.mpmed.2023.01.001
14. Oelke M, Bachmann A, Descazeaud A, et al. EAU guidelines on the treatment and follow-up of non-neurogenic male lower urinary tract symptoms including benign prostatic obstruction. Eur Urol. 2013;64(1):118-40. https://doi.org/10.1016/j.eururo.2013.03.004.
15. Cox M, Shao J. Emergency medicine in a developing country: experience from Kilimanjaro Christian Medical Centre, Tanzania, East Africa. Emerg Med Australas. 2007;19(5):470-5. https://doi.org/10.1111/j.1742-6723.2007.01012.x.
16. De Ridder D, Roumeguère T, Kaufman L. Urgency and other lower urinary tract symptoms in men aged ≥ 40 years: a Belgian epidemiological survey using the ICIQ-MLUTS questionnaire. Int J Clin Pract. 2015;69(3):358-65. https://doi.org/10.1111/ijcp.12541.
17. Zhang AY, Xu X. Prevalence, burden, and treatment of lower urinary tract symptoms in men aged 50 and older: a systematic review of the literature. SAGE Open Nurs. 2018;4:2377960818811773. https://doi.org/10.1177/2377960818811773.
18. Irwin DE, Kopp ZS, Agatep B, Milsom I, Abrams P. Worldwide prevalence estimates of lower urinary tract symptoms, overactive bladder, urinary incontinence and bladder outlet obstruction. BJU Int. 2011;108(7):1132-8. https://doi.org/10.1111/j.1464-410X.2010.09993.x.
19. Campain NJ, MacDonagh RP, Mteta KA, McGrath JS; BAUS Urolink. Current challenges to urological training in sub-Saharan Africa. BJU Int. 2015;116(3):316-8. https://doi.org/10.1111/bju.13168.
20. Idowu NA, Adekunle AA, Adeniran MA, Adeleye-Idowu SA. Bladder outlet obstruction: etiological pattern in southwestern Nigeria. Ann Afr Surg. 2023;20(3):87-93. https://doi.org/10.4314/aas.v20i3.3.
21. Vickman RE, Franco OE, Moline DC, et al. The role of the androgen receptor in prostate development and benign prostatic hyperplasia: a review. Asian J Urol. 2020;7(3):191-202. https://doi.org/10.1016/j.ajur.2019.10.003.
22. Musau P. The profile and urological service needs of outpatients attending a tertiary centre in western Kenya. East Afr Med J. 2013;90(1):1-4.
23. Payne SR, Anderson P, Spasojević N, et al. Male urethral stricture disease: why management guidelines are challenging in low-income countries. BJU Int. 2022;130(2):157-65. https://doi.org/10.1111/bju.15831.
24. Thiagesan R, Gopichandran V, Subramaniam S, Soundari H, Kosalram K. Prevalence of type 2 diabetes among persons with disabilities in the SouthEast Asian region: a systematic review and metaanalysis. Curr Med Issues. 2022;20(3):161-7. https://doi.org/10.4103/cmi.cmi_27_22.