





Bladder Outlet Obstruction: Etiological Pattern in Southwestern Nigeria

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Summary

Background: Bladder outlet obstruction (BOO) is a clinical condition that is characterized by impediment to the flow of urine. It affects all age groups with varying etiologies. The pattern of this clinical condition in our setting is unknown. This study aimed at determines the clinico-epidemiological pattern of BOO in southwestern Nigeria. **Method:** We retrospectively reviewed the case files of patients that were managed for BOO over a period of 10years in our center. **Results:** A total of 784 patients were managed for BOO during the period under review. Their median age was 65.9years and in all, 486 patients of in the study group had benign prostatic hyperplasia (BPH) was the most common diagnosis followed by prostate cancer, urethral strictures and neurogenic bladder. While prostate cancer, urethral stricture, neurogenic bladder, bladder cancer, and bladder stone were diagnosed in 181, 90, 20, 5, and 2

patients, respectively. **Conclusion:** We have done an overview of a clinico-epidemiological pattern of BOO in southwest Nigeria is documented. The most common cause of BOO in men was while in women. It was neurogenic bladder syndrome.

Keywords: Bladder outlet obstruction, benign prostatic hyperplasia, Prostate cancer

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Introduction

Bladder outlet obstruction (BOO) is a clinical condition that is characterized by impediment to the flow of urine. The obstructive element could be at any level of the

urinary tract from the bladder neck down to the external urethral meatus (1). It affects all age groups with varying etiologies but is more common in men (2,3). The

etiology of BOO can be categorized into either mechanical or functional obstruction, irrespective of gender. The mechanical causes in men include benign prostatic hyperplasia (BPH), prostate cancer, and urethral stricture, among others, while the commonly reported functional cause is neurogenic bladder dysfunction. The most common cause of BOO in adult men is BPH (4). While BOO is less common in women. (5) Common causes in women include inherent detrusor dysfunction, neurogenic bladder dysfunction, and following ant-incontinence surgeries (6,7). Although mechanical bladder outflow obstruction is rarely seen in women, it can occur postoperatively following anti-incontinence surgery (7). Other mechanical causes that have been reported in women are pelvic prolapse, primary bladder neck obstruction, and genitourinary tract neoplasm.

Patients with BOO often present with lower urinary tract symptoms which include poor urinary stream, straining, intermittency, and feeling of incomplete bladder emptying. These are referred to as voiding symptoms. Others are frequency, urgency, nocturia, and post-micturition symptoms. These are called storage symptoms and in advanced cases it may be complicated by renal failure (8, 9). About 2.3 billion people worldwide are said to have had lower urinary tract symptoms. BOO alone accounted for 1.1 billion of this population of people with lower urinary tract symptoms (2).

The number of individuals affected by BOO is much higher in the developing regions of the world. It was said to be 30.1–31.1% in the African population compared to 20.5–24.7% in South America, and 19.7–24.4% in Asia between 2008 and 2018 (2). The aim of evaluation of BOO is to establish the diagnosis and the likely underlying etiology. The gold standard in the investigation of BOO is full urodynamic studies (10).

The diagnosis of BOO is made by plotting the maximum flow rate (Q_{max}) against the detrusor pressure @ Q_{max} ($P_{det} @ Q_{max}$) into the international continence society normogram (11).

The degree of obstruction is calculated using the bladder outlet obstruction index (BOOI) equation. $BOOI = P_{det} @ Q_{max} - 2Q_{max}$. If the BOOI is more than 40, then

the individual is obstructed while a BOOI of below 20 indicates no obstruction. A BOOI of between 20-and 40 is equivocal (11).

The establishment of the underlined etiology by further investigations is dependent on the clinical suspicions. Abdominopelvic ultrasound, plain and contrast radiograph, computed tomography scan, and magnetic resonance imaging are the imaging modalities of choice.

(26) Patients with clinical suspicion of prostate cancer will require prostate-specific antigen assay and prostate needle biopsy (27)

The definitive management of BOO depends on the primary pathology. The initial care may involve urgent urinary diversion either in the form of urethral catheterization or suprapubic cystostomy and catheterization. Patients are subsequently evaluated and definitive treatment is offered (12).

The pattern of this clinical condition is unknown in our region. Considering the burden of BOO and its attendant negative impact on the quality of life, it is worthwhile to determine the profile of adult patients with BOO in our immediate environment. This could serve as important tools for surveillance of the underlined pathology. This may benefit the group (2) of elderly men suffering from BOO.

Our objective was to determine the age and gender distribution, clinical presentation, diagnosis, and etiological pattern of BOO among adult patients in a tertiary health center in southwestern Nigeria.

Methods

In this hospital based, retrospective cross-sectional study, we reviewed the case files of patients managed for BOO over a period of 10 years between June 2012 and July 2022 in our center. Patients with lower urinary tract symptoms were considered as BOO and were recruited into the study, while patients with only urinary tract infection as a cause of lower urinary tract symptoms were excluded from the study. The clinical diagnosis of BOO was made following patients' presentation with lower urinary tract symptoms. Some of the patients (100 patients, 12.7%) had uroflometry with an average flow rate of 11.09 mL/s. The diagnosis of BPH was made following clinical, sonographic, and

laboratory with or without prostate biopsy, while the diagnosis of prostate cancer was made following prostatic needle biopsy and subsequent staging investigations. The diagnosis of urethral stricture was made by contrast urethrogram and intravenous urogram. Cystoscopic plus bladder biopsy and abdominipelvic magnetic resonance imaging were used in evaluating patients with bladder cancer while plain radiograph was the point of call in patients with bladder stone. The diagnosis of neurogenic bladder dysfunction was made following the diagnosis of underlined neurological disorder and exclusion of mechanical obstruction. Patient files with incomplete information were also excluded from the study. Variables extracted included social demographic characteristics, clinical presentation, diagnosis, and etiological pattern. This information was analyzed using SPSS version 23.

Spearman’s rank correlation coefficient was used to determine the correlation between age, gender, and etiological pattern of BOO and also the correlation between the etiology of BOO and clinical features at presentation. For all statistical tests, $p < 0.05$ was considered as statistically significant.

Results

A total of 784 patients were managed for BOO during the period under review. Their ages ranged from 24 to— 90 years with a median of 65.9+/9.8S (IQR) and a peak in the 6th and 7th decades of life. A total of 768(97.96%) patients in the study group were males, while 16(2.04%) patients were females, as shown in Table 1. All the patients presented with lower urinary tract symptoms.

Table 1: Age distribution of this study group

AGE GROUP IN YEARS	FREQUENCY n =784	PERCENTAGE (%)
20-29	5	0.4
30-39	0	0
40-49	31	2.7
50-59	141	12.5
60-69	320	28.3
70-79	213	18.9
80-89	69	6.1
90-99	5	0.4
	65.9+/9.8SD	

Other common clinical features noted at presentation included low back pain (120patients, 15.30%), hypertension (110patients) and bilateral leg swelling. Others were acute urinary retention (35patients,4.46%), chronic urinary retention (10patients, 1.27%), hematuria (50patients, 6.37%), low back pain (120patients, 15.30%), bilateral leg swelling (70patients, 8.92%), weight loss (20patients, 2.551%), hypertension (110patients, 14.03%), and diabetes (37patients, 4. 71%).Others were pallor, paraplegia, indwelling urethral catheter, suspicious digital rectal examination findings, pathological fracture, large bowel

obstruction, watering can perineum, and renal failure. The feature of weightloss, pallor, paraplegia, pathological fracture, and low back pain were noted in patients with BOO from prostate cancer. (Table 2). The most common diagnoses were BPH, prostate cancer and, urethral stricture (Table 3).

The majority of the study group that were 60years and above had BPH and prostate cancer as the causes of BOO, while patients between the age of 40and 60had urethral stricture disease as the primary pathology (Table 3).

Table 2: Clinical features at presentation

FACTORS	FREQUENCY	PERCENTAGE (%)
Lower urinary tract symptoms	784	100
Acute urinary retention	35	4.46
Chronic urinary retention	10	1.27
Hematuria	50	6.37
Low back pain	120	15.30
Bilateral leg swelling	70	8.92
Weight loss	20	2.551
Hypertension	110	14.03
Diabetes mellitus	37	4.71
Pallor	89	11.35
Paraplegia	20	2.551
Indwelling urethral catheter	60	7.65
Suspicious DRE findings	130	16.58
Pathological fracture	5	0.63
Large bowel obstruction	5	0.63
Watering can perineum	10	1.27
Renal failure	35	7.01

Table 3: Etiological pattern of BOO among the study group.

AETIOLOGY	FREQUENCY n =784	PERCENTAGE
BPH	486	61.98
Prostate cancer	181	23.08
Urethral stricture	90	11.47
Bladder cancer	5	0.63
Bladder stone	2	0.25
Neurogenic bladder	20	2.55

The majority (13patients, 65%) of the patients with neurogenic bladder dysfunction were women.

The correlation between the age of respondent, gender, and etiology as well as clinical features was determined by Spearman's rank correlation coefficient. There was statistically significant correlation between the age of the respondent and causes of BOO ($r, -0.111$) at $p < 0.01$. The gender and causes of BOO (The clinical diagnosis of BOO was made following patients' presentation with lower urinary tract symptoms. Some of the patients (100patients, 12.7%) had uroflometry with an average flow rate of 11.09mL/s

$r, -0.096$) were at $p < 0.01$. There was, however, no correlation between the various age groups and causes

of BOO. There was a significant positive relationship between all the clinical features at presentation except storage lower urinary tract symptoms, watering can perineum and large bowel obstruction, and causes of BOO as shown in Table 4.

Discussion

This study agrees with the predominant average age of incidence of BOO in adult patients. Bladder outlet obstruction BOO affects all age groups, including in-utero. It is commonly seen in the elderly (13). This is because the common causes of BOO are diseases of the aging male (13) and the common cause is as result of prostatic disease which does not occur in women.

Table 4. Correlation between clinical features and etiology of BOO. (BPH, PROSTATE CANCER, URETHRAL STRICTURE, BLADDER CANCER AND NEUROGENIC BLADDER DYSFUNCTION)

CLINICAL FEATURES	(ETIOLOGY) R	p-VALUE <
Voiding LUTS	0.314	0.05
Storage LUTS	0	
Acute urinary retention	0.165	0.05
Chronic urinary retention	0.165	0.01
Hematuria	0.199	0.05
Low back pain	0.324	0.05
Bilateral leg swelling	0.238	0.05
Weight loss	0.123	0.05
Hypertension	0.308	0.05
Diabetes melitus	0.169	0.05
Pallor	0.123	0.05
Paraplegia	0.123	0.05
Indwelling urethral catheter	0.219	0.05
Suspicious findings on DRE	0.339	0.05
Pathological fracture	0	
Large bowel obstruction	0.061	
Watering can perineum	0.087	
Renal failure	0.209	0.05

We observed that the majority of the patients with BOO are male. BOO is seen mainly in adult men, although it is not a rarity in women (14). The common denominator in patients with BOO in this study is lower urinary tract symptoms. This is not different from what has been stated in the literature (15). This could be primarily voiding symptoms which include poor urinary stream, straining, intermittency, and feeling of incomplete bladder emptying, among others. These may subsequently lead to secondary changes in the bladder as well as upper urinary tract with attendant storage symptoms such as frequency, urgency, and nocturia (16). It may be complicated by renal failure, as noted in this study and some similar series (17).

the duration of symptoms of bladder outlet obstruction BOO was not determined in this study the clinical features at presentation are a strong pointer to delayed presentation and its attendant burden. This is unlike what have been reported in the developed regions of the world. This may be as a result of poor health-seeking behavior that we have often noted in our community. It

is also known that some of them may not have access to specialist health care in time due to financial constraints. The diagnosis of BOO is generally made following full urodynamic evaluation before the definitive diagnosis is made by further investigations depending on the suspected underlined cause. This was not done in our patients due to their inability to afford the procedures when they were referred, although a few of them had uroflowmetry to determine the urine flow rate. We relied on both voiding and storage lower urinary tract symptoms before they were made to undergo further tests to determine the primary pathology.

The finding of BPH, prostate cancer, and urethral stricture as the common causes of BOO in this study was not different from other similar studies (18, 19). The most common cause in adult men is BPH and this has been further confirmed by this study. This is a reflection of the burden of BOO in men The finding of elderly age group among patients with BPH and prostate cancer was in consonance with the previously established fact about

increasing age being one of the strongest risk factors for the development of prostatic diseases (22).

The epidemiology of BOO in women is poorly understood (20). This may be as a result of its relative rarity. This series showed neurogenic bladder dysfunction as the most common cause, while other similar series have shown post-anti-incontinence surgery as the most common mechanical cause. Others have reported inherent bladder dysfunction as the most common etiology of BOO in women (21). This reason for this variation cannot be ascertained

The finding of elderly age group among patients with BPH benign prostatic hyperplasia and prostate cancer was in consonance with the previously established fact about increasing age being one of the strongest risk factors for the development of prostatic diseases (22).

We observed there was statistically significant inverse correlation between the age of respondent, gender of respondent, and causes of BOO. This was not different from the outcome of similar series (23). Of all the clinical features at presentation, most showed a significant positive relationship with the etiology of BOO. The establishment of this correlation has shown the reliability of the clinical symptoms of BOO, particularly voiding lower urinary tract symptoms as a tool for establishing the diagnosis of BOO, especially in places where a full urodynamic study is not affordable. Some other similar series had also established this, while others have reported divergent views (24). The lack of correlation between storage lower urinary tract symptoms, watering can perineum, pathological fracture, and various causes of BOO may be because these features are not direct features of BOO.

We noted that all our patients with BOO from prostate cancer presented in advanced stage of the disease. The early form of prostate cancer hardly presents with BOO (25). BOO could only be seen in advanced prostate cancer. This is similar to other previous studies in this region, unlike in the developed regions of the world where they majorly see clinically localized prostate cancer which is hardly present with BOO.

Conclusion

This clinico-epidemiologic pattern of patients with BOO established that the majority of the study group showed features of delayed presentation with its attendant morbidity and the most common cause of BOO in adult men was BPH, while in women it was neurogenic bladder dysfunction.

There was significant positive correlation between the clinical features at presentation and causes of BOO. Although a full urodynamic study is the gold standard procedure of choice for establishing BOO, this correlation is a pointer that clinical features may reliably predict BOO.

The burden of BOO in this setting is enormous. There is a need for increased awareness on health education to facilitate early diagnosis. This will greatly reduce this burden.

Author contributions

NAI led in the conceptualization and writing of the first draft. All other authors contributed equally to reviewing and editing the original draft.

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