

Prevalence of lower urinary tract symptoms suggestive of benign prostatic hyperplasia in primary care, Port Harcourt, Nigeria

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Abstract

Objectives: The study objectives were to determine the pattern of presentation of Lower urinary tract symptoms (LUTS) in the respondents, the prevalence of LUTS suggestive of BPH, and respondents' quality of life.

Design: A prospective cross-sectional study of 290 probability-sampled subjects, using the International Prostate Symptom Score (IPSS), which also measures quality of life, to determine patients' symptoms.

Setting and subjects: The study was conducted at the Family Medicine Clinic, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria. The subjects were middle-aged and elderly men that presented with LUTS.

Result: The mean age of the subjects was 62.50 ± 11.66 years. The age range was 40-100 years. The majority (39.7%) of the subjects were elderly. Bladder storage symptoms were the most experienced LUTS. The prevalence of LUTS suggestive of BPH was 72.2% using the IPSS, and 60% had an enlarged prostate that was diagnosed through a digital rectal examination. The prevalence of bothersome LUTS was 71.3%.

Conclusion: Different diagnostic methods for LUTS suggestive of BPH provided different prevalence values. The findings need to be interpreted with caution, as hospital-based studies have higher prevalence values than those of population-based studies.

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Introduction

Lower urinary tract symptoms (LUTS) affect 15-60% of patients older than 40 years of age and can have a significant impact on their lives.^{1,2} According to the International Continence Society, LUTS can be classified as bladder storage, sensation, or voiding, symptoms.³ Specific symptoms associated with LUTS include frequency, urgency, nocturia, difficulty in initiating urination, a sense of incomplete bladder emptying, decreased force of stream and interruption of stream. These symptoms are often related to benign prostatic hyperplasia (BPH), which is the most common aetiology of male LUTS. These symptoms may also be associated with various unrelated syndromes, such as heart failure, urinary tract infections and diabetes, and certain neurological diseases, such as multiple sclerosis, spinal cord injury and cauda equine syndrome.³⁻⁶ In many instances, multiple causes or no specific causes may be identified and it can impact negatively on the quality of life of the individual.⁷ Therefore, its management involves

a focused history, physical examination and an assessment of bother.⁶

The prostate and lower urinary tract symptoms

Prostatic disease causes considerable morbidity in ageing men. BPH can lead to bothersome LUTS and/or acute urinary retention. Prostate cancer is common and early detection may be beneficial.⁸ Prostatitis constitutes only 2% of prostatic diseases, while BPH and prostate cancer make up 80% and 18%, respectively.⁹

Benign prostatic hyperplasia

BPH is characterised by hyperplasia of the prostatic stromal and epithelial cells, resulting in the formation of large, fairly discrete nodules in the periurethral zone, and when sufficiently large enough, cause partial or sometimes virtually complete obstruction of the urethra.¹⁰ BPH is

divided into microscopic, macroscopic and clinical BPH.⁹

Microscopic BPH is the proliferation of the epithelial and stromal elements of the prostate. Macroscopic BPH refers to enlargement of the prostate, as detected clinically by digital rectal examination (DRE) or more accurately by transrectal ultrasonography. Clinical BPH refers to LUTS attributable to BPH.¹¹ Microscopic BPH is seen in 20% of men aged 40 years. It increases to 70% by age 60, and to 90% by 70 years of age.¹¹ However, only 50% of men with microscopic BPH go on to develop macroscopic BPH, and of this proportion, only 50% eventually develop clinical BPH.¹²

The prevalence of BPH and LUTS rises with increasing age and also varies with locality and study design, e.g. population- or facility-based.

In Nsukka, south-eastern Nigeria, a prevalence of 25.3% has been reported, which is similar to figures from the UK (25.3%) and Spain (24.94%).⁸ These were all population-based studies. In Ado-Ekiti, south-west Nigeria, a hospital-based study reported a prevalence of 88%,¹³ which is comparable to 84.4% in another hospital-based study in Ethiopia.¹⁴ Both are higher than the 40% reported in India.¹⁵ In Ghana, a prevalence of 19.9%, 62.3% and 13.3% using the International Prostate Symptom Score (IPSS), DRE or IPSS, and an enlarged prostate on DRE, respectively, was reported in a population-based study.¹⁶ The Triumph Project in the Netherlands reported a prevalence of 10.3% after a population-based study, which was lower than the 14%, 18%, 38% and 56% for France, Scotland, the USA and Japan, respectively.¹⁷

According to Sausville et al,¹⁸ an individual who presents with LUTS is most likely to have clinical BPH, even if the DRE measurement of prostate-specific antigen (PSA) and urinalysis appears normal. However, other studies have objected to this view because the pathophysiology of LUTS is multifactorial and not well characterised.¹⁵ Recent studies have failed to reveal any significant correlation between LUTS suggestive of BPH.^{6,15} Further, the severity of LUTS does not necessarily correlate with the degree of bladder outlet obstruction or the prostate volume, and urinary symptoms can stem from other disease entities. They have been shown to be present in women as well.^{3,6,15} In Nigeria, a family physician plays a central role as a primary care physician and a gatekeeper to further levels of care. Patients who develop LUTS suggestive of BPH usually present to the physician for primary care first. However, studies on LUTS suggestive of BPH from the developing world are scanty or lacking, compared to those from the developed world.¹⁷

Therefore, the objectives of this study were to determine the pattern of presentation of LUTS, and the prevalence of LUTS suggestive of BPH, in the respondents, using the

diagnostic tools available to the family physician, as well as respondents' quality of life.

Method

Setting

The study was carried out at the Family Medicine Clinic of University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt, Nigeria. Port Harcourt had an estimated population of 1 005 904, with a male population of approximately 521 339¹⁹ in 2007.

Study design

This was a prospective cross-sectional study of middle-aged and elderly men who presented to the Family Medicine Clinic, UPTH, Port Harcourt, from October 2010 to April 2012.

Subject selection

A computer-generated table of random numbers was used to select informed and consenting subjects for the study. Recruited subjects were male patients aged 40 years and older who presented to the Family Medicine Clinic, UPTH, with LUTS. Exclusion extended to male patients who were younger than 40 years of age who presented with LUTS and male patients who were 40 years and older who presented without LUTS to the Family Medicine Clinic.

Sample size determination

The study was designed to detect a 5% difference in the prevalence of LUTS, with an alpha error of 5%, acceptable beta error of 20%, and a statistical power of 80%. Based on a 25.3% prevalence of BPH in a study in south-eastern Nigeria, and using the formula for sample size determination for studying proportions in populations of more than 10 000,²⁰ the minimum required sample size was thus determined to be 288.

Ethics consideration

Approval for this study was approved by the Ethics Committee of UPTH. Informed written consent was obtained from the respondents before involving them in the study.

Data collection

Data were obtained during clinic consultations with subjects who presented with LUTS to the researchers. Information was obtained on their biographical data, medical history, major co-morbid conditions and detailed self-reported symptoms of the urogenital system.

LUTS suggestive of BPH were assessed using the IPSS, which adds a quality of life question to the American Urology Association symptom index to determine the extent to which patients are troubled by their symptoms. This validated tool contains eight questions. Seven fall

under the LUTS categories and one pertains to quality of life.^{7,10} It has sound internal consistency, as measured by a Cronbach's alpha coefficient of 0.89. The seven questions of the IPSS comprise one on post-micturition symptoms, three on voiding symptoms and three on bladder storage symptoms. The sum of the IPSS was obtained by combining the sum of the answers for questions 1 to 7. This symptom category allows the physician to understand the degree of inconvenience that patients perceive their symptoms to have caused. Significant LUTS is usually defined as a total IPSS of at least 8 (moderate or severe).⁷

Physical examination of the patients was carried out by palpating the abdomen for a distended bladder or abdominal mass, a genitalia examination, inspecting the urinary meatus for evidence of stenosis or abnormality, and a DRE to evaluate prostate size, consistency, induration, nodularity, asymmetry, or the presence of a rectal mass. An enlarged, hard, indurated nodular or asymmetrical prostate was indicative of LUTS suggestive of BPH. A focused

neurological examination, including an assessment of rectal sphincter tone, was also performed.^{7,16} A laboratory evaluation incorporated a measurement of PSA and urinalysis.

Data analysis

Responses to questionnaires were coded and entered into a database using Statistical Package for Social Sciences® (SPSS, Chicago, Illinois, USA) version 16 for analysis. Associations between categorical variables were compared using the chi-squared test, Yates's chi-square and Fischer's exact test. Statistical significance was set at p-value < 0.05.

Results

In the study period, 10 416 middle-aged and elderly males attended the family medicine clinic at UPTH. Of these, 672 received a urological consultation, giving a prevalence of 6.45%. Of the 290 subjects who participated in the study, only 161 PSA results of the subjects were retrieved, representing 55.7% of the total. The mean age of the subjects was 62.50 ± 11.66 years. The age range was 40-100 years.

The majority of the subjects (39.7%) were at least 65 years of age. Only 12% were younger than 50 years of age (Table I).

One hundred and seventy-two of the subjects (59.3%), experienced a sense of incomplete emptying, which represents those with post-micturition symptoms. Those with intermittency, poor stream and hesitancy represented 40.7%, 58.4% and 56.6%, respectively, with an average of 50.9% of subjects having voiding symptoms. The proportions of subjects who experienced frequency,

Table I: Age groups of the subjects

Age group (years)	Frequency (%)
40-44	5 (1.7)
45-49	30 (10.3)
50-54	43 (14.8)
55-59	46 (16.0)
60-64	51 (17.5)
65 and older	115 (39.7)
Total	290 (100)

Table II: Presentation of the pattern of lower urinary tract symptoms in the subjects

Symptom score frequency (%)	0	1	2	3	4	5	Total
Symptoms							
Sense of incomplete emptying	118 (40.7)	59 (20.4)	31 (10.6)	38 (13.3)	23 (8)	21 (7.1)	172 (59.3)
Frequency	77 (26.5)	54 (18.6)	59 (20.4)	54 (18.6)	28 (9.7)	18 (6.2)	213 (73.5)
Intermittency	146 (50.4)	46 (15.9)	31 (10.6)	21 (7.1)	33 (11.5)	13 (4.4)	144 (40.7)
Urgency	95 (32.7)	51 (17.7)	45 (15)	51 (17.7)	25 (8.7)	23 (8)	195 (67.3)
Weak stream	121 (41.6)	59 (20.4)	36 (12.4)	31 (10.6)	28 (9.7)	15 (5.3)	169 (58.4)
Hesitancy	126 (43.4)	56 (19.5)	31 (10.6)	36 (12.4)	31 (10.6)	10 (3.5)	164 (56.6)
Nocturia	8 (2.7)	18 (6.2)	51 (17.7)	77 (26.5)	54 (18.6)	82 (28.3)	282 (97.3)

Table III: Association between respondents' age and symptom severity

Age group (years)	Mild (%)	Moderate (%)	Severe (%)	Total (%)	p-value
40-44	6 (1.8)	0 (0)	0 (0)	6 (1.8)	0.015
45-49	18 (5.3)	15 (4.4)	3 (0.9)	31 (10.6)	0.010
50-54	18 (5.3)	24 (7)	9 (2.7)	45 (15)	0.035
55-59	21 (6.2)	30 (8.8)	3 (0.9)	54 (15.9)	< 0.001
60-64	21 (6.2)	18 (5.3)	19 (5.3)	58 (16.8)	0.886
65 and older	13 (4.4)	84 (24.8)	37 (10.6)	136 (39.8)	0.000
Total	81 (27.8)	146 (50.5)	63 (21.7)	290 (100)	

Table IV: Results of the digital rectal examination in subjects with lower urinary tract symptoms

Prostate size	Frequency	Percentage
Normal	78	27
Enlarged	174	60
Abnormal	38	13
Total	290	100

urgency and nocturia were 73.5%, 67.3% and 97.3%, respectively. An average of 79.4% experienced bladder storage symptoms (Table II).

Using the total symptom score of each subject, 81 of them (27.8%) had mild LUTS symptoms, 146 (50.5%) moderate LUTS symptoms and 21.7% severe symptoms. Therefore, using the total symptom score of at least 8 as the definition for LUTS suggestive of BPH, 209 (72.2%) of the subjects had LUTS suggestive of BPH. No subject younger than 45 years of age had LUTS suggestive of BPH, while the majority of subjects older than 65 years of age (35.4%) had LUTS suggestive of BPH. The prevalence of LUTS suggestive of BPH increased with the advancing age of the subjects. There was also a significant association between the age group of the subjects and severity of symptoms (p -value < 0.05), except for subjects aged 60-64 years (p -value > 0.886) (Table III).

The results of the DRE showed that 60% of the subjects had an enlarged prostate, while 13% had a hard, nodular and/or asymmetric prostate. This gave a 73% prevalence for a DRE-detected enlarged or otherwise abnormal prostate (Table IV).

Table V: Association between prostate-specific antigen and digital rectal examination

PSA value (ng/ml)	Digital rectal examination			Total
	Normal (%)	Enlarged (%)	Abnormal (%)	
0-3.9	34 (21.8)	43 (26.6)	5 (3.1)	83 (51.6)
4-9.9	2 (1.6)	20 (12.5)	13 (7.8)	35 (21.8)
10-19.9	1 (1.6)	15 (9.4)	8 (3.1)	23 (14.1)
20 and above	0 (0)	7 (4.7)	13 (7.8)	20 (12.5)
Total	37 (25)	85 (53.2)	39 (21.8)	161 (100)

PSA: prostate-specific antigen
 $\chi^2 = 54.861$, p -value = 0.000

Table VI: Association between prostate-specific antigen and lower urinary tract symptoms

PSA value (ng/ml)	IPSS symptom grade			Total (%)
	Mild (%)	Moderate (%)	Severe (%)	
0-3.9	28 (17.1)	45 (28.2)	10 (6.2)	83 (51.5)
4-9.9	5 (3.1)	25 (15.7)	5 (3.1)	35 (21.7)
10-19.9	0 (0)	15 (9.3)	8 (4.7)	23 (14.1)
20 and above	2 (1.6)	8 (4.7)	10 (6.2)	20 (12.7)
Total	35 (21.8)	93 (57.9)	33 (20.3)	161 (100)

IPSS: International Prostate Symptom Score, PSA: prostate-specific antigen
 $\chi^2 = 29.615$, p -value = 0.000

Table V shows the association between PSA and the DRE.

Measurement of the PSA and results were obtained from 161 (55.5%) of the subjects. The PSA results for the rest (44.5%) were not obtained. Of those with PSA results, 51.6% had PSA values within the normal range of 0-4 ng/ml, while 48.4% had PSA values outside the normal limits. This means that 48.6% of the subjects will require a review by a urologist and a possible prostate biopsy. The result that 20 (12.5%) of the subjects had a PSA value of at least 20 ng/ml indicates that they have probable metastatic prostate cancer.

An association between the PSA and DRE showed that 7.8% of the subjects, representing 65% of those with a PSA value of at least 20 ng/ml, had both an abnormal prostate and a PSA of at least 20 ng/ml. This is opposed to 34.5% of the subjects who had a PSA value of 10-20 ng/ml, 37.1% with a PSA value of 4-10 ng/ml, and 6% with a PSA value of < 4 ng/ml with an abnormal prostate from the DRE.

Eighty-nine (53.2%) of the subjects with known PSA values had an enlarged prostate, while 39 (21.8%) had an otherwise abnormal prostate. This gave a 75% prevalence for LUTS suggestive of BPH (Table V), which is comparable to the 72.2% using the IPSS (Table III).

An association between PSA and the IPSS showed that 93 (57.9%) had moderate LUTS, while 33 (20.3%) had severe LUTS. This means that 126 (80.2%) had moderate to severe LUTS, indicative of LUTS suggestive of BPH. There was a significant association between PSA value and LUTS (p -value 0.000) (Table VI).

Table VII: Association between quality of life and lower urinary tract symptoms

Quality of life	IPSS symptom grade			Total (%)
	Mild (%)	Moderate (%)	Severe (%)	
Pleased	27 (9.6)	3 (0.9)	0 (0)	30 (10.4)
Mostly satisfied	40 (13.9)	13 (4.3)	0 (0)	53 (18.3)
Mixed	7 (2.6)	32 (11.3)	3 (0.9)	42 (14.8)
Mostly dissatisfied	5 (1.7)	51 (17.4)	10 (3.5)	66 (22.6)
Unhappy	0 (0)	45 (15.7)	38 (13)	83 (28.7)
Terrible	0 (0)	3 (0.9)	13 (4.3)	16 (5.2)
Total	79 (27.8)	147 (50.4)	64 (21.7)	290 (100)

IPSS: International Prostate Symptom Score

An association between quality of life and LUTS showed that no subjects with severe LUTS were pleased or mostly satisfied with their symptoms, while 5.2% of subjects with moderate LUTS were either pleased or mostly satisfied with their symptoms. In addition, no subjects with mild LUTS felt unhappy or terrible regarding their symptoms, while 81.3% of subjects with severe LUTS felt terrible regarding their symptoms. Two hundred and seven of the subjects (71.3%) had mixed of equally satisfied and dissatisfied, dissatisfied, unhappy or terrible quality of life symptoms with their LUTS. This showed that 71.3% of the subjects had troublesome LUTS.

Discussion

The pattern of LUTS presentation has shown that bladder storage symptoms are the most experienced symptoms. This supports findings from a study in India.¹⁵ In this study, nocturia was the most reported LUTS (73.4%), which is similar to the finding from the study carried out in India.¹⁵ It is also noteworthy that removal of nocturia from the LUTS would greatly alter the symptom score and reduce the prevalence of LUTS.

Using the IPSS, the prevalence of 72.2% for LUTS suggestive of BPH in this study was quite high compared to findings from a population-based study that was carried out in Nsukka, where an occurrence of 25.3% was reported.⁸ The population of subjects who were younger than 50 years of age in this study was 12.4%, as opposed to 43.8% in the Nsukka study. In addition, the prevalence in this study was higher than the 10.3% reported in the Netherlands and other parts of the developed world.¹⁷

However, occurrence in this study was comparable to that in reports from hospital-based prevalence studies in Ado-Ekiti, south-western Nigeria (88%)¹³ and Ethiopia (84.4%).¹⁴ Therefore, this suggests that the prevalence of LUTS suggestive of BPH in hospital-based studies is comparatively higher than that obtained in population-based studies.

In this study, the prevalence of LUTS suggestive of BPH, using an association between DRE and PSA, was 53.5%. This is lower than that obtained using the IPSS and the 80.2% obtained from the association between the IPSS and PSA. DRE-detected enlarged prostate alone gave a prevalence of 60%, which is comparable to that pertaining to the association between DRE and PSA. In this study, the prevalence of DRE-detected enlarged prostate was similar to the 62.3% from the population-based study that was carried out in Ghana. There was also a significant association between IPSS and prostate size, as noted from the DRE, as well as the IPSS and PSA level. This supports the fact that prostate size is associated with PSA level.

This study also showed that 71.3% of the subjects had troublesome LUTS. Again, this was higher than the 18.9% reported by the study carried out at Nsukka.⁸

The prevalence of bothersome LUTS in this study showed that LUTS suggestive of BPH impacted negatively on the lives of the subjects, as other reports have shown.⁷ This makes it imperative for family physicians to keep abreast of the management of the condition if they are to improve the quality of life of patients and members of the community.

Limitations of study

When carrying out this study, the researchers experienced some limitations. Firstly, the patient follow-up in the study environment was poor, which led to low collection of PSA results, and which affected some of the findings in this study. Secondly, the cost of conducting PSA testing in the study centre may also have contributed to the low collection of PSA. Thirdly, the results of this study were hospital-based and this may not be representative of what occurs in the community. Therefore, extrapolations should be made with caution.

Conclusion

This study showed that storage symptoms were the most experienced LUTS. While different diagnostic methods for LUTS suggestive of BPH gave different prevalence values,

in general, this study showed that hospital-based studies have a higher prevalence value than that of population-based studies. The prevalence of troublesome LUTS in this study was also high. Therefore, it is imperative for family physicians to keep abreast of the management of the condition so as to improve the quality of lives of patients and members of the community.

Conflict of interest

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

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