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Benign Prostatic Enlargement, the International Prostate Symptoms Score and a Review of Other Symptom Scores

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Abstract

Benign prostatic hyperplasia (BPH) is the most common benign prostate disease in elderly men, and its incidence increases with age and is associated with lower urinary tract symptoms (LUTS). The international prostate symptoms score (IPSS) is the most common symptom score used to assess LUTS even though other symptom scores exist. This study aims to evaluate the LUTS of patients secondary to BPH presenting to the urology clinic of UPTH using the IPSS and to review other scoring systems. **Materials and Methods:** This was a prospective hospital based descriptive cross-sectional study carried out in University of Port Harcourt Teaching Hospital (UPTH). All adult male patients with LUTS secondary to BPE were given an IPSS questionnaire to fill. Another IPSS questionnaire was filled by the patient assisted by the researcher. The data were collated using Microsoft Excel 2016 version and they were analyzed using SPSS version 20. Results were presented in tables. **Results:** Sixty-nine (69%) patients had at least secondary level of education. Sixty-four (64%) could complete their questionnaire without any aid. The mean IPSS was 22.13 ± 6.34 as most patients presented with severe symptoms. The mean Quality of Life score was 4.60 ± 1.38. There was a significant positive correlation between Quality of Life and IPSS. **Conclusion:** A level of literacy is needed to complete the questionnaire. Most patients in our study presented late with severe symptoms and significant level of bother. Nocturia was the worst symptom.

Keywords

Benign Prostatic Enlargement BPE, International Prostate Symptoms Score IPSS

1. Introduction

Benign prostatic hyperplasia (BPH) is the most common benign prostate disease in elderly men, and its incidence increases with age and is associated with lower urinary tract symptoms (LUTS) [1]. The lower urinary tract symptoms are classified into storage, voiding and post micturition symptoms. The storage symptoms include frequency, urgency, nocturia, urgency incontinence and nocturnal enuresis. The storage symptoms include hesitancy, poor stream, straining, intermittency. The post micturition symptoms include feeling of incomplete emptying and post micturition dribbling.

The International Prostate Symptom Score (IPSS) was adopted as a basic questionnaire standard at the International Council of BPH organized by the World Health Organization in 1993, and recommended for assessing treatment of patients with BPH [2]. The IPSS consists of three storage symptoms (frequency, urgency and nocturia), four voiding symptoms (poor stream, intermittency, straining and feeling of incomplete voiding) and, a question relating to the Health-Related Quality of Life (HRQOL). The quality of life is scored from 0 to 6. Each symptom is scored on a scale of 0 - 5. The IPSS score is between 0 - 35. IPSS is subjective. The uroflowmetry is also a simple noninvasive and valuable tool used in assessing patients with BPH [3]. The uroflowmetry is more objective.

A good symptom score assessment scale should be responsive to change, valid and reliable [4]. There are other symptom scores used in analyzing patients with BPH and other cause of lower urinary tract obstruction that are not as popular as the IPSS but are quite useful. They include the Danish Prostate symptom Score (DPSS) [5], Visual prostate Symptom Score (VPSS) [6], Core Lower Urinary Tract Symptom (CLUTS), [7] and BPH Impact Index (BII) [8].

A study correlating uroflowmetry and IPSS in adult male patients with lower urinary tract symptoms in Port Harcourt has been carried out [9]. No study has been carried out to evaluate lower urinary tract symptoms in patients with lower urinary tract obstruction in Port Harcourt. Ogwuche *et al.* [10] carried out a study to evaluate the problems with administration of international prostate symptom score in a developing community in Northern Nigeria.

This study was carried out to evaluate the lower urinary tract symptoms of patients with BPE presenting to the Urology clinic of University of Port Harcourt Teaching Hospital using the IPSS, and also the quality of life of these patients. It also assesses the correlation between IPSS and quality of life of these patients and reviews other scoring systems. This will enable us identify the symptoms that are most disturbing or more common in patients who present in our clinic.

2. Materials and Methods

This was a prospective hospital based descriptive cross-sectional study carried out in the urology clinic of the University of Port Harcourt Teaching Hospital (UPTH), Choba, Port Harcourt from January 1st 2017 to December 31st 2017.

Adult male patients with LUTS secondary to BPE attending urology clinic at

UPTH were included in the study. Inclusion criteria included normal digital rectal examination (DRE) findings, normal PSA levels and normal PSA density and normal TRUS findings.

Exclusion criteria were patients with BPE on catheter, patients who had had previous surgery, patients with features suggestive of prostate cancer, abnormal DRE findings, abnormal PSA, patients with neurogenic bladder.

The sample size was determined, using the formula 66:

$$n = \left(Z^2 pq / e^2\right) \quad [11]$$

where;

n = the minimum sample size.

Z = the standard normal deviation corresponding to the level of significance of 95%.

p = the proportion of the sample population presenting to UPTH Urology clinic from 1st January 2015 to 31st December 2015, which is 86 patients of the 1425 patients seen within that year.

$$q = (1 - p)$$

e = level of precision or maximum error of estimate at 95% confidence level, with $e = 0.05$ $p = 0.06$.

$Z = 1.96$, $q = 0.94$.

Therefore,

$$\begin{aligned} n &= Z^2 pq / e^2 \\ &= 1.96^2 \times 0.06(0.94) / 0.05^2 \\ &= 3.84 \times 0.056 / 0.0025 \\ &= 86 \end{aligned}$$

For reliability or non-response, therefore; increase by 10%.

86 + 9 = 95.

Consecutive patients who met the inclusion criteria and gave consent were selected for the study till the sample size was completed. In this study the IPSS was the only symptom score reviewed.

The study questionnaire (**Appendix 3**) and IPSS forms (**Appendix 1**) were administered to the patient alone. The authors then assisted the patients in filling another IPSS questionnaire. The physician assisted IPSS questionnaire was evaluated. Patients who could complete their IPSS on their own were noted. The data from the questionnaire were collated and entered using Microsoft Excel 2016 version and transferred into the statistical package for social sciences (SPSS) for windows (version 20) (IBM SPSS Inc. Chicago, IL) for analysis. Categorical data was presented in the form of frequencies and percentages using tables. Continuous variables were presented in means and standard deviation. Results were presented in tables (Tables 1-6) and charts.

3. Results

The level of education of the respondents is as shown below:

Table 1. Educational level of respondents. Many patients had some form of formal education.

Educational Status	Number	Percentage
Primary	30	30.0
Secondary	31	31.0
Tertiary	38	38.0
None	1	1.0

Table 2. Number of respondents who could complete IPSS questionnaire on their own. Thirty-six patients could not complete their IPSS form.

	Number of patients (n)	Percentage (%)
Completed forms	64	64
Uncompleted forms	36	36
Total	100	100

4. Discussion

The IPSS is the most utilized symptom score assessment used for patients with BPH. The IPSS has a significant negative correlation with maximum and average flow rate and so it may be used in place of uroflowmetry when the latter is unavailable [9]. Despite its international status, the IPSS has a number of drawbacks.

There is a high level of illiteracy in Nigeria. A study by Ogwuche *et al.*, revealed that 74.3% of patients could not understand English [10]. The authors recommended that IPSS be translated into local languages [10]. A reasonable level of literacy and numeracy is needed to accurately fill the IPSS forms [12]. In Nigeria, there are over 250 local languages. Translating the IPSS into these languages may be difficult. A multimedia version of the IPSS may aid the less educated in completing the form [10]. In our study 68% of respondents completed the forms on their own without assistance as shown in **Table 2**. The reason may be due to fact that 69% of the respondents had at least a secondary level of education as seen in **Table 1**. Rivers state is an oil producing state in Nigeria. Many educated individuals reside in Rivers state. A study revealed that Rivers state is the fifth most educated Nigerian State with a literacy level set at 92.11% [13]. Physicians could also assist patients who are not literate in English to complete the IPSS form but this may be more time consuming and apportion more work for the already overworked doctors, it may also introduce bias. A number of doctors have left Nigeria for greener pastures in abroad. To eliminate bias in this study every respondent had their questionnaire completed with the assistance of the authors.

For patients that are blind the IPSS would have to be read out to them and completed by a physician [14]. The IPSS does not address urgency incontinence

Table 3. IPSS of respondents. Nocturia and incomplete emptying had the most severe symptoms. Fifty-one respondents had 5 or more sleep waking voids, while 43% of respondents almost always had the feeling of incomplete emptying after voiding. Straining and intermittency had the least severe symptoms.

Characteristics	Frequency (n = 100)	Percentage (%)
Incomplete emptying		
Not at all	6	6.0
Less than 1 time in Almost always	5	5.0
Less than half of the time	12	12.0
About half the time	18	18.0
More than half the time	16	16.0
Almost always	43	43.0
Frequency		
Not at all	1	1.0
Less than 1 time in Almost always	7	7.0
Less than half of the time	20	20.0
About half the time	28	28.0
More than half the time	30	30.0
Almost always	14	14.0
Intermittency		
Not at all	5	5.0
Less than 1 time in Almost always	17	17.0
Less than half of the time	18	18.0
About half the time	34	34.0
More than half the time	19	19.0
Almost always	7	7.00
Urgency		
Not at all	7	7.0
Less than 1 time in Almost always	13	13.0
Less than half of the time	20	20.0
About half the time	20	20.0
More than half the time	23	23.0
Almost always	17	17.0
Weak stream		
Not at all	3	3.0
Less than 1 time in Almost always	12	12.0
Less than half of the time	19	19.0
About half the time	23	23.0

Continued

More than half the time	28	28.0
Almost always	15	15.0
straining		
Not at all	6	6.0
Less than 1 time in Almost always	14	14.0
Less than half of the time	23	23.0
About half the time	25	25.0
More than half the time	20	20.0
Almost always	12	12.0
Nocturia		
None	2	2.0
1) time	3	3.0
2) times	11	11.0
3) times	19	19.0
4) times	14	14.0
5) or more times	51	51.0

Table 4. Total IPSS of respondents. IPSS is grouped into mild, moderate and severe symptoms. Sixty five percent of patients presented with severe symptoms and this was statistically significant.

Total IPSS	Frequency (n = 10)	Percentage (%)	Chi-square (χ^2), p-value
Mild symptom (1 - 7)	0	0.0	
Moderate symptom (8 - 19)	35	35.0	18.0 (0.001)*
Severe symptom (20 - 35)	65	65.0	
Mean IPSS		22.13 ± 6.34	

*Statistically significant ($p < 0.05$).

Table 5. Quality of life (QoL) of respondents. Many patients were unhappy (36%) or felt terrible (30%) about their symptoms before presenting to the hospital.

QoL	Frequency (n = 100)	Percentage (%)	Chi-square (χ^2), p-value
Pleased (1)	1	1.00	(0.001)*
Mostly satisfied (2)	13	13.00	
Mixed about equally satisfied and dissatisfied (3)	7	7.00	
Mostly dissatisfied (4)	13	13.00	
Unhappy (5)	36	36.00	
Terrible (6)	30	30.00	
QoL mean score		4.60 ± 1.38	

*Statistically significant ($p < 0.05$).

Table 6. Correlation between Quality of Life (QoL) and IPSS. There was a weak statistically significant positive correlation between patients with high IPSS scores and quality of life. Patients with high IPSS scores had a poor quality of life and patients with low IPSS scores had a better quality of life.

		IPSS
Quality of Life (QoL)	The Pearson correlation coefficient, r	0.227
	R-Square (r^2)	0.051
	p-value	0.023*
	95% CI	0.026 - 0.348

*Statistically significant ($p < 0.05$).

and hesitancy, the authors feel this is a drawback of the IPSS as urgency incontinence can be very embarrassing.

The worst symptom in the study was nocturia with 51 respondents have 5 or more sleep waking voids as shown in **Table 3**. Nocturia would disturb sleep and affect a patient's QoL. Studies by Oranusi *et al.* [15] in Nnewi, South Eastern Nigeria also noticed that nocturia was the most prevalent symptom. Patients are also more likely to remember waking up from sleep to void. Nocturia was followed closely with incomplete emptying with 43% of respondents almost always had the feeling of incomplete emptying after voiding. Intermittency and straining had the least prevalent symptom.

Straining is usually a symptom in structural obstruction such as urethral stricture or meatal stenosis where the abdominal musculature would be used to initiate or maintain voiding but in BPE the obstruction is more functional than structural.

Most patients presented with severe symptoms as seen in **Table 4**, the mean IPSS in this study was 22.13 ± 6.34. The findings in this study are similar to that carried out by Agrawal *et al.* [12] with a mean IPSS 23.5 ± 2.8 in Nepal. Ogwuche noted that black patients are more likely to present with severe symptoms and sometimes with complications of BPE [10]. This late presentation occurred despite the seemingly better level of education as compared to Ogwuche's study.

The mean quality of life score in this study was 4.6 ± 1.38, showing that patients present to the hospital when they have significant level of bother. Most patients (66%) presented with a QoL score of 5 or 6. This is in agreement with the study by Oranusi and colleagues [15] who had a QoL of 4.3 ± 1.13. There was also a significant positive correlation between IPSS and QoL, as the IPSS increased patients were more bothered about their symptoms and vice versa. Patients in developing economies tend to present to herbalist, church, mosque or patent medicine dealer over a qualified medical professional because of lack of finance [16] [17] [18]. They usually seek healthcare late and sometimes with complications.

The visual prostate symptom score is a type of symptom score assessment developed by Vander Walt *et al.* [19]. It uses pictograms to represent four symp-

toms of the IPSS [19]. These symptoms are frequency, nocturia, weak urine stream and quality of life [19] [20]. VPSS is simple and easy to comprehend [20]. The VPSS can be used with men with limited level of education [19].

The drawbacks of the VPSS include the fact that four symptoms are left out of the IPSS in creation of VPSS (urgency, intermittency, straining and incomplete emptying). These omitted symptoms are important in the evaluation of subjects. The VPSS cannot be used for the visually impaired or blind.

The DAN-PSS-1 is actually similar to the IPSS. It has hesitancy, dysuria, urge incontinence, stress incontinence and overflow incontinence in addition to the symptoms of IPSS. Each symptom is divided into 12 (A and B). The A question assesses the symptom while the B question assesses the quality of life. Each question frame contains 4 ordered categories scored from 0 to 3 [21]. For each question, frequency of the symptom is multiplied by the quality of life score yielding a total of 108 [21].

The DAN-PSS-1 is internally consistent (Cronbach's alpha = 0.73), has a high degree of construct validity, and is sensitive to changes following therapy [22].

However, IPSS has a higher internal consistency of 0.86 compared to DAN-PSS-1 of 0.73, so it may be more reliable. IPSS has 8 questions and some authors claim that it is difficult to understand [11]. However, DAN-PSS-1 has 24 questions and the subject needs to multiply the frequency of symptoms and degree of bother. These calculations may be difficult for some respondents.

The International Continence Society Male Short Form (ICSmaleSF) questionnaire is an abridged version of the 22-item International Continence Society (ICS) male questionnaire developed by Donovan *et al.* [23]. The ICSmaleSF has 14 symptoms and an item on the degree of bother. Response frames for the scale items have 5 ordered categories, scored 0 to 4. The ICSmale questionnaire is valid and reliable [23]. However it has more symptoms than IPSS and may be more difficult to complete.

Core Lower urinary tract symptoms include a comprehensive questionnaire that covered 25 LUTS defined by a standardization report [24]. CLUTS is responsive and provides a good assessment of new patients and patients with multiple diseases [25]. However; this scoring system contains 10 symptoms unlike IPSS that contains 7, so it may be more cumbersome and difficult to complete.

BPH Impact Index (BII) is a questionnaire that measures the impact of BPH on a patient's life. It consists of 4 questions. The questions include: how much physical discomfort did any urinary problems cause you, how much did you worry about your health because of any urinary problems, how bothersome has any trouble with urination been overall, how much of the time has any urinary problem kept you from doing things you would usually do. The first three questions are scored from 0 - 3 and while the last is scored from 0 - 4, hence scores on the scale range 0 - 13. Higher scores mean greater impact. The BII is easy to understand and captures clinically relevant BPH impact related LUTS [26]. The BII is also reliable, responsive to change and has good construct validity [27].

However, while the BII measures the impact on a patient's quality of life, the IPSS assesses the symptoms and also quality of life. So, the IPSS may be more reliable.

Boyarsky Symptom Score is scoring system for patients with LUTS developed in 1977. It consists of 10 items of equal weight, each with a score 0 - 3. Scores range from 0 to 30. The symptoms include frequency, urgency, nocturia, hesitancy, poor stream, straining, intermittency, incomplete emptying of the bladder, dysuria and post micturition dribbling [26]. This scoring system has no item assessing quality of life and so it does not assess quality of life like in the IPSS.

The Madsen-Iverson Scoring System was developed in 1983 [26]. It is one of the oldest known scoring systems [26]. It consists of 9 items which include frequency, urgency, nocturia, hesitancy, poor stream, straining, intermittency, incomplete emptying and post micturition dribbling (it contains the same items as the Boyarsky scoring system without dysuria). The items are not of equal weight. Frequency, urgency and nocturia have equal weights of 0 - 3, poor stream and incomplete emptying carry weights of 0 - 4, while hesitancy and intermittency carry weights of 0 or 3 each. Straining and post micturition dribbling carry weights of 0 - 2 each [26]. This scoring system (just like Boyarsky) does not assess quality of life because there is no item addressing that domain like in the IPSS.

5. Limitations of the Study

The sample size in the study was 100 subjects, a larger sample size may have given a different outcome.

6. Conclusion

A level of literacy and numeracy is needed to complete the questionnaire. Most patients in our study presented late with severe symptoms and significant level of bother. Nocturia and incomplete emptying were the most common symptom. Straining and intermittency were the least prevalent symptoms. There was a statistically significant positive correlation between IPSS and QoL.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix 1

International Prostate Symptom Score

NAME: DATE: Date of Birth:

In the past month:	None at all	Less than 1 in 5 times	Less than half the time	About Half the Time	More than Half the time	Almost Always	Your score
1) Incomplete Emptying How often have you had the sensation of not emptying your bladder?	0	1	2	3	4	5	
2) Frequency How often have you had to urinate less than every two hours?	0	1	2	3	4	5	
3) Intermittency How often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
4) Urgency How often have you found it difficult to postpone urination?	0	1	2	3	4	5	
5) Weak Stream How often have you had a weak urinary stream?	0	1	2	3	4	5	
6) Straining How often have you had to strain to start urination?	0	1	2	3	4	5	
	None	1 Time	2 Times	3 Times	4 Times	5 Times	
7) Nocturia How many times did you typically get up at night to urinate?	0	1	2	3	4	5	
Total I-PSS score							

Score: 1-7: Mild 8-19: Moderate 20-35: Severe

Quality of Life Due to Urinary Symptoms	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?	0	1	2	3	4	5	6

Appendix 2

Statement of the Person Giving Consent

I have read the description of the research, and/or it has been translated to my understanding. I have discussed it with the doctor to my satisfaction. I understand that my participation is voluntary. I know a lot about the study and its risks, and I want to participate. I understand that I may freely opt out of the study at any time. I have received a copy of the consent form and additional information sheet to keep for myself.

Date ……..

Name ……

Signature ……

Witness name …….

Witness signature ……..

Appendix 3

Study on Benign Prostatic Enllargement and International Prostate Symptom Score

QUESTIONNAIRE

A. Biodata:

Folder No…….

Date of birth…….

Address…….

Level of Education……

Marital status…….

Occupation……

Religion…….

Ethnic group……..

Phone No……

B. Condition:

Duration of symptoms…….

Total prostate volume……..

IPSS and QoL……