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Original Research Article

Comparison between Visual Prostate Symptoms Score and International Prostate Score in Evaluation of Benign Enlargement of Prostate in a Tertiary Care Hospital

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Abstract: ***Introduction*:** Benign enlargement of the prostate (BEP) is a major health concern for aging men worldwide. Assessing lower urinary tract symptoms in BEP patients is essential for starting and managing treatment. Both the International Prostate Symptom Score (IPSS) and the new Visual Prostate Score (VPS) are commonly used to evaluate these symptoms. This study was designed to compare the effectiveness of these two scores with urodynamic assessments in patients. ***Patients and Methods*:** Following ethical committee approval, a one-year study was conducted that included 100 patients diagnosed with Benign Prostatic Enlargement and lower urinary tract symptoms, all of whom provided written informed consent. After being educated about the study, participants completed the International Prostate Symptom Score and Visual Prostate Score questionnaires, and their uroflowmetry parameters were documented. The scores from the two questionnaires were then compared to each other, as well as to the uroflowmetry results. ***Result*:** Among the patients enrolled, 35% were illiterate. Out of 100 patient 61% required assistance to complete IPSS (p = <0.001). VPSS completion time was significantly less (p = <0.001). There was a notable relationship between the total IPSS and the VPSS scores (R = +0.489; p= <0.001), and total IPSS QOL and total VPSS QOL correlated positive (R = 0.349; p = 0.018). ***Conclusion*:** There is a significant correlation between the Visual Prostate Score and the IPSS for the quantification of lower urinary tract symptoms resulting from Benign Prostatic Enlargement. Furthermore, the VPSS can be completed without assistance by a greater proportion of patients and in a certain period of time.

Keywords: Benign Enlargement of Prostate, Lower Urinary Tract Symptoms, Visual Prostate Score, International Prostate Symptom Score, Uroflowmetry.

INTRODUCTION

Benign Prostatic Enlargement (BEP) is a non-malignant condition related to the gradual enlargement of the prostate as a result of hyperplasia of epithelial and smooth muscle cells [1]. It is one of the most prevalent urological disorders affecting ageing men, with histological evidence of prostatic hyperplasia present in approximately 60% by 70 years of age and up to 90% by 80 years [2]. With increasing life expectancy, BEP has become an important public health concern worldwide.

Enlargement of the prostate leads to compression of the prostatic urethra, leading to bladder outlet obstruction and the development of lower urinary tract symptoms (LUTS) [3]. These symptoms include both storage symptoms, including frequency, urgency, incontinence, and nocturia, and voiding symptoms, including straining, weak stream, hesitancy, intermittency, and a sensation of incomplete bladder emptying [4]. LUTS have a considerable impact on quality of life and may cause psychological distress, particularly when symptoms are severe or prolonged.

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The severity of LUTS correlates poorly with prostate size and degree of obstruction, emphasizing the subjective nature of symptom perception. Consequently, standardized symptom scoring systems are essential for assessing symptom severity, directing management, and measuring treatment efficacy [5]. This is most commonly assessed using IPSS; however, it relies heavily on literacy and cognitive comprehension [6]. Several studies have demonstrated that a substantial proportion of patients, particularly elderly men and those with limited education, have difficulty understanding and completing the IPSS accurately, leading to potential reporting bias [7].

To address these limitations, the VPSS was developed using pictorial representations to evaluate nocturia, frequency, urinary stream, and quality of life. VPSS is simple, reliable, and less dependent on literacy, making it particularly suitable for populations with low educational attainment [8]. However, data on its applicability and usefulness in the Nepalese population are lacking.

Given the relatively low literacy rate among elderly men in Nepal and the anticipated rise in BEP prevalence with rising life expectancy, alternative symptom assessment tools need to be evaluated. Our study aims to evaluate the usefulness and applicability of VPSS in Nepalese men with BEP leading to LUTS.

MATERIALS AND METHODS

The cross-sectional study was conducted in the Urology Unit of the Department of Surgery, National Medical College and Teaching Hospital, Birgunj, Nepal, from July 2018 to June 2019 after obtaining ethical clearance from the Institutional Ethics Committee [NMC/301/075/076].

Study Sample

Sample Size Calculation

$$n = \frac{Z^2 \times pq}{e^2}$$

Z= 1.96at 95% confidence interval
P= prevalence of BEP = 47.9%[1]
Q= 100-p
e= 10%
n = 96
100 patients were included in the study. IPSS and VPSS questionnaires were filled out by all the patients.

Inclusion Criteria:

- Patients with BEP presenting with LUTS.

Exclusion Criteria:

- Patients with indwelling catheter (IDC)
- Patients with urethral and/or prostatic surgery history.
- Patients with urethral stricture or urethritis
- Patients with neurogenic bladder
- Patients with altered creatinine
- Patient with visual impairment, mental retardation
- Patients diagnosed or suspected with other causes of LUTS.

METHODOLOGY

All cases of BEP with LUTS that satisfied the inclusion criteria were enrolled. Informed written consent was obtained from patient/ guardian. A complete medical history was obtained, followed by a thorough general and systemic examination. Educational status was recorded, and participants were stratified into groups based on literacy level. All patients underwent digital rectal examination to evaluate prostate size, surface characteristics, gland consistency, and the condition of the rectal mucosa. Ultrasonography was done to measure the size of the prostate.

The IPSS, which comprises seven questions, was completed, with severity recorded on a scale of 0 to 5 for each item, giving a maximum total score of 35.

- Severity according to the score:
  i. Mild: 0 to 7
  ii. Moderate: 8 to 19
  iii. Severe: 20 to 35

The IPSS includes a QoL question scored 0–6. Patients needing help with the questionnaire were assisted by a doctor.

Patients also completed VPSS, a four-item pictogram-based questionnaire scored from 0 to 6 per item for a total score of 24. Symptoms were categorized into three groups:

i. Mild: <8
ii. Moderate: 9 to 16
iii. Severe: 17 to 23

Uroflometry was performed using a Nidhi flow uroflowmeter, 814. Parameters of uroflowmetry measured were voided volume (VV), maximum flow rate (Qmax) measured in ml/s, and average flow rate (Qavg) measured in ml/s. This was followed by assessment of PVRU using transabdominal ultrasonography.

Total IPSS and VPSS scores were analyzed against uroflowmetry parameters to assess their efficacy in quantifying LUTS in BEP. Individual parameters (frequency, nocturia, and straining) were also correlated with uroflowmetry, and correlation values were obtained.

RESULTS

One hundred participants who met inclusion and exclusion criteria, who presented with LUTS suggestive of BEP were evaluated.

Table 1: Age distribution of patients

Age (year)	Frequency	Percentage
<70	42	42%
>70	58	58%

Mean Age = 72.1± 7.594

More than half of the patients (58/100, 58%) were aged between 70 and 79 years.

Table 2: Patients characteristics and laboratory values

Variable	Mean	Std. Deviation	Range
Prostate Volume on usg	50.71	7.88	35-68
Serum Creatinine	0.97	0.47	0.46-2.98
Serum PSA	2.90	0.79	1.2-4.98

Table 3: Assistance needed for IPSS and VPSS by literacy group

		-IPSS group			-VPSS group		
Level of Education		Alone	Assisted	P-value	Alone	Assisted	P-value
	>9TH	29	11	<0.001	33	7	<0.001
	<9TH	10	21		26	5	
	Illiterate	0	29		6	23	

Among the 100 patients who required assistance of medical personnel to fill up IPSS were 61 % of which all 29 % illiterate patients needed assistance. The VPSS, however, was completed by 35% of patients without help, and only 23% of the cases required assistance among the illiterate group. In the literate population, only 12% needed assistance to complete VPSS.

Table 4: IPSS vs VPSS: Completion time

Questionnaires	Time Taken (sec)	Median	Std. Deviation	P-value
IPSS	294 (200 - 400)	300	52.108	0.071
VPSS	128 (60 - 180)	130	34.692	

There was significant difference between IPSS and VPSS mean completion time, which for VPSS was 2 min and 8 sec, and for IPSS was 4 min and 54 sec (p <0.001).

Table 5: Correlation of IPSS and VPSS

Statistics	IPSS Score	VPSS Score	P-value
Mean	15.6	9.59	<0.001
Median	15	9	
Standard Deviation	5.3	2.768	

Patients had a mean IPSS of 15.60 ± 5.33 and a mean IPSS-QoL of 4.03 ± 1.56. The corresponding values for VPSS were 9.59 ± 2.79 (total) and 3.71 ± 1.5 (QoL). IPSS had significant correlation with VPSS (p<0.001)

Table 6: Uroflowmetry parameters

Uroflowmetry Parameters	Mean	Std.Deviation
Voided Volume	219.46	53.322
Qmax	11.44	3.023
Qavg	6.625	1.649
PVRU	89.48	29.573

Uroflowmetry study showed median voided volume of 200ml, Qmax of 10ml/s and Qavg of 6.25ml/s. Post procedure PVRU of 88ml.

Table 7: Spearman's Rank Correlation between IPSS and VPSS

Group	Correlation Coefficient (r)	P-value
IPSS total vs VPSS total	0.489	<0.0001
IPSS total vs Qmax	-0.120	0.072
VPSS total vs Qmax	-0.136	0.333
IPSS total vs Qavg	-0.068	<0.0001

Group	Correlation Coefficient (r)	P-value
VPSS total vs Qavg	-0.180	0.578
VPSS total vs VPSS Qol	0.395	0.208
IPSS Qol vs VPSS Qol	0.349	0.018
IPSS total vs IPSS Qol	0.584	<0.0001
Frequency: VPSS Q2 vs IPSS Q2	0.432	<0.001
Nocturia: VPSS Q3 vs IPSS Q7	0.369	0.079
Poor stream: VPSS Q1 vs IPSS Q5	0.381	0.027
Poor stream: IPSS Q5 vs Qmax	-0.108	0.391
Poor stream: VPSS Q1 vs Qmax	-0.207	0.968
Age vs Total IPSS	-0.335	0.261
Age vs Total VPSS	-0.153	0.003
Prostate Volume vs Total IPSS	0.118	0.020
Prostate Volume vs Total VPSS	0.002	0.195
Age vs Prostate Volume	-0.092	0.183

Age showed significant correlation with VPSS (r: 0.153; p-value: 0.003) but not with IPSS (r: 0.335; p-value: 0.261). A strong positive correlation existed between total IPSS and VPSS ($r = +0.489$, $p < 0.001$).

Questions on frequency in VPSS Q2 and IPSS Q2 had positive correlation which was significant (r: 0.432; p-value: <0.002). Questions on poor stream VPSS Q1 and IPSS Q5 had significant relation with positive correlation. (r: 0.381; p-value: 0.027). However, positive correlation was present between nocturia VPSS Q3 and IPSS Q7 with no significance (r: 0.369; p-value: 0.079). Also, total IPSS and total VPSS had negative correlation with Qmax, though the result was not significant (p-value: 0.072 and p-value: 0.333). There was a negative correlation with significance between IPSS total and Qavg (r: 0.068; p-value: <0.001). However, VPSS total and Qavg were inversely related with no significance (r:0.180; p-value: 0.578).

Notably, IPSS QoL had positive correlation with VPSS QoL and had significant result (r+0.349; p=0.018).

DISCUSSION

For the evaluation of LUTS in men, the IPSS remains the most commonly employed assessment tool [9]. The questionnaire was intended for self-completion by patients, without help from staff. Previous studies have identified low educational level as a major barrier to the successful completion of questionnaires [10]. Misinterpretation of questionnaires by patients or assistants can bias scores and lead to poor management. The VPSS avoids this by using pictograms to visually represent each question [8].

BEP is common in old age. In the present study, most of the patients were in their seventies (48%), followed by their sixties (36%). This is in line with other studies, which showed the incidence to be greater than 50% in their sixties and up to 90% by age 85 [3, 4]. In this study, significant relation was seen between age and VPSS.

Literacy plays a significant role in the assessment of patients with symptoms score. In several studies Illiteracy and low levels of education were seen to be major drawbacks for the administration of questionnaires [11]. In one study done in South Africa, Van der Walt *et al*., found that approximately one-third of patients assessed with IPSS and VPSS had education below the 7th standard, with 4.2% being illiterate [8]. The literacy rate in Nepal in male is nearly 75%. In the present study, 29% of patients were illiterate, and 31% had an education below 9th grade, and 40% had an education above 9th grade. Among the illiterate 80%, required assistance to fill up the VPSS, and 100% patients required assistance to complete the IPSS. In the study by Van der Walt, patients with low education status of < 7 standard 87% required assistance to complete IPSS, and 30% to complete VPSS, among 100 patient 61% required assistance, and only 35% required assistance to complete VPSS (P=<0.001). A study done in Turkey by Ceylan *et al.,* which compared IPSS and VPSS, showed that in low-education status patients, VPSS was more reliable [12].

In this study result are in line with previous reports indicating that the VPSS may be a practical alternative for LUTS assessment in an educationally diverse population. Selekman *et al*., similarly observed that the VPSS was particularly useful in the evaluation of patients of lower academic backgrounds [13].

In one of the studies, a greater proportion of illiterate men were able to complete the VPSS without assistance compared to the IPSS (68% vs. 13%). In a subsequent study, the VPSS pictograms were further modified to enhance patient comprehension [13]. Recent studies from various countries have confirmed a significant correlation between VPSS and IPSS scores, suggesting that VPSS may also be valuable for long term monitoring.

The significantly lower time required for VPSS completion compared to IPSS ($p < 0.001$) in our study mirrors the results reported by Wessels SG *et al*.,

highlighting the VPSS's advantage in busy OPD environments [14].

In present study Mean IPSS was 15.6 ±SD 5.33. According to IPSS categorization majority of patients had moderate symptoms. This was possibly due to patients were evaluated in outdoor settings and some patients were under regular medications for BEP. Those who were managed surgically had higher IPSS score.

Mean score of VPSS observed in this study was 9.59 ± SD 2.786. Till date, only a small number of studies have assessed VPSS in patients with LUTS due to urethral stricture or BEP. However, VPSS value was not mentioned in both [14]. According to Park *et al*., the VPSS can be utilized for LUTS assessment at both first and subsequent visits [15].

While the gold standard for diagnosing bladder outlet obstruction remains the pressure-flow study, its invasiveness and complexity limit its use in routine practice. Simpler tests, such as uroflowmetry, which correlate with symptom scores, offer a practical alternative. The European Association of Urology (EAU) recommends uroflowmetry and post-void residual measurement as part of the initial assessment. According to Wadie *et al*., the mean Qmax was 11.8 mL/s, mean Qave was 6.07 mL/s, and mean PVRU was 43.3 mL [15]. Among 71 men evaluated by El Din Ke *et al*., the mean Qmax was 10.9 mL/s, and the mean PVRU was 56 mL [16]. This study shows uroflowmetry findings were similar, with mean Qmax 11.44 ml/s with Qavg 6.625ml/s with mean PVRU 89.48 ml.

Numerous studies have explored the correlation of IPSS components. Asutosh Roy and colleagues reported that IPSS scores rise as LUTS severity increases [7]. In a study involving 466 men between 40 and 79 years of age, Girman *et al*., demonstrated a statistically significant inverse relationship with Qmax ($p < 0.001$) [17].

In their study, Wadie *et al*., found a statistically significant association between total IPSS and Qmax ($r = 0.10$, $p < 0.04$), and between total IPSS and Qavg ($r = 0.10$, $p < 0.01$) [15]. IPSS had similar correlations with uroflowmetry parameter. In their analysis, Heyns and colleagues found that IPSS correlated negatively with Qmax ($r = -0.38$, $p < 0.002$), and VPSS correlated negatively with Qavg ($r = -0.37$, $p < 0.003$) [18].

Although IPSS showed an inverse correlation with uroflowmetry parameters in this study, the associations were weak and statistically nonsignificant. Additionally, uroflowmetry is subject to inherent drawbacks, such as measurement and reading inaccuracies, requiring continuous monitoring of its readings. Few prerequisites need for the evaluation. As a standard, at least two reading are necessary. The voiding process should mimic patient real voiding pattern. Despite its utility, uroflowmetry—particularly Qmax—lacks the specificity necessary for accurate urodynamic diagnosis, and PVRU shows only a weak association with bladder outlet obstruction [19]. In findings from 196 males, Van venrooij *et al*., correlated IPSS verses Qmax (r=0.12) [20]. Ezz el Din *et al*., established that correlations among objective noninvasive parameters of LUTS is weak [16].

In this study, VPSS showed negative correlation which was not significant. In their study, Van der Walt *et al.,* observed that total IPSS and total VPSS were positively correlated ($r = 0.73$, $p < 0.01$) [8]. Heyn *et al*., also showed direct correlations between the VPSS and IPSS ($r=+0.62$, $P<0.001$) [18]. Afriyanash *et al*., [21], and Tareja *et al*., [22], also had similar finding.

In this study, VPSS showed positive correlations with IPSS and result were significant ($r= +0.989$, P-value <0.0001). Questionnaires in IPSS and VPSS were found comparable on frequency (VPSS Q2 vs. IPSS Q2), nocturia (VPPS Q3 vs. IPSS Q7) and weak stream (VPSS Q1 vs. IPSS Q5) and had positive correlation and result were significant and result were consistent with study of Afriyanash *et al*., [21], Heyns *et al*., [18], and Tereja *et al*., [22].

CONCLUSION

The VPSS is comparable to the IPSS in evaluating the severity of LUTS due to BEP. It can be self-administered by a higher number of patients, reducing the need for external help and in shorter period of time.

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