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COMPARISON OF VISUAL PROSTATE SYMPTOM SCORE WITH INTERNATIONAL PROSTATE SYMPTOM SCORE AND THEIR CORRELATION WITH UROFLOWMETRY IN THE EVALUATION OF MEN WITH BENIGN PROSTATIC ENLARGEMENT

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Abstract

OBJECTIVE: *To evaluate the association among the visual prostate symptom score, the international prostate symptom score, and uroflowmetry in males diagnosed with benign prostatic enlargement.*

METHODOLOGY: *The current investigation was carried out from April 2024 to December 2024 in the urology department of Jinnah Postgraduate Medical Centre (JPMC), Karachi on 129 patients presenting with symptoms suggestive of benign prostatic hyperplasia (BPH) or lower urinary tract symptoms (LUTS) for longer than two months. This study recruited eligible subjects with the age of 50–80 years to examine the relationship between the international prostate symptom score (IPSS and visual prostate symptom score (VPSS), and uroflowmetric variables in male patients with benign hyperplasia. The resulting dataset was subjected to various statistical analyses using SPSS version 26 that included descriptive proportions and Pearson's correlation coefficient*

RESULTS: *The average age of the participants was determined to be 61.95 years (± 7.33 SD). A robust negative correlation was identified between the International Prostate Symptom Score (IPSS) and the maximum urine flow rate (Q max) (r=-0.831, p=0.000), as well as between IPSS and the average urine flow rate (Q ave) (r=-0.852, p=0.000). Conversely, there was no statistically significant correlation between IPSS and the voided volume (r=0.031, p=0.723). A strong negative correlation was similarly established between the Voiding Perception Symptom Score (VPSS) and the maximum urine flow rate (Q max) (r=-0.830, p=0.000), as well as between VPSS and the average urine flow rate (Q ave) (r=-0.847, p=0.000). However, no significant correlation was detected between VPSS and the voided volume (r=0.004, p=0.962).*

CONCLUSION: *IPSS and VPSS display strong negative correlations with both the maximal and average urine flow rates and, therefore, can be used clinically to assess the severity of symptoms in men with benign prostatic enlargement. Because of its visual format, VPSS is an easily accessible alternative to IPSS,*

particularly in patients with poor literacy. It is strongly advised that extensive research be conducted in order to substantiate the findings currently presented.

INTRODUCTION

Benign Prostate Hyperplasia (BPH) constitutes the primary etiological factor contributing to bladder outlet obstruction among the geriatric demographic and, consequently, represents a significant source of morbidity within this population [1]. Benign prostatic hyperplasia (BPH) is recognized as the primary cause of lower urinary tract symptoms (LUTs) within the male population, characterized by sensations suggestive of incomplete bladder evacuation, increased urinary frequency, episodic urination, urgency, a decreased urinary stream, straining during urination, and nocturia [3]. Objectives: The LUTS associated with BPH present persistent and multifaceted clinical challenges, particularly in individuals over the age of 50 years [1]. The systematic classification of these symptoms is essential for the development of a standardized therapeutic protocol as well as for the evaluation of treatment effectiveness after a specified duration [1]. What is understood: By clarifying the fundamental pathophysiology of the condition, its natural course, symptomatic intricacies, and the consequent effects on the population, it is acknowledged that symptoms arising from BPH can be profoundly distressing and substantially diminish the quality of life (QoL) of patients [1]. International Prostate Scoring System (IPSS) is diagnostic tool for LUTS [1-10]. IPSS is a valid and effective scoring system, used commonly by urologists in clinical settings to assess and track treatment of LUTS patients. The International Prostate Symptom Score (IPSS) questionnaire consists of eight items; seven symptom-related questions are scored between 0 and 5 points each, and the last question relates to quality of life and is scored from 0 to 6 [3]. Despite this, a proportion of patients struggle to fill in the questionnaire correctly due to a wide range of factors such as educational inequalities or in the older population due to cognitive or visual problems, thus needing the involvement of healthcare practitioners [2]. To mitigate such obstacles, Van der Walt et al. developed an alternative tool known as the Visual Prostate Symptom Score (VPSS), which evaluates frequency, nocturia, weak urinary stream, and quality of life through the incorporation of pictorial representations [2]. Each of the four pictograms is assigned scores for Frequency (1-6), Nocturia (1-6), Weak Stream (1-5), and QoL (0-6). This alternative offers a practical solution for patients who are illiterate or possess limited educational experiences and/or cognitive challenges [4]. Research indicates that the VPSS can be utilized by any patient experiencing LUTS due to BPH, irrespective of their educational background, which markedly contrasts with the IPSS, which is not readily applicable to uneducated individuals without external support [1-10].The investigation conducted by Oranusi et al. revealed a weak correlation between the IPSS and both voiding time (r = 0.220), flow time (r = 0.128), and time to maximum flow (r = 0.246) among patients diagnosed with benign prostate hyperplasia. Furthermore, the IPSS exhibited a negative correlation with maximum flow rate (r = -0.368), average flow rate (r = -0.203), and voided volume (r = -0.164), with the negative correlation being statistically significant for the maximum flow rate [11]. An additional study documented a significant negative correlation of the VPSS with Qmax (r = -0.435), average urinary flow rate (r = -0.163), alongside a negative correlation of the IPSS with Qmax (r = -0.105) and average urinary flow rate (r = -0.010) in patients afflicted by BPH [12]. While several studies on BPH have undertaken comparisons among IPSS, VPSS, and uroflowmetry in men presenting with LUTS, our comprehensive literature review revealed the absence of localized data regarding these parameters in BPH patients experiencing bladder outlet obstruction. This study provides clinically pertinent insights that may assist urologists in efficiently assessing symptom severity and urinary flow rates, while concurrently enlightening patients on symptom-related variables and therapeutic considerations.

METHODOLOGY

This investigation was a cross-sectional study executed between April 2024 and December 2024 within the Department of Urology at the Jinnah Postgraduate Medical Centre (JPMC), Karachi, aimed at elucidating

the correlation between the International Prostate Symptom Score (IPSS), the Visual Prostate Symptom Score (VPSS), and the parameters derived from uroflowmetry in male patients diagnosed with Benign Prostatic Hyperplasia (BPH).

In the course of this research, a cohort of 129 participants was meticulously selected for analysis through non-probability sampling methodologies. The study cohort consisted of males aged 50 to 80 years, who had been diagnosed with BPH or exhibited lower urinary tract symptoms (LUTS) for a duration exceeding two months. The exclusion criteria encompassed individuals with a history of pelvic surgery, previous surgical interventions involving the prostate or urethra, LUTS attributable to alternative etiologies, and urinary tract infections confirmed by positive urine cultures.

Data collection was meticulously conducted at all designated time points subsequent to securing informed consent from the participants. A pre-structured instrument for data collection was employed to systematically document both demographic and clinical information. The diagnosis of BPH was predicated on the observation of a prostate volume exceeding 30 mL, ascertained through transabdominal ultrasound examination.

The diagnosis of BPH was substantiated by transabdominal ultrasound that revealed prostatic enlargement with a volume surpassing 30 mL, calculated utilizing the formula [width x height x length x 0.52]. The ultrasound results were also congruent with evidence of central gland enlargement, characterized by hypoechoic or mixed echogenicity, alongside the presence of calcifications within the enlarged gland and its pseudocapsule [2]. Uroflowmetry was conducted to quantify the volume of urine expelled, the flow rate of urine, and the duration of the discharge. The evaluation recorded the measured voided volume (mL) and the maximal flow rate (Qmax) (mL/sec) during the act of micturition. Our analytical framework encompassed individuals who successfully completed the IPSS and VPSS questionnaires. This assessment was quantified utilizing the International Prostate Symptom Score (IPSS: 0–35), which considers urinary frequency, nocturia, straining (evidenced by a weak urinary stream), and overall quality of life, with elevated scores denoting increased symptom severity. The Visual Prostate Symptom Score (VPSS) [0 to 23], supplemented by visual aids for frequency, nocturia, weak urinary stream, and quality of life indicators [higher score = worse symptom], was utilized for evaluation.

The Statistical Package for the Social Sciences (SPSS) version 26 was utilized for data entry and subsequent statistical analysis. Means, standard deviations, and frequencies were computed as descriptive statistics for the various study variables. The correlations among IPSS, VPSS, and uroflowmetry parameters were examined utilizing Pearson's correlation coefficient. A p-value of less than or equal to 0.05 was established as the threshold for statistical significance.

RESULTS

The research encompassed a cohort of 129 subjects, exhibiting a mean age of 61.95 years, which signifies a predominantly aged demographic. A greater segment of the participants was aged over 60 years (57.4%), in contrast to those within the 50-60 years of age bracket (42.6%).

The mean Body Mass Index (BMI) was recorded at 26.03 kg/m², with a predominant majority of participants (58.1%) exhibiting a BMI ranging from 13 to 26 kg/m², whereas 41.9% presented with a BMI exceeding 26 kg/m². This indicates a relatively equitable distribution between the categories classified as normal and elevated BMI.

The average dimension of the prostate gland was measured at 60.33 cm³, with 55% of the participants demonstrating a prostate size surpassing 60 cm³, thereby suggesting a propensity towards larger prostate dimensions within the study cohort.

In terms of comorbidities, 39.5% of the participants were diagnosed with diabetes mellitus, and 46.5% exhibited hypertension, thereby underscoring the prevalence of these medical conditions within the study population.

An overwhelming majority of participants were found to be married (95.3%), with a mere minority remaining unmarried (4.7%), thereby reflecting a high prevalence of marital status among the participants as illustrated in Table I.

The International Prostate Symptom Score (IPSS) demonstrates a robust negative correlation with the maximum urine flow rate (Q max), evidenced by a correlation coefficient (r) of -0.831. This outcome

elucidates that a heightened symptom score correlates with a diminished maximum urine flow rate, thereby signifying that a decrease in prostate symptoms is evidently associated with an enhancement in urine flow rate. This observation demonstrates a statistically significant association, as evidenced by the p-value of 0.000.

Correspondingly, the International Prostate Symptom Score (IPSS) displayed a significant negative correlation with the average urine flow rate (Q ave) (correlation coefficient [r]=-0.852). The implication of this finding is that exacerbation of symptoms correlates with a reduction in mean urine flow, further underscoring the detrimental influence of prostate symptoms on urinary function. Again, the p-value is 0.000, reflecting a statistically significant relationship with substantial significance.

Conversely, the correlation between IPSS and voided volume is characterized as weak and statistically nonsignificant (r=0.031, p=0.723). This denotes that while the severity of prostate symptoms bears some relation to urinary retention, the total volume of urine voided does not seem to correlate with the severity of symptoms (Table II).

The Visual Prostate Symptom Score (VPSS) demonstrates a significant and negative correlation with Q max (r = -0.830). The more severe the underlying symptomatology (i.e., higher the VPSS), the lower the maximum flow rate that can be attained in relation to bladder outlet function and behavior, which underscores the demonstrable negative repercussions of escalating symptom severity on urinary flow dynamics. Indeed, the p-value in this context is 0.000, corroborating the statistical significance of this association.

Similarly, the correlation coefficient (r= -0.847) between the average urine flow rate (Q ave) and the VPSS is also markedly negative. Thus, this reinforces the notion that greater severity of symptoms is associated with diminished average urine flow, indicating the influence of prostatic symptoms on urinary tract functionality. For instance, a p-value of 0.000 is interpreted as denoting an extremely statistically significant relationship.

Conversely, the correlation between VPSS and voided volume was found to be weak and statistically insignificant (r=0.004; p=0.962). It therefore indicates that prostate symptoms severity does not have a significant impact on the total amount of urine voided, as illustrated in table III.

DISCUSSION

The interrelationship among the Visual Prostate Symptom Score (VPSS), the International Prostate Symptom Score (IPSS), and uroflowmetry parameters has been extensively examined in various academic studies, revealing critical insights pertaining to the assessment of lower urinary tract symptoms (LUTS) in male patients diagnosed with benign prostatic hyperplasia (BPH).

In the current study, a notable negative correlation was observed between the IPSS and the maximum urine flow rate (Q max) (r = -0.831, p = 0.000), as well as between the IPSS and the average urine flow rate (Q ave) (r = -0.852, p = 0.000). In contrast, no statistically significant correlation was identified between the IPSS and voided volume (r = 0.031, p = 0.723). A distinctly negative correlation was found between the VPSS and the maximum urine flow rate (Q max) (r = -0.830, p = 0.000), along with a similarly negative correlation between the VPSS and the average urine flow rate (Q ave) (r = -0.847, p = 0.000). Nonetheless, a lack of significant correlation between the VPSS and voided volume was noted (r = 0.004, p = 0.962). The research conducted by Oranusi et al. indicated a weak correlation between the IPSS and voiding time (r = 0.220), flow time (r = 0.128), and time to maximum flow (r = 0.246) among patients with benign prostate hyperplasia. The IPSS exhibited a negative correlation with the maximum flow rate (r = 0.368), average flow rate (r = -0.203), and voided volume (r = -0.164), with the negative correlation for maximum flow rate being statistically significant [11]. Another investigation revealed a significant negative correlation of the VPSS with Q max (r = -0.435), average urinary flow rate (r = -0.163), and a negative correlation of the IPSS with Q max (r = -0.105) and average urinary flow rate (r = -0.010) in patients suffering from BPH [12].

In a parallel study conducted in Indonesia, the VPSS and the IPSS were systematically compared with uroflowmetry parameters [13]. The results demonstrated that both symptom scores were well correlated with various uroflowmetric assessments which provide additional evidence supporting the contention that these qualitative measures may yield

clinically important information regarding lower urinary tract symptoms (LUTS). The similar principle was explored by Setthawong et al; based on a sample of adult Thai male subjects, examined the relationships between the VPSS, IPSS and uroflowmetry, and presented a significant correlation for both symptom scores with uroflowmetric parameters. However, it was also shown that determinants such as education may affect the validity of the symptom score, demonstrating the need for caution in implementation of such scoring systems in heterogeneous populations.

The validity and reliability of the VPSS were compared with the IPSS, focusing on the VPSS's ability to evaluate pain perception in patients undergoing transrectal ultrasound-guided prostate biopsy[15]. The findings affirmed the efficacy of the VPSS as a straightforward assessment tool for prostate-related symptoms when contrasted with the conventionally employed International Prostate Symptom Score (IPSS). Moreover, the VPSS was proposed as a more feasible alternative to the more commonly utilized International Prostate Symptom Score (IPSS), particularly in scenarios where patients may experience challenges in completing comprehensive questionnaires.

By the same token, Gyasi-Sarpong et al. in a cohort of patients exhibiting lower urinary tract symptoms (LUTS) [16] ascertained that the International Prostate Symptom Score (IPSS) effectively encapsulated the intensity of symptom severity in relation to clinical outcomes. His recently published study within the realm of psychiatry corroborated the applicability of the IPSS concerning the stratification of severity; however, this investigation indicated that the Visual Prostate Symptom Score (VPSS) presents a straightforward and visually intuitive alternative to symptom questionnaires, which may pose challenges for certain patients.

In a Portuguese investigation, Laranjo-Tinoco et al. [17] conducted a comparative analysis of the VPSS and the IPSS, ultimately concluding that the VPSS yielded comparable diagnostic accuracy in evaluating LUTS while being less burdensome for patients to complete. They proposed that the VPSS could function as a feasible tool for regular clinical utilization, especially in primary care settings where ease of use represents a crucial factor. Additionally, Sanman et al. [18] deliberated on the prospective advantage of an adapted VPSS in supplanting the IPSS, particularly in India, where simplicity and comprehensibility are critical for ensuring patient adherence.

This study is characterized by several limitations and shortcomings that warrant consideration. Firstly, the cross-sectional design constrains the capacity to infer causal relationships or observe longitudinal changes, as it solely provides a temporal snapshot of the interrelations between the IPSS, VPSS, and uroflowmetry parameters at a singular point in time. Moreover, the employment of non-probability, consecutive sampling may engender selection bias, potentially compromising the generalizability of the findings to the wider population of males with benign prostatic hyperplasia (BPH) or LUTS. Furthermore, the exclusion criteria, which disqualified patients with histories of pelvic surgeries, prior prostate or urethral surgeries, LUTS attributable to alternative etiologies, and urinary tract infections, constricted the study population and may restrict the applicability of the results to individuals with more intricate medical backgrounds.

Another limitation pertains to the sample size; although 129 participants were enrolled, a larger cohort would have facilitated the accounting for greater variability and bolstered the robustness of the findings. The study was conducted within a single center, which adversely affects its external validity, as the results may not be translatable to other geographical regions or healthcare environments.

In terms of weaknesses, the study did not investigate several additional potential confounders, such as pharmacological interventions or psychological influences, which could also affect the relationship between symptoms and uroflowmetry parameters. The research could be fortified by integrating more objective measures of symptom severity, such as bladder diaries or 24-hour urine collections, in conjunction with the IPSS and VPSS to validate these self-reported scores. Furthermore, the standardization of uroflowmetry testing conditions, encompassing variables such as patient hydration and positioning, would enhance the reliability and accuracy of the recorded measurements. Lastly, future investigations could be enriched by adopting a larger, multi-center approach with a diverse sample, to augment

generalizability and incorporate additional clinical variables such as comorbidities.

CONCLUSION

IPSS and VPSS display strong negative correlations with both the maximal and average urine flow rates and, therefore, can be used clinically to assess the severity of symptoms in men with benign prostatic enlargement. Because of its visual format, VPSS is an easily accessible alternative to IPSS, particularly in patients with poor literacy. It is strongly advised that extensive research be conducted in order to substantiate the findings currently presented.

Table I: Characteristics of Study Participants (n=129)	
Variable	**n** (%)
Age (Mean ± SD) = 61.95 ± 7.33 years	
50 - 60 years	55 (42.6)
>60 years	74 (57.4)
Body Mass Index (Mean ± SD) = 26.03 ± 4.97 kg/m^2	
13 - 26 kg/m^2	75 (58.1)
>26 kg/m^2	54 (41.9)
Prostate Gland Size (Mean ± SD) = 60.33 ± 13.90 cm^3	
30 - 60 cm^3	58 (45.0)
>60 cm^3	71 (55.0)
Comorbid	
Diabetes Mellitus	51 (39.5)
Hypertension	60 (46.5)
Marital Status	
Married	123 (95.3)
Unmarried	6 (4.7)

Table II: Correlation between International Prostate Symptom Score and Uroflowmetry (n=129)

Correlation	Mean	±SD	Correlation (r) 95% Confidence Interval	P-Value
IPSS	18.23	±4.96	-0.831 (-0.878~~-0.766)	0.000
Urine Flow Rate Q max (ml/sec)	10.99	±2.61		
IPSS	18.23	±4.96	-0.852 (-0.892~~-0.799)	0.000
Urine Flow Rate Q ave (ml/sec)	9.67	±2.52		
IPSS	18.23	±4.96	0.031 (-0.125~~0.192)	0.723
Voided Volume (ml)	178.95	±23.55		

Table III: Correlation between Visual Prostate Symptom Score and Uroflowmetry (n=129)

Correlation	Mean	±SD	Correlation (r) 95% Confidence Interval	P-Value
VPSS	15.46	±4.39	-0.830 (-0.876~~-0.781)	0.000
Urine Flow Rate Q max (ml/sec)	10.99	±2.61		
VPSS	15.46	±4.39	-0.847 (-0.887~~-0.802)	0.000
Urine Flow Rate Q ave (ml/sec)	9.67	±2.52		

VPSS	15.46	±4.39	0.004 (-0.145----0.155)	0.962
Voided Volume (ml)	178.95	±23.55		

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