Comparison of Visual Prostate Symptom Score with the International Prostate Symptom Score and uroflowmetry parameters in assessing men with lower urinary tract symptoms in Dr. Cipto Mangunkusumo National General Hospital, Indonesia

I.B.O.W. Putra, A.R.A.H. Hamid, N. Rasyid, C.A. Mochtar, R. Umbas*

Department of Urology, Faculty of Medicine University of Indonesia, Dr. Cipto Mangunkusumo Hospital, Indonesia

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**Abstract**

**Background:** The complexity of International Prostate Symptom Score (IPSS) as an objective questionnaire for lower urinary tract symptoms might be overcome with alternative questionnaire such as the Visual Prostate Symptom Score (VPSS) which uses pictograms instead of questions to illustrate some of the questions addressed in IPSS.

**Methods:** Male patients older than 45 years with lower urinary tract symptoms were evaluated with Indonesian version of the IPSS and VPSS, for uroflowmetry parameters using a transabdominal ultrasound. Appropriate statistical analysis was used.

**Results:** Of all participants, 24.2% and 11.1% require assistance when answering IPSS and VPSS questionnaires, respectively. The mean age, IPSS total score, VPSS total score, Qmax, voided volume, and postvoid residual volume were 67.4 ± 8.9 years, 13.4 ± 7.8, 10.8 ± 2.7, 13.6 ± 8.6 mL/sec, 248 ± 136 mL, and 54.9 ± 68.3 mL, respectively. Total IPSS, IPSS quality of life (QoL), IPSS question (Q) 2, IPSS Q7, and IPSS Q5 were significantly correlated with total VPSS, VPSS QoL, VPSS Q1, VPSS Q2, and VPSS Q3 [correlation coefficient (r) P value: 0.57, <0.001; 0.76, <0.001; 0.39, <0.001; 0.72, <0.001; 0.50, <0.001, respectively]. VPSS Q3 was significantly correlated with Qmax (r, P value: 0.26, <0.001). There was no significant relationship between the level of education and the ability to complete VPSS questionnaire (P = 0.649).

**Conclusion:** The VPSS was significantly correlated with IPSS and Qmax. The novel questionnaire proved useful as an alternative tool for IPSS for assessing men with lower urinary tract symptoms, especially for those with lower level of education.

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1. Introduction

Symptoms addressed by patients experiencing disease of the lower urinary tract are collectively known as lower urinary tract symptoms (LUTS). The International Continence Society has divided various components of LUTS into three major groups of symptoms that are related to storage, voiding, and postmicturation symptoms. These can be assessed by thorough history taking or objectively with the help of questionnaires such as the International Prostate Symptom Score (IPSS). The IPSS was known as the American Urological Association symptom index which consisted of seven questions encompassing storage, voiding, and postmicturation symptoms as well as a quality-of-life question.

The IPSS is designed to be self-administered by patients without the assistance of an attending physician. Illiteracy and low level of education are major drawbacks for the administration of the questionnaire. In addition, it should also be noted that about one-third of patients were unable to complete the questionnaire. This posed as a problem in Indonesia taking into account that the rate of
illiteracy for people older than 45 years is still high at 17.20%, although the number decreases constantly each year. Furthermore, the participation in education rates in Indonesia decreases with an increase in the level of education. The numbers were 92.43% for primary school, 70.73% for junior high school, 51.35% for senior high school, and 13.28% for college/university.

The complexity of the IPSS as an objective questionnaire for LUTS might be overcome with an alternative questionnaire such as the Visual Prostate Symptom Score (VPSS, Fig. 1 Stellenbosch University) that uses pictograms instead of questions to illustrate some of the questions addressed in the IPSS. A preliminary study from South Africa found that there was a good correlation between the VPSS with IPSS, Qmax, and Qave. The VPSS may be used in place of the IPSS for patients who are illiterate or with low level of education.

This study aims to compare and correlate the novel VPSS with IPSS and objective uroflowmetry parameters [uroflowmetry, i.e., Qmax, Qave, postvoid residual urine volume (PVR), and voided volume] in a setting of Indonesian men who visited Cipto Mangunkusumo National General Hospital.

2. Materials and methods

Data were collected prospectively from February 2014 until August 2015 at the Department of Urology, Dr. Cipto Mangunkusumo National General Hospital. Male patients older than 45 years with the chief complaint of LUTS were selected. Patients were recruited based on their educational level: (i) low level of education (i.e., no formal education, had not graduate primary school, and graduated primary school) or (ii) high level of education (i.e., graduated senior high school or graduated college/university). Sample size calculation revealed that the study required a minimum sample size of 38 for each group (based on the educational level). Participants were recruited by consecutive sampling. Those patients with indwelling urethral or suprapubic catheter, urinary tract infection, and a history of prior urological surgery and those

![Fig. 1. Pictograms of the visual prostate symptoms score questionnaire (Stellenbosch University).](image-url)
who were blind or visually impaired (including those with visual acuity problem) were excluded from our study. This study was approved by the Research Ethics Committee of Faculty of Medicine Universitas Indonesia and Dr. Cipto Mangunkusumo National General Hospital [#60/H2.F1/ETIK/2014].

Standard demographic data such as age, literacy (able to read), and level of education were recorded. All participants underwent standard clinical examination. They were requested to complete the Indonesian adaptation of the IPSS and VPSS. Participants who require assistance when answering the questionnaires were noted and thus assisted by a physician. Maximum urinary flow (Qmax), average urinary flow (Qave), and voided volume (VV) were measured using Medtronic URODYN 1000 Stationary Uroflow Recorder (Dantec, Skovlunde, Denmark). PVR was measured using BK Medical Pro Focus 2202 Ultrasound Scanner (BK-Medical, Herlev, Denmark) using a convex array transducer.

Chi-square test was used for categorical data analysis, Kruskal–Wallis test was used for nonparametric data analysis, and Spearman’s test was used for correlation analysis. Statistical analysis was performed using IBM SPSS Statistics software (IBM Corp., NY) version 20. A P value of <0.05 was considered statistically significant.

3. Results

During the period of February 2014 until August 2015, a total of 252 men were enrolled in our study. The mean age was 67.4 ± 8.9 years (range: 45–101 years). Three participants (1.2%) were illiterate, i.e., unable to read. Based on the IPSS, 67 (26.6%) had mild symptoms, 128 (50.8%) had moderate symptoms, and 57 (22.6%) had severe symptoms. The participant characteristics are presented in Table 1.

Of all participants, 75.8% (n = 191) did not require assistance when answering the IPSS, whereas 88.9% (n = 224) did not require assistance when answering the VPSS. The IPSS questionnaire was completed with assistance by 36 of 100 men (36%) with low level of education compared with 25 of 152 men (16.4%) with high level of education. The participant characteristics are presented in Table 1.

Table 1

| Age (range) | 67.4 ± 8.9 years (45 – 101) |
| Level of education |  |
| Main category |  |
| Low | 100 (39.7) |
| High | 152 (60.3) |
| Category |  |
| No formal education | 1 (0.4) |
| Had not graduated primary school | 8 (3.4) |
| Graduated primary school | 91 (35.1) |
| Graduated senior high school | 51 (20.2) |
| Graduated college/university | 101 (40.1) |
| IPSS total score (range) | 13.4 ± 7.8 (0 – 35) |
| IPSS storage score (range) | 6.4 ± 3.4 (0 – 15) |
| IPSS voiding score (range) | 6.9 ± 5.2 (0 – 20) |
| Qmax (range) | 3 ± 1.5 (0 – 6) |
| VPSS total score (range) | 10.8 ± 2.7 (3 – 17) |
| VPSS storage score (range) | 7.9 ± 2.3 (2 – 12) |
| VPSS voiding score (range) | 2.8 ± 0.9 (0 – 5) |
| VPSS QoL (range) | 2.9 ± 1.7 (0 – 6) |
| VV (range) | 13.6 ± 8.6 |
| PVR (range) | 248 ± 136 |
| VPSS, Visual Prostate Symptom Score; PVR, postvoid residual urine volume; Qmax, maximum urinary flow rate; QoL, quality of life; SD, standard deviation; VPSS, Visual Prostate Symptom Score; VV, voided volume. |

was completed with assistance by 10 of 100 men (10%) with low level of education compared with 18 of 152 men (11.8%) with high level of education (P = 0.649). These results are shown in Tables 2 and 3.

The IPSS total score was significantly correlated with the VPSS total score and IPSS QoL (r = 0.57, <0.001; and r = 0.67, <0.001, respectively). The VPSS total score was significantly correlated with the VPSS QoL (r = 0.45, P < 0.001) and inversely correlated with Qmax (r = -0.19, P = 0.002). The IPSS QoL was significantly correlated with the VPSS QoL (r = 0.76, P < 0.001). Both the IPSS question 5 (Q5, weak urinary stream) and corresponding VPSS Q3 were significantly correlated with Qmax (r = -0.17, P = 0.006 and r = -0.26, P < 0.001, respectively). The IPSS Q2 (frequency), Q5 (weak urinary stream), and Q7 (nocturia) were significantly correlated with their corresponding VPSS questions: Q1, Q2, and Q3 (r = 0.39, P < 0.001; r = 0.50, P < 0.001; and r = 0.72, P < 0.001, respectively). The total IPSS storage score (questions 2, 4, and 7) and voiding score (questions 1, 3, 5, and 6) were significantly correlated with the total VPSS storage and VPSS voiding score (r = 0.57, P < 0.001 and r = 0.51, P < 0.001, respectively). The VPSS voiding score was significantly correlated with Qmax (r = -0.26, P < 0.001) and PVR (r = -0.16, P = 0.011). The IPSS voiding score was correlated significantly with PVR (r = 0.17, P = 0.006). These results are presented in Table 4.

4. Discussion

The IPSS has been used as a tool to assess LUTS in male patients. The questionnaire consisted of seven questions which included questions on storage/irritative symptoms, voiding/obstructive symptoms, and postmicturition symptoms. An additional question assessing the QoL was also included in the questionnaire. It is designed to be self-administered by patients without assistance of an attending physician or a nurse. Studies had shown that illiteracy and low level of education were major drawbacks for the
administration of the questionnaire.14 Patients with low level of education (less than grade six) may have difficulty in answering the questions addressed in the IPSS.15 These patients may misinterpret the questionnaire resulting in a biased score, thus leading to inappropriate care.11 A simpler questionnaire, the VPSS is in evaluating LUTS in men who underwent brachytherapy.16 Similarly, a recent study in India by Taneja et al showed that the VPSS could be completed by most people with low level of education.17 An earlier study in Namibia showed that apart from illiteracy, language was not a barrier in completing the VPSS questionnaire.18 Dr. Cipto Mangunkusumo National General Hospital was the national referral hospital in Indonesia. Our participants came from different culture and ethnicities and thus may speak more than one local language beside Indonesian.

A study by Ceylan et al which compared both the questionnaires in Turkish people found that the VPSS was more reliable than the IPSS in low-educated patients and in elderly patients who have difficulty in reading small prints in the IPSS.19 Our study did not evaluate patients who are visually impaired (including those who have visual acuity problem) as these patients were already excluded from the study.

This study showed significant correlations between total IPSS and VPSS scores, between their individual corresponding scores (questions assessing frequency, nocturia, and urinary stream), and QoL scores. The results of our study were similar and consistent with the results of previous studies (Table 5).8,9,12,17,20 In addition, similar to earlier studies, uroflowmetry parameter Qmax (maximum urinary flow rate) was significantly correlated with the IPSS question 5 and its VPSS counterpart (question 3). This showed that similar to the IPSS, the VPSS may be used to evaluate the urinary stream.8,9,17,21

Wessels et al had used the VPSS in assessing LUTS in patients with urethral stricture disease. The study found that the VPSS correlated significantly with the IPSS, Qmax, and urethral diameter. Also, the questionnaire takes significantly less time to complete than the IPSS.21 Park et al found the VPSS could be used in evaluating LUTS at initial and follow-up visits.20 Future possible application of the VPSS is in evaluating LUTS in men who underwent brachytherapy. A study by Okihara et al which assessed LUTS in patients who underwent brachytherapy found that the visual analog scale reflected symptoms and QoL of patients more precisely than the IPSS.24

The limitation of our study was weaker correlation coefficients than in other studies. This could be due to methodological

### Table 4

| IPSS and VPSS parameters | Correlation coefficient | *P* value |
|--------------------------|-------------------------|-----------|
| IPSS total score—VPSS total score | 0.57 | <0.001 |
| IPSS QoL—VPSS QoL | 0.76 | <0.001 |
| IPSS total score—VPSS QoL | 0.67 | <0.001 |
| VPSS total score—VPSS QoL | 0.45 | <0.001 |
| IPSS total score—Qmax | -0.08 | 0.252 |
| VPSS total score—Qmax | -0.19 | 0.002 |
| IPSS Q5—Qmax | -0.17 | 0.006 |
| VPSS Q3—Qmax | -0.26 | <0.001 |
| IPSS Q2—VPSS Q1 | 0.39 | <0.001 |
| IPSS Q7—VPSS Q2 | 0.72 | <0.001 |
| IPSS Q5—VPSS Q3 | 0.50 | <0.001 |
| VPSS storage score—VPSS storage score | 0.57 | <0.001 |
| VPSS voiding score—VPSS voiding score | 0.51 | <0.001 |
| VPSS voiding score—Qmax | -0.09 | 0.129 |
| VPSS voiding score—Qmax | -0.26 | <0.001 |
| IPSS storage score—VPSS QoL | 0.17 | 0.006 |
| IPSS voiding score—PVR | 0.16 | 0.011 |

**IPSS, International Prostate Symptom Score; IPSS Q2, IPSS question 2 (frequency); IPSS Q5, IPSS question 5 (weak urinary stream); IPSS Q7, IPSS question 7 (nocturia); IPSS total score, sum of IPSS scores from question 2, 4, and 7; VPSS total score, sum of VPSS scores from question 1 and 2; Qmax, maximum urinary flow rate; QoL, quality of life; VPSS, Visual Prostate Symptom Score; VPSS storage score, sum of VPSS scores from question 1 and 2; VPSS voiding score, score from VPSS question 3; VV, voided volume.**

### Table 5

| Variables | Our study | Afriansyah et al12 | van der Walt et al9 | Heyns et al8 | Park et al20 | Taneja et al17 |
|-----------|-----------|--------------------|--------------------|-------------|-------------|-------------|
| Total IPSS—total VPSS | 0.57 (<0.001) | 0.67 (<0.001) | 0.73 (<0.001) | 0.62 (<0.001) | 0.63 (<0.001) | 0.72 (<0.001) |
| IPSS QoL—VPSS QoL | 0.76 (<0.001) | 0.82 (<0.001) | NE | 0.68 (<0.001) | 0.59 (<0.001) | 0.84 (<0.001) |
| Frequency (IPSS Q2—VPSS Q1) | 0.39 (<0.001) | 0.49 (<0.001) | NE | 0.54 (<0.001) | NE | 0.51 (<0.001) |
| Nocturia (IPSS Q7—VPSS Q2) | 0.72 (<0.001) | 0.95 (<0.001) | NE | 0.80 (<0.001) | NE | 0.89 (<0.001) |
| Weak stream (IPSS Q5—VPSS Q3) | 0.50 (<0.001) | 0.57 (<0.001) | NE | 0.59 (<0.001) | NE | 0.76 (<0.001) |
| Storage scores (IPSS—VPSS) | 0.57 (<0.001) | 0.73 (<0.001) | NE | NE | 0.69 (<0.001) | NE |
| Voiding scores (IPSS—VPSS) | 0.51 (<0.001) | 0.50 (<0.001) | NE | NE | 0.50 (<0.001) | NE |

Results were expressed in: *r (P value); r: Spearman’s correlation coefficient; NE: not evaluated.*
difference and a diverse set of population. Our patients came from different educational backgrounds. Moreover, we included all patients with the chief complaint of LUTS, which could be due to benign prostate hyperplasia, stricture, overactive bladder, etc. Thus, application of this study results in clinical practice should be appraised carefully.

The novel questionnaire may prove a useful clinical tool in routine clinical practice for evaluation of treatment, initial assessment, and follow-up of patients with LUTS, especially for those with low level of education.

5. Conclusion

The VPSS was significantly correlated with IPSS and Qmax. The novel questionnaire proved useful as an alternative tool for the IPSS for assessing men with LUTS, especially for those with lower level of education.

Conflicts of interest

All authors have no conflict of interest to declare.

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References

1. Abrams P, Cardozo L, Fall M, Grifiths D, Rosier P, Ulmsten U, et al. The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. Urol ogy 2003;61(1):37–49.
2. Barry MJ, Fowler Jr FJ, O'Leary MP, Bruskewitz RC, Holtgrewe HL, Mebust WK, et al. The Measurement Committee of the American Urological Association. The American Urological Association symptom index for benign prostatic hyperplasia. J Urol 1992;148(5):1549–57.
3. Ozturk MI, Koca O, Keles MO, Gunes M, Kaya C, Karaman MI. International prostate symptom score: really appreciated by all patients or not? J Urol 2011;183(1):227–30.
4. Badia X, Rodriguez F, Carballo J, Losa GM, Unda M, Dal-Re R, et al. Influence of sociodemographic and health status variables on the American Urological Association symptom scores in patients with lower urinary tract symptoms. Urology 2001;57(1):71–7.
5. Galan ML, Borda AP, Oses EM, Gonzalez LL, Sanchez AB. The validity of the IPSS questionnaire in a sample of 262 patients with benign prostatic hyperplasia. Arch Esp Urol 1997;50(8):847–53.
6. Central Bureau of Statistics of Indonesia. Percentage of illiterate population by age group. 2003-2012; 2012 [cited 20 November 2013]. Available from: http://www.bps.go.id/linkTableDinamis/viewId/1055.
7. Central Bureau of Statistics of Indonesia. Education indicators, 1994-2012; 2012, cited 18 December 2013. Available from: http://www.bps.go.id/index.php/linkTableStatis/1525.
8. Heyns CF, van der Walt CL, Groeneveld AE. Correlation between a new visual prostate symptom score and uroflowmetry parameters in men with lower urinary tract symptoms. S Afr Med J 2012;102(4):237–40.
9. van der Walt CL, Heyns CF, Groeneveld AE, Edlin RS, van Vuuren SP. Prospective comparison of a new visual prostate symptom score versus the international prostate symptom score in men with lower urinary tract symptoms. Urology 2011;78(1):17–20.
10. Manoarfa RA, Mochtar CA. Validation of Indonesian version of IPSS. Indonesia J Urol 2014;21(1):15–9.
11. Johnson TV, Abbasi A, Ehrlich SS, Kleeris RS, Schoenberg ED, Owen-Smith A, et al. Patient misunderstanding of the individual questions of the American Urological Association symptom score. J Urol 2008;179(5):2291–4.
12. Afriansyah A, Gani YI, Nusali H. Comparison between visual prostate symptom score and international prostate symptom score in males older than 40 years in rural Indonesia. Prostate Int 2014;2(4):176–81.
13. Master VA, Johnson TV, Abbasi A, Ehrlich SS, Kleeris RS, Abbasi S, et al. Poorly numerate patients in an inner city hospital misunderstand the American Urological Association symptom score. Urology 2010;75(1):148–52.
14. Okihara K, Ukimura O, Ushijima S, Kamoi K, Iwata T, Kobayashi K, et al. Quantitative evaluation of lower urinary tract symptoms using a visual analog scale in men undergoing permanent brachytherapy. Brachytherapy 2012;11(4):265–70.
15. Ushijima S, Ukimura O, Okihara K, Mizutani Y, Kawauchi A, Miki T. Visual analog scale questionnaire to assess quality of life specific to each symptom of the International Prostate Symptom Score. J Urol 2006;176(2):665–71.
16. Selekman RE, Harris CR, Filippou P, Chi T, Alwaal A, Blaschko SD, et al. Validation of a Visual Prostate Symptom Score in men with lower urinary tract symptoms in a Health Safety Net Hospital. Urology 2006;68(2):354–8.
17. Taneja Y, Ram P, Kumar S, Raj K, Singh CK, Dhaked SK, et al. Comparison of Visual Prostate Symptom Score and International Prostate Symptom Score in the evaluation of men with benign prostatic hyperplasia: a prospective study from an Indian population. Prostate Int 2017;5(4):158–61.
18. Heyns CF, Steenkamp BA, Chiwso J, Stellmacher GA, Fortsch HE. Van der Merwe A. Evaluation of the visual prostate symptom score in a male population with great language diversity and limited education: a study from Namibia. S Afr Med J 2014;104(5):353–7.
19. Ceylan Y, Gunlunuo Y, Dergirmenci T, Kozacioglu Z, Bolat D, Minareci S. Is new visual prostate symptom score useful as International Prostate Symptom Score in the evaluation of men with lower urinary tract symptoms? A prospective comparison of 2 symptom scores in Turkish society. Urology 2013;83(3):653–7.
20. Park YW, Lee JT. Correlation between the visual prostate symptom score and international prostate symptom score in patients with lower urinary tract symptoms. Int Neurourol J 2014;18(1):37–41.
21. Wessel SG, Heyns CF. Prospective evaluation of a new visual prostate symptom score, the international prostate symptom score, and uroflowmetry in men with urethral stricture disease. Urology 2014;83(1):220–4.