Turk J Urol 2018; 44(4): 335-40 • DOI: 10.5152/tud.2018.44834



GENERAL UROLOGY
Original Article

# The Modified Urdu version of International Prostate Symptom Score: A psychometric validation study

Muhammad Salman[1], Amer Hayat Khan[2], Syed Azhar Syed Sulaiman[2], Jeffery Hughes[3], Junaid Habib Khan[4], Khalid Hussain[1]

**Cite this article as:** Salman M, Khan AH, Syed Sulaiman SA, Hughes J, Khan JH, Hussain K. The Modified Urdu version of International Prostate Symptom Score: A psychometric validation study. Turk J Urol 2018; 44: 335-40.

## ABSTRACT

**Objective:** The objective of the current study was to develop an Urdu version of the International Prostate Symptom Score (IPSS-U) and validate it for Pakistani patients suffering from lower urinary tract symptoms (LUTS).

**Material and Methods:** IPSS-U was developed by a two-step forward and back translation and to evaluate its psychometric properties, a prospective study involving patients suffering from LUTS (n=267) was conducted at Outpatient Urology Department, Mayo Hospital, Lahore, Pakistan. Internal consistency and reproducibility were assessed using Cronbach's alpha and the Intra-Class Correlation Coefficient (ICC). Moreover, exploratory, and confirmatory factor analyses were performed to determine dimensionality of IPSS-U items.

**Results:** Overall reliability of IPSS-U was satisfactory (Cronbach's alpha=0.72, ICC of symptom questions=0.92 and ICC of QOL index=0.75). Exploratory factor analysis revealed that two factors were consistent, which together explained 59.8% of the variance. IPSS-U items 1, 3, 5 and 6 were components of the first factor whereas item 2, 4 and 7 were components of the second factor. All the items loaded high on their factors and there were no cross loadings. Moreover, confirmatory factor analysis also showed two-factor model, with acceptable fitting patterns.

**Conclusion:** IPSS-U is a valid and reliable non-gender specific instrument to assess the frequency and severity of LUTS in Urdu-speaking population.

**Keywords:** Lower urinary tract symptoms; patient-reported outcome measures; psychometric.

**ORCID IDs of the authors:**
M.S. 0000-0002-4366-1461;
A.H.K. 0000-0001-6079-0567;
S.A.S.S. 0000-0001-5535-2802;
J.D.H. 0000-0003-0040-4753;
J.H.K. 0000-0001-8847-2499;
K.H. 0000-0001-9627-8346.

[1]Punjab University College of Pharmacy, University of the Punjab, Lahore, Pakistan

[2]Discipline of Clinical Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia

[3]School of Pharmacy, Curtin Health Innovation Research Institute, Curtin University, Perth, Western Australia, Australia

[4]National Hospital and Medical Center, Lahore, Pakistan

**Submitted:**
25.01.2018

**Accepted:**
23.03.2018

**Correspondence:**
Muhammad Salman
E-mail:
msk5012@gmail.com



Available online at
www.turkishjournalofurology.com

## Introduction

The term lower urinary tract symptoms (LUTS) includes all urological symptoms related to voiding, storage and post-micturition, which are considered to be progressive, age-related, non-sex specific, non-organ-specific and have a negative impact on patient's quality of life (QOL).[1] International Prostate Symptom Score (IPSS)[2] is used frequently to quantify these symptoms not only in clinical practice but also in research. Although IPSS was originally designed to assess benign prostatic hyperplasia-related LUTS, it is widely used and acknowledged as a validated, non-disease specific and non-sex specific questionnaire.[3-6] IPSS is an 8-item questionnaire (7-items to assess LUTS and one QOL question). The first seven items assess the frequency and severity of urinary symptoms; incomplete bladder emptying, frequency of urination, intermittency, urgency to urinate, poor urinary stream, straining and nocturia. These questions are scored from 0 to 5 and total symptoms score is obtained by adding the scores of all the seven questions (range 0-35). Scores of 0-7, 8-19 and 20-35 are graded as mild, moderate and severe LUTS, respectively. The 8th question assesses the disease-specific QOL using a scale of 0-6, with 0 indicating "delighted" and 6 "terrible". The IPSS has been translated and validated in many languages of the world.[6-11] However, it

Turk J Urol 2018; 44(4): 335-40
DOI:10.5152/tud.2018.44834

has not been translated and validated in Urdu language which is a national language of Pakistan, and being spoken in several Asian countries. Therefore, the Urdu version of IPSS may not only be useful in assessing the severity of LUTS in Urdu speaking patients and guiding patient management but it is also an important research tool. Therefore, the aim of the current study was to develop an Urdu version of IPSS called IPSS-U and perform its psychometric analysis.

## Material and methods

This prospective, psychometric validation study had two phases; the first phase involved the development of IPSS-U, whereas the second phase involved the psychometric analysis of the instrument.

### Development of International Prostate Symptoms Score-Urdu (IPSS-U)

As per the guidelines of International Society of Pharmacoeconomics and Research Outcomes guidelines,[12] forward translation of IPSS was performed by two Urdu translation experts of the Oriental College, University of the Punjab, Lahore, Pakistan. Discrepancies in the Urdu version were settled and this version was reviewed by two urologists and 4 non-urologists. The Urdu version was back translated into English by two independent experts from the Department of English Language and Literature, University of the Punjab, Lahore, Pakistan. Discrepancies between the back translation and the original English version were settled by the investigators and final version of the instrument was developed.

### Face and content validity

Face and content validity, and cultural compatibility were determined in a pilot study.[13] Findings of this study indicated that majority of the participants were not able to understand the response options of the first six items. Keeping in view of the findings of this study, response options of the first 6-items of IPSS-U were revised to a new 6-point Likert-scale of "not at all", "seldom", "sometimes", "often", "usually" and "almost always" which was understandable to all.

### Psychometric testing of IPSS-U

Participants for psychometric analysis of IPSS-U were recruited from the Mayo Hospital, Lahore, Pakistan, during a period of 6 months (August 2016-January 2017). All adult patients with LUTS visiting the outpatient urology department at the said institute were eligible for inclusion in the study. Individuals aged<18 years, illiterate, catheterized, refused to participate ortoo ill to give consent were excluded from the study.

The first author approached the eligible patients and explained the aims and objectives, procedure and the nature of the study. Those willing to participate were enrolled in the study and administered IPSS-U. Contact details were also obtained from the study participants for the test-retest procedure and the participants were contacted within 14 days of enrollment by the first author who administered the IPSS-U by telephonic interview. A period of two weeks is long enough to prevent recall but short enough to ensure that clinical change is unlikely to have occurred. The participants were asked to report the change in their health state since the first time they filled out the questionnaire. Those who reported no change in their complaints were included to determine test-retest reliability.

### Ethical approval

The Human Ethical Committee of Punjab University College of Pharmacy, University of the Punjab, Lahore, Pakistan, reviewed and approved the protocol of the study. Moreover, permission from the Medical Superintendant, Department of Urology (Unit-I), Mayo Hospital, Lahore, Pakistan, was also obtained. All study procedures were performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. An informed consent was obtained from every individual prior to enrollment. Patients were assured about the confidentiality of their responses and their right to withdraw from the study with no penalty or adverse effects on their treatment.

### Statistical analysis

Continuous variables were presented as mean ± standard deviation (SD), whereas the group variables were presented as number and percentages. The internal consistency of the IPSS-U was determined by Cronbach's $\alpha$ coefficient using cut-off value ≥0.70, for adequate internal consistency.[14] Reproducibility (test-retest reliability) was determined by intra-class correlation coefficient (ICC), with ICC ≥ 0.70 indicating good reliability.[15] The construct validity of IPSS-U was assessed by the exploratory factor analysis. To assess the suitability of the data for the factor analysis, Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were examined. A minimum KMO value of 0.6[16,17] and significance ($p<0.05$) of Bartlett's test[18] are required for the factor analysis to be considered satisfactory. We used Principle Component Analysis with oblique rotation (oblimin) to determine dimensionality, considering only factors having eigenvalues ≥1.00 (Kaiser's criterion). Subsequently, confirmatory factor analysis was performed using the following indices of fit: CMIN/DF, root mean square error of approximation index (RMSEA), normed fit index (NFI), comparative fit index (CFI) and goodness of fit index (GFI). All statistical analysis was performed using IBM Statistical Package for the Social Sciences version 22.0 (IBM-SPSS Inc. Armonk, NY, USA) and AMOS version 24.0, with $p<0.05$ considered statistically significant.

## Results

### Patient characteristics

Figure 1 depicts patient enrollment in the current psychometric validation study. The objective and nature of the study were explained to a total 416 eligible patients and IPSS-U was administered to consented 267 patients. Data of the patients who refused to participate were not available for comparison. Demographic characteristics of the study participants are shown in Table 1. The mean age of the respondents was 56.44±15.66 years, with majority of them being 18-65 years old. There was a predominance of married male patients with a primary level of education. Eighteen and 21% of the study participants were current, and former smokers, respectively.

### Psychometric performance

Corrected item-total correlation values, internal consistency and test-retest reliability of the IPSS-U by gender are shown in Table 2. The corrected item-total correlation was 0.24-0.56. IPSS-U Item 4, 7 and 1 had the lower values, of which the item 1 also had the lower but acceptable communalities (0.33). The corrected item-total correlation value should be positive and more than 0.20 or even 0.30. The communalities should be greater than 0.10 or even 0.20.[19,20] Nonetheless, excluding these items did not significantly improve the Cronbach's alpha value of the scale so these items were retained. Cronbach's alpha value was satisfactory (0.72) for the seven items related to urinary symptoms. Test-retest reliability was determined in 125 respondents who did not report any change in their complaints from the baseline. Overall the ICC of the IPSS-U total symptom and QOL scores were excellent in both male and female respondents.

A factor analysis was carried out on the seven items with oblique rotation (oblimin) to allow the factors to correlate among them. Individuals with missing data were eliminated listwise before the factor analysis. The KMO coefficient (0.73) indicated that the sample size in the present study was adequate and Bartlett's Test of sphericity ($\chi 2=447.911$, $p<0.001$) revealed correlations among the IPSS-U items, and the data were suitable for factor analysis.

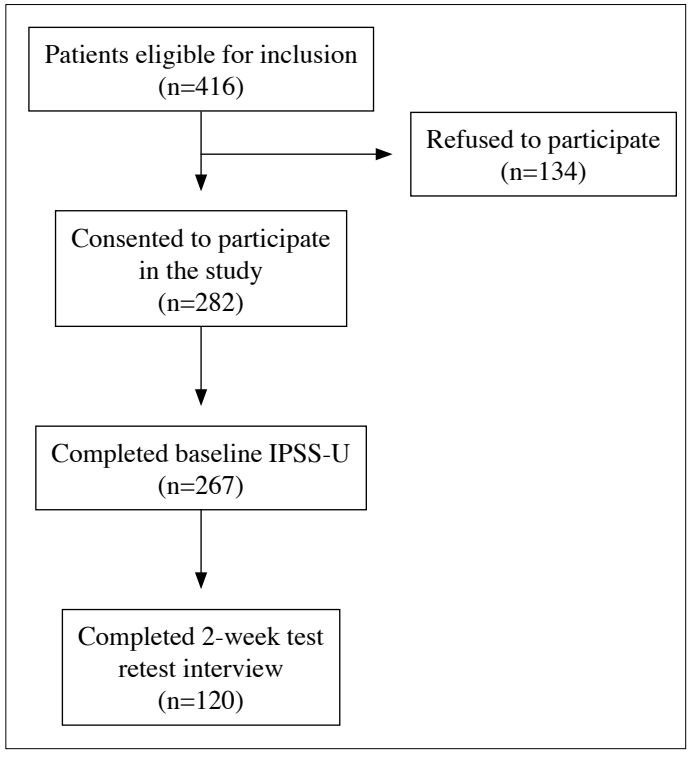


Figure 1. Patient characteristics

**Table 1. Patient characteristics (n=267)**

| Characteristics | n (%) |
|---|---|
| **Age** (56.44±15.66) (yrs) | |
| 18-65 | 193 (72.3) |
| >65 | 74 (27.7) |
| **Gender** | |
| Male | 216 (80.9) |
| Female | 51 (19.1) |
| **Marital status** | |
| Single | 14 (5.2) |
| Married | 225 (84.3) |
| Divorced | 5 (1.9) |
| Widowed | 23 (8.6) |
| **Education** | |
| Primary | 128 (47.9) |
| Secondary | 118 (44.2) |
| Tertiary | 21 (7.9) |
| **Strata** | |
| Urban | 175 (65.5) |
| Rural | 92 (34.5) |
| **Working Status** | |
| Working | 120 (44.9) |
| Not working | 147 (55.1) |
| **Economic Class** | |
| Lower | 245 (91.8) |
| Middle | 22 (8.2) |
| Upper | -- |
| **Smoking status** | |
| Non-smoker | 163 (61.0) |
| Current smoker | 48 (18.0) |
| Former smoker | 56 (21.0) |

Turk J Urol 2018; 44(4): 335-40
DOI:10.5152/tud.2018.44834

**Table 2. Descriptive statistics, internal consistency and reliability of study instrument**

| | Male | | | Female | | | Overall | | |
|---|---|---|---|---|---|---|---|---|---|
| **IPSS-U Items** | **n** | **Mean±SD** | **Corrected item-total correlation** | **n** | **Mean±SD** | **Corrected item-total correlation** | **n** | **Mean±SD** | **Corrected item-total correlation** |
| Incomplete emptying | 216 | 2.71±1.63 | 0.36 | 51 | 2.65±1.31 | 0.53 | 267 | 2.70±1.58 | 0.37 |
| Frequency | 216 | 3.60±1.37 | 0.48 | 51 | 3.55±1.15 | 0.22 | 267 | 3.59±1.33 | 0.42 |
| Intermittency | 216 | 2.96±1.63 | 0.50 | 51 | 1.61±1.63 | 0.52 | 267 | 2.70±1.71 | 0.52 |
| Urgency | 216 | 2.79±1.65 | 0.27 | 51 | 2.80±1.43 | 0.10 | 267 | 2.79±1.60 | 0.24 |
| Weak stream | 216 | 3.41±1.58 | 0.57 | 51 | 1.98±1.54 | 0.42 | 267 | 3.13±1.67 | 0.56 |
| Straining | 216 | 2.65±1.74 | 0.55 | 51 | 1.84±1.73 | 0.42 | 267 | 2.50±1.77 | 0.54 |
| Nocturia | 216 | 3.37±1.46 | 0.34 | 51 | 3.10±1.03 | 0.46 | 267 | 3.31±1.40 | 0.38 |
| QOL index | 216 | 3.56±1.39 | | 51 | 3.25±1.59 | | 267 | 3.50±1.43 | |
| Total symptoms score | 216 | 21.33±6.90 | | 51 | 17.41±5.70 | | 267 | 20.58±6.85 | |
| | Male | | | Female | | | Overall | | |
| Cronbach's alpha | 0.72 | | | 0.66 | | | 0.72 | | |
| ICC | | | | | | | | | |
| Total symptom score | 99 | 0.91 | | 26 | 0.95 | | 125 | 0.92 | |
| QOL score | 99 | 0.74 | | 26 | 0.78 | | 125 | 0.75 | |

ICC: intra-class correlation coefficient; IPSS-U: International Prostate Symptom Score-Urdu; QOL: quality of life

**Table 3. Total variance explained and Eigenvalues**

| | Initial eigen values | | | Extraction sums of squared loadings | | | Rotation sums of squared loadings[a] |
|---|---|---|---|---|---|---|---|
| **Factor** | **Total** | **% of variance** | **Cumulative %** | **Total** | **% of variance** | **Cumulative %** | **Total** |
| 1 | 2.672 | 38.173 | 38.173 | 2.672 | 38.173 | 38.173 | 2.505 |
| 2 | 1.512 | 21.603 | 59.776 | 1.512 | 21.603 | 59.776 | 1.917 |
| 3 | 0.891 | 12.730 | 72.506 | | | | |
| 4 | 0.624 | 8.912 | 81.418 | | | | |
| 5 | 0.493 | 7.049 | 88.467 | | | | |
| 6 | 0.459 | 6.558 | 95.025 | | | | |
| 7 | 0.348 | 4.975 | 100.000 | | | | |

Extraction Method: Principal Component Analysis. [a]. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

We conducted an initial analysis to generate eigenvalues for each factor in the data. Both the Kaiser's criteria (Table 3) and the scree plot (Figure 2) revealed that two factors were consistent, which together explained 59.8% of the variance. Factor loading after rotation with <0.30 suppressed factor loading is shown in Table 4. Items clustering on the same factor showed that the first factor comprised of symptoms related to voiding and the second factor represented storage symptoms. Item loadings were high enough to be convergent and there were no cross loading that indicated good discriminant validity. Both voiding and storage sub-scales (0.77 and 0.64, respectively) had satisfactory reliabilities. As shown in Figure 3, confirmatory factor analysis revealed two-factor model, with satisfactory fitting patterns. The analysis confirmed the validity of all the parameters (Table 5).

## Discussion

The main findings of the current study revealed that IPSS-U is a valid and reliable non-gender specific instrument for assessing LUTS in Urdu speaking population as it was found to have good discriminant, convergent, and constructive validities and reproducibility.

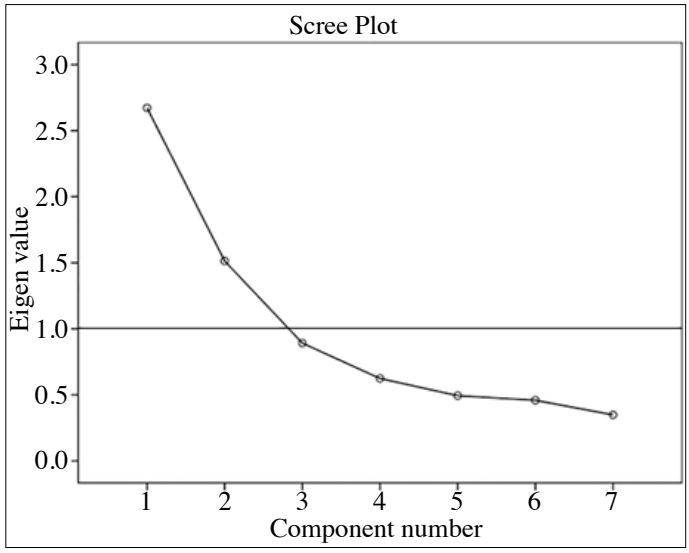


Figure 2. Scree plot for factor solutions of items in the international prostate symptom score-Urdu

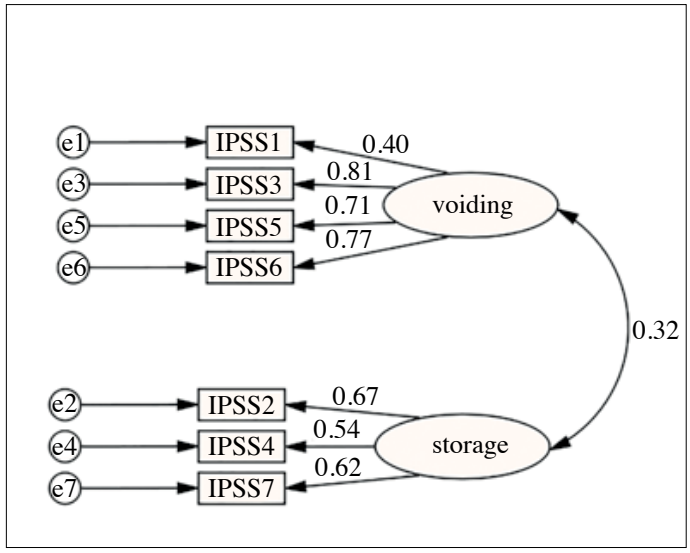


Figure 3. Schematized structure of International prostate symptom score-Urdu

**Table 4. Pattern matrix[a] after Oblimin rotation**

| | Factor | |
|---|---|---|
| IPSS-U items | 1 "Voiding symptoms" | 2 "Storage symptoms" |
| Item 3 | 0.877 | |
| Item 6 | 0.848 | |
| Item 5 | 0.789 | |
| Item 1 | 0.517 | |
| Item 4 | | 0.776 |
| Item 2 | | 0.762 |
| Item 7 | | 0.746 |

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. aRotation converged in 4 iterations.

**Table 5. Confirmatory factor analysis adjustment parameters**

| Parameters | Acceptable cut-off | Results |
|---|---|---|
| CMIN/DF | <3 good; <5 sometimes permissible[21] | 2.801 |
| GFI | >0.95 excellent; >0.90 traditional; >0.80 sometimes permissible[21] | 0.96 |
| AGFI | >0.80[21] | 0.92 |
| NFI | >0.90[22] | 0.92 |
| RAMSEA | <0.05 good; 0.05-0.10 moderate; 0.10 bad[21] | 0.08 |
| PCLOSE | >0.05[21] | 0.05 |

The response options of the first six items of IPSS-U are different from the original IPSS (English version). Because our pilot study to assess the clarity, relevance and interpretation of each question of IPSS-U and its response options indicated that the majority of Pakistani did not comprehend the word to word translation of the response options of the said items.[13] Therefore, response options of the first six items of IPSS-U had a 6-point Likert-scale of "not at all", "seldom", "sometimes", "often", "usually" and "almost always" that was understandable to all individuals. In this study, IPSS-U was found to be a reliable instrument to assess LUTS in males as well as females. The overall (both males and females) internal consistency of IPSS-U was satisfactory and comparable to the original English IPSS. Similar to the findings of an earlier study,[6] the Cronbach's alpha was slightly lower in females (0.66), which is still acceptable. The two week test-retest reliability in individuals with no change in their complaints from the baseline was excellent and comparable to the other versions of IPSS.[6-12] As expected, factor analysis yielded two independent factors in our IPSS modified for Urdu-speaking people. Incomplete bladder emptying, intermittency, poor stream and straining were components of the first factor (Voiding symptoms), whereas frequency, urgency to urinate and nocturia storage symptoms were components of the second factor. The correlation analysis and factor analysis revealed a good constructive validity of IPSS-U. Furthermore, confirmatory factor analysis also showed two-factor model, with good fitting patterns. CMIN/DF, RMSEA, NFI, CFI and GFI were within the acceptable ranges.[21,22] For future use in research or clinical practice, our IPSS-U can be obtained online from MAPI research Trust. Though, we achieved the desired objective of

Turk J Urol 2018; 44(4): 335-40
DOI:10.5152/tud.2018.44834

this study, the responsiveness of IPSS-U still needs to be determined. Moreover, the accuracy of the answers to IPSS-U items should be determined in future investigations (self-completion vs. physician-assisted completion of the instrument).

In conclusion, our modified Urdu version of IPSS is found to be a valid and reliable tool to assess the frequency and severity of LUTS in Pakistani males and females. We recommend the use of this instrument in both clinical practice and research for Urdu-speaking patients worldwide.

---

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Punjab University College of Pharmacy, University of the Punjab.

**Informed Consent:** Verbal informed consent was obtained from every individual who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – A.H.K., M.S., S.A.S.S., J.D.H.; Design – M.S., A.H.K., S.A.S.S.; Supervision – A.H.K., S.A.S.S., J.D.H., J.H.K.; Data Collection and/or Processing – M.S.; Analysis and/or Interpretation – M.S., A.H.K.; Literature Search – M.S.; Writing Manuscript – M.S.; Critical Review – K.H., S.A.S.S., J.H.K.

**Acknowledgments:** The authors are thankful to all the translation experts and doctors who contributed to the development of IPSS-U. The authors are also thankful to Michael J. Barry and MAPI Research Trust, Lyon, France, for granting us the permission to translate and validate IPSS into Urdu. Moreover, the authors also acknowledge the study participants for their valuable time to fill the study instrument.

**Conflict of Interest:** Authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

## References

1. Chapple CR, Wein AJ, Abrams P, Dmochowski RR, Giuliano F, Kaplan SA, et al. Lower urinary tract symptoms revisited: a broader clinical perspective. Eur Urol 2008;54:563-9.
2. Barry MJ, Fowler FJ Jr, O'Leary MP, Bruskewitz RC, Holtgrewe HL, Mebust WK, et al. The American Urological Association symptom index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association. J Urol 1992;148:1549-57.
3. Kakizaki HH, Matsuura SS, Mitsui TT, Ameda KK, Tanaka HH, Koyanagi T. Questionnaire analysis on sex difference in lower urinary tract symptoms. Urology 2002;59:58-62.
4. Chancellor MB, Rivas DA. American Urological Association symptom index for women with voiding symptoms: lack of index specificity for benign prostate hyperplasia. J Urol 1993;150:1706-8.
5. Okamura K, Nojiri Y, Osuga Y, Tange C. Psychometric analysis of international prostate symptom score for female lower urinary tract symptoms. Urology 2009;73:1199-202.
6. Choi EP, Lam CL, Chin WY. Validation of the International Prostate Symptom Score in Chinese males and females with lower urinary tract symptoms. Health Qual Life Outcomes 2014;12:1.
7. Hammad FT, Kaya MA. Development and validation of an Arabic version of the International Prostate Symptom Score. BJU Int 2010;105:1434-8.
8. Gregoire JP, Moisan J, Labrecque M, Cusan L, Diamond P. Validation of a French adaptation of the international prostatic symptom score. Prog Urol 1996;6:240-9.
9. Badia X, Garcia-Losa M, Dal-Re R, Carballido J, Serra M. Validation of a harmonized spanish version of the IPSS: evidence of equivalence with the original American scale. International Prostate Symptom Score. Urology 1998;52:614-20.
10. Quek KF, Chua CB, Razack AH, Low WY, Loh CS. Construction of the Mandarin version of the International Prostate Symptom Score inventory in assessing lower urinary tract symptoms in a Malaysian population. Int J Urol 2005;12:39-45.
11. Homma Y, Tsukamoto T, Yasuda K, Ozono S, Yoshida M, Yamaguchi T. Evaluation of psychometric properties of Japanese version of international prostate symptom score and BPH impact index. Nihon Hinyokika Gakkai Zasshi 2003;94:560-9.
12. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. Value Health 2005;8:94-104.
13. Salman M, Khan AH, Sulaiman SAS. Content validation of the Urdu version of international prostate symptom score. J Pak Med Assoc 2017;67:1782.
14. Nunnally JC. Psychometric theory. New York: McGraw-Hill, 1978.
15. Terwee CB, Bot SD, De Boer MR, van der Windt DA, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol 2007;60:34-42.
16. Hair JF, Anderson RE, Tatham RL, Black WC. Multivariate Data Analysis, 5th ed. Prentice-Hall, Upper Saddle River, New Jersey, 1998. p. 87-138.
17. Tabachnick BG, Fidell LS. Using Multivariate Statistics, 4th ed. Allyn and Bacon, Boston, 2001, 25-6.
18. Kaiser H. A second generation Little Jiffy. Psychometrika 1970;35:410-5.
19. Kaiser H. An index of factorial simplicity. Psychometrika 1974;39:31-6.
20. Barlett MS. A note on the multiplying factors for various chi square approximations. J R Stat Soc 1954;16:296-8.
21. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Modeling 1999;6:1-55.
22. Byrne BM. Structural equation modeling with EQS and EQS/Windows: Basic Concepts, Applications, and Programming. Thousand Oaks, CA: Sage Publications, 1994.