ORIGINAL ARTICLE

Validation and Efficacy of the Modified International Prostate Symptom Score (IPSS) Thai Version: A Simplified Version for Assessing Lower Urinary Tract Symptoms in Thai Men

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Background: In assessing male lower urinary tract symptoms (LUTS) by the International Prostate Symptom Score (IPSS), misunderstanding and misinterpretation were detected in low-educated and elderly patients. Thus, a modified IPSS Thai version had been created to solve these problems.

Objective: To evaluate efficacy of the modified IPSS Thai version that had been developed and compare it to the original one.

Materials and Methods: The present study was conducted in male participants having LUTS. Each participant was tested with the original and the modified IPSS Thai version. Data on age, educational level, and duration time to complete each questionnaire were collected. They were asked to select the preferred easier-to-understand version. The accuracy and validity of the modified version was assessed.

Results: Overall, 101 participants, with a mean age of 64 years, were included. The interclass correlation of the modified and the original Thai IPSS was 0.932 with the Cronbach's alpha score of 0.906 verifying no difference in total score of both versions. The mean (±SD) total score of the modified Thai IPSS was 13.82±7.88 while the original version was 14.19±8.58 demonstrated no significant difference (p=0.376). Five responders requested for assistance or explanation for the original version, but only 1 patient did for the modified one. Most participants (72.3%) voted for the modified Thai IPSS as the preferred easier-to-understand version. The mean (±SD) time to complete the modified version was 127.07±59.02 seconds, which was significantly less than the original one at 156.53±63.86 seconds (p<0.001).

Conclusion: In assessing male LUTS, the modified Thai IPSS was more practical, easier to understand, and less time-consuming than the original version for all ages over 40 years and all education levels. The content validity of the modified version was comparable to the original one. Therefore, the modified Thai IPSS was useful in clinical practice.

Keywords: International Prostate Symptom Score; IPSS; Thai version; Modification; Validity; Efficacy

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Benign prostatic hyperplasia (BPH) is a common condition in elderly males, with an increasing incidence with aging. Moreover, approximately half of the males aged over 50 years had BPH and lower urinary tract symptoms (LUTS)[1]. A previous study in the USA revealed that the incidence of BPH was as high as 70% in males aged between 60 and 69 years and increased to more than 80% in males over 70 years[1]. Additionally, the prevalence of symptomatic BPH in elderly men in Thailand has been reported as 41.3%[2].

The International Prostate Symptom Score (IPSS) is the standard self-administered questionnaire to evaluate the severity of LUTS, including voiding symptoms and storage symptoms such as frequency, urgency, intermittency, and nocturia. The questionnaire was first published in 1992 and consisted of 8 questions, including question No. 1 to 7 for evaluating LUTS and question No. 8 indicating the impact on quality of life. In questions No. 1 to 7, each had scores of 0 to 5, with a total of 35 points. The overall scores of 0 to 7 were defined as mild symptoms, 8 to 19 as moderate symptoms, and 20 to 35 as severe symptoms. Question No. 8 had scores of 0 to 6[3].

Nonetheless, many previous studies reported

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that there might be problems for patients completing the IPSS questionnaire[4-8].

Studies in the USA by Johnson et al. evaluated the IPSS questionnaire by comparing a group of self-administered questionnaire completion and a physician-assisted group[7,8]. As a result, there was significantly different answers between both groups. The study also found that patients with fewer than 9 years of education mistakenly answered the questions by 5.33 points, and as high as 58% of the patients missed 4 points[7]. In addition, it was reported that 72% of the patients in community and university hospitals could answer the IPSS correctly[8].

Recently, Tolbert et al. studied 1,017 participants on the use of pie charts to communicate the treatment response and outcomes, either improved, stable, or worsened, in cancer patients, which was significantly more effective and precise than the picture or bar charts[9]. Furthermore, Vaughn et al. studied the use of pictures in the symptom chart for evaluating critically ill children via telephone and reported that the pie and bar charts were easy to understand and communicate between the children and their doctors[10].

In the literature review, LUTS patients, especially the elderly and low education level groups in Thailand and other countries, have encountered similar problems in understanding the questionnaire and frequently require assistants to perform the IPSS which was originally intended to be a self-administered questionnaire[4-8,11].

The IPSS has been translated into Thai version, with its validity and reliability test since 2014[12]. Currently, the Thai version of IPSS is widely used in the clinic for evaluating and following up men on LUTS. However, a recent study on the Thai version of IPSS reflected the patients' difficulties performing this self-administered questionnaire, particularly the elderly and the low education level groups[11]. The difficulties included the rating numbers (range 0 to 5) and the interpretation of questions regarding symptom frequency as displayed in proportional numbers (e.g., 1 in 3 times)[11]. Accordingly, the author then created and reported a modified version of Thai IPSS in 2018. This modified version consisted of simple pie charts and pictures. Nevertheless, its validity and efficacy had not yet been confirmed[11].

The present study aimed to test this new modified version of Thai IPSS which should be simplified for patients of all ages and education levels. In addition, the modified Thai IPSS was evaluated for its accuracy and validity.

Materials and Methods

The present study was approved by the Institutional Ethics committee of Somdech Phra Pinklao Hospital (IRB No. 061/65) and was studied in accordance with the tenets of the declaration of Helsinki. The study period was between September 1, 2022 and January 31, 2023. It was designed as an observational cross-sectional study.

The modified version of the Thai IPSS (Figure 1A) had been generated with all original tables and information being reserved. It was approved by the agreement of three experienced urologists for its content validity.

The present study was conducted in a tertiary care hospital in Bangkok, Thailand. For the enrollment, inclusion criteria were patients over 40 years old visited the urological outpatient clinic during their stable period of LUTS and consented to participate. Patients diagnosed with prostate cancer, who had previous prostate gland surgery, chemotherapy, or radiation treatments, and who had urinary tract infections, were excluded.

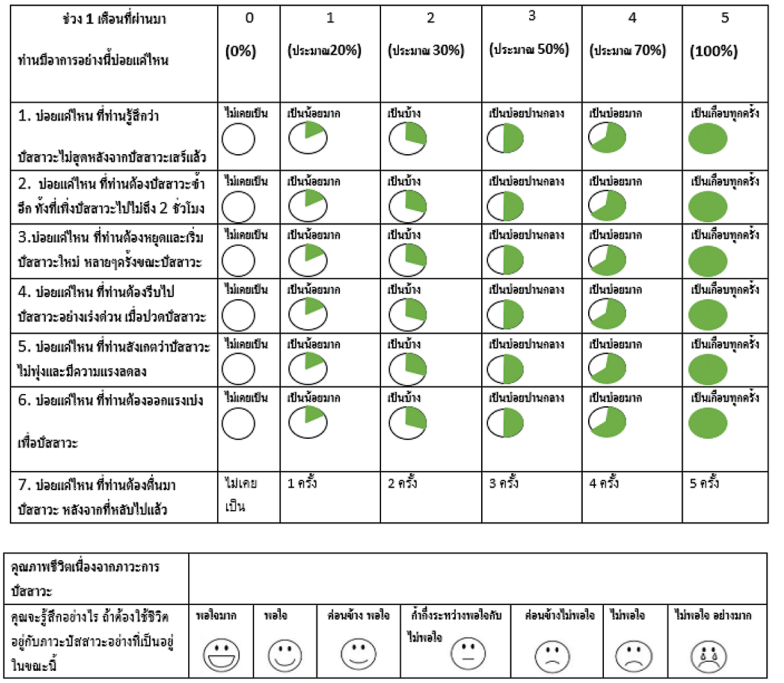
The sample size was calculated using a statistical formula by giving a population correlation coefficient of 0.80 and a 20% error. According to the calculation, the appropriate sample size should include at least 70 patients.

Overall, 101 Thai male patients were included in the present study. They were divided into 2 distinct groups: the first group (50 patients) was requested to complete the original Thai IPSS version first, followed by the modified Thai IPSS version (Figure 1A), thereafter, and the second group (51 patients) on the vice versa. All patients were allowed to ask questions or ask for assistance on any parts of the questionnaire at any time (Figure 1B, depicted the modified Thai IPSS version being translated into English).

Data on age, educational level, and duration of time to complete each questionnaire were recorded. The questionnaire completion time also included the period of assistance by the physician. Finally, the patients were asked to select the preferred version of Thai IPSS, which was easier to understand between the original and the modified Thai IPSS version.

The accuracy and validity of the modified Thai IPSS version were assessed and compared to the original Thai IPSS version. The internal consistency of both versions was analyzed by the interclass correlation and the Cronbach's alpha coefficient.

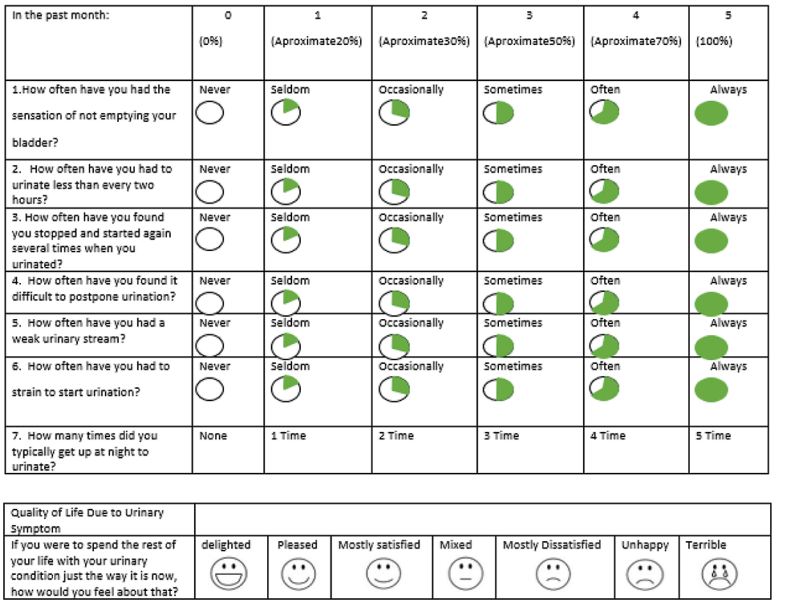
For analysis purposes, the paired sample t-test was used. The statistical analyses were calculated using Stata/BE Software, version 17.0 (StataCorp



ช่วง 1 เดือนที่ผ่านมา ท่านมีอาการอย่างนี้บ่อยแค่ไหน	0 (0%)	1 (ประมาณ20%)	2 (ประมาณ 30%)	3 (ประมาณ 50%)	4 (ประมาณ 70%)	5 (100%)
1. บ่อยแค่ไหน ที่ท่านรู้สึกว่า บัสสาวะไม่สุดหลังจากบัสสาวะเสร็แล้ว	ไม่เคยเป็น	เป็นน้อยมาก	เป็นบ้าง	เป็นบ่อยปานกลาง	เป็นบ่อยมาก	เป็นเกือบทุกครั้ง
2. บ่อยแค่ไหน ที่ท่านต้องบัสสาวะซ้ำอีก ทั้งที่เพิ่งบัสสาวะไปไม่ถึง 2 ชั่วโมง	ไม่เคยเป็น	เป็นน้อยมาก	เป็นบ้าง	เป็นบ่อยปานกลาง	เป็นบ่อยมาก	เป็นเกือบทุกครั้ง
3.บ่อยแค่ไหน ที่ท่านต้องหยุดและเริ่มบัสสาวะใหม่ หลายๆครั้งขณะบัสสาวะ	ไม่เคยเป็น	เป็นน้อยมาก	เป็นบ้าง	เป็นบ่อยปานกลาง	เป็นบ่อยมาก	เป็นเกือบทุกครั้ง
4. บ่อยแค่ไหน ที่ท่านต้องรีบไปบัสสาวะอย่างเร่งด่วน เมื่อปวดบัสสาวะ	ไม่เคยเป็น	เป็นน้อยมาก	เป็นบ้าง	เป็นบ่อยปานกลาง	เป็นบ่อยมาก	เป็นเกือบทุกครั้ง
5. บ่อยแค่ไหน ที่ท่านสังเกตว่าบัสสาวะไม่พุ่งและมีความแรงลดลง	ไม่เคยเป็น	เป็นน้อยมาก	เป็นบ้าง	เป็นบ่อยปานกลาง	เป็นบ่อยมาก	เป็นเกือบทุกครั้ง
6. บ่อยแค่ไหน ที่ท่านต้องออกแรงเบ่งเพื่อบัสสาวะ	ไม่เคยเป็น	เป็นน้อยมาก	เป็นบ้าง	เป็นบ่อยปานกลาง	เป็นบ่อยมาก	เป็นเกือบทุกครั้ง
7. บ่อยแค่ไหน ที่ท่านต้องตื่นมาบัสสาวะ หลังจากที่หลับไปแล้ว	ไม่เคยเป็น	1 ครั้ง	2 ครั้ง	3 ครั้ง	4 ครั้ง	5 ครั้ง

คุณภาพชีวิตเนื่องจากภาวะการบัสสาวะ							
คุณจะรู้สึกอย่างไร ถ้าต้องใช้ชีวิตอยู่กับภาวะบัสสาวะอย่างที่เป็นอยู่ในขณะนี้	พอใจมาก	พอใจ	ค่อนข้าง พอใจ	กำกึ่งระหว่างพอใจกับไม่พอใจ	ค่อนข้างไม่พอใจ	ไม่พอใจ	ไม่พอใจ อย่างมาก

Figure 1A. Modified Thai version of the International Prostate Symptom Score (IPSS) in Thai.



In the past month:	0 (0%)	1 (Aproximate20%)	2 (Aproximate30%)	3 (Aproximate50%)	4 (Aproximate70%)	5 (100%)
1.How often have you had the sensation of not emptying your bladder?	Never	Seldom	Occasionally	Sometimes	Often	Always
2. How often have you had to urinate less than every two hours?	Never	Seldom	Occasionally	Sometimes	Often	Always
3. How often have you found you stopped and started again several times when you urinated?	Never	Seldom	Occasionally	Sometimes	Often	Always
4. How often have you found it difficult to postpone urination?	Never	Seldom	Occasionally	Sometimes	Often	Always
5. How often have you had a weak urinary stream?	Never	Seldom	Occasionally	Sometimes	Often	Always
6. How often have you had to strain to start urination?	Never	Seldom	Occasionally	Sometimes	Often	Always
7. How many times did you typically get up at night to urinate?	None	1 Time	2 Time	3 Time	4 Time	5 Time

Quality of Life Due to Urinary Symptom							
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?	delighted	Pleased	Mostly satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible

Figure 1B. Modified Thai version of the International Prostate Symptom Score (IPSS) in English.

LLC, College Station, TX, USA). A p-value of less than 0.05 represented statistical significance.

Results

A total of 101 patients were recruited in the present study following the inclusion criteria. None of them were excluded during the study. Their educational levels, occupations, and mean age were shown in Table 1.

The interclass correlation of the modified Thai IPSS version and the original Thai IPSS version was 0.932, with the Cronbach's alpha score of 0.906

Table 1. Demographic data of all patients (n=101)

	n (%)
Education levels	
Primary education	26 (25.8)
Lower secondary education	11 (10.9)
Higher secondary education	14 (13.9)
Certificate of technical vocation	14 (13.9)
Certificate of higher technical vocation	10 (9.9)
Bachelor's degree	21 (20.8)
Master's degree	5 (5.0)
Occupations	
Government service/state official	22 (21.8)
Company official	4 (4.0)
Private business	20 (19.8)
Retirement	32 (31.7)
Unemployed	13 (12.9)
Others	10 (9.9)
Age (years)	
Mean±SD	64.18±10.97
Median (min-max)	65 (40 to 87)

SD=standard deviation

Table 3. The preferred version of Thai IPSS chosen by the participants

IPSS version	n (%)
Original Thai IPSS version	28 (27.7)
Modified Thai IPSS version	73 (72.3)

IPSS=International Prostate Symptom Score

Table 4. Proportion of patients having different degree of symptom severity from the IPSS

IPSS version	n (%)
Original Thai IPSS version	
Mild symptom	28 (27.7)
Moderate symptom	43 (42.6)
Severe symptom	30 (29.7)
Modified Thai IPSS version	
Mild symptom	28 (27.7)
Moderate symptom	49 (48.5)
Severe symptom	24 (23.8)

IPSS=International Prostate Symptom Score

indicating that the modified Thai IPSS version was valid and consistent with the original version. There was no significant difference in the total IPSS scores performed by the same responders between both versions.

The mean ± standard deviation (SD) of total scores of the modified Thai IPSS version was 13.82±7.88, which was not significantly different from 14.19±8.58 of the original Thai IPSS version (p=0.376) (Table 2). The mean (±SD) duration of time to complete the modified Thai IPSS version was 127.07±59.02 seconds, which was significantly less than the original Thai IPSS (duration of time 156.53±63.86 seconds, p<0.001), as shown in Table 2. In addition, five responders requested for assistance or clarification on the questions for the original Thai IPSS, but only 1 patient for the modified Thai IPSS (Table 2).

Table 3 demonstrated that most participants (72.3%) preferred the modified Thai IPSS rather than the original version as the easier-to-understand one.

The proportion of patients who had mild, moderate, and severe symptoms from both IPSS versions were represented in Table 4, indicating no difference in symptom severity among the versions.

In subgroup analysis, patients in all age groups and education levels preferred the modified Thai IPSS version to the original one. Furthermore, the duration of time to complete the modified Thai IPSS was significantly shorter than the original version in all age groups and education levels, except the age

Table 2. Total IPSS score, duration of time to complete each version, and the number of responders needing assistance

	Original Thai IPSS version	Modified Thai IPSS version	Mean difference ± SE	95% CI	p-value
Total IPSS score			0.36±0.41	−0.45 to 1.18	0.376
Mean±SD	14.19±8.58	13.82±7.88			
Median (min-max)	14 (0 to 35)	14 (1 to 35)			
IQR	7 to 20	7 to 18			
Time to complete questionnaire (seconds)			29.46±4.63	20.28 to 38.65	<0.001
Mean±SD	156.53±63.86	127.07±59.02			
Median (min-max)	145 (54 to 341)	114 (40 to 380)			
IQR	110 to 191	89 to 154			
Responders needing assistance; n	5	1			

IPSS=International Prostate Symptom Score; SD=standard deviation; IQR=interquartile range; SE=standard error; CI=confidence interval

Table 5. Subgroup analysis showing duration of time to complete each questionnaire

	Duration of time to complete the questionnaires (seconds)		Mean difference ± SE	95% CI	p-value
	Original Thai IPSS version	Modified Thai IPSS version			
Age group (years)					
41 to 50			48.4±20.06	3.03 to 93.77	0.039
• Mean±SD	120.4±61.76	72±36.39			
• Median (min-max)	101 (60 to 261)	60.5 (40 to 162)			
• IQR	80 to 148	48 to 89			
51 to 60			14.94±7.73	-0.82 to 30.7	0.062
• Mean±SD	127.5±51.8	112.56±48.28			
• Median (min-max)	111 (54 to 270)	100 (48 to 250)			
• IQR	91.5 to 146.5	85 to 127.5			
61 to 70			30.48±7.95	14.15 to 46.82	0.001
• Mean±SD	167.22±57.22	136.74±51.58			
• Median (min-max)	159 (90 to 341)	123 (45 to 232)			
• IQR	125 to 198	100 to 180			
71 to 90			37.22±8.06	20.78 to 53.66	<0.001
• Mean±SD	187.84±64.92	150.63±66.65			
• Median (min-max)	164 (91 to 338)	130 (63 to 380)			
• IQR	144 to 235	108 to 174.5			
Education level					
Primary education			35.31±11.9	10.81 to 59.81	0.007
• Mean±SD	177.77±71.53	142.46±74.6			
• Median (min-max)	173.5 (67 to 341)	126.5 (46 to 380)			
• IQR	129 to 207	90 to 180			
Lower secondary education			35.91±9.72	14.25 to 57.57	0.004
• Mean±SD	177±71.93	141.09±54.23			
• Median (min-max)	144 (91 to 300)	150 (63 to 222)			
• IQR	120 to 265	89 to 198			
Higher secondary education			36.11±8.94	17.77 to 54.44	<0.001
• Mean±SD	163.04±59.99	126.93±47.72			
• Median (min-max)	152.5 (60 to 304)	117.5 (48 to 285)			
• IQR	127 to 195	99.5 to 141.5			
Certificate of higher technical vocation			-5.1±12.42	-33.19 to 22.99	0.691
• Mean±SD	155.8±60.36	160.9±65.47			
• Median (min-max)	147.5 (77 to 265)	163 (73 to 274)			
• IQR	110 to 215	110 to 215			
Bachelor's degree and higher			27.04±6.23	14.21 to 39.87	<0.001
• Mean±SD	119.92±42.81	92.88±34.44			
• Median (min-max)	105 (54 to 230)	92 (40 to 168)			
• IQR	90 to 140	61 to 114			

IPSS=International Prostate Symptom Score; SD=standard deviation; IQR=interquartile range; SE=standard error; CI=confidence interval

group 51 to 60 years and the group of certificate of higher technical vocation (Table 5).

Discussion

The IPSS is widely accepted as a questionnaire for assessing the severity of male LUTS, which has been commonly used in clinical practice and translated into 53 languages worldwide with confirmed validity and reliability[3,13]. It was originally created in 1992 by the American Urological Association (AUA) as a self-administered questionnaire without assistance for bias prevention and was meant to be self-completed within 10 minutes[3,13].

However, as being reported from studies in many countries including Thailand, the original IPSS can be misinterpreted or misunderstood by the patients[4-8,11].

The significant contributing factors were mainly aging and lower education level, resulting in the requirement of assistance to complete the questionnaire that ought to be self-administered[4-8,11]. In a study from India by Jindal et al. in 2014[6], BPH patients with high English fluency were asked to complete the English IPSS version twice, independently first, and later, under supervision with the full assistance from medical residents in urology. The scores were significantly different, indicating the possible impact of patients' misinterpretation on evaluating LUTS and their severity[6]. In Thailand, there had been a study reporting some misunderstandings and misinterpretation problems in the IPSS Thai version, especially in low educated and/or aging patients[11]. In 2018, the author created a modified Thai IPSS version in order to overcome these problems[11].

In the present study, the previously developed modified Thai IPSS version[11] was evaluated. This modified version (Figure 1A, B) was composed of simple pie charts and pictures which had been proven for their ability to provide a quick overall impression of data or information by visualizing[9,10]. Consequently, only one respondent did ask for assistance in order to complete the modified Thai IPSS, while there were 5 patients for the original Thai IPSS. In addition, the responders required less time to complete the modified Thai IPSS than the original version in almost all age groups and education levels.

It was found that the modified Thai IPSS had a high correlation in internal consistency with the original Thai IPSS from the Cronbach's alpha coefficient score of 0.906. In the original Thai IPSS, 27.6% of patients in the present study had mild symptoms, 42.6% had moderate symptoms, and 23.8% had severe symptoms. These were similar to the total scores when using the modified Thai IPSS (27.6%, 48.5%, and 29.7%, respectively).

The present study demonstrated the usefulness and easiness of the modified version of Thai IPSS in evaluating male patients with LUTS/BPH and their symptoms severity at all age groups and education levels. Besides, the present study was the first study using the modified Thai IPSS (with pie chart) in Thai BPH patients. Its clinical application may also help eliminate the need for assistance in completing the IPSS questionnaire and thus massively reduce the workload of medical personnel at the clinic.

The limitation of the present study is possibly the effect of recall bias, as the patients were asked to complete the two versions of IPSS questionnaires, which had the exact contents, on the same day. Moreover, the present study was conducted at a single institute.

For further study, the authors intend to apply this modified Thai IPSS to a larger volume of patients and figure out if there were any clinical correlations of the questionnaire's result with other clinical aspects of male LUTS/BPH such as physical finding on examination, uroflowmetry or urodynamic finding of each patient.

Conclusion

The modified Thai IPSS version in evaluating LUTS was likely to be more practical, easier to understand, and less time-consuming than the original Thai IPSS version for all patients over 40 years with different education levels. Moreover, the content validity of the modified Thai IPSS version was comparable to the original Thai IPSS version, thus suggesting the medical personnel to confidently use the modified Thai IPSS version in their clinical practices.

What is already known on this topic?

The IPSS is the standard self-administered questionnaire to evaluate the severity of LUTS/BPH patients. However, the elderly and the low education level patients may misunderstand or be confused with the IPSS questionnaire and frequently require assistants to perform the self-administered questionnaire.

What this study adds?

This study develops a new simplified version of the Thai IPSS for male patients of all age groups and all different education levels to be easily understood and self-completed with less time consuming.

Conflicts of interest

The authors declare no conflict of interest.

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