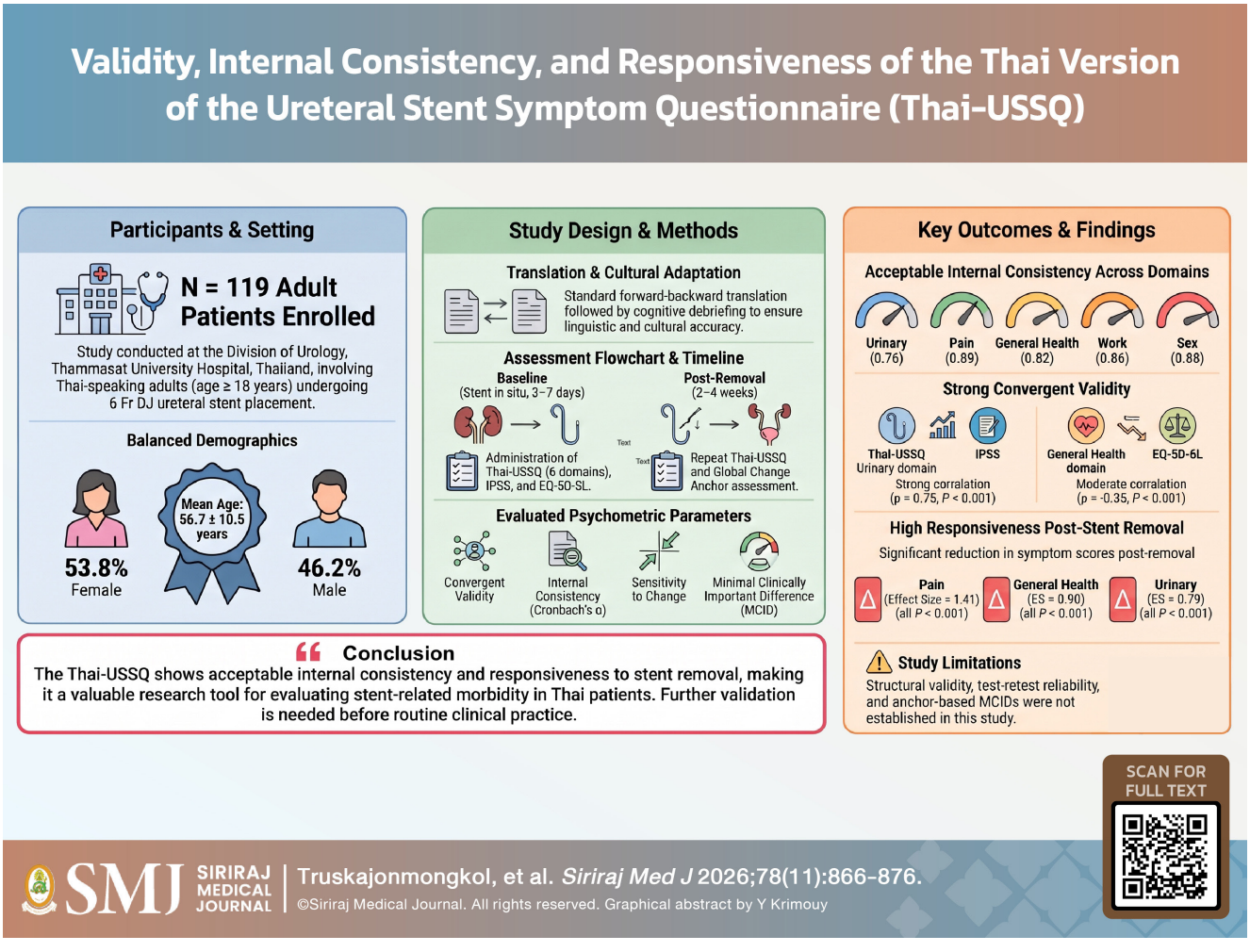
Validity, Internal Consistency, and Responsiveness of the Thai Version of the Ureteral Stent Symptom Questionnaire (Thai-USSQ)

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ABSTRACT

Objective: To evaluate the convergent validity, internal consistency, responsiveness, and minimal clinically important difference (MCID) of the Thai version of the Ureteral Stent Symptom Questionnaire (Thai USSQ).

Materials and Methods: This prospective cohort study enrolled 119 patients undergoing ureteral stent placement. The USSQ was translated into Thai via a standardized forward-backward process. Participants completed the Thai USSQ, IPSS, and EQ-5D-5L with the stent in situ and repeated the Thai USSQ after stent removal. Convergent validity, internal consistency, and responsiveness (effect sizes) were evaluated. The MCID was determined using an anchor-based approach (patients reporting "slightly improved" status) and a distribution-based approach.

Results: Mean age was 56.7 (±10.5) years. Cronbach's α was 0.76 (urinary symptoms), 0.89 (pain), 0.82 (general health), 0.86 (work performance), and 0.88 (sexual matters; n = 16). The urinary domain correlated strongly with IPSS (Spearman's $\rho = 0.75$, $P < 0.001$) and general health moderately with EQ-5D-5L ($\rho = -0.35$, $P < 0.001$). Urinary symptoms, body pain, and general health scores decreased post-stent removal (effect sizes 0.79, 1.41, and 0.90; all $P < 0.001$). The global-change anchor correlated poorly with any domain changes ($\rho \leq 0.29$); distribution-based MCIDs (0.5 SD) were 3.3, 4.3, and 2.5, respectively.

Conclusion: The Thai USSQ showed acceptable internal consistency and responsiveness, with partial convergent validity. Evidence for the sexual domain is limited by sample size. Structural validity, test–retest reliability, measurement error, and valid anchor-based MCIDs were not established.

Keywords: Stents; USSQ; ureteral stent; minimal clinically important difference (MCID); validation; psychometrics
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INTRODUCTION

Ureteral stent placement is among the most frequently performed urological procedures, with indications spanning the management of upper urinary tract obstruction, facilitation of urinary drainage following endoscopic and percutaneous interventions, and reduction of ureteral stricture formation.[1] Despite its clinical utility, indwelling ureteral stents impose a significant symptom burden. Up to 80% of stented patients experience lower urinary tract symptoms, hematuria, flank pain, and general discomfort, all of which can substantially impair health-related quality of life.[2]

The pathophysiology of stent-related symptoms is multifactorial, involving vesicoureteral reflux, stent position, length, diameter, and material composition. Accordingly, numerous strategies have been investigated to alleviate these symptoms, including modifications in stent design and material, as well as pharmacological interventions, notably alpha-blockers and anticholinergic agents with variable reported efficacy.[3-5]

To enable standardized, objective assessment of stent-related symptoms and their impact on quality of life, Joshi et al. developed the Ureteral Stent Symptom Questionnaire (USSQ), a validated multidimensional instrument comprising 38 items across six domains: urinary symptoms, body pain, general health, work performance, sexual matters, and additional problems. The USSQ has been widely adopted in clinical research and has consistently demonstrated robust reliability and construct validity.[6]

Linguistic validation and psychometric evaluation of the USSQ have since been conducted in multiple languages, including Chinese, Italian, German, Hindi, Danish, Korean, Spanish, Turkish, and Urdu, with each validation supporting the instrument's cross-cultural applicability.[7-15] However, a formally validated Thai version of the USSQ has not yet been established.

Given the widespread use of ureteral stents in Thailand and the substantial symptom burden experienced by Thai patients, the absence of a validated Thai USSQ represents a meaningful clinical and research gap. The present study therefore aimed to translate the USSQ into Thai and to rigorously evaluate its psychometric properties, including convergent validity, internal consistency, responsiveness, and the minimal clinically important difference in a cohort of Thai patients with indwelling ureteral stents.

MATERIALS AND METHODS

Study population

This prospective study was conducted to evaluate the measurement properties of the Thai version of the USSQ. The Research Ethics Committee of the Faculty of Medicine, Thammasat University, approved the study (MTU-EC-SU-0-086/68). All participants provided written informed consent prior to enrolment.

Eligible participants were Thai-speaking adults

aged 18 years or older who underwent ureteral stent placement and were able to independently read and complete the questionnaire. Patients were excluded if they had difficulty communicating in Thai or were unable to complete assessments at the required time points. Additional exclusion criteria included a prior diagnosis of overactive bladder, urinary incontinence, chronic prostatitis, prostate cancer, or chronic pelvic pain. Pregnant women were also excluded. Patients were enrolled by convenience sampling between October 2025 to January 2025.

Instruments

The Ureteral Stent Symptom Questionnaire (USSQ) is a multidimensional instrument comprising 38 items across six domains: urinary symptoms, body pain, general health, work performance, sexual matters, and additional problems. Domain scores were calculated according to the developer's scoring instructions. The urinary symptom index is the sum of items U1–U11 (range 11–56). The pain index is the sum of items P3–P9, where P3 is the visual analogue scale (0–10) for stent-related pain; participants who reported no stent-related pain scored 0. The general health index is the sum of items G1–G6. Work performance is described by the number of days in bed (W2), the number of half-days of reduced activity (W3), and a quality-of-work score (sum of W5–W7) completed only by participants in paid work. Sexual matters are described by the proportion of participants without an active sex life because of the stent (S2) and a quality-of-sex score (sum of S3 and S4) completed only by participants with an active sex life (S1). Additional problems (A1–A4) are reported descriptively without a summary score, and global quality of life with the stent is assessed with a single item (GQ, range 1–7). Higher scores indicate greater symptom burden. Unanswered items were treated as missing; a domain score was prorated (mean of the answered items multiplied by the number of items) when at least half of its items had been answered and was otherwise set to missing. The Thai USSQ and its scoring instructions are available from the corresponding author on reasonable request, subject to permission from the original developer.

The International Prostate Symptom Score (IPSS) comprises seven questions evaluating lower urinary tract symptoms, including incomplete emptying, frequency, intermittency, urgency, weak stream, straining, and nocturia, together with one item assessing quality of life related to urinary symptoms.

The EQ-5D-5L is a standardized health-related quality-of-life instrument assessing five dimensions, mobility, self-care, usual activities, pain/discomfort, and anxiety/depression each rated on a five-level severity scale. An additional visual analogue scale (EQ-VAS) captures overall self-rated health.

Translation process

Permission to translate and use the USSQ was obtained from the original developer (Joshi et al., Bristol, UK). Translation and cross-cultural adaptation followed published guidelines for patient-reported outcome measures.[20] A forward translation from English into Thai was produced by a bilingual lecturer at the Chulalongkorn University Language Institute. The Thai version was back-translated into English by a native bilingual (Thai–Australian) speaker who was independent of the forward translator and blinded to the original questionnaire. Conceptual and semantic equivalence with the original instrument was confirmed by comparing the back-translation with the original English version, and no items required modification. The pre-final version was then tested by cognitive debriefing in 10 patients with indwelling ureteral stents, who were interviewed about the comprehensibility, relevance, and acceptability of each item; no wording changes were required. Patients who participated in cognitive debriefing were also included in the validation cohort.

Study procedure

Eligible patients undergoing ureteral stent placement at the Division of Urology, Thammasat University Hospital, were invited to participate. A 6 Fr polyurethane DJ stent (Percuflex™; Boston Scientific, Marlborough, MA, USA) was used in all the study participants and the length of DJ stent was adjusted according to the patient's height. Following written informed consent, baseline demographic data including age, sex, residual renal stone status, and employment status, as well as sexual activity were recorded. The indication for ureteral stent placement was also recorded for each participant. In this cohort, stents were placed following endoscopic management of urolithiasis (ureteroscopy or percutaneous nephrolithotomy) and for the relief of ureteral obstruction. Participants completed the Thai USSQ, IPSS, and EQ-5D-5L independently; each assessment required approximately 15–20 minutes. The first assessment was conducted within 3-7 days of stent insertion, with the stent *in situ*. The second assessment was performed 2–4 weeks after stent removal, using the version of the USSQ intended for administration after stent removal, as in the original validation study.[6] At this visit, participants also completed the global change anchor question (see Statistical Analysis). Follow-up visits were

scheduled in accordance with standard clinical practice. Participants who did not complete the post-removal assessment were to be retained in the cross-sectional analyses but excluded from the paired analyses; missing data were not imputed.

Statistical analysis

Convergent validity was assessed by comparing USSQ domain scores with corresponding scores on the IPSS and EQ-5D-5L using Spearman's rank correlation coefficients with 95% confidence intervals (CIs) calculated using the Fisher z transformation. EQ-5D-5L health states were converted to index values using the Thai value set (hybrid model, 20 parameters),[23] with higher index values and EQ-VAS scores indicating better health; the unweighted level sum score (range 5–25; higher scores indicating worse health) is reported as a supplementary analysis. In accordance with COSMIN recommendations,[21] hypotheses on the expected direction and magnitude of correlations were formulated post hoc, after data collection and during the revision of this manuscript, based on the original and previous language validations:[6-15] (i) the urinary symptoms domain would correlate positively and strongly ($\rho \geq 0.50$) with the IPSS total score; (ii) the general health domain would correlate negatively and at least moderately ($|\rho| \geq 0.30$) with the EQ-5D-5L index value; and (iii) the general health domain would correlate negatively and at least moderately ($|\rho| \geq 0.30$) with the EQ-VAS. Correlations were classified as weak (< 0.30), moderate (0.30–0.49), or strong (≥ 0.50). Construct validity was considered supported if at least 75% of the hypotheses were confirmed.[22]

Internal consistency was evaluated using Cronbach's alpha coefficient; values between 0.70 and 0.95 were considered acceptable, and values above 0.95 were considered to suggest possible item redundancy. 95% CIs for α were calculated using Feldt's method,[26] and corrected item–total correlations and α-if-item-deleted were examined for each domain. For the pain index, α was calculated for items P3–P9 among participants reporting pain, and for the sexual matters domain for items S3 and S4 among sexually active participants; participants without the relevant condition were excluded to avoid inflation by structurally zero responses. Because the unidimensionality of each domain was not tested by factor analysis in this sample, Cronbach's α was interpreted as a descriptive indicator of inter-item consistency based on the domain structure established in the original validation study,[6] rather than as conclusive evidence of internal consistency.[21] Analyses of the work performance and sexual matters domains were restricted to employed (n = 67) and sexually active (n = 17) participants, respectively. Interdomain associations were examined as an exploratory analysis using Spearman's correlation, restricted for each pair to participants with applicable data for both domains. No adjustment for multiple comparisons was made; these results are therefore interpreted according to the magnitude of ρ and its 95% CI rather than P values.

Sensitivity to change was assessed by comparing USSQ domain scores obtained with the stent in situ and after stent removal. Paired t-tests were used for normally distributed domains (urinary symptoms, body pain, general health), and the Wilcoxon signed-rank test was applied for non-normally distributed domains (work performance, sexual matters). The magnitude of change was quantified with the effect size (ES; mean change divided by the baseline SD) and the standardized response mean (SRM; mean change divided by the SD of change), with bootstrap 95% CIs (5,000 resamples), interpreted as small (0.20–0.49), moderate (0.50–0.79), or large (≥ 0.80).[24] Because paired differences were not normally distributed (Shapiro–Wilk $P < 0.01$), the paired t-test results were confirmed with Wilcoxon signed-rank tests. For the work performance and sexual matters domains, analyses were restricted to employed and sexually active participants, respectively, and the Hodges–Lehmann estimate of the median paired difference with its 95% CI and exact P value was calculated. Responsiveness was hypothesized post hoc, after data collection, to be indicated by at least a moderate decrease (ES ≥ 0.50) in the urinary symptoms, body pain, and general health domains after stent removal.

The Minimal Clinically Important Difference (MCID) was estimated for the urinary symptoms, body pain, and general health domains using an anchor-based approach. Following stent removal, participants rated their global change in condition relative to the stented period on a three-category scale: "much improved", "slightly improved", or "no change". Participants were asked, in Thai: "Compared with when you had the ureteral stent, how do you feel now?" The MCID was defined as the mean score reduction (score with stent in situ minus score after removal, expressed as a positive value) among participants who rated themselves as "slightly improved".[16]

The number of participants in each anchor category was reported, and the 95% CIs of the MCID estimates were calculated using the t distribution. The validity of the anchor was assessed by the Spearman correlation between the anchor rating and each domain change score, with $\rho \geq 0.30$ considered adequate.[25] As supportive analyses, distribution-based estimates were calculated as

0.5 SD of the baseline score.[25] Because the anchor scale comprised only three categories and did not include an option for worsening, the MCID estimates were regarded as preliminary.

Sample size

According to COSMIN standards, a sample of at least 100 participants is considered very good for studies of internal consistency and hypotheses testing for construct validity.[21] With 119 participants, the expected half-width of the 95% CI for a correlation of 0.50 is approximately 0.14. The analyses of the work performance (n = 67) and sexual matters (n = 17) domains, and of the "slightly improved" subgroup for the MCID (n = 28), were based on smaller samples, and their estimates are correspondingly less precise.

RESULTS

Demographic characteristics

A total of 119 participants were enrolled between October 2025 and January 2025, all of whom completed both the assessment with the stent in situ and the post-removal assessment. The mean age was 56.7 ± 10.5 years. The cohort comprised 64 women (53.8%) and 55 men (46.2%). Residual renal stone fragments were identified in 9 patients (7.6%). Seventeen participants (14.3%) reported an active sex life with the stent in situ, whereas 102 (85.7%) did not; of the latter, 16 (15.7%) attributed this to the stent. Sixty-seven participants (56.3%) were in paid work (Table 1).

Convergent validity

The urinary symptoms domain correlated strongly with the IPSS total score (ρ = 0.75, 95% CI 0.66 to 0.82; P < 0.001), confirming hypothesis (i). The general health domain correlated negatively with the EQ-5D-5L index value derived from the Thai value set (ρ = −0.35, 95% CI −0.50 to −0.18; P < 0.001), confirming hypothesis (ii), and positively with the EQ-5D-5L level sum score (ρ = 0.34, 95% CI 0.17 to 0.49). The correlation between the general health domain and the EQ-VAS was in the expected direction but below the hypothesized threshold (ρ = −0.28, 95% CI −0.44 to −0.11; P = 0.002), so hypothesis (iii) was not confirmed. Because higher USSQ and level sum scores indicate worse health, whereas higher index values and EQ-VAS scores indicate better health, the opposite signs of these correlations are consistent in direction. Overall, two of three hypotheses (67%) were confirmed (Table 2).

Internal consistency

Cronbach's α was within the acceptable range for all domains (Table 3): 0.76 (95% CI 0.69–0.82) for urinary symptoms (n = 109), 0.89 (95% CI 0.85–0.92) for the pain index among participants reporting pain (n = 104), 0.82 (95% CI 0.76–0.86) for general health

TABLE 1. Baseline patient characteristics.

Variable	Value
Number of subjects	119
Age, mean (SD), years	56.7 (10.5)
Sex, n (%)	
Female	64 (53.8)
Male	55 (46.2)
Residual renal stone fragment, n (%)	9 (7.6)
Sexually active, n (%)	
Active	17 (14.3)
Not active	102 (85.7)
Employment status, n (%)	
Employed	67 (56.3)
Not employed	52 (43.7)

Abbreviations: N, number; SD, standard deviation

TABLE 2. Convergent validity of the Thai USSQ (Spearman Correlation Coefficients).

Comparison	Spearman ρ	P-value
Urinary symptoms vs. IPSS	0.75	<0.001
General health vs. EQ-5D-5L level sum score	0.34	<0.001
General health vs. EQ-5D-5L VAS	−0.28	0.002
General health vs. EQ-5D-5L index value (Thai value set)	−0.35	<0.001

Abbreviations: IPSS, International Prostate Symptom Score; EQ-5D-5L, European Quality of Life 5 Dimensions 5 Level Version; EQ-5D-5L VAS, European Quality of Life 5 Dimensions 5 Level visual analogue scale; USSQ, Ureteral Stent Symptom Questionnaire

TABLE 3. Internal consistency of the Thai USSQ (Cronbach's Alpha).

USSQ Domain	Cronbach's α (95% CI)
Urinary symptoms	0.76 (0.69–0.82)
Body pain	0.89 (0.85–0.92)
General health	0.82 (0.76–0.86)
Work performance	0.86 (0.79–0.91)
Sexual matters	0.88 (0.67–0.96)

Abbreviation: USSQ, Ureteral Stent Symptom Questionnaire

(n = 119), 0.86 (95% CI 0.79–0.91) for quality of work among employed participants (n = 61), and 0.88 (95% CI 0.67–0.96) for quality of sex among sexually active participants (n = 16). Corrected item–total correlations ranged from 0.22 to 0.67 for items U1–U10, 0.67 to 0.74 for the pain index, 0.47 to 0.68 for general health, 0.62 to 0.83 for quality of work, and 0.79 for quality of sex. Item U11 had a corrected item–total correlation of 0.14, and α would increase to 0.80 if it were removed (Supplementary Table S1).

Interdomain Association

In the exploratory interdomain analysis (Table 4), correlations between domains ranged from weak to strong. The pain index correlated strongly with general health (ρ = 0.57, 95% CI 0.44 to 0.68) and global quality of life (ρ = 0.51, 95% CI 0.36 to 0.63), and global quality of life correlated strongly with quality of work (ρ = 0.57, 95% CI 0.38 to 0.71). Moderate correlations were observed between quality of work and both pain (ρ = 0.47) and general health (ρ = 0.47), between urinary symptoms and quality of work (ρ = 0.36), between general health and global quality of life (ρ = 0.35), and between urinary symptoms and pain (ρ = 0.34).

Urinary symptoms correlated weakly with general health (ρ = 0.24, 95% CI 0.06 to 0.40) and global quality of life (ρ = 0.14, 95% CI −0.04 to 0.31). Correlations involving quality of sex (ρ = 0.04 to 0.47) were based on 16 sexually active participants, and all 95% CIs included zero. Correlations involving quality of work (n = 67) and quality of sex (n = 16) were calculated only among participants for whom these scores were applicable (n = 14 for quality of work vs. quality of sex). P values were not adjusted for multiple comparisons.

Sensitivity to change

All 119 participants had paired assessments, and scores in all USSQ domains decreased after stent removal (Table 5). Mean urinary symptom scores decreased from 28.31 ± 6.50 with the stent in situ to 23.19 ± 5.80 after

TABLE 4. Interdomain correlations of the Thai USSQ (Spearman ρ, 95% CI).

	Urinary	Pain	General health	Work	Sexual	Global QoL
Urinary	1.00					
Body pain	0.34 (0.17 to 0.49)	1.00				
General health	0.24 (0.06 to 0.40)	0.57 (0.44 to 0.68)	1.00			
Work performance	0.36 (0.14 to 0.56)	0.47 (0.26 to 0.64)	0.47 (0.26 to 0.64)	1.00		
Sexual matters	0.40 (−0.12 to 0.75)	0.44 (−0.08 to 0.77)	0.26 (−0.27 to 0.67)	0.47 (−0.08 to 0.80)	1.00	
Global QoL	0.14 (−0.04 to 0.31)	0.51 (0.36 to 0.63)	0.35 (0.18 to 0.50)	0.57 (0.38 to 0.71)	0.04 (−0.46 to 0.53)	1.00

Abbreviations: USSQ, Ureteral Stent Symptom Questionnaire; QoL, quality of life

TABLE 5. Sensitivity to change of the Thai USSQ.

USSQ Domain	Stent in situ	After stent removal	P-value
Urinary symptoms, mean (SD)	28.31 (6.50)	23.19 (5.80)	<0.001
Body pain, mean (SD)	19.86 (8.68)	7.63 (7.24)	<0.001
General health, mean (SD)	14.10 (4.92)	9.65 (3.60)	<0.001
Work performance, median (IQR)	9 (6–12)	6 (4–8)	<0.001
Sexual matters, median (IQR)	4 (2–8)	2 (2–3)	<0.001

Abbreviations: USSQ, Ureteral Stent Symptom Questionnaire; IQR, interquartile range; SD, standard deviation

removal (mean change 5.12, 95% CI 4.29 to 5.96; P < 0.001; ES 0.79, 95% CI 0.64 to 0.97; SRM 1.11, 95% CI 0.93 to 1.35). Pain index scores decreased from 19.86 ± 8.68 to 7.63 ± 7.24 (mean change 12.23, 95% CI 10.62 to 13.85; P < 0.001; ES 1.41, 95% CI 1.17 to 1.71; SRM 1.38, 95% CI 1.19 to 1.62), and general health scores decreased from 14.10 ± 4.92 to 9.65 ± 3.60 (mean change 4.45, 95% CI 3.68 to 5.22; P < 0.001; ES 0.90, 95% CI 0.75 to 1.08; SRM 1.05, 95% CI 0.89 to 1.24). Wilcoxon signed-rank tests gave the same conclusions (all P < 0.001). The responsiveness hypothesis was therefore confirmed for all three domains. Among employed participants, the median quality-of-work score decreased from 9 (IQR 6–12) to 6 (IQR 4–8) (n = 66; Hodges–Lehmann median difference 3.0, 95% CI 2.5 to 4.0; P < 0.001), and among sexually active participants, the median quality-of-sex score decreased from 4 (IQR 2–8) to 2 (IQR 2–3) (n = 15; Hodges–Lehmann median difference 2.5, 95% CI 1.0 to 5.0; P = 0.005).

Minimal Clinically Important Difference (MCID)

Of the 119 participants who completed the anchor question, 83 (69.7%) rated themselves as much improved, 28 (23.5%) as slightly improved, and 8 (6.7%) as unchanged. Anchor-based estimates, expressed as the absolute magnitude of score reduction among the 28 participants who rated themselves as slightly improved, are presented in Table 6. The estimate was 4.0 (95% CI 3.1–5.0) for the urinary symptoms domain, 11.5 (95% CI 8.9–14.2) for the pain index, and 2.6 (95% CI 1.6–3.5)

TABLE 6. Minimal Clinically Important Difference (MCID) of the Thai USSQ.

USSQ Domain	MCID (95% CI)
Urinary symptoms	4.0 (3.1–5.0)
Body pain	11.5 (8.9–14.2)
General health	2.6 (1.6–3.5)

Abbreviations: USSQ, Ureteral Stent Symptom Questionnaire; CI, confidence interval; MCID, minimal clinically important difference

for general health. The Spearman correlation between the anchor rating and the change score was 0.16 (P = 0.073) for urinary symptoms, 0.07 (P = 0.463) for the pain index, and 0.29 (P = 0.001) for general health; none met the criterion of $\rho \geq 0.30$. Participants reporting no change had mean score reductions of 3.4, 10.0, and 2.9, respectively, similar to those reporting slight improvement. Distribution-based estimates (0.5 SD of the baseline score) were 3.3 for urinary symptoms, 4.3 for the pain index, and 2.5 for general health.

DISCUSSION

Ureteral stents are indispensable in urological practice but impose a well-recognized symptom burden that adversely affects patients' quality of life. Standardized assessment of stent-related morbidity is therefore critical in both clinical care and research.[5] The USSQ is the most comprehensive validated instrument developed for this purpose, and its availability in multiple languages has enabled cross-cultural evaluation of stent-related outcomes. To our knowledge, this is the first study to evaluate the measurement properties of a Thai version of the USSQ. It provides evidence supporting the internal consistency and responsiveness of the instrument, with partial support for its convergent validity, in Thai patients with indwelling ureteral stents, whereas structural validity, test–retest reliability, and measurement error remain to be evaluated.

Convergent validity of the Thai USSQ was supported by a strong correlation between the urinary symptoms domain and the IPSS, a well-established measure of lower urinary tract symptoms, and by a moderate correlation between the general health domain and the EQ-5D-5L index value. The correlation between the general health domain and the EQ-VAS ($\rho = -0.28$) was in the expected direction but fell just below the hypothesized threshold, so two of three hypotheses (67%) were confirmed, short of the 75% criterion; convergent validity was therefore only partially supported.[12] These findings are consistent with results reported in other linguistic validations of the USSQ and provide partial support for the convergent validity of the instrument in this population.

Cronbach's α values were within the acceptable range for all domains. For work performance, α (0.86) was calculated among employed participants only, because including non-employed participants, whose responses are structurally zero, would artificially inflate the coefficient. Item U11, which asks how the patient would feel about living with the current urinary symptoms and is scored on a 7-point scale, showed a weak corrected item–total correlation (0.14), consistent with it capturing the overall impact of symptoms rather than their frequency or severity. Because unidimensionality was not tested by factor analysis, these values should be interpreted as descriptive evidence of inter-item consistency rather than conclusive evidence of internal consistency. For the sexual matters domain, which is scored from two items (S3 and S4) in sexually active participants only, α was 0.88, but this estimate was based on only 16 participants and its 95% CI was wide (0.67–0.96). Only 17 participants (14.3%) reported an active sex life with the stent in situ, and 16 of the 102 participants without an active sex life (15.7%) attributed this to the stent; the sexual matters domain could therefore not be evaluated adequately in this cohort. Small numbers of sexually active respondents have also been reported in other Asian validations of the USSQ,[7] and this limitation should be considered when interpreting sexual matters domain scores in Thai clinical contexts. The adaptation of urological symptom questionnaires from their original English versions into Thai, with careful attention to cultural and contextual appropriateness for Thai patients, has also been demonstrated for other instruments. For example, the International Consultation on Incontinence Questionnaire–Female Lower Urinary

Tract Symptoms Long Form (ICIQ-FLUTS LF) was validated in Thai using a similar process, confirming that such instruments can be translated and adapted for the Thai population while preserving conceptual equivalence and cultural relevance.[19]

In the exploratory interdomain analysis, weak-to-strong correlations between domains are consistent with each domain capturing a related but distinct aspect of stent-related morbidity, in keeping with the multidimensional conceptual framework of the USSQ. However, interdomain correlations do not establish structural validity, which would require factor analysis or another dimensionality assessment. The correlations of body pain with general health and work performance, and of global quality of life with work performance and body pain, are clinically coherent and align with the expected interplay between physical symptoms and perceived well-being.

The Thai USSQ was responsive to stent removal, with large effect sizes in the pain (ES 1.41) and general health (ES 0.90) domains and a moderate effect size in the urinary symptoms domain (ES 0.79), consistent with the hypothesized responsiveness. However, the post-removal assessment also captures natural postoperative recovery and changes in concomitant treatment, such as discontinuation of analgesics or alpha-blockers, which could not be separated from the effect of stent removal itself. These findings support the ability of the instrument to detect change in stent-related symptoms, which is relevant to its potential use as an outcome measure in interventional studies.

A statistically significant change does not necessarily represent a change that is meaningful to patients. In this study, the anchor-based approach yielded estimates of 4.0 for urinary symptoms, 11.5 for pain, and 2.6 for general health; however, the anchor did not correlate adequately with change in any domain. Patient-anchored MCIDs are increasingly used to interpret treatment effects in urological research.

For instance, the International Prostate Symptom Score (IPSS) has utilized patient-centered anchor measures to define minimal important differences, ensuring that changes in lower urinary tract symptoms are perceptible and relevant to the patient rather than merely reaching a statistical cutoff.[17] Similarly, in sexual medicine, Rosen et al. established specific MCID thresholds for the erectile function domain of the International Index of Erectile Function (IIEF), which are widely used to interpret the clinical efficacy of erectile dysfunction therapies.[18] Furthermore, in the field of urogynecology, Pruijssers et al. demonstrated that a summary score change of 0.31 on the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire, IUGA-Revised (PISQ-IR) represents a clinically meaningful improvement for patients following surgery.[16]

MCID estimates may help clinicians and researchers judge whether changes associated with new stent designs or pharmacological interventions are perceptible to patients, and may inform sample size calculations in future trials. In the present study, however, the global-change anchor correlated weakly with change in urinary symptoms ($\rho = 0.16$) and general health ($\rho = 0.29$) and not at all with change in pain ($\rho = 0.07$), and participants who reported no change had score reductions similar to those who reported slight improvement. The anchor-based estimates therefore cannot be regarded as valid MCIDs. The poor performance of the anchor may reflect its three categories with no option for worsening, its administration after stent removal, when most participants (69.7%) rated themselves as much improved, and the tendency of global ratings to reflect overall relief from stent removal rather than change in specific symptom domains. Until anchor-based thresholds are established in independent cohorts using a more discriminating and balanced anchor, the distribution-based estimates (3.3 for urinary symptoms, 4.3 for pain, and 2.5 for general health) may serve as provisional benchmarks.

Study limitations

Several limitations of this study merit acknowledgement. Test–retest reliability was not assessed, as follow-up was conducted in accordance with routine clinical practice and a stable interval without stent-related change could not be reliably identified. The temporal stability of the Thai USSQ therefore remains to be established in future research. Additionally, the relatively small proportion of sexually active participants may have limited the statistical precision of analyses related to the sexual matters domain and may have contributed to the low internal consistency observed in this section. Future studies incorporating formal test–retest evaluation and enrolling larger samples of sexually active patients would further strengthen the validation evidence for the Thai USSQ. In addition, the indications for stent placement in this cohort were predominantly stone-related, and the symptom burden and generalizability of these findings may differ in patients stented for other indications, such as malignant obstruction or after ureteral reconstruction. Further evaluation across a broader range of stent indications is therefore warranted. Structural validity was also not assessed by factor analysis, and measurement error (standard error of measurement and smallest detectable change) was not estimated; the latter requires test–retest data.

Moreover, the change in scores after stent removal may partly reflect natural postoperative recovery and changes in concomitant medications. The global-change anchor had only three categories, without a worsening option, and correlated inadequately with change in every domain, so valid anchor-based MCIDs could not be established. In addition, few participants were sexually active, which precluded an adequate evaluation of the sexual matters domain. Clinical factors that may influence stent-related symptoms, such as the indication for stenting, laterality, stent length, dwell time, and concomitant medications, were not included in the study dataset. The hypotheses for convergent validity and responsiveness were formulated after data collection, during the revision of this manuscript, which may have introduced bias in their specification. Only one forward translation was produced, whereas cross-cultural adaptation guidelines recommend two independent forward translations, and patients who took part in cognitive debriefing were also included in the validation cohort. Finally, this was a single-center study, which may limit generalizability to other settings.

CONCLUSION

The Thai version of the USSQ showed acceptable internal consistency and responsiveness to stent removal in male and female Thai patients with indwelling ureteral stents, with partial support for convergent validity. The sexual matters domain could not be evaluated adequately because few participants were sexually active. Because structural validity, test–retest reliability, and measurement error were not assessed, and valid anchor-based MCIDs could not be established, further validation is needed before the Thai USSQ is recommended for routine clinical practice. Within these limitations, it may be used to assess stent-related symptoms in research settings, where it may facilitate comparison with studies using other language versions of the USSQ.

Data Availability Statement

The datasets generated and/or analyzed during the current study are not publicly available due to patient privacy and institutional regulations but are available from the corresponding author on reasonable request.

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Conflicts of Interest

The authors declare no conflict of interest.

Registration Number of Clinical Trial

Not applicable. This study is a questionnaire validation study and does not involve clinical trial interventions requiring prospective registration.

Author Contributions

Conceptualization and methodology, P.T., and T.T.; Investigation, P.T., and T.T.; Formal analysis, T.T. ; Visualization and writing – original draft, P.T. ; Writing – review and editing, P.T., and T.T.; Funding acquisition, P.T., and T.T.; Supervision, T.T. All authors have read and agreed to the final version of the manuscript.

Use of Artificial Intelligence

During the preparation of this manuscript, the authors used Gemini in order to refine the academic English phrasing and grammar. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of the Faculty of Medicine, Thammasat University (Protocol code: MTU-EC-SU-0-086/68, Certificate no.250/2568) with approval on October 6, 2025.

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