

Reliability and Validity of the Thai Version of the International Consultation on Incontinence Questionnaire-Male Lower Urinary Tract Symptoms (ICIQ-MLUTS) and the Prevalence of Lower Urinary Tract Symptoms in Patients with Chronic Obstructive Pulmonary Disease

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Background: The high prevalence of lower urinary tract symptoms (LUTS) both voiding and incontinence symptoms have been reported in chronic obstructive pulmonary disease (COPD) patients. However, the screening questionnaire the International Consultation on Incontinence Questionnaire-Male Lower Urinary Tract Symptoms (ICIQ-MLUTS) has not be available in Thai version.

Objective: To evaluate the reliability and validity of the Thai version of ICIQ-MLUTS and determine the prevalence of LUTS in Thai men with COPD.

Materials and Methods: A cross-sectional study was conducted at COPD clinic, Siriraj Hospital, Bangkok, Thailand. Translations of Thai ICIQ-MLUTS were performed after obtaining permission from the ICIQ group. Internal consistency, test-retest reliability, and construct validity were evaluated, and the prevalence of LUTS was determined.

Results: One hundred ninety-one men with stable COPD, mean age of 72±8 years (range of 45 to 94), were included. The internal consistency of the questionnaire was acceptable, with a Cronbach's alpha of 0.709. Fifty-eight patients were evaluated for test-retest reliability at a median interval of 2.4 weeks (interquartile range 2.1, 3.0). The intraclass correlation coefficient of test-retest reliability was good at 0.798 (95% confidence interval 0.680 to 0.876). Construct validity using the Spearman's correlation coefficient showed a strong correlation between the Thai version of ICIQ-MLUTS and the International Prostate Symptom Score (IPSS) at 0.832 ($p < 0.001$). The prevalence of LUTS, as determined by the Thai version of ICIQ-MLUTS, was high in 148 patients (77.5%), comprising voiding symptoms in 135 patients (70.7%), and incontinence symptoms in 93 patients (48.7%). The prevalence of urge urinary incontinence (UI) at 15.2%, was higher than that of stress UI, which was at 1.6%.

Conclusion: The Thai version of the ICIQ-MLUTS has good reliability and validity. The prevalence of LUTS in Thai men with COPD was high. Questionnaire screening should be considered when detecting LUTS in patients with COPD.

Keywords: COPD; ICIQ-MLUTS; Lower urinary tract symptoms; Reliability; Validity

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Chronic obstructive pulmonary disease (COPD) is the leading cause of death worldwide⁽¹⁾. The COPD burden is expected to increase owing to continuous

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exposure to risk factors and aging population⁽²⁾. COPD is a chronic inflammatory disorder that affects both the pulmonary and extrapulmonary systems. Patients with COPD commonly have comorbidities, such as cardiovascular disease, metabolic syndrome, diabetes, osteoporosis, skeletal muscle dysfunction, anemia, lung cancer, and depression, which contribute to morbidity and mortality^(1,3). Interestingly, a study analyzing the National Health and Nutrition Examination Survey 2001-2008⁽⁴⁾ data showed that urinary incontinence (UI)/prostate disease was the most prevalent comorbidity at 63.6% in self-reported COPD in patients aged 45 years and above. The present study showed that UI/prostate disease was an independent predictor of worse self-rated health,

together with congestive heart failure, arthritis, and diabetes, after adjusting for all other important comorbidities in patients with COPD.

The prevalence of UI ranges from 9.8% to 38.8% in men with COPD^(5,9) and 49.6% in women with COPD⁽⁸⁾. Previous studies have shown that the prevalence of UI in patients with COPD is higher than that in the control groups^(5,9). These findings suggest that UI is a prevalent comorbidity in patients with COPD and should be considered in clinical practice. UI, defined as any involuntary urine leakage, is a storage symptom of lower urinary tract symptoms (LUTS). LUTS can be classified into three groups, storage, voiding, and postmicturition symptoms⁽¹⁰⁾. Storage symptoms include increased daytime frequency, nocturia, urgency, and UI, whereas voiding symptoms include hesitancy, slow stream, straining, intermittency, splitting or spraying, and terminal dribbling. Postmicturition symptoms include feeling of incomplete emptying and postmicturition dribble⁽¹⁰⁾.

Urodynamics is an invasive procedure that objectively determines the etiology of LUTS by providing functional information regarding bladder filling, urine storage, and emptying⁽¹¹⁾. However, symptom-based questionnaires, such as the International Prostate Symptom Score (IPSS)⁽¹²⁾ and the International Consultation on Incontinence Questionnaire-Male Lower Urinary Tract Symptoms (ICIQ-MLUTS)⁽¹³⁾, can be used as preliminary assessment tools for LUTS in men. These questionnaires can help identify patients who may benefit from further diagnostic testing or treatment. The IPSS questionnaire is a widely used tool to assess LUTS related to benign prostatic hyperplasia (BPH) in men, with most of the questions focusing on voiding symptoms⁽¹²⁾. In contrast, the ICIQ-MLUTS questionnaire covers both voiding and incontinence symptoms⁽¹³⁾. In addition, the LUTS-MLUTS questionnaire assesses the bother-score for each question, which is a measure of the impact of LUTS on the patient's quality of life⁽¹⁴⁾. The LUTS-MLUTS questionnaire has been validated and recommended as a grade A-level tool by the ICI⁽¹⁴⁾. Overall, both the IPSS and ICIQ-MLUTS questionnaires are valuable tools for assessing LUTS in patients. The choice of questionnaire may depend on the patient being evaluated and specific symptoms of interest.

In clinical practice, the ICIQ-MLUTS questionnaire may be suitable for detecting LUTS in terms of both incontinence and voiding symptoms in

men with COPD. However, a Thai version of the ICIQ-MLUTS questionnaire is unavailable. The aim of the present study was to translate the ICIQ-MLUTS questionnaire to Thai, evaluate the validity and reliability of the questionnaire in patients with COPD, and determine the prevalence of LUTS in men with COPD.

Materials and Methods

Translation of original ICIQ-MLUTS questionnaire to Thai

The ICIQ-MLUTS questionnaire had 13 items comprising voiding symptoms with five items, incontinence symptoms with six items, daytime frequency, and nocturia⁽¹³⁾. The scores for each question ranged from 0 to 4, with higher scores indicating worse symptoms. The total score ranged from 0 to 44 with voiding score of 0 to 20 and incontinence score of 0 to 24. Daytime frequency and nocturia scale scores were not included in the total score. The first study to propose the severity banding of ICIQ-MLUTS was addressed by Ito et al. in 2020⁽¹⁵⁾, and the ICIQ committee subsequently updated the score interpretation into three scoring bands as mild from 0 to 16, moderate from 17 to 25, and severe from 26 to 44⁽¹⁶⁾.

After obtaining permission for translation of the ICIQ-MLUTS questionnaire from the ICIQ group (www.iciq.net), the validation methodology of the Thai version of the ICIQ-MLUTS questionnaire followed the ICIQ Development Group recommendations. The original English version was translated to Thai following the guidelines for the cross-cultural adaptation of self-report measures⁽¹⁷⁾ by the Center for Translation and Language at the Research Institute for Languages and Cultures of Asia, Mahidol University, Bangkok, Thailand. The original English version of the ICIQ-MLUTS questionnaire was translated by two native Thai translators who were excellent English speakers. After synthesizing the forward translation, the first draft of the Thai version was back translated by two bilingual translators who were completely blinded to the original version. The back translated questionnaire was developed through consensus of the two bilingual translators, and the researcher and translator team met for approval of the back-translated version. Finally, the back translated questionnaire and all translation processes were reassessed by the ICIQ Development Group for approval of the Thai version of the ICIQ-MLUTS questionnaire. Content validity was assessed to check the questions clearly and unambiguously through

interviews with ten patients and observations of patients completing the questionnaires.

Participant recruitment

This cross-sectional study was conducted at the COPD clinic of Siriraj Hospital, Bangkok, Thailand between June 2016 and July 2018. COPD diagnosis followed the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines for patients aged 40 years or older who had symptoms and risk factors of COPD and postbronchodilator forced expiratory volume in 1 second/forced vital capacity (FEV1/FVC) of less than 70%⁽¹⁾. Men with stable COPD who comprehended the conversation and had no exacerbation within four weeks were included in the present study. The exclusion criteria were patients with COPD, with bladder stones, interstitial cystitis, chronic pelvic pain syndrome, previous prostatic, urethral, or bladder surgery, prostatic, urethral, or bladder cancer, pelvic radiotherapy, neurological conditions that might affect urinary function, or uncompensated heart failure. All methods were performed in accordance with the Declaration of Helsinki, and the study protocol was reviewed and approved by the Siriraj Institutional Review Board of the Mahidol University (COA no. Si382/2016). Informed consent was obtained from all patients before enrollment. Baseline patient characteristics were recorded at the first visit.

Tests for reliability and validity

Internal consistency

One hundred ninety-one men with COPD of all severities were interviewed using the Thai version of the ICIQ-MLUTS questionnaire, and the internal consistency of the questionnaire was evaluated.

Test-retest reliability

Fifty-eight patients were readministered the Thai version of the ICIQ-MLUTS questionnaire at interval of two to four weeks after their first visit to evaluate the stability.

Construct validity

There was no definite gold-standard questionnaire to test the construct validity of the ICIQ-MLUTS questionnaire. However, the IPSS questionnaire was widely used for evaluating LUTS in men and was found to have a good correlation with the ICIQ-MLUTS questionnaire in a previous study⁽¹⁸⁾. Therefore, the Thai version of the IPSS questionnaire⁽¹⁹⁾ was used to test the construct validity of the Thai version of the ICIQ-MLUTS questionnaire.

Statistical analysis

Descriptive data were presented as number and percentage for categorical data and mean \pm standard deviation or median, interquartile range (IQR) for continuous data, as appropriated. The internal consistency was assessed using the Cronbach's alpha coefficient, with a value 0.7 or greater considered acceptable⁽²⁰⁾. Test-retest reliability assessed the stability of the questionnaire over time using weighted kappa (K_w) analysis for each item and the intraclass correlation coefficient (ICC) for the total score. The classified K_w statistics and strength of agreement were slight for 0.00 to 0.20, fair for 0.21 to 0.40, moderate for 0.41 to 0.60, substantial for 0.61 to 0.80, and almost perfect for 0.81 to 1.00⁽²¹⁾. The ICC values were indicative of poor for less than 0.5, moderate for 0.5 to 0.75, good for 0.75 to 0.9, and excellent for greater than 0.9 reliabilities⁽²²⁾. The Spearman correlation was used to evaluate construct validity by comparing the Thai version of the ICIQ-MLUTS questionnaire with the Thai version of the IPSS questionnaire. The interpretation of the Spearman rho (r) results were poor for less than 0.3, fair for 0.3 to 0.5, moderately strong for 0.6 to 0.8, and very strong for 0.80 or greater⁽²³⁾. The association between the severity of COPD and the severity of ICIQ-MLUTS was analyzed using the chi-square or Fisher's test for categorical variables. An independent t-test was analyzed for continuous variables when comparing demographic data of the patients with COPD with the prevalence and severity levels of ICIQ-MLUTS. PASW Statistics for Windows, version 18.0 (SPSS Inc., Chicago, IL, USA) was used for the data analyses.

Results

One hundred ninety-one Thai men with COPD completed the administration of the Thai version of the ICIQ-MLUTS questionnaire. The mean patient age was 72 \pm 8 (range of 45 to 94) (Table 1). The duration of COPD diagnosis was 6.0 \pm 4.2 years, and 188 patients (98.4%) had a history of smoking with a median of 42.0 (IQR 23.8, 75.0) pack-year. The severity of COPD predicted using the postbronchodilator FEV1%⁽²⁴⁾ was mild, moderate, severe, and very severe in 55 (28.8%), 76 (39.8%), 50 (26.2%), and 10 (5.2%) patients, respectively. One hundred forty (73.3%) of the patients had a lower level of education, which is less than 12 years. Comorbidities were found in 140 patients (73.3%), and the most common comorbidity was hypertension in 124 patients (64.9%), followed by dyslipidemia

Table 1. Demographic data of men with COPD (n=191)

Characteristics	
Age (years); mean±SD (range)	72±8 (45 to 94)
BMI (kg/m ²); mean±SD	22.3±3.8
Educational status; n (%)	
Lower education (<12 years)	140 (73.3)
Higher education (≥12 years)	51 (26.7)
Smoking (pack-year); median (IQR)	42.0 (23.8, 75.0)
Smoking status; n (%)	
Smokers	188 (98.4)
Ex-smokers	173 (90.6)
Current smokers	15 (7.8)
COPD diagnosis (years); mean±SD	6.0±4.2
Post-bronchodilator FEV1/FVC%; mean±SD	50.1±13.2
COPD severity*; n (%)	
Mild	55 (28.8)
Moderate	76 (39.8)
Severe	50 (26.2)
Very severe	10 (5.2)
Comorbidities; n (%)	
Hypertension	124 (64.9)
Dyslipidemia	95 (49.7)
Benign prostate hypertrophy	69 (36.1)
Diabetes Mellitus	31 (16.2)
Coronary arterial diseases	30 (15.7)
Pharmacotherapy; n (%)	
Inhaled LAMA	36 (18.8)
Inhaled LAMA/ICS/LABA	65 (34.0)
Alpha-1blocker	37(19.4)
Alpha-1blocker + 5-ARI	11 (5.8)
Alpha-1 blocker + 5 ARI + antimuscarinic	1 (0.5)
Duration of alpha-1blocker/5-ARI/antimuscarinic (months); median (IQR)	71.7 (31.3, 118.9)
Min-max	4.5 to 150.9

COPD=chronic obstructive pulmonary disease; SD=standard deviation; BMI=body mass index; IQR=interquartile range; FEV1=forced expiratory volume in 1 second; FVC=forced vital capacity; LAMA=long-acting muscarinic antagonist; ICS=inhaled corticosteroid; LABA=long-acting beta2-agonist; 5-ARI=5-alpha reductase inhibitor

* GOLD classification of COPD severity by postbronchodilator FEV1% predicted, mild (≥80), moderate (50 to 79), severe (30 to 49), and very severe <30⁽²⁴⁾

and BPH in 95 (49.7%) and 69 (36.1%) patients, respectively.

Inhaled bronchodilator containing long-acting muscarinic antagonist (LAMA) was treated in 101 out of 191 (52.9%) COPD patients. Oral alpha-1 blocker, 5-alpha reductase inhibitor (5-ARI), and/or antimuscarinic drugs were prescribed to 49 out of 191 (25.7%), with 44 patients receiving treatment for BPH with alpha-1-blocker, 5-ARI and/or antimuscarinic drugs and five for hypertension with an alpha-1 blocker. The median duration of treatment with these

Table 2. Correlation between each question and total score and the Cronbach's alpha for each question if item was deleted (n=191)

Symptoms	Corrected item-total correlation	Cronbach's alpha, if item deleted
Voiding symptoms		
Hesitancy	0.372	0.685
Straining to continue urination	0.433	0.674
Strength of stream	0.414	0.680
Intermittency	0.566	0.653
Incomplete emptying	0.616	0.642
Incontinence symptoms		
Urgency	0.353	0.688
Urge urinary incontinence	0.218	0.704
Stress urinary incontinence	0.194	0.711
Unexplained urinary incontinence	0.160	0.709
Nocturnal enuresis*	-	-
Postmicturition dribble	0.358	0.690
Frequency	0.109	0.714
Nocturia	0.300	0.700

* Not all patients reported nocturnal enuresis

medications was 71.7 months (IQR 31.3, 118.9), with a minimum duration of 4.5 months (Table 1).

Content validity

The Thai version of the ICIQ-MLUTS questionnaire had good content validity. After completing the questionnaire, ten patients gave feedback that the questionnaire was easy to understand and made sense to the questions. The experts agreed that the questionnaire was comprehensive and clinically meaningful.

Internal consistency (reliability)

The Cronbach's alpha coefficient for the Thai version of the ICIQ-MLUTS questionnaire was 0.709. All Cronbach's alpha coefficients for the items deleted from each question were greater than 0.6, actually, ranged from 0.642 to 0.714 (Table 2). The Cronbach's alpha coefficient for voiding symptoms, which was hesitancy, straining to continue urination, strength of stream, intermittency, and incomplete emptying, was 0.642 to 0.685, whereas that for incontinence symptoms, including urgency, urge UI, stress UI, unexplained UI, and postmicturition dribble, was 0.688 to 0.711. The question of nocturnal enuresis was not included in the analysis because none of the patients answered "never".

Test-retest reliability (stability)

Fifty-eight men with COPD were assessed for test-retest reliability of the Thai version of the ICIQ-

Table 3. The weighted kappa (K_w) coefficient of test-retest reliability (n=58)

Symptoms	Weighted Kappa coefficient*
Voiding symptoms	
Hesitancy	0.598
Straining to continue urination	0.461
Strength of stream	0.452
Intermittency	0.729
Incomplete emptying	0.532
Incontinence symptoms	
Urgency	0.629
Urge urinary incontinence	0.850
Stress urinary incontinence	0.651
Unexplained urinary incontinence	0.794
Nocturnal enuresis	1.000
Postmicturition dribble	0.426
Frequency	0.820
Nocturia	0.685

* Scale of weighted kappa coefficient: slight (0 to 0.20), fair (0.21 to 0.40), moderate (0.41 to 0.60), substantial (0.61 to 0.80), and almost perfect (0.81 to 1.00) agreement⁽²¹⁾

MLUTS questionnaire at a median of 2.4 weeks (IQR 2.1, 3.0) after the first visit. The ICC of test-retest reliability was 0.798 (95% confidence interval [CI] 0.680 to 0.876). The ICC of the total scores of the voiding and UI domains were 0.760 (95% CI 0.623 to 0.851), $p < 0.001$ and 0.668 (95% CI 0.494 to 0.790), $p < 0.001$, respectively. The K_w coefficients for each item ranged from 0.426 to 0.850 (Table 3). The voiding domains showed moderate-to-substantial agreement (K_w 0.452 to 0.729). The UI domains showed moderate-to-almost perfect agreement (K_w 0.426 to 0.850). The highest K_w coefficient of the voiding domain was for intermittency at 0.729, and that of the incontinence domain was for urge UI at 0.850.

Construct validity

One hundred eighteen men with COPD were tested for construct validity of the Thai version of the ICIQ-MLUTS questionnaire and compared to the validated Thai version of the IPSS questionnaire⁽¹⁹⁾. The Spearman correlation between the total scores of the Thai version of the ICIQ-MLUTS and IPSS questionnaires was very strong ($r = 0.832$, $p < 0.001$) (Figure 1).

LUTS in men with COPD

By using the Thai version of the ICIQ-MLUTS questionnaire, 148 of the 191, or 77.5%, (95% CI 70.9 to 83.2) men with COPD had LUTS, voiding

Table 4. The prevalence of lower urinary tract symptoms in men with chronic obstructive pulmonary disease (n=191)

Items	n (%)	95% CI
Voiding symptoms		
Hesitancy	67 (35.1)	28.3 to 42.3
Straining to continue urination	65 (34.0)	27.3 to 41.2
Strength of stream	81 (42.4)	35.3 to 49.8
Intermittency	78 (40.8)	33.8 to 48.2
Incomplete emptying	91 (47.6)	40.4 to 55.0
Incontinence symptoms		
Urgency	68 (35.6)	28.8 to 42.8
Urge urinary incontinence	29 (15.2)	10.4 to 21.1
Stress urinary incontinence	3 (1.6)	0.3 to 4.5
Unexplained urinary incontinence	4 (2.1)	0.6 to 5.3
Nocturnal enuresis	-	-
Postmicturition dribble	46 (24.1)	18.2 to 30.8
Frequency	40 (20.9)	15.4 to 27.4
Nocturia	174 (91.1)	86.1 to 94.7

CI=confidence interval

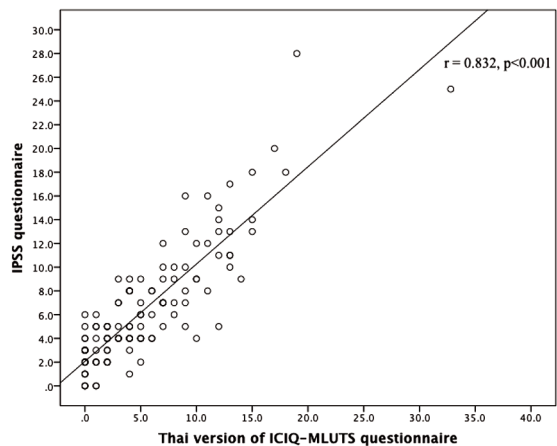


Figure 1. The Spearman correlation between the total scores of the International Consultation on Incontinence Questionnaire-Male Lower Urinary Tract Symptoms (ICIQ-MLUTS) and International Prostate Symptom Score (IPSS) questionnaires.

and incontinence symptoms were present in 135 (70.7%, 95% CI 63.7 to 77.0) and 93 (48.7%, 95% CI 41.4 to 56.0) patients, respectively (Table 4). Among voiding symptoms, incomplete emptying was the most common at 47.6% (95% CI 40.4 to 55.0), followed by strength of stream at 42.4% (95% CI 35.3 to 49.8) and intermittency at 40.8% (95% CI 33.8 to 48.2). Urgency, complaint of a sudden compelling desire to pass urine, which is difficult to defer⁽¹⁰⁾, was the most common incontinence symptom at 35.6% (95% CI 28.8 to 42.8%), followed by postmicturition dribble at 24.1% (95% CI 18.2

to 30.8). Urge UI, complaint of involuntary leakage immediately preceded by urgency⁽¹⁰⁾, was found in 29 patients (15.2%, 95% CI 10.4 to 21.1), whereas stress UI, complaint of involuntary leakage on effort or exertion or on sneezing or coughing, was found in three patients (1.6%, 95% CI 0.3 to 4.5).

The authors found no significant association between the prevalence of LUTS, as assessed by the Thai version of the ICIQ-MLUTS, and the factors listed in Table 1, including age, BMI, smoking status, duration of COPD diagnosis, severity of COPD measured by post-bronchodilator FEV1% predicted, comorbidities, or pharmacotherapy. However, among men with COPD patients, those with higher education, greater than 12 years, exhibited a significantly higher prevalence of LUTS compared to those with lower education, or less than 12 years, at 90.2% and 72.7%, respectively (p=0.01). Excluding patients who received oral drugs potentially affecting LUTS such as alpha 1-blocker or 5-ARI, and antimuscarinic, the prevalence of LUTS did not significantly differ at 76.1% compared to all patients, which was 77.5%.

The mean score for LUTS among the 148 COPD patients assessed using the Thai version of ICIQ-MLUTS was 6.67±4.52. Although LUTS scores tended to increase with COPD severity, with scores of 6.34±4.88, 6.56±4.28, 6.74±4.06, and 9.67±6.74 in mild, moderate, severe, and very severe COPD, respectively (Table 5), this trend did not reach statistical significance. However, a moderate degree of LUTS was significantly more prevalent in patients with very severe COPD compared to other severity categories (p=0.01). In the present study, the maximum LUTS score observed was 21, and none of the severe LUTS using the Thai version of the ICIQ-MLUTS were identified.

Discussion

The reliability and validity of the Thai version of the ICIQ-MLUTS questionnaire

The internal consistency and reliability of the Thai version of the ICIQ-MLUTS questionnaire in patients with COPD was acceptable at 0.7 or greater⁽²⁰⁾, with a Cronbach's alpha coefficient of 0.709. However, the Cronbach's alpha coefficient in the present study was lower than that of the previous studies in other languages, which ranged from 0.757 to 0.798⁽²⁵⁻²⁷⁾. The Cronbach's alpha coefficient of the item deleted for each question in the present study ranged from 0.642 to 0.714 (Table 2), whereas those in the previous studies was greater than 0.7⁽²⁵⁻²⁷⁾. This might be due to differences in the study population.

Table 5. The severity of lower urinary tract symptoms using the Thai version of ICIQ-MLUTS, categorized by the severity of COPD (n=148)

Severity of COPD*	Severity of LUTS†			p-value
	Total score (44 score) mean±SD	Mild n (%)	Moderate n (%)	
Mild (n=44)	6.34±4.88	42(95.5)	2 (4.5)	0.01
Moderate (n=59)	6.56±4.28	58 (98.3)	1 (1.7)	
Sever (n=39)	6.74±4.06	39 (100)	0 (0.0)	
Very severe (n=6)	9.67±6.74	4 (66.7)	2 (33.3)	

COPD=chronic obstructive pulmonary disease; LUT=lower urinary tract symptom; SD=standard deviation

* GOLD classification of COPD severity by postbronchodilator FEV1% predicted, mild (≥80), moderate (50 to 79), severe (30 to 49), and very severe <30⁽²⁴⁾; † Severity of LUTS, score of mild (0 to 16), moderate (17 to 25), severe (26 to 44)⁽¹⁵⁾

The authors studied older patients with COPD at a COPD clinic, who had lower education and high rate of comorbidities (Table 1), whereas most other studies included younger men with LUTS at urological clinics.

The test-retest reliability for the total score of the Thai version of the ICIQ-MLUTS questionnaire showed good stability⁽²²⁾, with an ICC of 0.798 (95% CI 0.680 to 0.876) at an interval of 2.4 weeks (IQR 2.1, 3.0). The ICC of the total score of voiding domains in the present study tended to be lower than the study by Castro-Díaz et al.⁽¹⁸⁾, which was at 0.760 (95% CI 0.623 to 0.851 versus 0.885, 95% CI 0.771 to 0.999), however, both were in the range of good reliability. The ICC of the total score of UI domains was 0.668 (95% CI 0.494 to 0.790), which was similar to that reported by Castro-Díaz et al., which was at 0.695 (95% CI 0.440 to 0.948). Overall, the reliability of the Thai version of the ICIQ-MLUTS questionnaire was acceptable, although the internal consistency and test-retest reliability tended to be lower than those reported in the previous studies^(18,25-27).

The construct validity was very strong, or 0.80 or greater⁽²³⁾, between the Thai versions of the ICIQ-MLUTS and IPSS questionnaires with the Spearman correlation coefficients of 0.832. These results were similar to those of the previous studies, with the Pearson's correlation coefficients of 0.846 in the study by Huang et al.⁽²⁵⁾ and 0.879 in the study by Pourmomeny et al⁽²⁷⁾. The present study showed the Thai version of the ICIQ-MLUTS questionnaire had acceptable reliability and validity and could be used to detect LUTS in men with COPD.

There are ICIQ-MLUT questionnaires in long-form with 23 items and short-form with 13 items, which have not yet been translated into Thai at the

time of the present study. The authors were able to obtain permission to translate the short-form version of the ICIQ-MLUTS questionnaire from the ICIQ group and used it to study the prevalence of LUTS in COPD patients. Another study by Pinyoboon et al.⁽²⁸⁾ studied the validity and reliability of the Thai version of the long-form ICIQ-MLUTS questionnaire (ICIQ-MLUTS-LF) in the urology clinic and younger patients. That study reported high internal consistency and reliability, with Cronbach's alpha 0.954 and the test-retest reliability with the intraclass correlation 0.974. However, it should be noted that there were differences in the form of questionnaires and the studied population between the two studies, which may limit the comparability of the results. Therefore, further studies should be conducted to test the reliability and validity of the Thai version of the ICIQ-MLUTS short-form questionnaire in a urology clinic setting.

LUTS in men with COPD

The LUTS questionnaire is not routinely used in clinical practice, which could lead to under recognition and under diagnosis of LUTS in patients with COPD^(7,8,29). Using the Thai version of the ICIQ-MLUTS questionnaire, a high prevalence of LUTS at 77.5%, was found in men with COPD, comprising voiding at 70.7%, and incontinence symptoms at 48.7%. Voiding symptoms suggest bladder outlet obstruction in the absence of infection or obvious pathology other than the possible causes of outlet obstruction⁽¹⁰⁾ and are common symptoms of BPH. The authors found that 36.1% of the patients were diagnosed with BPH by urologists. Patients typically seek care from urologists when their symptoms disrupt their daily life. Patients often prefer not to mention their LUTS because of shame or a low perception of the importance of the pathological condition⁽²⁹⁾. Both COPD and BPH are common in older populations; however, Pent et al.⁽³⁰⁾ showed that the incidence of BPH was 1.53 times higher in the COPD group than in the non-COPD group after adjusting for covariates.

Patients with COPD also experience symptoms of incontinence, which include urgency, urge UI, stress UI, unexplained UI, nocturnal enuresis, and postmicturition dribble⁽¹³⁾. The prevalence of UI in men with COPD varies from 10% to 39%^(5,7-9), which may be due to the different methods used to detect UI and different COPD populations⁽²⁹⁾. Using the ICIQ-MLUTS questionnaire, the prevalence of UI in the present study was 48.7%, which was higher than

that reported by Burge et al. at 38.8% in Australia⁽⁵⁾. Urge UI is defined as the complaint of involuntary leakage immediately preceded by urgency, and stress UI, defined as the complaint of involuntary leakage on effort or exertion or on sneezing or coughing⁽¹⁰⁾, are importance incontinence symptoms in patients with COPD^(5,7). However, the prevalence of urge UI was higher than that of stress UI in men with COPD at 15.2% and 1.6%, respectively. These findings are consistent with those of a previous study by Hirayama et al.⁽⁷⁾, which reported a higher prevalence of urge UI at 63% of UI than stress UI at 8% of UI, in men with COPD. These findings suggest that stress UI causes fewer problems than urge UI in men with COPD.

The authors observed a higher prevalence of LUTS among patients with a higher level of education compared to those with a lower level of education, similar to Zhang et al.⁽³¹⁾. They hypothesized that this difference might be due to the education level influencing the understanding of the disease and the decision-making progress. Contrary to expectations, the authors did not find a significant association between the prevalence of LUTS and the severity of COPD. This result was different from Burge et al. study⁽⁵⁾, which reported an increasing prevalence of UI with greater COPD severity, as indicated by FEV1. Nevertheless, in the present study, there was an observable trend of LUTS scores increasing alongside COPD severity, although this trend did not attain statistical significance. Notably, the authors observed that a moderate degree of LUTS in patients with very severe COPD was significantly higher compared to those with other severities of COPD.

Limitation

One limitation of the present study was that it was conducted at a single center, which may limit the generalizability of the findings to other centers or populations. Additionally, the study was specific to older men with COPD who had a rate of comorbidities. This limits the generalizability of the study results to other populations, including women and younger patients with COPD, even though most patients with COPD are diagnosed at the age of 40 years or older.

Conclusion

The present study found that the Thai version of the ICIQ-MLUTS questionnaire had good internal consistency reliability, test-retest reliability, and construct validity indicating that it is a reliable tool for assessing LUTS in Thai men with COPD in clinical

practice. The Thai version of the ICIQ-MLUTS questionnaire demonstrated a high prevalence of LUTS, including voiding and incontinence symptoms, in men with COPD. Therefore, healthcare professionals should be aware of LUTS in patients with COPD and consider screening for LUTS using a questionnaire, such as the ICIQ-MLUTS, in men with COPD to detect and manage LUTS earlier.

What is already known on this topic?

Previous studies showed that the UI/prostate disease was an independent predictor of worse self-related health in patients with COPD and higher prevalence than in controlled group.

The ICIQ-MLUTS questionnaire has been used to detect the LUTS in terms of both incontinence and voiding symptoms.

The LUTS questionnaire is not routinely used in clinical practice, which could lead to under recognition and under diagnosis of LUTS in patients with COPD.

What does this study add?

The Thai version of the ICIQ-MLUTS questionnaire in short-form has been developed. The questionnaire has good reliability and validity indicating a reliable tool for assessing LUTS in Thai men with COPD.

Using the Thai version of the ICIQ-MLUTS questionnaire, this study showed a high prevalence of LUTS, including voiding and incontinence symptoms, in men with COPD.

Physicians should consider screening for LUTS in men with COPD using a questionnaire, to detect and manage LUTS earlier.

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Conflicts of interest

The authors declare no conflict of interest.

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