

## RESEARCH ARTICLE

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# Validation of the Thai Version of the Memorial Symptom Assessment Scaled - Short Form Among Cholangiocarcinoma Patients

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### Abstract

**Background:** The Memorial Symptom Assessment Scale-Short Form (MSAS-SF), a standard instrument for assessing cancer patients' symptoms, has been validated in numerous languages. However, it has not been validated in Thai. **Objectives:** The purpose of this study was to translate the MSAS-SF into Thai and determine its psychometric properties in Cholangiocarcinoma (CCA) patients. **Methods:** The MSAS-SF was translated into Thai, and 231 CCA patients completed the questionnaires, which included baseline characteristics, T-MSAS-SF, Functional Assessment of Cancer Therapy-Hepatobiliary (FACT-Hep), and the Hospital Anxiety and Depression Scale (HADS). Cronbach's alpha coefficient was used to assess reliability for internal consistency. For convergent validity, Pearson's correlation coefficient was used to calculate the relationship between the T-MSAS-SF and the T-CaSUN, HADS, and FACT-Hep subscales. **Results:** Subscale and total T-MSAS-SF internal consistency reliability was moderately high, with Cronbach alpha coefficients ranging from 0.76 to 0.87. For convergent validity, the majority of T-MSAS-SF scores had moderate to low inverse correlation with FACT-Hep, HADS T-CaSUN subscales with the correlation coefficients -0.10 to -0.68 ( $p < 0.05$ ), reflecting that they were measuring a similar construct. **Conclusion:** Our findings showed that the T-MSAS-SF has acceptable validity and reliability to assess the psychometric properties of early to advance stage CCA patients during treatment and early post-treatment stage.

**Keywords:** Validation- MSAS-SF- Thai- symptom assessment- cholangiocarcinoma

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### Introduction

Cholangiocarcinoma (CCA) is one of the most prevalent malignancies in males and females in Thailand and other regions of Southeast Asia with age-standardized rate (ASR) for intrahepatic CCA and extrahepatic CCA were 2.19 and 0.71, respectively (Florio et al., 2020). There are few guarantees of successful therapy or supportive care throughout the CCA trajectory, and the overall 5-year survival rate of CCA patients worldwide is fewer than 10% (Kamsa-Ard et al., 2021).

CCA patients encounter a variety of symptoms as a result of their disease and treatment modalities, and these symptoms can have an impact on their health-related quality of life (HRQOL) (Somjaiwong et al., 2011). Moreover, treatment-related symptoms can disrupt treatment plans, and late treatment-related symptoms frequently have an impact on survival rehabilitation and treatment adherence (Cleeland, 2007). These symptoms also vary in severity, frequency, and duration. Prior studies

demonstrated that a high symptom burden is associated with a low HRQOL (Wen et al., 2018; Pongthavornkamol et al., 2019), and a good symptom management is an important aspect of health care providers in order to improve HRQOL in cancer patients (Fu et al., 2018). Therefore, suitable symptom evaluation in CCA patients is an issue that requires further research.

The Memorial Symptom Assessment Scale Short Form (MSAS-SF) is a commonly used symptom assessment instrument that assesses both the frequency and severity of a group of common physical and psychological symptoms of cancer and its treatment (Chang et al., 2000). According to a systematic review of cancer symptom instruments, the MSAS is one of the most complete scales with strong psychometric criteria; it is simple to learn and appropriate for both initial clinical evaluation and research (Kirkova et al., 2006). Until now, this instrument has been widely recognized, developed, and translated for use in patients suffering from various cancers, including lung (Yücege et al., 2015), colorectal (Lam et al., 2008) in numerous

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countries, including Taiwan (Lam et al., 2008), Korea (Nho et al., 2018), Spain (Dapueto et al., 2014), and China (Fu et al., 2018b). However, no information on the cultural adaptation and validation of the MSAS-SF for CCA patients has been reported.

Although previous research in Thailand validated a Thai version of the Edmonton Symptom Assessment Scale (ESAS-Thai), this measurement is appropriate for assessing symptoms in Thai patients with advanced stage of cancer or those receiving palliative care (Chinda et al., 2011). To date, there are currently lack of tools for complete symptom assessment that specialize in CCA patients. Since the MSAS-SF is simple to use and takes less time to complete (Chang et al., 2000a), this might assist measure symptoms in CCA patients who may have reduced energy from cancer-related symptoms and some unique to their disease. Furthermore, we require an accurate and effective complete symptom assessment tool in Thai to measure the many concurrent symptoms experienced by CCA patients. The MSAS-SF, on the other hand, has yet to be translated or approved in Thai. The purpose of this study was to translate the MSAS-SF into Thai and determine its psychometric properties in Cholangiocarcinoma (CCA) patients.

## Materials and Methods

### *Study design and population*

This cross-sectional recruited 231 CCA patients from the oncology services of the university hospital in Khon Kaen provinces, Thailand. The questionnaire was administered from February 2021 to April 2021. To participate, patient must have at least 40 years old, diagnosed with CCA, be able to read and understand the Thai language, and be willing to participate in the study. The study protocol was approved by the ethics committee of Khon Kaen University (HE631628).

### *Study instruments*

The original version of MSAS-SF was developed by Chang et al (Chang et al., 2000). The physical symptom distress score (PHYS), the psychological symptom distress score (PSYCH), and the global distress index (GDI) are all part of this subscale. The PHYS covers 12 common physical symptoms such as a lack of appetite, energy, pain. The PSYCH covers six common psychological symptoms such as worried, sadness, nervousness, difficulty sleeping. The GDI assesses 4 common psychological symptoms (sadness, worry, irritability, and nervousness) as well as the suffering linked with 6 physical symptoms (lack of appetite, change in taste, pain, change in skin, feeling bloated, and weight loss). The score is obtained by averaging the symptom scores of all 32 symptoms; each subscale score contributes to the overall score.

The Functional Assessment of Chronic Illness Therapy's (FACT-Hep) Version 4 of the Functional Assessment of Cancer Therapy-Hepatobiliary (FACT-Hep). More information and downloads are available at [www.facit.org](http://www.facit.org). This device is most commonly used for patients with hepatobiliary malignancies including CCA (Fan et al., 2010). It is divided into two parts: the

first relates to cancer patients' general QOL (FACT-G) and consists of 4 subscales (physical well-being, social/family well-being, emotional well-being, and functional well-being) with 27 items, and the second relates to CCA patients' specific QOL (hepatobiliary subscale) with 18 items. The FACT-G Thai version was utilized (Taechaboonsermsak et al., 2005). FACT-Hep items are graded on a 5-point scale (0 = "not at all," 4 = "very lot"). Our earlier publication provided details on the instrument used to assess HRQOL (Woradet et al., 2016).

The Hospital Anxiety and Depression Scale (HADS), developed by Zigmond and Snaith (Zigmond and Snaith, 1983), is a 14-item measure widely used as a screening tool with cancer populations ranging from recently diagnosed patients to long-term cancer survivors in a variety of oncology settings. HADS scores below 8 are designated as "normal," scores 8–10 is "borderline," while people scoring above 10 are considered "clinical" cases. The Spanish version has good validity, a test-retest reliability of  $r > 0.85$ , and high internal consistency (Cronbach's  $\alpha = 0.86$  for anxiety; 0.86 for depression).

The Thai version of Cancer Survivor's Unmet Needs (T-CaSUN) was a translation of the CaSUN (Hodgkinson et al., 2007). This instrument has 20 items that are divided into four categories: intensive care (9 items), information (4 items), relationship (3 items), and medical care (4 items). All items are rated on participants' answers whether the needs described by the items are not applicable, met, or unmet. If an unmet need is reported, the intensity of the need is then rated as weak (score 1), moderate (score 2), or strong (score 3), the total score was the sum of all need items, with higher scores indicating greater unmet needs our questionnaire.

### *Validation Procedures*

The validation procedure was divided into two phases. The translation was carried out followed by the psychometric evaluation in the second phase.

### *Phase I*

The translation process was performed following a generally accepted procedure: 1) the original author's permission was obtained, and the translation process was guided by an experienced professor. 2) The MSAS-SF was translated into Thai by a bilingual researcher and an English instructor. 3) The two translations were synthesized by the researchers. 4) The first simplified Thai version of the MSAS-SF was translated back into English by a cancer nursing instructor and another English instructor who were completely blinded to the original English version. 5) All discrepancies in the back translations were compared to the English version. 6) An expert committee consolidated all of the instrument's versions. 7) To estimate comprehensibility and cognitive equivalence, the second simplified Thai version was tested in 20 CCA patients. 8) Another researcher double-checked the finalized translation for minor errors. Finally, A final report on the translation was written and is available upon request.

## Phase II

In order to determine psychometric properties of the T-MSAS-SF, 231 enrolled subjects from the same oncology department were asked to complete questionnaires including the T-CaSUN, FACT-Hep, and HADS to test its reliability and validity. Participants were required to complete the questionnaire package by themselves. Otherwise, researchers assisted participants if they could not complete the questionnaires.

### Sample size

To detect moderate correlations ( $r=0.30$ ) at the 0.05 alpha level for validity, we calculated that  $n=84$  sample size was required to achieve 80% power for MSAS (Yücege et al., 2015). We also intended to enroll all 231 CCA patients who had taken part in our study at the time of data collection.

### Data analysis

Pearson's correlation was used to investigate the relationship between the T-MSAS-SF and FACT-hep subscales, HADS, and T-CaSUN, and convergent validity was demonstrated if the T-MSAS-SF subscales had high significant correlations with those scales. Cronbach's alpha was used to evaluate the internal consistency reliability. Cronbach's alpha was computed with a satisfactory coefficient of  $\geq 0.70$  (DeVon et al., 2007).

### Ethical considerations

The research ethics committee of Khon Kaen University in Thailand accepted this study (HE631628). Eligible participants were addressed at their regular medical appointments by nurses or at patient advocacy group meetings by the study researcher. We received signed informed consent from all participants after a brief explanation of the study design.

## Results

### Demographic and Clinical Characteristics of CCA Patients

The questionnaire was completely done by 231 CCA patients. Of these, 154 participants were males (66.7%) and the average age was  $66.85 \pm 8.65$  SD years. The majority of their marital status was married (75.8%) and had primary school education (69.4%). Two out of third of the participants (71.9%) were classified in stage III-IV with metastatic condition (61.9%) (Table 1).

### Summary Statistics of the 32 Symptoms by the T-MSAS-SF

The five most prevalent physical symptoms were shown in Table 2 including change in food tastes (61.37%), pain (61.05%), weight loss (58.87%), feeling bloated (57.32%), and lack of appetite (54.21%), respectively. The most frequent psychological symptoms were feeling irritable (71.33%), worrying (70.72%), feeling sad (69.78%), and feeling nervous (66.67%). Symptoms with the highest scores were change in the way food tastes, pain, weight loss, feeling bloated, and lack of appetite and corresponding mean symptom scores were  $1.08 \pm 0.69$  SD,  $1.34 \pm 0.99$  SD,  $1.11 \pm 0.85$  SD, and  $1.32 \pm$

$1.04$  SD, respectively (Table 3).

### Reliability

Both total and all T-MSAS-SF subscales also showed good internal consistency with the Cronbach alpha coefficient more than 0.70. The Cronbach alpha coefficient of GDI, PHYS, PSYCH and TMSAS were 0.80, 0.80, 0.82, 0.76, and 0.87, respectively (Table 4).

### Convergent Validity

As expected, the PHYS subscale of T-MSAS-SF showed both negatively significant correlation with the physical well-being subscale of FACT-Hep ( $r=-0.68$ ,  $p<0.001$ ) and Hepatobiliary cancer subscale ( $r=-0.52$ ,  $p<0.001$ ). Whereas, the PSYCH subscale of the T-MSAS-SF significantly positively correlated with the Emotional Wellbeing subscale of FACT-Hep ( $r=-0.64$ ,  $p<0.001$ ), Hepatobiliary cancer subscale ( $r=0.60$ ,  $p<0.001$ ) and HADS ( $r=0.66$ ,  $p<0.001$ ). In addition, the T-MSAS-SF PHYS, PSYCH, GDI, MSAS and NS subscale showed inversely significantly correlation with the overall scores of FACT-Hep ( $r=-0.56$ ,  $r=-0.64$ ,  $r=-0.65$ ,  $r=-0.61$  and  $r=-0.56$ ,  $p<0.001$ ) respectively (Table 5).

Table 1. Baseline and Clinical Characteristics of the CCA Patients (n=231)

Characteristics	Number	Percent
Gender		
Male	154	66.7
Female	77	33.3
Age (year)		
Less than 50	8	3.5
50-59	43	18.7
$\geq 60$	180	77.9
Mean ( $\pm$ SD)	66.85( $\pm 8.65$ )	
Education level		
Primary	159	69.4
Secondary	53	23.1
Bachelor	17	7.4
Marital status		
Married	175	75.8
Unmarried	56	24.2
Comorbidity		
No	127	55.2
Yes	103	44.8
Cancer stage at diagnosis		
I	21	9.0
II	28	12.1
III	96	41.6
IV	70	30.3
Unknown	16	7.0
Metastasis		
No	88	38.1
Yes	143	61.9

Table 2. The Prevalence of Physial Symptom among CCA Patients Assessed by T- MSAS-SF (n= 231)

Item	Frequency: How Much Did the Symptom Distress You?						SCORE
	Prevalence n (%)	Not At All n (%)	A little Bit n (%)	Some what n (%)	Quite a Bit n (%)	Very Much n (%)	Symptom Mean (±SD)
Difficulty concentrating	65 (20.2)	166 (71.9)	50 (21.6)	8 (3.5)	7 (3.0)	0 (0.0)	0.37 (±0.69)
Pain	196 (61.1)	35 (15.2)	138 (59.7)	35 (15.2)	23 (10)	0 (0.0)	1.19 (±0.81)
Lack of energy	160 (49.8)	71 (30.7)	86 (37.2)	48 (20.8)	22 (9.5)	4 (1.7)	1.14 (±1.01)
Cough	38 (11.84)	193 (83.5)	29 (12.6)	9 (3.9)	0 (0.0)	0 (0.0)	0.20 (±0.49)
Changes in skin	165 (51.4)	66 (28.6)	124 (53.7)	30 (13.0)	6 (2.6)	5 (2.2)	0.96 (±0.84)
Dry mouth	158 (49.2)	73 (31.6)	147 (63.6)	2 (0.9)	8 (3.5)	1 (0.4)	0.77 (±0.67)
Nausea	87 (27.1)	144 (62.3)	66 (28.6)	18 (7.8)	2 (0.9)	1 (0.4)	0.48 (±0.71)
Feeling drowsy	78 (24.2)	153 (66.2)	56 (24.2)	22 (9.5)	0 (0.0)	0 (0.0)	0.43 (±0.66)
Numbness/tingling	29 (9.03)	202 (87.4)	22 (9.5)	7 (3.0)	0 (0/0)	0 (0.0)	0.18 (±0.57)
Difficulty sleeping	145 (45.1)	86 (37.2)	113 (48.9)	22 (9.5)	10 (4.3)	0 (0/0)	0.80 (±0.77)
Feeling bloated	184 (57.3)	47 (20.3)	129 (55.8)	44 (19.9)	4 (1.7)	0 (0.0)	1.11 (±0.85)
Problems with urination	33 (10.2)	198 (85.7)	26 (11.3)	7 (3.0)	0 (0.0)	0 (0.0)	0.20 (±0.58)
Vomiting	19 (5.9)	212 (91.8)	18 (7.8)	1 (0.4)	0 (0.0)	0 (0.0)	0.80 (±0.29)
Shortness of breath	6 (1.86)	225 (97.4)	5 (2.2)	1 (0.4)	0 (0.0)	0 (0.0)	0.03 (±0.24)
Diarrhea	14 (4.36)	217 (93.9)	13 (5.6)	1 (0.4)	0 (0.0)	0 (0.0)	0.06 (±0.26)
Sweats	46 (14.3)	185 (80.1)	33 (14.3)	9 (3.9)	4 (1.7)	0 (0.0)	0.27 (±0.61)
Mouth sores	59 (18.4)	172 (74.5)	54 (23.4)	5 (2.2)	0 (0.0)	0 (0.0)	0.27 (±0.49)
Sexual interest or activity	87 (27.1)	144 (62.3)	41 (17.7)	19 (8.2)	26 (11.3)	1 (0.4)	0.69 (±1.05)
Itching	123 (38.3)	108 (46.8)	89 (38.5)	18 (7.8)	16 (6.9)	0 (0.0)	0.74 (±0.87)
Lack of appetite	174 (54.2)	57 (24.7)	79 (34.2)	65 (28.1)	23 (10.0)	7 (3.0)	1.32 (±1.04)
Dizziness	129 (40.1)	102 (44.2)	99 (42.9)	30 (13.0)	0 (0.0)	0 (0.0)	0.68 (±0.69)
Difficulty swallowing	43 (13.3)	138 (81.4)	39 (16.4)	1 (0.4)	3 (1.3)	0 (0.0)	0.21 (±0.50)
Change in food tastes	197 (61.3)	34 (14.7)	155 (67.1)	30 (13.0)	12 (5.2)	0 (0.0)	1.08 (±0.69)
Weight loss	189 (58.8)	42 (18.2)	107 (46.3)	48 (20.8)	28 (12.1)	6 (2.6)	1.34 (±0.99)
Hair loss	38 (11.8)	193 (83.5)	38 (16.5)	0 (0.0)	0 (0.0)	0 (0.0)	0.16 (±0.37)
Constipation	90 (28.1)	141 (61.0)	88 (38.1)	2 (0.9)	0 (0.0)	0 (0.0)	0.39 (±0.50)
Swelling of arms or legs	40 (12.4)	191 (82.7)	30 (13.0)	6 (2.6)	4 (1.7)	0 (0.0)	0.21 (±0.48)

Table 3. The Prevalence of Psychological Symptom among CCA Patients assessed by T-MSAS-SF (n= 231)

Item	Frequency: How Much Did the Symptom Distress You?					SCORE Symptom
	Prevalence n (%)	Rarely n (%)	Occasionally n (%)	Frequently n (%)	Almost Constantly n (%)	Mean(±SD)
Feeling sad	224 (69.7)	150 (64.9)	47 (20.3)	24 (10.4)	1 (0.4)	1.38 (±0.74)
Worrying	227 (70.7)	28 (12.1)	133 (57.6)	60 (26.0)	6 (2.6)	2.15 (±0.72)
Feeling irritable	229 (71.3)	102 (44.2)	83 (35.9)	43 (18.6)	1 (0.4)	1.73 (±0.78)
Feeling nervous	214 (66.6)	195 (84.4)	10 (4.3)	9 (3.9)	0 (0.0)	1.04 (±0.52)

Table 4. Internal Consistency of the T-MSAS-SF based on Symtom Scores for Itemss Included in each Subscale

Method	T-MSAS-SF			
	PHYS	PSYCH	GDI	TMSAS
Cronbach’s alpha	0.82	0.76	0.8	0.87

T-MSAS-SF, simplified Thai version of the Memorial Symptom Assessment Scaled-Short Form; PHYS, Physical Symptom Subscale; PSYCH, Psychological Symptom Subscale; GDI, Global Distress Index; TMSAS, Total Memorial Symptom Assessment Scale

## Discussion

Understanding symptom burden can improve clinical decision making by clarifying which symptom interventions are needed and by defining the optimal timing of palliative and supportive care for cancer patients, as symptoms are closely associated with QOL Unmet Needs and anxiety and depression (Gough et al., 2017).

Thus, for cancer patient care, symptom assessment using reliable and valid instruments is critical. Because



Table 5. Correlation Matrix for Convergent Validity of T-MSAS-SF among FACT-Hep, HADs and T-CaSUN

Scale	PHYS	PSYCH	GDI	MSAS	NS
FACT-Hep					
Physical well-being	-0.68**	-0.54	-0.68	-0.7	-0.6
Social/family well-being	-0.15	-0.65	-0.24	-0.22	-0.19
Emotional well-being	-0.33	-0.64**	-0.59	-0.46	-0.41
Functional well-being	-0.37	-0.39	-0.41	-0.42	-0.39
Hepatobiliary cancer subscale	-0.52**	0.60**	-0.65	-0.57	-0.62
Total (overall HRQOL)	-0.56**	-0.64**	-0.65**	0.61**	0.56**
HADS	0.4	0.66**	0.63	0.54	0.5
T-CaSUN					
Intensive care	-0.10*	-0.16**	-0.12	-0.1	-0.1
Information	-0.16*	-0.17*	-0.16	-0.15	-0.15
Relationship	-0.14*	-0.15*	-0.13	-0.13	-0.15
Medical care	-0.14*	-0.15*	-0.14	-0.15	-0.14

(\*p < 0.05; p\*\* < 0.001).

the MSAS-SF has established reliability and validity in many countries, we conducted the first assessment of the Thai version's validity as a tool for symptom evaluation of patients with CCA in Thailand.

The current study demonstrated that the T-MSAS-SF has been culturally translated successfully. Most of CCA patients completed the T-MSAS-SF in less than five minutes, indicating that the instrument is simple to use. Meanwhile, when applied to mainland Thai CCA patients, the T-MSAS-SF had adequate psychometric properties of reliability and validity, and these results were comparable to previous studies in other groups. (Chang et al., 2000; Lam et al., 2008; Nho et al., 2018).

T-MSAS-SF scores varied according to cancer stage; the advanced stage T-MSAS-SF subscale scores were higher than those in the early stage group. These results are consistent with the findings that MSAS-SF subscale scores are significantly correlated with advanced cancer stage patients with lung cancer based on tumor, node, and metastasis (TNM) stage (Yücege et al., 2015). Thus, the T-MSAS-SF was appropriate to cancer stage. The top five most physical symptom prevalence, including change in the way food tastes, pain, weight loss, feeling bloated, and lack of appetite, were consistent with the original study's findings (Chang et al., 2000). In our study, however, the prevalence of psychological symptoms was higher than in the original study (Chang et al., 2000), and three of four most prevalent psychological symptoms including feeling irritable, worrying, and feeling sad, were among the most frequently reported.

The current study demonstrates that the T-MSAS-SF has a high degree of internal consistency with Cronbach's alphas ranging from 0.76 to 0.87, thus supporting their reliability. The findings are consistent with previous research in Taiwan (Lam et al., 2008), Korea (Nho et al., 2018), Spain (Dapuetto et al., 2014), and China (Fu et al., 2018). Cronbach's alphas for the PHYS and PSYCH subscales in the original MSAS were 0.88 and 0.83, respectively. Our results, for the internal consistency of the T-MSAS-SF are consistent with the original MSAS (Portenoy et al., 1994). Furthermore, the mean scores of

the PHYS, PSYCH, GDI, and TMSAS subscales, as well as the number of symptom occurrences, were comparable to those of Chinese colon cancer outpatients receiving chemotherapy (Fu et al., 2018). All T-MSAS-SF subscales had adequate internal consistency, which was similar to the original study (Chang et al., 2000). T-MSAS-SF subscale scores and number of symptoms were low to moderately correlated with scores on various measures of psychological distress and HRQOL, indicating that the T-MSAS-SF had good convergent validity. (Chang et al., 2000; Fu et al., 2018)

The subscale scores of T-MSAS-SF were moderately correlated with HADS, reflecting that they were measuring a similar construct. Construct validity was also supported by comparing T-MSAS-SF scores in clinically distinct subpopulations. CCA patients with worse performance status, such as advanced stage of cancer or metastatic CCA, had higher MSAS subscale and total scores than those with early stage of cancer. We provided a detailed description of the distress and unmet needs that CCA patients face on their daily basis. We also showed that many of these patients not only report symptom burden but they are also associated with depression, anxiety, and HRQOL. Regardless of whether the individuals had mild to severe symptoms, 98.7 percent of cases reported being distressed by their symptom occurrences, physical, and psychological symptoms that impacted their HRQOL. Similar to Gray et al., physical, psychological and social factors were all significantly and independently associated with overall QOL. The majority of predictors could be changed, with symptoms, depression, and limitations to usual activities being the most important (Gray et al., 2011). In addition, symptom occurrences also showed weak correlation with T-CaSUN. This result could be explained by the fact that some CCA patients have symptoms and poor psychological functioning presenting unmet, but some of these patients may have been satisfied with their care, did not find their symptoms or limitations to be bothersome, or did not require professional assistance (Steele and Fitch, 2008).

### Limitations

This study has limitations. This research was carried out in a single tertiary hospital. As a result, the sample may not be fully representative of Thailand's total population of cancer patients. A multicenter study may be conducted in the future. Nevertheless, this study confirms that the T-MSAS-SF is a reliable and valid tool for symptom assessment in CCA patients. Because cancer and palliative care are urgent national priorities in our setting, we hope that this instrument will aid in the advancement of research and clinical care for Thai CCA populations.

In conclusion, the T-MSAS-SF is a valid and reliable scale for measuring the intensity, severity, and distress of CCA patients' symptoms. The T-MSAS-SF can help health care providers assess physical and psychological symptoms for most CCA patients in early to advance stage of cancer in Thailand during cancer treatment and early post-treatment stage and contribute to symptom management. Moreover, health care providers are permitted to use the T-MSAS-I to track patients' symptom experiences and to provide appropriate and timely nursing interventions.

### Author Contribution Statement

MS., PR. envisioned the research idea. US. analyzed, interpreted the data, and helped to draft the manuscript. That was also discussed with US and ST. who supervised the research project. All authors revised the manuscript critically and approved the final version to be published.

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### Ethical Approval

This research was approved by the research ethics committee of Khon Kaen University, Thailand (HE631628). The informed written consent was obtained from each of the study participants of this study. Besides, every participant was assured about the confidentiality of his personal information.

### Availability of the data

Data can be provided on a duly justified request to the corresponding author.

### Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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