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Original Article

Psychometric properties of the Screen for Child Anxiety Related Disorders Thai version

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Abstract ***Background*:** Anxiety disorders are the most common psychiatric disorders among children. Because of their internalizing nature, anxiety disorders are underdiagnosed and untreated. Therefore, self-report screening tools play an important role in the early identification of these cases. This study aimed to examine the psychometric properties of the Screen for Child Anxiety Related Disorders (SCARED)-Thai version in a clinical population.

***Methods*:** One hundred and eight participants were enrolled from patients aged 9–16 years with any psychiatric diagnosis and their parents who visited a child and adolescent psychiatric clinic in Thailand. All the parent-child pairs completed the SCARED and the Strengths and Difficulties Questionnaire (SDQ)-emotional subscale. Clinical diagnosis of an anxiety disorder was endorsed through a standard clinical interview by certified child and adolescent psychiatrists blinded to the results of the SCARED and SDQ. Internal consistency, predictive validity, and convergent validity of the screens were assessed.

***Results*:** This study found that the SCARED-Thai version had very good reliability, with internal consistency (Cronbach's alpha) of 0.913 for the SCARED-Child form and 0.925 for the SCARED-Parent form. With an optimal cut-off point of 23, the SCARED-Child version significantly distinguished anxious from non-anxious young people in clinical settings with a sensitivity of 0.74 and a specificity of 0.50, while the SCARED-Parent version had a sensitivity of 0.74 and a specificity of 0.67 at the same threshold. The convergent validity between the SCARED-Thai (total) and SDQ (emotional subscale) was at a highly suitable range ($r = 0.81$).

***Conclusion*:** The SCARED-Thai version exhibited good psychometric quality for identifying young people with comorbid anxiety disorders when used in clinical settings.

Key words anxiety disorder, reliability, Screen for Child Anxiety Related Disorder, validity.

Anxiety disorders are one of the most common classes of psychiatric disorders among children, with a prevalence ranging from 10–32% in the general population.[1,2] Pediatric anxiety disorders are associated with multiple psychosocial and family dysfunctions as well as academic difficulties.[3] If not treated appropriately, childhood anxiety disorders are likely to persist into early adulthood and could, heterotypically, proceed to various forms of psychiatric illness, such as depression and substance use disorder as well as, homotypically, continue as comorbidities.[1] Because of their internalizing nature, anxiety disorders are often underdiagnosed and left untreated.[4,5] Children with anxiety disorders may not seek help on their own, while their parents are often unable to recognize their symptoms.

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Therefore, disorder-specific, self-report screening tools play an important role in the process of early identification in these cases.[3,6] Currently, several pediatric anxiety screening tools are available and used in both clinical and research settings, including the Screen for Child Anxiety and Related Disorders (SCARED), the Multidimensional Anxiety Scale for Children, Second Edition (MASC2), the Paediatric Anxiety Rating Scale (PARS), and the Spence Children's Anxiety Scale (SCAS).[7]

The SCARED is a self- and parent-report instrument that screens for anxiety symptoms based on the *Diagnostic and Statistical Manual of Mental Disorders*, fourth Edition (DSM-IV) classification[8] in children and adolescents aged 9–18 years. The SCARED was developed by Birmaher *et al*. in 1997,[9] and has been widely accepted and translated into several languages.[10–12] The SCARED-Thai version was translated[13] and piloted to determine its content validity in a clinical sample of young people in Thailand (Ularntinon S and Nithiuthai J, 2017, unpublished data). Hence, the current study aimed to examine the reliability and validity of the SCARED-Thai version when used as an anxiety screening measure in clinical settings.

Method

Participants

A total of 108 participants were recruited for the study. They were enrolled through purposive sampling from patients aged 9–16 years with any psychiatric diagnosis who visited the Child and Adolescent Psychiatric Clinic, Queen Sirikit National Institute of Child Health, Bangkok, Thailand from 1 February to 31 December 2019. The children's parents were also enrolled. Informed consent and child assent were obtained prior to participation. Participants with severe medical or psychiatric illnesses (e.g., psychosis, delusion, hallucination, suicidal ideation/attempt, and alteration of consciousness) were excluded, as were those who were unable to understand the Thai language. The total N was calculated by the formula: $n = \frac{Z^2_{1-\alpha/2}\,(1-\text{sens})}{d^2 \times \text{Prev}}$ using a prevalence at 0.39 (prevalence of total anxiety disorder)[11] and sensitivity of 0.71 (Ularntinon S and Nithiuthai J, 2017, unpublished data). The number of participants required was 101.

Procedure

Child participants completed the SCARED-Child Thai version, and their parents completed the SCARED-Parent Thai version. Both also completed the Thai Strengths and Difficulties Questionnaire (SDQ)-emotional subscale. Demographic information was obtained from the parents. A confirmed diagnosis of an anxiety disorder based on *the Diagnostic and Statistical Manual of Mental Disorders,* fifth Edition[14] was endorsed through a standard clinical interview by a certified child and adolescent psychiatrist blinded to the results of the SCARED and SDQ.

The study was approved by the Institutional Review Board of the Queen Sirikit National Institute of Child Health (approval number REC.077/2562).

Measures

The Screen for Child Anxiety Related Disorders

The SCARED (Birmaher *et al.*[9]) consists of 41 items, and has both child and parent forms. Participants rate from 0 to 2 based on the frequency of each item (0 = not true or hardly ever true, 1 = sometimes true, and 2 = true or often true) with a higher score reflecting a higher level of anxiety. The SCARED is composed of five subscales drawing on the five dimensions of anxiety manifestation in young people: (i) somatic/panic disorder (13 items), (ii) generalized anxiety disorder (9 items), (iii) separation anxiety disorder (8 items), (iv) school phobia (4 items), and (v) social anxiety (7 items). The psychometric properties of the original English version were conducted in psychiatric clinical settings with good test-retest reliability (interclass correlation coefficient = 0.86), good internal consistency ($\alpha = 0.90$), and good discriminant validity between the young people with and without an anxiety disorder.[9] At a cut-off score of 25, the discriminant validity of the scale between the clinical and non-clinical samples was 0.71 for sensitivity and 0.67 for specificity.[9]

The SCARED-Thai version was translated[13] and piloted to determine its content validity in a clinical sample of young people in Thailand (Ularntinon S and Nithiuthai J, 2017, unpublished data).

Strengths and difficulties Questionnaire

The SDQ (Goodman[14]) comprises 25 items. The participants rate each item from 0 to 2 (0 = not true, 1 = somewhat true, and 2 = certainly true). The SDQ is divided into five subscales: (i) conduct problems, (ii) hyperactivity, (iii) emotional symptoms, (iv) peer relationships, and (v) prosocial behavior. The scale has self-report, parent-report, and teacher-report forms with good internal consistency ($\alpha = 0.80$ for self-report, $\alpha = 0.82$ for parent-report). The emotional subscale, which was used for assessing the convergent validity in this study, was effective for screening mood and anxiety disorders in young people in the clinical samples, with both the sensitivity and specificity at 0.8.[15] The SDQ-Thai emotional scale has been used in Thailand for almost 10 years with sufficiently favorable validity in case identification. The SDQ-Thai emotional scale has acceptable internal consistency ($\alpha = 0.63$ for both the parent- and self-reports).[16]

Statistical analysis

Data were analyzed using IBM SPSS software for Windows, version 23.0 (IBM Corp., Armonk, New York, United States). Sample characteristics were analyzed using descriptive statistics (numbers and percentages for categorical data, and the mean and standard deviation for continuous data). The reliability of the SCARED-Thai version was determined by Cronbach's alpha coefficient for internal consistency whereas predictive validity was reported as sensitivity, specificity, and positive and negative predictive values. The optimal cut-off threshold for a diagnosis of anxiety in this study was determined by plotting the receiver operating characteristic (ROC) curve. Agreement between the child and parent reports of the SCARED-Thai version within each item was reported via kappa agreement. Pearson's correlation coefficient was used to examine the parent-child agreement on the five SCARED subscales and the convergent validity of the SCARED-Thai version and SDQ-emotional subscale. For all analyses, the statistical significance was set at P-value < 0.05.

Results

Demographic data

The mean age of the 108 child participants who enrolled in this study was 10.99 $\pm$ 1.81 years. Sixty-seven participants (62%) were male, and 41 (38%) were female. The premorbid

psychiatric diagnoses for clinic visits included attention-deficit/hyperactivity disorder (ADHD) (63 participants, 58.3%), specific learning disorder (29 participants, 26.9%), and mood disorders (14 participants, 13%). Thirty-five participants (32.4%) were diagnosed with anxiety disorders: 11 participants with generalized anxiety disorder (10.2%), 10 participants with panic disorder (9.3%), 10 participants with social anxiety disorder (9.3%), five participants with significant school avoidance (4.6%), and two participants with separation anxiety disorder (1.9%).The diagnostic clinical interviews were performed by two, board-certified child psychiatrists (TT and SU).

The mean scores of the SCARED-Thai version scale and subscales are shown in Table 1. The total score and almost all subscale scores from both the SCARED parent and child forms were significantly different between children with anxiety disorders (n = 35) and those with non-anxiety disorders (n = 73). The exception was only in the separation anxiety and school avoidance subscales from the SCARED-Child report that did not show the difference between these two groups.

Table 1 Comparison of SCARED mean scores between anxious and non-anxious participants

	SCARED-child report				SCARED-parent report			
	Total (N= 108) Mean ± SD	Anxious (n= 35) Mean ± SD	Non-anxious (n = 73) Mean ± SD	P	Total (N = 108) Mean ± SD	Anxious (n = 35) Mean ± SD	Non-anxious (n= 73) Mean ± SD	P
Total SCARED	26.54 ± 13.6	32.29 ± 14.46	23.78 ± 12.34	0.002*	25.31 ± 13.58	34.06 ± 13.81	21.12 ± 11.36	<0.001*
Panic disorder	5.9 ± 4.79	7.57 ± 5.3	5.1 ± 4.33	0.01*	6.23 ± 5.15	9.2 ± 6.07	4.81 ± 3.96	<0.001*
Generalized anxiety disorder	5.77 ± 4.11	7.11 ± 4.4	5.12 ± 3.83	0.036*	6.45 ± 4.32	8.77 ± 4.28	5.34 ± 3.9	<0.001*
Separation anxiety disorder	6.52 ± 3.25	7.31 ± 3.45	6.14 ± 3.11	0.083	5.05 ± 3.05	6 ± 3.19	4.59 ± 2.89	<0.001*
Social anxiety disorder	6.05 ± 3.48	7.71 ± 3.21	5.25 ± 3.33	<0.001*	5.8 ± 3.24	7.49 ± 3.36	4.99 ± 2.86	<0.001*
Significant school avoidance	2.31 ± 1.9	2.57 ± 1.97	2.18 ± 1.87	0.302	1.79 ± 1.94	2.6 ± 2.16	1.4 ± 1.71	<0.001*

*Significant at $P < 0.05$.
SCARED, Screen for Child Anxiety Related Disorders.

Reliability and Validity of the SCARED-Thai version

Reliability of the SCARED-child and SCARED-parent forms and their subscales

The internal consistency. Cronbach's alpha coefficient of the internal consistency of the total scores of the SCARED-Child and SCARED-Parent forms were in the excellent range of 0.913 and 0.925, respectively. All the subscale scores in both versions were also ranged from good to very good (Table 2).

Cross-informant agreement. The total SCARED-Parent and SCARED-Child scores were significantly correlated with the report r = 0.66. The parent-child correlations were 0.613 for the social anxiety disorder subscale, 0.576 for the panic disorder subscale, 0.547 for the separation anxiety disorder subscale, 0.52 for the school avoidance subscale, and 0.517 for the generalized anxiety disorder subscale (Table 3). The kappa values for the parent-child agreement within each item and for each SCARED-Thai subscale are shown in Figure 1. The kappa values for the items on the panic subscale ranged between 0.072 and 0.357, while the generalized anxiety subscale ranged between 0.1 and 0.321, the separation anxiety subscale ranged between 0.193 and 0.289, the social anxiety subscale ranged between 0.061 and 0.314, and the school avoidance subscale ranged between 0.271 and 0.306.

Validity of the SCARED-Thai version

The convergent validity of the total SCARED-Thai version and the SDQ-emotional subscale were in a very good range at 0.81. For the subscales, the correlation was the highest in the panic and generalized anxiety subscales and lowest in the separation anxiety subscale (Table 3).

Table 2 Internal consistency of SCARED-Child and SCARED-Parent forms and their subscales

	SCARED-Child ($N = 108$)	SCARED-parent ($N = 108$)
Total score (41 items)	0.913	0.925
Subscale		
1. Panic disorder or significant somatic symptoms (13items)	0.835	0.879
2. Generalized anxiety disorder subscale (9 items)	0.833	0.863
3. Separation anxiety disorder (8 items)	0.641	0.702
4. Social anxiety disorder (7 items)	0.767	0.791
5. Significant school avoidance (4 items)	0.711	0.743

Values represent Cronbach's alpha coefficient.
SCARED, Screen for Child Anxiety Related Disorders.

Predictive validity of the SCARED-Thai version in the clinical sample

The SCARED-Thai version showed good discriminant validity between clinical anxious and non-anxious young people (Table 3). At a threshold score of 23, the SCARED-Child form could significantly distinguish anxious young people from non-anxious young people with sensitivity of 0.74 and specificity of 0.50, while the SCARED-Parent form showed sensitivity of 0.74 and specificity of 0.67 (Table 4).

The ROC curve showed that the SCARED-Parent form could better discriminate anxious from non-anxious young people than the SCARED-Child form, with the area under the curve (AUC) at 0.775 ($P < 0.001$) for the SCARED-Parent form and 0.668 ($P = 0.005$) for the SCARED-Child form (Figs 2 and 3).

Discussion

The purpose of this study was to investigate the reliability and validity of the SCARED-Thai version in a clinical sample of Thai young people.

Both the child and parent forms of the SCARED-Thai in this study showed excellent internal consistency (Cronbach's alpha coefficient of the SCARED-Child and SCARED-Parent forms were 0.913 and 0.925, respectively), which was consistent with the original English version in a clinical sample from a previous study.[9] Panic disorder, significant somatic symptoms, and generalized anxiety disorder subscales showed good internal consistency, whereas social anxiety disorder, significant school avoidance, and separation anxiety disorder subscales showed acceptable internal consistency that correlated with the findings of the Arabic version, also studied in a clinical sample.[11]

Parent-child agreement between the child's and parent's scores was in the range of high agreement, with Pearson's correlation coefficient reported at 0.66. This finding was comparable to an Italian study ($r = 0.6$)[17] and a German study ($r = 0.5$)[12] that also reported agreement values higher than the established English version ($r = 0.33$).[9] As for the subscales, the highest rate for the parent-child agreement was in the social anxiety subscale. This finding was different from the Italian study[17] and a Spanish study,[18] which showed that the highest agreement was in the separation anxiety subscale. This might be explained by the socio-cultural differences in that Thai families are more likely to live as a close-knit social unit. Unfamiliar situations may provoke more social anxiety and separation anxiety symptoms in Thai children. Thus it would be easier for Thai parents to notice and report these relatively culture-bound symptoms of both conditions. Interestingly, the parent-child agreement within each item revealed that Items 34 (When I get frightened, I feel like throwing up.) and 22 (When I get frightened, I sweat a lot.) had the highest agreement. From a clinical perspective, these two symptoms disturb children and parents a lot, so children are more likely to report or show these symptoms to their parents.

The SCARED-Thai version total scores and SDQ-Thai emotional subscale scores were highly correlated in both the

Table 3 Mean scores for each perspective, cross- informant agreement and correlations between the SDQ and SCARED

SCARED	Child	Parent	*P*	Cross-informant Agreement	Correlations with SDQ	
	Mean (SD) ± $N = 108$	Mean (SD) $N = 108$		*r*	Child *r*	Parent *r*
Total	26.54 (13.60)	25.31 (13.58)	0.29	0.66**	0.81**	0.81**
Panic/Somatic	5.90 (4.79)	6.23 (5.15)	0.46	0.576**	0.71**	0.54**
Generalized anxiety	5.77 (4.11)	6.45 (4.32)	0.09	0.517**	0.77**	0.51**
Separation anxiety	6.52 (3.25)	5.05 (3.05)	<0.001*	0.547**	0.49**	0.35**
Social phobia	6.05 (3.48)	5.80 (3.24)	0.39	0.613**	0.51**	0.28**
School phobia	2.31 (1.9)	1.79 (1.94)	0.01*	0.520**	0.53**	0.47**

*Significant at $P < 0.05$.
**Significant $P < 0.01$.
SCARED, Screen for Child Anxiety Related Disorders; SQD, Strength and Difficulties Questionnaire.

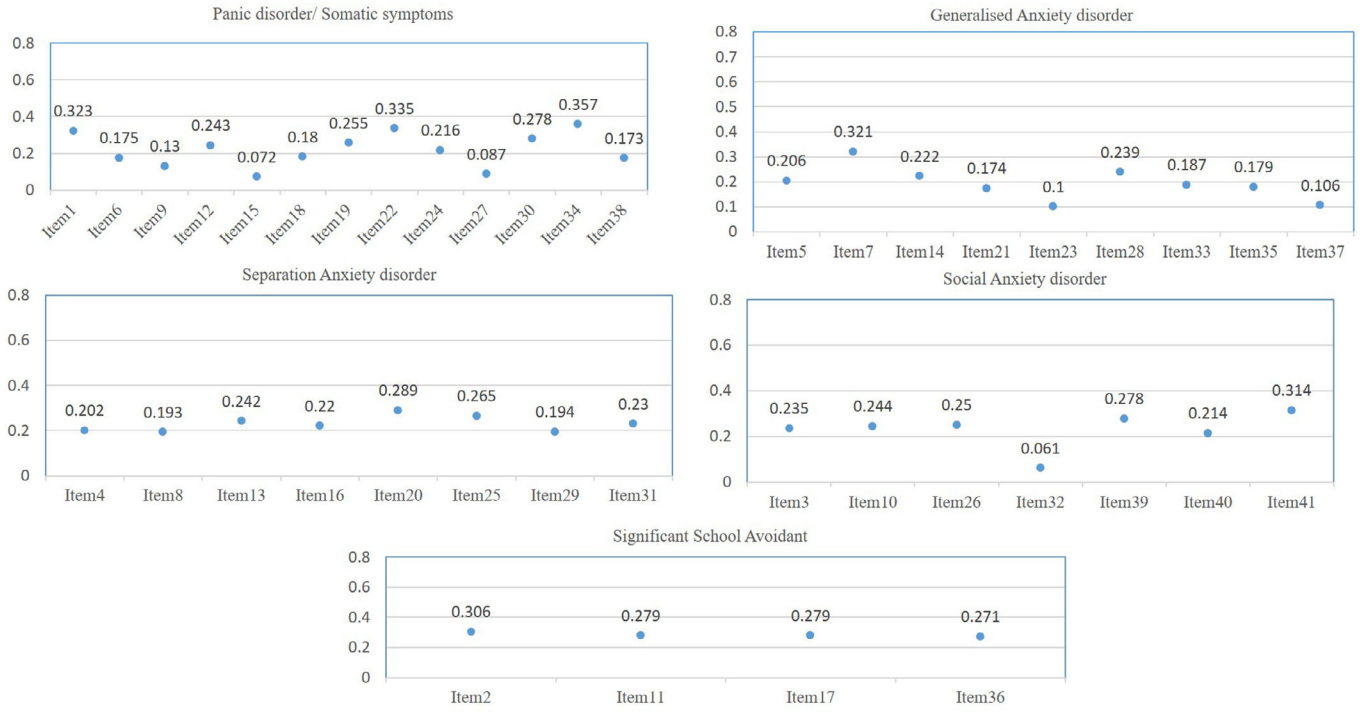

Fig. 1 Graphical representation of Kappa for parent-child agreement within each item and for reach Screen for Child Anxiety Related Disorders-Thai version (SCARED-Thai) subscale.

Table 4 Predictive validity of SCARED

	Report	AUC	*P*	Cut-off	Sensitivity%	Specificity%	PPV%	NPV%
SCARED total score	Child	0.668	0.005	23	74.29	50.68	41.94	80.43
	Parent	0.775	<0.001	23	74.29	67.12	52	84.48

AUC, area under the curve; NPV, negative predictive value; PPV, positive predictive value; SCARED, Screen for Child Anxiety Related Disorders.

child and parent versions (r = 0.81). The correlations were higher than that reported in the Arabic version, which was conducted in a clinical sample comparing the SCARED-Arabic version with the SDQ-Arabic emotional subscale (r = 0.7).[11] However, the correlations for the scores in each subscale of the SCARED were not significantly correlated with the SDQ emotional subscale, as demonstrated in the SCARED total scores. This may be explained by the SDQ emotional subscale, which was composed of only five items and was not specific enough to identify the different dimensions of the anxiety disorders.

This study also found that children reported a higher number of symptoms, particularly separation anxiety and social phobia, when compared to their parents' report, which was similar to previous studies from Western countries.[19,20] However, the SCARED-Parent form could better distinguish anxious from non-anxious young people than the SCARED-Child form (AUC = 0.775 vs. AUC 0.668), as demonstrated by the ROC curves (Figs 2 and 3), which was comparable to the original English version study[9] (AUC = 0.7). This contradictory finding may be the result of parents taking into consideration the developmental stage, sex, and functional impairment from the anxiety symptoms of their child while considering endorsed positive symptoms of anxiety disorder.[19]

The original version of the SCARED proposed the cut-off scores for screening anxiety of 25 with sensitivity of 0.71 and specificity of 0.67. The lower threshold for the anxiety diagnosis of the SCARED-Thai version (cut-off = 23) when compared to the original version may be the result of 58.3% of participants in this study having previously been diagnosed with ADHD, in which anxiety disorder is a frequent comorbidity.[21] Therefore, a lower threshold for diagnosis may be the sequel of higher anxiety prevalent in the studied population. The psychometric properties of the SCARED-Arabic version were also conducted in clinical settings and reported cut-off scores of 24 for the SCARED-Parent form and 26 for the SCARED-Child form, with sensitivity and specificity of 0.67 and 0.55, respectively, for the SCARED-Parent form and 0.66 and 0.56 for the SCARED-Child form,[11] which was highly consistent with the predictive validity from the current study.

There were a number of limitations in this study. First, the sample size was too small to calculate the predictive validity

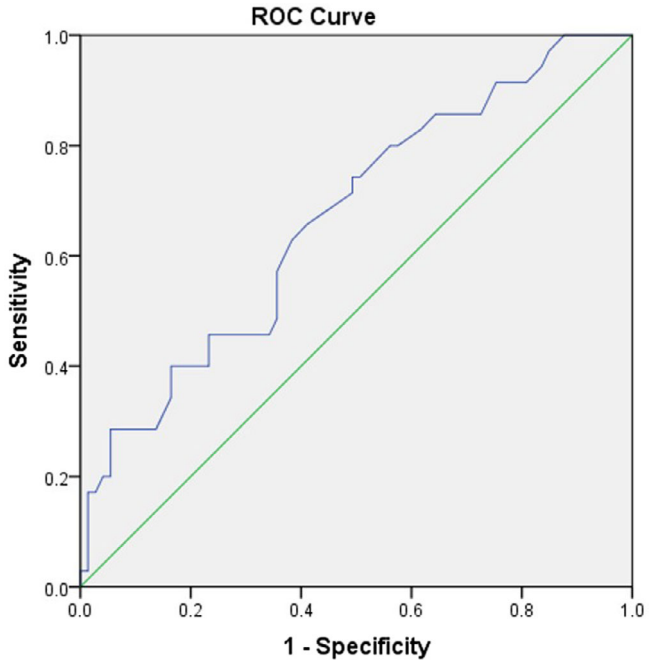

Fig. 2 Receiver operating characteristic (ROC) of Screen for Child Anxiety Related Disorders-child report form (SCARED-C) total score.

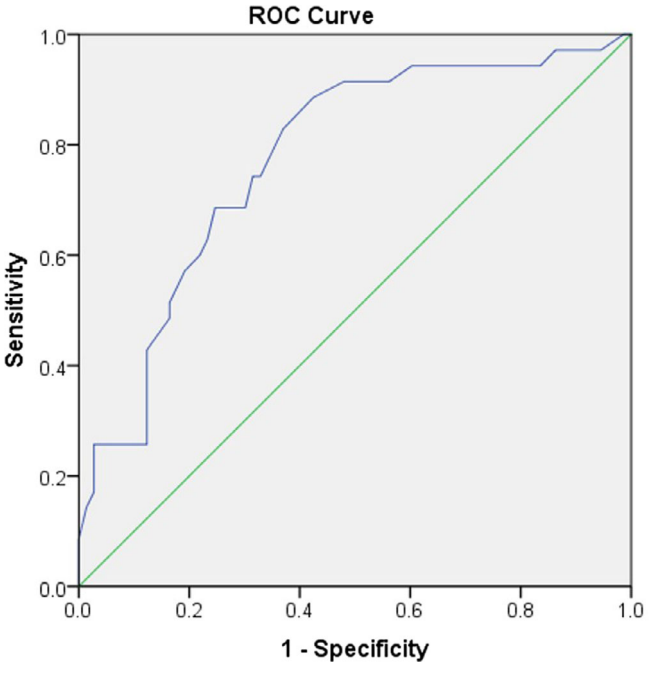

Fig. 3 Receiver operating characteristic (ROC) of Screen for Child Anxiety Related Disorders-Parent report form (SCARED-P) total score.

and factor analysis of each clinical subscale since it was calculated from the prevalence of overall anxiety disorders. Second, participants were enrolled from a clinical sample that frequently had a comorbidity of anxiety disorder. Hence, the cut-off score from this study may not be generalized to identify anxiety disorders in the community or other settings. Third, this study could not clarify the influence and possibility of the depressive symptoms upon the endorsed anxiety symptoms from the recruited participants since about 10–15% of the children with anxiety disorders were also diagnosed with concurrent depressive disorders.[22–24] Finally, due to the limited number of available participants, a comparative analysis of the participant subgroups, such as ADHD, specific learning disorder, and mood disorders, could not be performed.

For the clinical implications, we suggested that even though anxiety disorders are internalized in nature, information from both the child and parent were still considered valuable since various child anxiety symptoms were noticed more by the parents. In summary, the SCARED-Thai version possessed suitable psychometric properties, comparable to the established English version, and could be used reliably in psychiatric clinical settings as a valid screening tool to identify young people with comorbid anxiety disorders.

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Disclosure

The authors declare that they have no competing interests.

Author contributions

T.T., A.S., and S.U. designed the study. T.T. and A.S. collected and analyzed the data. T.T. and S.U. wrote the manuscript. All authors read and approved the final manuscript.

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