

Research Article**Translation Validity and Reliability of Modified Social Expressive Language and Language Comprehensive Subscales of the Child Development Inventory for Children With Autistic Disorder (Thai Version)**

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Abstract

The purpose of this study was to translate and examine the validity and reliability of the modified Thai version of social, expressive language and language comprehensive subscales of the Child Development Inventory (CDI). Forward and backward translation was applied. The process followed the back-translation procedure of WHO guideline. To test the validity and reliability of the CDI, content validation process was verified by five experts and reliability process was tested by thirty participants. The results showed that the modified CDI included similar content as the original. The content validity was high (Content Validity Index: CVI= .85-1.00) while the internal consistency reliability for the overall questionnaire was also high (Kuder-Richardson 20: KR-20= .88 - .94). In conclusion, the translation this modified subscale of CDI into Thai was successfully conducted. The Thai version of this subscale can be used in the assessment of the social, expressive language, and language comprehensive skills among Thai children with autistic disorder.

Keywords: autistic disorder; Child Development Inventory (CDI); expressive language; language comprehensive; social

Introduction

Currently, the number of children being diagnosed with autistic disorders has substantially increased. It is estimated that worldwide 1 in 160 children has an Autism Spectrum Disorder (ASD)¹. Autistic disorder is characterized by atypical development in the domains of social interaction, communication, and restrictive or repetitive behavior². Deficit in social attention is a primary concern. The children present with impairments in looking at others and orienting to their name as early as 8 months old and present a deficit in joint attention at 12 months old³. Impairment in social interaction is in the form of failure in developing peer relationships, impaired nonverbal behaviors, and lack of shared enjoyment or social-emotional reciprocity⁴. Impairment in communication is the form of delay of spoken language, stereotyped language, impairment in conversational ability, and deficits in imaginative play⁴. In summary, communication and social interaction skills are the important impairment symptoms that present before the symptom of repetitive behaviors at an early age. Moreover, the caregiver will notice these impairments at home. If the caregiver or health care teams can assess the symptoms of autistic children at an early age, the children also will receive treatment at an early age. Thus, the tool for the assessment of symptoms of children is important.

From the literature review relevant to the instrument, it was found that there are various types of existing instruments that have been used extensively for screening or diagnosing autistic disorder such as the Vineland Adaptive Behavior Scales (VABS) and the Child Development Inventory (CDI). However, with limited use of instruments with permission, some parts of CDI subscale could be selected to evaluate communication and social skills for preschool children with autism.

The CDI is a questionnaire designed for a parent to assess their own children and was designed

for assessment of children in the first 6 years of life and older children who are judged to be functioning at 6 years of age. The parent is asked to indicate the statement by marking "Yes" or "No". The result for each scale is interpreted as "within normal limits," "borderline," or "delayed"⁵. The CDI consists of 270 statements that measure development in 8 subscales: social, self-help, gross motor, fine motor, expressive language, language comprehension, letters, and numbers. The CDI developmental scales that correlated closely with age ($r= .84$) include social ($r= .81$), self-help ($r= .84$), gross motor ($r= .81$), fine motor ($r= .84$), expressive language ($r= .83$), language comprehension ($r= .84$), letters ($r= .70$), numbers ($r= .83$), and general development ($r= .89$). Expressive language, language comprehension, and general development scales showed the highest reliabilities; only a few item at older age levels show lower reliabilities. Language comprehensive, expressive language and general development subscales show the highest reliability; only a few items at older age show lower reliabilities⁵. As a result of focusing on the communication and social interaction skill impairment of children with autistic disorder, the focus of this study is on social, expressive language and language comprehension subscales. The social subscale of the CDI consists of 40 items that include interaction with parents, children and other adults. The expressive language subscales consist of 50 items; those items include expressive from simple to complex. The language comprehensive subscale also consists of 50 items that include language understanding from simple to the concept⁵.

However, at present, it is considered to be the most appropriate score for assessing the development skills of children with autistic disorder. The CDI has been considering for several reasons including the acceptable set of scale reliability and validity of the CDI and the appropriate between the details of subscale and the outcome measure. It was found

that the CDI fits for use in assessing communication and social interaction skills because the CDI reflects a set of subdomains that are relevant to expressive language, language comprehension, and social skills subscales. In addition, the strength of this scale was good reliability and validity. In Thai context, there are limited screening instruments in Thai version and the limitation of the CDI is the English version of the instrument.

In order to assess the symptoms of autistic children and treat them at an early age, it is necessary to back translate the social, expressive language and language comprehensive subscales of the CDI to Thai language and necessary to examine the validity and reliability of this instrument (Thai version). In addition, the researcher believes that Thai cultural adaptation and validation of these subscales would be extremely beneficial for Thai children, parents, and care providers.

Objective

The main objective was to translate the social, expressive language and language comprehensive subscales of the CDI to Thai and to examine the validity and reliability of this instrument (Thai version).

Methods

Descriptive research was applied with forward-backward translation of social, expressive language and language comprehensive subscales of the Child Development Inventory (CDI). The original instrument of CDI was translated to Thai version with permission of Child Development Review, Behavior Science Systems, Inc.

Procedures

The procedure of forward translation and the back-translation process followed the back-translation WHO guideline that focuses on cross-cultural and conceptual rather than on linguistic equivalences⁶. The process of translation and adaptation

were described as follows:

First step (forward translation)

For this step, one translator, an expert in English, translated the instrument into Thai. The translator should be an expert in the English-speaking culture⁶.

Second step (expert panel back-translation)

In order to maintain the content of the original version of instrument in this study, one translator, who was bilingual, translated the instrument back to English. Then, one native English speaker compared the similarity of meaning between the original and back-translated versions to test the equivalent⁶. It was found that there does not seem any difference of meaning between the original and back-translated versions. The researchers worked together in order to develop the final version in Thai language.

The process of validity and reliability testing

Validity testing

The instrument was evaluated for content validity by five experts that were comprised of one child psychiatrist, one speech and language pathologist, one child psychologist, and two expert child psychiatric nurses. The experts suggested for the cultural fit that 11 questionnaire items did not fit Thai culture; consisted of 8 items in expressive language subscale and 3 items in language comprehensive subscale. Then, the 11 items of the tool were modified based on the feedback of the experts. In addition, the CVI of all items were calculated.

Reliability testing

For the reliability of this tool, 30 caregivers of children with autistic disorder were asked to assess the meaning, clarity and readability of CDI Thai version. The tool was revised again based on the feedback of the caregivers. In addition, all data were calculated for internal consistency reliability by using the Kuder-Richardson Formula 20 (KR-20). As the question was designed for a parent to assess the communication and social skill of their

own children; it has limitation to assess inter-rater reliability.

Ethical consideration

The research gained ethical approval from the Institutional Review Board (IRB) of the Faculty of Nursing, Prince of Songkla University (PSU IRB 2017-NSt 029) and the Ethical Committee Review Board of Songkhla Rajahagarindra Psychiatric Hospital. Then the participants who met the inclusion criteria were approached by the first researcher. Written informed consent was obtained from each of the participants.

Collecting data for reliability testing

This study was conducted at Songkhla Rajahagarindra Psychiatric Hospital, a 300 beds and tertiary care hospital in the South of Thailand, from March to April 2018. Participants who agreed to participate in this study were informed about the details of the study. In addition, guardians were asked to sign the consent form. The demographic data form and the social, expressive language and language comprehensive subscales were carried out by the researcher.

Sample

The target population of this study is caregivers of children with autistic disorder. The participants are caregivers of children with autistic disorder who meet the inclusion criteria (purposive sampling). The selection criteria of the participants of this study include 1) the caregiver who provides continuing care for children with autistic disorder (children aged 4-7 years old), 2) adults aged over 18 years, 3) able to communicate or understand Thai language, and 4) live with their children with autistic disorder.

The number of patients to be included in the pilot study will depend on the parameters to be estimated; A general rule of thumb is to take 30 patients or greater to estimate a parameter^{7,8}. Therefore, the sample size of this study comprised 30 participants.

Results

Demographic data of the participants, from a total of 30 caregivers, the mean age of the caregivers was 38.53 years old (SD=10.92). 23 (76.7%) were parents and 7 (23.3%) were grandparents or cousins. The majority parental marital status was married (76.7%). Half of the caregivers graduated with a primary or secondary school degree (50.0%); the other half graduated higher secondary school degree (50.0%). Most of those caregivers were employed (70.0%) and had an average income of more than 10,000 baht per month (60.0%). According to the total of the 30 children with autistic disorder, 28 (93.3%) were male and 2 (6.7%) were female. The mean age was 64.83 months old (SD=11.64). Most of those children were diagnosed with autistic disorder (63.3%) and have received medication (76.7%) such as Risperidone and Ritalin. More than half of participants had a chief complaint related to communication or social skills (70.0%) and have received speech or occupation therapy (50.0%). Most of those children were Buddhist (56.7%) and have two siblings or more (73.3%). Most of the parents enrolled their children in preschool including Kindergarten (70.0%).

There were no major inconsistencies regarding forward (English to Thai) and back translation (Thai to English) procedure. As far as cultural adaptation is concerned, that could vary significantly among different cultures, lifestyles, and language (grammar). Regarding the three subscales, 1) the social skill subscale includes 40 items that related to interaction with parents, children and other adults; all items meaning fit with Thai culture. Thus, it was not necessary to adapt; 2) the expressive language subscale consists of 50 items relevant to talking language, expressive communication, gestural, vocal, and verbal behavior. 7 questionnaire items were in relation to talking English language and English grammar that was significantly different to Thai language; 1

questionnaire item was a question about an English nursery rhyme that was from a different culture. Thus, it needed to be adapted to Thai culture; and 3) the language comprehensive subscale comprises of 50 items that is the questionnaire about understanding language. There were 2 questionnaire items that related to English language and grammar and 1 item relevant to a different culture and clothing. Thus, there was a need to adapt all three items. In summary, total 11 questionnaire items were modified to Thai culture in this study.

Content validation was calculated using Content Validity Index (CVI) with 5 experts quantifying the extent of agreement between the experts. The experts were asked to independently rate the relevance of each item to the objective. The CVI is defined as the proportion of items given a rating of quite/ very relevant by raters involved. If all items are given ratings of 3 or 4 by raters, interrater agreement will be perfect and the value of the CVI will be 1.00. On the other hand, if one-half of the items are jointly classified as 1 or 2, the CVI will be 0.50, indicating an unacceptable level of content validity⁹. The validity assessment of the Thai version subscale in this study demonstrated high validity and was statistically acceptable; the social subscale showed acceptable validity (.85); and the expressive language and the language comprehensive subscales showed high validity (.98-1.00) (Table 1).

Table 1 The instrument content validity (Content Validity Index: CVI) and internal consistency reliability (Kuder-Richardson Formula 20: KR-20) (n=30)

Subscale	Content Validation Index (CVI)	Kuder-Richardson Formula 20 (KR-20)
Social	.85	.88
Expressive Language	.98	.94
Language Comprehensive	1.00	.94

Internal consistency reliability is most frequently employed for cognitive measures where concern is with the consistency of performance of one group across the items on a single measure. The Kuder-Richardson Formula 20 (KR-20) would be calculated as the estimate of reliability. KR 20 is special case of alpha used when data are dichotomously scored; each item in a test is scored 1 if correct and 0 if incorrect or missing. The closer the correlation coefficient, alpha, P_o , or K is to 1.00 (or 100%), the more reliable the measure or tool is presumed to be; Therefore, a good reliability should be .80 or more^{9,10}. For this study, the internal consistency reliability was calculated using KR20. It was found that the internal consistency reliability of the Thai version subscale showed good reliability (the ranges of KR-20 = .88-.94) (Table 1).

In conclusion, the results showed that the modified social, expressive language and language comprehensive subscales of CDI included similar content as the original. The content validity was high (Content Validity Index: CVI= .85-1.00) while the internal consistency reliability for overall questionnaire was also high (KR-20= .88-.94). Therefore, this instrument can be used to assess the social and communication skills of children with autistic disorder in Thailand.

Discussion

The results of the study are discussed and compared with previous studies. Discussion of this study finding is presented and organized according to the research objective. The purpose of this study was to translate the social, expressive language and language comprehensive subscales to Thai and to examine the validity and reliability of this instrument (Thai version). It was found that the overall Thai version of subscale showed good content validity (.85-1.00) and internal consistency reliability (.88 - .94). The possible reason supporting the results are explained as follows:

The first reason is the effectiveness of forward translation and the back-translation process which followed the back-translation WHO guideline. In this study, the researcher used one translator who was an expert in the English-speaking culture for translation of the original version of instrument into Thai in the first step (forward translation). Then, the researcher used one translator who was bilingual for translation of the instrument back to English and one native English speaker for comparison of similarity in meaning between the original and back-translated versions in the second step (expert panel back-translation). The result of this study is close to those of the American version⁵. In 1992, the original version of CDI was developed for assessment young children who are developmentally delayed. The original version includes 8 subscales: subscales: social, self-help, gross motor, fine motor, expressive language, language comprehension, letters, and numbers. An acceptable set of scale reliability and validity were the strengths of the CDI⁵. This is similar to a study in China that found that acceptable high specificities (77.9-95.1%) were found for most of the subscales, except for the personal social subscale (57.6%). The expressive language and personal social subscales were good predictors of autistic spectrum disorders with specificities of 70% and

76.2%, respectively¹¹. Consequently, it can be said that the effectiveness of forward translation and the back-translation process is a factor that affects the effectiveness of tool.

The second reason is the participants who were used for the reliability test. The participants in this study are the caregivers of children with autistic disorder. As the questionnaire limitation was designed for a parent to assess the communication and social skill of their children; because parents are a caregiver who is living with children and can observe their children all day. If the participants are other people who are not living with children such as teachers, friends, and grandmothers, the result may show a different level of reliability. This is similar to a study in France that also demonstrated that the score for the CDI general development scale correlates closely with chronological age ($r= .89$). The intra and inter-observer (mother vs teacher) agreements were .97 and .76; the French version of the CDI, like the English one, provides a useful tool for measuring children's development¹². In addition, this tool was modified (11 questionnaire items) to suit Thai culture. This also may have been another cause that affects the effectiveness of tool.

In summary, based on the reasons related to the effectiveness of forward translation and back-translation process, the participants, and the modified tool suitable for Thai culture; the comprehensible wording for each item of the subscales can easily be completed by caregivers of children. In addition, the social, expressive language and language comprehensive subscales are standardized instruments that were translated into Thai using the back-translation procedure of WHO. In addition, the Thai version is guaranteed by high validity and reliability of statistical tests which is strength of this study. However, the social, expressive language and language comprehensive subscales of the CDI were designed for screening rather than diagnostic purposes.

Therefore, it can be claimed that the subscales are a valid and useful screening tool for Thai children with autistic disorder. The subscales have high validity when identifying an autistic child. It is important to refer those with positive finding on screening to a group of other specialists in child development.

Limitation of the study

The limitation of this study can be divided into two points: 1) the reliability test of this tool; the tool was tested only for internal consistency reliability (KR-20). Because the questionnaire limitation was designed for a parent to assess the social, expressive language and language comprehensive skill of their children; it has limitation to assess inter-rater reliability; and 2) the small sample size; in this study there were 30 participants who met the inclusion criteria (purposive sampling) because the populations of preschool children who are diagnosed with autistic children are a small group.

Recommendations and implications

The results of this study showed the outcomes related to nursing implications. As a consequence, it could be extended to knowledge covering nursing practice, nursing education, nursing research and health policy implications as follows.

1. Nursing practice: The findings are useful for nurses and health care providers to assess the symptoms of autistic children in early age in order to develop an appropriate intervention program to treat and promote children with autistic disorder.

2. Nursing education: The Thai version subscale of CDI was the outstanding example of nursing role practice on assessment in child psychiatric care. Thus, the Thai version subscale should be promoted in nursing curricula in order to extend nursing knowledge in the area of health assessment to classify between normal and autistic children.

3. Nursing research: Further study for Thai version of CDI using confirmatory factor analysis or comparative scale between typical children and children with autistic disorder.

4. Health Policy implications, the information related to atypical development after assessment by Thai version subscale may be useful for the government and Ministry of Public Health of Thailand to provide health policy supporting and helping for children with autistic disorder.

Acknowledgment

This study was supported by Prince of Songkla University and Faculty of Nursing, Thailand. The Child Development Inventory (CDI) was translated to Thai with permission from Child Development Review, Behavior Science Systems, Inc.

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