The Children's Depression Inventory as a Screen for Depression in Thai Children

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Abstract

This study examines the utilization of the Children's Depression Inventory (CDI), Thai version, as a screen for depression in Thai children. Subjects which consisted of 139 children aged 10-15 years filled out the CDI and were evaluated with structured psychiatric interview by a child psychiatrist who was blind to the results of the CDI. Children with interview validated depression had significantly elevated CDI scores (mean = 18.5, SD = 6.1) compared with nondepressed children (mean = 9.3, SD = 4.1), $P > 10^{-6}$. Furthermore, the CDI scores increased as the severity of depression increased. Using the Receiver Operating Characteristic Curve, a cut-point of 15 produced the best overall screening characterstics (sensitivity = 79%, specificity =91% and accuracy = 87%). The results of this study indicate that the CDI efficiently differentiated depressed from nondepressed children. Since the CDI is an economical, easy to adiminister and readily analyzable instrument, it should be used as a screen for depression and a supplant for clinical evaluation and follow-up in the treatment of depression in children.

In both adults and children depression is an important psychiatric disorder because of its high morbidity and mortality. The prevalence of childhood depression in Western countries is high, ranging from 5-50 per cent[1-5] and from 10.2-34.6 per cent in Thailand[6-9] depending on the method of assessment and the population studied.

Studies on childhood depression have grown tremendously in Western countries. In Thailand, there are great limitations in data on depression in children. A basic obstacle has been the absence of validated measurement instruments for use in this population.

Most instruments used to assess depression fall into 2 categories: interview or staff-rated devices and self-rated devices[10]. Self-rated or self-report devices are widely used in adults and selected measures have been modified for use in children. The Children's Depression Inventory (CDI), developed by Maria Kovacs, has been the

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most widely used self-report measure in children. It is a 27-item, symptom-oriented scale that was designed for school age children and adolescents. It quantifies an array of depressive symptoms including disturbed mood, hedonic capacity, vegetative functions, self-evaluation, and interpersonal behavior. Beside measuring current levels of depressive symptomatalogy, it has been used as a screen to differentiate symptomatic individuals or potential cases of depressive disorders from normal individuals[10-13].

The CDI has been employed in hundreds of studies with children and was translated into other languages such as Japanese and Arabic [14,15]. Since items in the CDI describe various feelings or problems that any child may experience and are not culturally specific, it is interesting to know if the CDI can be used in the Thai population. With permission from the author, we translated the current version of the CDI into the Thai language. Around 30 10- to 15- year-old "normal" youngsters as well as those who visited psychiatric and pediatric outpatient clinics assisted in rewording the translated version.

The question for this study was whether the CDI could be used to evaluate depressive symptoms in Thai children especially in separating depressed from nondepressed individuals. It also investigated the statistical properties of the CDI and the feasibility of using the translated version of the CDI as a screening for depression in this population.

METHOD

This study is part of the Depression Project of the Department of Psychiatry, Faculty of Medicine, Chulalongkorn University. Subjects were children who came to the pediatric and child psychiatric outpatient clinics. The inclusion criteria were ages 10-15 years, and the ability to give information about him or herself. Exclusion criteria were a child who was in acute distress (such as having high fever or in severe pain) or a child who came to the clinic alone with no caretaker to give relevant information.

Of 139 children included in the investigation, 72 were boys and 67 were girls with the mean age of 12.7 years (SD = 1.6). Ninety-four per cent were students. The rest had finished primary education and were currently working. Subjects were predominanty of lower socioeconomic status. Most (57%) came for pediatric visits, mostly acute physical problems such as upper respiratory tract infection, 30 per cent came for psychiatric visits and the rest were normal children who accompanied their siblings to the hospital.

Upon presentation to the clinic, the second author did a 1/2 - 1 hour interview with the parent by using a semi-structured interview form which elicited information about reasons for the visit, past history of psychiatric, medical or developmental problems, family and peer relationships, the psychosocial history of the family, and the current stressors in the child's immediate environment. Questions were also focused on risk factors for emotional illness in children. In the meantime the child was given the CDI, Thai version, to complete by him or herself without the parent's help.

The CDI consists of 27 items which describe symptoms usually found in depressed children. Response on each item is made on a 3-point scale, ranging from 0, indicating that a symptom was present "rarely or none of the time", to 2, indicating that a symptom was present "most or all of the time". Thus, the total score can range from 0 to 54. About 50 per cent of the items start with the choice that reflects the greatest symptom severity ; for the rest, the sequence of choices is reversed[16]. The respondent is instructed to select the one sentence for each item that best describes him or her for the past 2 weeks (see appendix).

After the child completed the CDI, the first author (who was blind regarding each child's performance on the CDI) interviewed the child and the parent together and separately. All interviews were conducted using DSMIII-R criteria with the focus on depressive symptomatology. The outpatient record of the child was reviewed when possible.

At the end of the study period the total CDI score of each child was calculated and analysed with regards to the clinical diagnosis given to each child. The Chi-square test and the student's *t*-test were used to examine statistical significance between groups. The sensitivity, specificity, and positive predictive value of the CDI were calculated for all possible cut-points. A Receiver Operating Characteristic (ROC) curve which is a graph of all possible combinations of achievable sensitivities and corresponding false positive rates (1-specificity), was used to find the optimal cut-point.

RESULTS

From the psychiatric interview, 92 of 139 subjects did not have any depressive symptoms. The mean age of this group was 12.8 years (SD = 1.6) and male to female ratio was 1.2 : 1. The depressed group consisted of 47 subjects with the mean age of 12.5 years (SD=1.7) and M:F ratio of 1:1.2. There was no statistical difference between both groups regarding age and sex. The diagnoses in the depressed subjects fell into 4 categories : mild depression (depressive symptoms without functional impairment), n=10; adjustment disorder with depressed mood, n=23; dysthymia or chronic depression, n=10; and major depression, n=4.

Reliability of the CDI

The reliability of the CDI was measured by analysis of correlation between each item and between each item and the total score. The inter - item correlation was 0.15 (min = -0.14, max = 0.50). The corrected item - total score correlation was 0.09 - 0.58 (Table 1). The internal consistency, or the extent to which all items on the depression scale actually measured the same underlying dimension, was assessed with Cronbach's coefficient alpha.

Table 1. Item-total score correlations.

Item	correlation	item	correlation	item	correlation
1.	0.45	10.	0.56	19.	0.28
2.	0.43	11.	0.51	20.	0.53
3.	0.33	12.	0.20	21.	0.21
4.	0.27	13.	0.32	22.	0.47
5.	0.34	14.	0.33	23.	0.32
6.	0.40	15.	0.09	24.	0.34
7.	0.58	16.	0.38	25.	0.39
8.	0.17	17.	0.33	26.	0.34
9.	0.40	18.	0.23	27.	0.37

Table 2. CDI scores in various diagnostic groups.

Diagnosis	Range	Mean	S.D.
non depressed (n=92) *	0-20	9.3	4.1
depressed (n=47)*	7-36	18.5	6.1
mild depression (n=10)	8-21	15.4	4.7
adjustment disorder (n=23)	7-26	18.2	4.1
dysthymia (n=10)	8-36	21.5	8.5
major depression (n=4)	18-34	23.7	9.0

*$P < 10^{-6}$ between depressed and non depressed group.

The value of alpha obtained for the entire group was 0.83 which was above the 0.80 limit generally deemed acceptable for correlational analysis.

Validity of the CDI

Mean CDI scores were examined to determine the extent to which the scale differentiated contrasting groups. CDI scores were significantly higher among subjects rated during the interview as having depressive symptoms as compared with those rated as evidencing no symptoms (mean = 18.5, SD = 6.1 and mean = 9.3, SD = 4.1 respectively, $p<10^{-6}$).

To determine if the CDI was sensitive to the severity of depressive illness, the mean scores of subjects with different diagnostic categories were compared (Table 2). A trend of increasing scores as a subject progressed from mild depression to adjustment disorder with depressed mood, to dysthymia and to major depression was evident. However, the difference between groups was not statistically significant.

Individual CDI item responses were analyzed to examine differences in reported symptom severity. The mean score of each item was calculated (Table 3). Depressed children endorsed higher severity ratings (higher mean score) on 26 of the 27 items. The differences were signicant in 22 items. These results suggest that the CDI, Thai version, possesses a good degree of discriminant validity.

Possible CDI cut-points

An attempt was made to find the optimal cut-point of the CDI score which would best differentiate depressed from non-depressed individuals. As can be seen from Table 4, each CDI score gives a different predicted percentage of false positive and false negative cases. In this investigation the authors were interested in screening efficiency which is composed of sensitivity and specificity. The choice of the optimal cutting score was derived from data plotted in a Receiver Operating Characteristic (ROC) curve (Fig. 1). The examination of the ROC curve suggested that optimal screening cut - point for depression is 15. At this cut- point, the CDI, Thai version, had the sensitivity of 79 per cent, specificity 91 per cent, accuracy 87 per cent, positive predictive value (PPV) 82 per cent, and negative predictive value (NPV) 89 per cent.

Table 3. Item scores broken down by depression status.

CDI item	Nondepressed		Depressed		P
	mean	SD	mean	SD	
1. Sadness	0.08	(0.27)	0.60	(0.71)	0.000
2. Pessimism	0.78	(0.57)	1.20	(0.59)	0.000
3. Self-deprecation	0.35	(0.48)	0.60	(0.65)	0.023
4. Anhedonia	0.46	(0.50)	0.79	(0.66)	0.003
5. Misbehavior	0.33	(0.54)	0.77	(0.70)	0.000
6. Pessimistic worrying	0.30	(0.50)	0.90	(0.68)	0.000
7. Self-hate	0.05	(0.23)	0.47	(0.62)	0.000
8. Self-blame	0.59	(0.63)	0.55	(0.66)	0.697
9. Suicidal ideation	0.17	(0.38)	0.60	(0.61)	0.000
10. Crying spells	0.11	(0.35)	0.70	(0.75)	0.000
11. Irritability	0.26	(0.44)	0.87	(0.65)	0.000
12. Reduced social interest	0.30	(0.49)	0.47	(0.58)	0.082
13. Indecisiveness	0.70	(0.70)	1.04	(0.66)	0.006
14. Negative body image	0.64	(0.48)	0.90	(0.52)	0.005
15. School-work difficulty	0.49	(0.65)	0.53	(0.72)	0.725
16. Sleep disturbance	0.08	(0.30)	0.38	(0.64)	0.000
17. Fatigue	0.25	(0.48)	0.72	(0.68)	0.000
18. Reduced appetite	0.49	(0.58)	0.81	(0.65)	0.004
19. Somatic concern	0.50	(0.56)	0.91	(0.72)	0.000
20. Loneliness	0.27	(0.47)	0.72	(0.68)	0.000
21. School dislike	0.30	(0.53)	0.47	(0.69)	0.156
22. Lack of friends	0.11	(0.35)	0.47	(0.58)	0.000
23. School performance decrement	0.41	(0.60)	0.81	(0.77)	0.003
24. Self-deprecation	0.75	(0.57)	1.00	(0.55)	0.014
25. Feeling unloved	0.17	(0.38)	0.45	(0.54)	0.003
26. Disobedience	0.30	(0.49)	0.45	(0.54)	0.119
27. Fighting	0.08	(0.27)	0.36	(0.57)	0.000

Table 4. Comparision of cut-points for the CDI.

	CDI scores							
	10	11	12	13	14	15	16	17
Sensitivity	91.5	91.5	87.2	85.1	80.9	78.7	72.3	68.1
Specificity	47.8	63.0	73.9	80.4	87.0	91.3	93.5	94.6
PPV	47.3	55.8	63.1	69.0	76.0	82.2	85.0	86.5
NPV	91.7	93.5	91.9	91.4	89.9	89.4	86.9	85.3
Accuracy (%)	62.6	72.7	78.4	82.0	84.9	87.1	86.3	85.6

DISCUSSION

Self-rated device is one of the most widely used modalities in psychological assessment. It is important in evaluating depression because affective states are likely to be manifest in subjective evaluation of one's own experiences. The investigation of the validity of the screening device for psychiatric disorder involves many steps. Internal consistency, often ascertained as a high degree of item homogeneity, is a necessary prerequisite for the establishment of validity[17]. Many studies on the CDI revealed the alpha reliability coefficient between 0.71 to 0.89[16]. In this study the alpha coefficient for the total sample was 0.83 which indicates good internal consistency of the instrument.

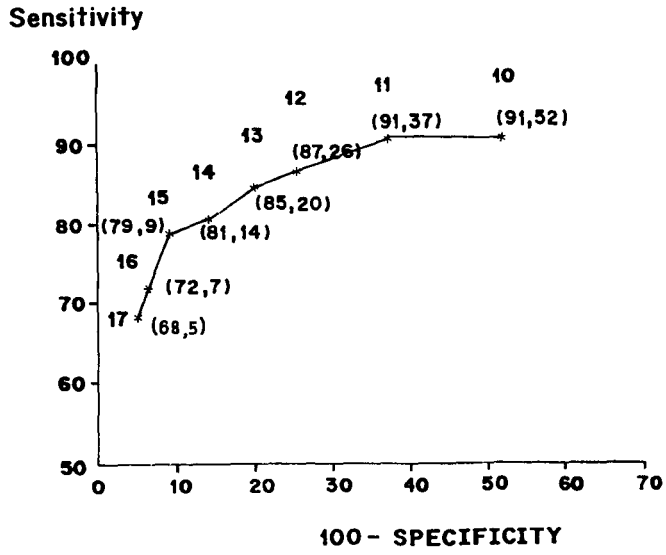

Fig. 1. ROC curve.

Many studies found that the CDI could discriminate clinically-diagnosed from non-clinical youth and depressed from nondepressed group [11,18,19]. In the current study the mean CDI score was significantly higher among individuals with DSM III-R diagnosed depression *versus* those with no depression. This confirms the good discriminant validity of the CDI. However, the ability of the CDI to differentiate between diagnostic categories is still controversial. A lot of studies found the CDI score in major depression to be significantly higher than dysthymia, conduct disorder and other diagnoses,[11,18,19] while others found the scores to be not significantly different[20,21]. In this study, a trend of increasing scores as a subject progressed from adjustment disorder to dysthymia and major depression was noted. However, it was not statistically significant due to the small sample size in each group. Further study with a larger sample size is needed to prove the sensitivity of the CDI in differentiating between diagnostic groups.

Most instruments are designed to assess severity of depression. However, they can also be used with criterion scores or cut-points to diagnose the presence or absence of a depressive syndrome. Kovacs pointed that the cut-point can be set at different places depending upon the purpose of the instrument. In a clinical setting when an identified child should receive detailed clinical assessment and diagnosis, the cut-point can be set relatively low, e.g. 12 or 13. But in general screening, the cut-point can be higher, e.g. 19 or 20, in order to minimize the probability of false positives[16]. The aim of this study is to find a screening device that detects children at the early stage of the disease. Using the ROC curve identified the score of 15 as the optimal cut-point that differentiates depressed from nondepressed individuals. This cut point permits correct classification of 87 per cent of the sample.

The development and expression of depressive symptomatology are different in various cultural contexts. An analysis of self-report items may shed light on this difference. The analysis of individual items of the CDI, Thai version, found that in 22 out of 27 items the mean item scores endorsed by depressed children were significantly higher compared with the nondepressed group. For item 8, 12, 15, 21 and 26 which concern the symptom of self-blame, reduced social interest, school-work difficulty, school dislike and disobedience, the difference between the mean scores in each group was not significant. Moreover, the item-total score cor-

relations of item 8, 12, 15 and 21 were relatively low. This suggests that in Thai children these symptoms may be found in the depressed as well as the nondepressed and may not be of diagnostic value.

A high correlation between physician judgement and the results of the CDI in this study corresponds to the findings of many investigations that children can report on their own depression and that considerable agreement exists among self-report, interview and diagnostic measures[22]. However, there are several issues that need to be raised ragarding the use of self-report measures for childhood depression. One is that children may avoid expression of depressed affect. In that case, self-report is likely to present limitations as an assessment modality. The second issue is the extent to which children at various ages are capable of accurately portraying their pathology and the duration of various symptoms. The third is the language and cognitive skills at different age levels which are likely to influence the children's interpretations of the questions that examiners ask as well as the answers the children are likely to provide. Hence, self-report measures may be limited in the information they can be expected to provide especially in younger children. With these issues in mind the clinican must be cautious in interpreting the results of the self-report instrument and should not rely on it solely.

Although many limitations exist, a self-report instrument is helpful for children who may feel embarrassed in talking about their feelings. From the clinical experience of the authors most Thai children have difficulty expressing their feelings. This is understandable because feelings are not readily discussed in the family and Thai culture holds that a person should be nice and respectful to others expecially in the case between children and adults. Direct expression of feelings is therefore, not acceptable[23]. Within this cultural background, the CDI is a very useful tool in helping children express their feelings without having to confront adults. Moreover, in the situation of a severe shortage of child psychiatrists in this country, the usefulness of the CDI as a screening device cannot be over-emphasized.

SUMMARY

Depression is a treatable disease. The development of assessment device will lead to increased recognition and timely intervention for children suffering from it. The current study found that the CDI which was originally constructed for use in Western populations could be used in Thai children. Since the CDI, Thai version, is an economical, easy to administer and readily analysable instrument, it should be used as a screening instrument and a supplant to clinical evaluation and follow-up of depression in children.

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Appendix : The Children's Depression Inventory, Thai version.

ต่อไปนี้เป็นความรู้สึกที่เกิดขึ้นได้ในบุคคลทั่วไป ไม่มีข้อใดผิด หรือข้อใดถูก จงเลือกข้อที่ตรงกับความรู้สึกของท่านมากที่สุด ในช่วง 2 สัปดาห์ที่ผ่านมา (กา X บน ก ข หรือ ค)

1. ก. ฉันรู้สึกเศร้านาน ๆ ครั้ง
   ข. ฉันรู้สึกเศร้าบ่อยครั้ง
   ค. ฉันรู้สึกเศร้าตลอดเวลา

2. ก. อะไร ๆ ก็มีอุปสรรคไปเสียหมด
   ข. ฉันไม่แน่ใจว่าสิ่งต่าง ๆ จะเป็นไปด้วยดี
   ค. สิ่งต่าง ๆ จะเป็นไปด้วยดีสำหรับฉัน

3. ก. ฉันทำอะไร ๆ ได้ค่อนข้างดี
   ข. ฉันทำผิดพลาดหลายอย่าง
   ค. ฉันทำอะไรผิดพลาดไปหมด

4. ก. ฉันรู้สึกสนุกกับหลายสิ่งหลายอย่าง
   ข. ฉันรู้สึกสนุกเฉพาะกับบางสิ่งบางอย่าง
   ค. ไม่มีอะไรสนุกสนานเลยสำหรับฉัน

5. ก. ฉันทำตัวไม่ดีเสมอ
   ข. ฉันทำตัวไม่ดีบ่อยครั้ง
   ค. ฉันทำตัวไม่ดีนาน ๆ ที

6. ก. นาน ๆ ครั้งฉันจะคิดถึงสิ่งไม่ดีที่อาจเกิดขึ้นกับฉัน
   ข. ฉันวิตกว่าจะมีสิ่งไม่ดีเกิดขึ้นกับฉัน
   ค. จะต้องมีสิ่งเลวร้ายเกิดขึ้นกับฉันแน่ ๆ

7. ก. ฉันเกลียดตัวเอง
   ข. ฉันไม่ชอบตัวเอง
   ค. ฉันชอบตัวเอง

8. ก. สิ่งเลวร้ายทั้งหมดที่เกิดขึ้นเป็นความผิดของฉัน
   ข. สิ่งเลวร้ายหลายสิ่งที่เกิดขึ้นเป็นความผิดของฉัน
   ค. สิ่งเลวร้ายที่เกิดขึ้นมักไม่ใช่ความผิดของฉัน

9. ก. ฉันไม่คิดจะฆ่าตัวตาย
   ข. ฉันคิดถึงการฆ่าตัวตาย แต่ฉันจะไม่ทำเช่นนั้น
   ค. ฉันต้องการฆ่าตัวตาย

10. ก. ฉันรู้สึกอยากร้องไห้ทุกวัน
    ข. ฉันรู้สึกอยากร้องไห้บ่อยครั้ง
    ค. ฉันรู้สึกอยากร้องไห้นาน ๆ ครั้ง

11. ก. ฉันรู้สึกหงุดหงิดใจตลอดเวลา
    ข. ฉันรู้สึกหงุดหงิดใจบ่อยครั้ง
    ค. ฉันรู้สึกหงุดหงิดใจนาน ๆ ที

12. ก. ฉันชอบอยู่กับคนอื่น
    ข. ฉันไม่ค่อยชอบอยู่กับคนอื่น
    ค. ฉันไม่ต้องการอยู่กับใครเลย

13. ก. ฉันไม่สามารถตัดสินใจอะไรต่าง ๆ ด้วยตนเอง
    ข. ฉันตัดสินใจเรื่องต่าง ๆ ได้ลำบาก
    ค. ฉันตัดสินใจเรื่องต่าง ๆ ได้ง่าย

14. ก. ฉันเป็นคนหน้าตาดี
    ข. ฉันเป็นคนหน้าตาไม่ค่อยดี
    ค. ฉันเป็นคนหน้าตาน่าเกลียด

15. ก. ฉันต้องใช้ความพยายามอย่างหนักทุกครั้งที่ทำการบ้าน
    ข. ฉันต้องใช้ความพยายามอย่างหนักบ่อยครั้งเวลาทำการบ้าน
    ค. การทำการบ้านไม่ใช่ปัญหาใหญ่สำหรับฉัน

16. ก. ฉันนอนไม่หลับทุกคืน
    ข. ฉันนอนไม่หลับหลายคืน
    ค. ฉันนอนหลับสบาย

17. ก. ฉันรู้สึกเหนื่อย นาน ๆ ครั้ง
    ข. ฉันรู้สึกเหนื่อยบ่อยครั้ง
    ค. ฉันรู้สึกเหนื่อยตลอดเวลา

18. ก. มีหลายวันที่ฉันไม่รู้สึกอยากกินอาหาร
    ข. มีบางวันที่ฉันไม่รู้สึกอยากกินอาหาร
    ค. ฉันกินอาหารได้ดี

19. ก. ฉันไม่กังวลกับการเจ็บป่วย
    ข. ฉันกังวลกับการเจ็บป่วยบ่อยครั้ง
    ค. ฉันกังวลกับการเจ็บป่วยตลอดเวลา

20. ก. ฉันไม่รู้สึกเหงา
    ข. ฉันรู้สึกเหงาบ่อยครั้ง
    ค. ฉันรู้สึกเหงาตลอดเวลา

Appendix : The Children's Depression Inventory, Thai version.

21. ก. ฉันไม่รู้สึกสนุกเลย เวลาอยู่ที่โรงเรียน
    ข. ฉันรู้สึกสนุกนาน ๆ ครั้ง เวลาอยู่ที่โรงเรียน
    ค. ฉันรู้สึกสนุกบ่อยครั้ง เวลาอยู่ที่โรงเรียน

22. ก. ฉันมีเพื่อนมาก
    ข. ฉันมีเพื่อนไม่กี่คนและอยากมีมากกว่านี้
    ค. ฉันไม่มีเพื่อนเลย

23. ก. การเรียนของฉันอยู่ในขั้นใช้ได้ดี
    ข. การเรียนของฉันไม่ค่อยดีเหมือนเมื่อก่อน
    ค. การเรียนของฉันแย่ลงมาก

24. ก. ฉันทำอะไรไม่ได้ดีเท่าคนอื่น
    ข. ฉันคงทำอะไรได้ดีเท่าคนอื่น ถ้าฉันพยายาม
    ค. ฉันทำได้ดีพอ ๆ กับคนอื่นอยู่แล้ว ในขณะนี้

25. ก. ไม่มีใครรักฉันจริง
    ข. ฉันไม่แน่ใจว่ามีใครรักฉันหรือเปล่า
    ค. ฉันรู้สึกว่ามีคนรักฉัน

26. ก. ฉันทำตามคำสั่งที่ได้รับเสมอ
    ข. ฉันไม่ทำตามคำสั่งบ่อยครั้ง
    ค. ฉันไม่เคยทำตามคำสั่งเลย

27. ก. ฉันเข้ากับคนอื่นได้ดี
    ข. ฉันทะเลาะกับคนอื่นบ่อยครั้ง
    ค. ฉันทะเลาะกับคนอื่นตลอดเวลา

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The Children's Depression Inventory เครื่องมือในการตรวจค้นหาภาวะซึมเศร้าในเด็กไทย

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งานวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาการใช้แบบวัดอาการซึมเศร้า Children's Depression Inventory (CDI) ฉบับภาษาไทยในการค้นหาภาวะซึมเศร้าในเด็กไทย เด็กจำนวน 139 คน อายุระหว่าง 10–15 ปี ทำแบบสอบวัด CDI ด้วยตนเอง และหลังจากนั้นได้รับการประเมินทางจิตเวช โดยจิตแพทย์เด็กซึ่งไม่รู้ผลของ CDI ที่เด็กทำ ผลการศึกษาพบว่าเด็กที่ได้รับการวินิจฉัยว่ามีภาวะซึมเศร้ามีคะแนน CDI สูงกว่าเด็กที่ไม่มีภาวะซึมเศร้าอย่างมีนัยสำคัญทางสถิติ (ค่าเฉลี่ย = 18.5 และ 9.3 ค่าเบี่ยงเบนมาตรฐาน = 6.1 และ 4.1 ตามลำดับ P ต่ำกว่า 10^{-6}) นอกจากนี้ คะแนน CDI จะสูงขึ้นตามความรุนแรงของภาวะซึมเศร้า จาก Receiver Operating Characteristic Curve พบว่า คะแนนที่ 15 เป็นจุดตัดที่ใช้คัดกรองภาวะซึมเศร้าได้ดีที่สุด โดยที่คะแนนนี้ CDI จะมีความไว 79% ความจำเพาะ 91% และความแม่นยำ 87% ผลการศึกษานี้แสดงว่า CDI เป็นเครื่องมือที่สามารถแยกเด็กที่ซึมเศร้าออกจากเด็กที่ไม่ซึมเศร้าได้อย่างมีประสิทธิภาพ เนื่องจาก CDI เป็นเครื่องมือที่ประหยัด ใช้ง่ายและสามารถวิเคราะห์ผลได้รวดเร็ว จึงควรใช้เป็นเครื่องตรวจหาภาวะซึมเศร้าในเด็ก และเป็นเครื่องประกอบในการประเมินทางคลินิกและการติดตามผลในการดูแลรักษาภาวะซึมเศร้าในเด็กต่อไป

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