Original Article

Translation and psychometric properties of the Persian version of the center for Epidemiological Studies Depression Scale for Children

Abass Ebadi[1], Zeinab Habibpour[2]

[1]Professor, Behavioral Sciences Research Center, Life Style Institute, Faculty of Nursing, Baqiyatallah University of Medical Sciences, Tehran, IR Iran, [2]Nursing Faculty, Khoy University of Medical Sciences, Khoy, Iran

Abstract

Context: Psychological disorders afflict a great number of youths throughout the world. The early beginning of psychological disorders not only affects all of the life of a person but also affects

Children's, Depression Questionnaire (Center for Epidemiological Studies Depression Scale for Children), Iranian Version, Psychometric properties the welfare of next generations. It is necessary to develop acceptable psychometric tools to measure the depression of children and youths.

Aims: This study deals with the psychological properties of the Persian version of the Center for the Epidemiological Studies Depression Scale for children.

Setting and Design: This study is a cross sectional study with a methodological design. 342 students with the age range of 11–17 were selected by random cluster sampling in multiple stages from among students in Khoy.

Material and Methods: Original version of the scale was translated from English to Persian language using Backward Forward translation method.

Statistical Analysis: The validity of the instrument was determined using face validity and exploratory factor analysis.Reliability was reported by Alpha Cronbach coefficient and test–retest and intraclass correlation coefficient (ICC). The SPSS was used to analyze the data.

Results: The confirmatory factor analysis confirmed the construct validity of the scale with four factors and a cumulative variance of 50.443. The correlation with Beck's Depression Test for Children is quiet strong $r = 0.738$. Cronbach's alpha = 0.872, ICC = of 0.97 that both show a good validity for the Persian version.

Conclusion: The Persian version of the Children's Depression Questionnaire has a good reliability and validity and can be used as a proper tool for the screening of the depression of children and youth

Keywords: Children's, Depression Questionnaire (Center for Epidemiological Studies Depression Scale for Children), Iranian Version, Psychometric properties

Address for correspondence: Ms. Zeinab Habibpour, Nursing Faculty, Khoy University of Medical Sciences, Khoy, Iran.
E-mail: z_habibpour@yahoo.com
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INTRODUCTION

Psychological disorders afflict a great part of the youths' population through the world,[1] and depression is one of the most prevalent psychological disorders in the world that has different consequences for all of the daily life aspects.[2] A systematic review has shown that many of the features

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of the modern life is related to more depression among youths. Through the world, depression is a debilitative disease that has significant negative effects on the life quality of millions of people.[3]

The studies carried out in different countries show the spread of depression in the puberty period, especially among girls more than boys.[4] Depression among youths was 2.2% in the Netherlands up to 22.9% in China.[5] In Iran, it has been reported between 10% and 68%.[6,7]

The beginning of depression in the childhood period results in the increase of the danger of psychological trauma in the adulthood. People, who go through depression in their early life, have a higher risk for psychological disorders in their adulthood, especially depression.[8] Hence, depression in children has extensive and deep effects on different aspects of life. Hence, the consequences of depression are long term in the childhood period, and even the educational function of that person will be adversely affected.[9,10] Studies show that depressed children face more educational problems in comparison with other children. Weak educational performance is one of the secondary signs of depression in children and youths.[11,12] Children and adolescences that have experienced depression and will have a higher risk of suicide attempts in their adulthood[9] Hence, in the worst condition, depression can result in suicide.[10] Preventive interventions can reduce the depression up to 22%.[13] In the diagnosis of depression disorders, the use of multiple stage guidelines has been recommended. The first stage of this guideline is to use at least one screening test such as a questionnaire.[14] Hence, the existence of evaluative tools with an acceptable level of psychometric properties is necessary for the evaluation of depression of children and youths. In the screening of depression, the self-report tools can be a good replacement for the time-consuming interviews for their easy and fast implementation.[15]

There are many tests for the determination of type, rate, and the outbreak of the symptoms of depression in children and youths.[16-18] Children's Depression Inventory (CDI)[19] and Children's Depression Scale (CDS)[20] are two recognized questionnaires for the measurement of depression in children. However, the Center for Epidemiological Studies Depression Scale for Children (CES-DC) is a screening questionnaire that uses a multidimensional approach in the measurement of the symptoms of depression among children and youths. This questionnaire includes twenty short and simple first-person sentences about the affective, cognitive, and behavioral components of depression in a four-point Likert scale.[21] The original English version of CES-DC was not developed directly for children and youths. Radloff has driven it from the adults' version of CES-D[21,22] and Weissman *et al.* have adapted some of its items for the use of children.[21] This questionnaire has been the subject of psychometrics in Spain,[23] France, China, Germany,[20] Turkey,[24] and Africa.[25] Since the sentences of CES-DC are short and simple and easy to use for users and have fewer sentences compared to other children's depression questionnaires, and also because there are not enough preliminary studies in Iran, the present study aims at the translation and psychometric properties of the Persian version of the CES-DC in Iran.

MATERIALS AND METHODS

The present study is a cross-sectional study with a psychometric design through which the psychometric properties of the Persian version of CES-DC have been studied among Iranian school students.

Children's Depression Tool (Center for Epidemiological Studies Depression Scale for Children)

The CES-DC is a 20-item questionnaire that has been designed by Weismann *et al.* In 1980, the scoring method is based on Likert's four-point scale from zero as "never" to 3 as "always," and questions 12, 8, 4, and 18 are scored vice versa and a score <15 is considered as a depressed person and this tool has four subscales that include somatic (1-2-5-7-11-13-20), interpersonal (15-19) positive (4-8-19-16) and depressed (3-6-9-10-14-17-18)].[21] First, the researchers corresponded with the Epidemiologic Center of Diseases and with Dr. Michele Ybarra by e-mail and after gaining the necessary permissions of the original designers; the research team translated the English version of CES-DC into Persian.

Translation method

After receiving the necessary permissions from the original designer of the tool, for the domestication of the English version, two translators, one university professor teaching medical texts, and the other a translator of general English texts translated the text separately. Then, in a session with the presence of researchers and translators, the two translations were considered, and finally, a unified translation was chosen. The edited translation was then again back-translated into English by another university professor expert in medical texts that had not seen the original version. Then, the research team and Michele Ybarra in the Center of Epidemiologic Studies reviewed the back translation against the original scale and found that there was a match between the two of them. For the preliminary evaluation and the comprehension of items and interpretation and impression of people, the Persian

version was given to twenty students with different ages and genders for the determination of its comprehensibility and they were asked to give their opinions about the clarity, writing style, and the easiness of completing it. In this stage after the study of the completed questionnaires, the final Persian version was codified.

Statistical analysis

Psychometric properties of the questionnaire were assessed by several statistical tests as follows: factor analysis, Kaiser-Meyer-Olkin (KMO) test, Bartlett's test, and Pearson correlation.

Validity

For the determination of face and content validity, the opinions of ten professors of medical sciences with the specialization of psychology, psychiatry, and psychiatric nursing were used.

Construct validity

Exploratory factor analysis – For the analysis of the exploratory factor, the KMO, Bartlett's test of sphericity, and varimax rotation were used. In the exploratory factor analysis of some of the studies, the sample volume is determined based on the number of items, i.e., for each item, 10 or 20 samples are chosen.[26] In the present study, 342 students (168 boys and 174 girls) with the age range of 11–17 were chosen by random cluster sampling in multiple stages from among the 1st and 2nd year high school students.

Convergent validity

For the validity of the scale, the short version of Beck's Depression Inventory (BDI-13) was used. Beck's CDI includes 13 questions. This questionnaire was first introduced by Beck *et al.* in 1961. Since the initial BDI only covered 6 criteria out of 9 criteria of depression, in 1996, it was reviewed for more consistency with Diagnostic and Statistical Manual of Mental Disorders-IV. The initial version of this inventory included twenty questions. In the following years, to make this questionnaire easier, a 13-question version was developed. In this version like the 20-question version, each includes four choices that the subject should choose one of them. Furthermore, based on the collected scores, each person can be placed in one of the stages of depression. In the Iranian version of this questionnaire, two subscales were developed. Each question included 0–3 scores and the whole scores of the questionnaire were between 0 and 39. The evaluation of depression is based on the general score: zero (0 to 4) is natural,[5-7] mild depression,[8-15] as average depression and 16 and higher is severe (chronic) depression. Dehshiri *et al.* studied the psychometrics of these features in 2009.[27]

Reliability

For the determination of reliability of the inventory, the internal consistency was considered with Cronbach's alpha, and repeatability was considered by test–retest. The internal consistency of the tool was calculated by Cronbach's alpha for the whole inventory and for each domain. The tool is considered reliable when Cronbach's alpha is equal to or bigger than 0.7.[28] With the use of test–retest, the repeatability was determined. The interval between the two tests is suggested from 2 weeks to 1 month.[29] For the determination of the reliability with the method of test–retest and intraclass correlation coefficient (ICC), the inventory was given to thirty students with a 2-week interval. The correlation between the scores of the two correlation index test and the ICC was determined. The study data were analyzed using the SPSS software (v. 16.0).

Ethical principles

the ethical considerations of this study include the permission of the designers of the original scale and the free participation of students in the study and their anonymity.

RESULTS

The demographic features of the children that participated in this study are being summarized in Table 1. The findings of the demographic characteristics show that the students were chosen from different age groups and different school years.

Factor analysis

the efficiency of the sampling with the KMO test was equal to 0.901 that was at a desirable level. The result of the Bartlett's test of sphericity was approximately $\chi = 2027.267$, df = 190, sig <0.001 that was statistically significant. The results of varimax rotation show four factors: The first domain with eight questions with the title of physical

Table 1: Demographic characteristics in school student in Khoy city

Variable	Class	*n* (%)
Sex	Girl	174 (50.9)
	Boy	168 (49.1)
Grade	Seventh	31 (9.1)
	Eighth	70 (20.5)
	Ninth	123 (36)
	Tenth	68 (19.9)
	Eleven	50 (14.6)
Age	Eleven	20 (5.8)
	Twelve	52 (15.2)
	Thirteen	90 (26.3)
	Fourteen	88 (25.7)
	Fifteen	50 (14.6)
	Sixteen and more	42 (12.3)

problems and the second domain with six questions with the title of low temper and the third domain with two questions under the title of interpersonal problems and the fourth domain with four questions with the title of positive affection [Table 2].

To provide more evidence for the construct validity, the convergent validity was used. Convergent validity is quite strong correlation between the questions related to one domain with the same domain. Based on the recommendations of the European Organization of Cancer Research and Treatment, Pearson's correlation coefficient should be bigger than 4.0. For this purpose, Beck's CDI was used. CES-DC total score was highly correlated with the Beck's CDI total score (r=0.738, P<0.001).

The results of the reliability are shown in Table 3.

DISCUSSION

This study has dealt with the translation and psychometrics of CES-DC in Iran for the first time to show whether this scale can be used for Iranian children and youths. The results support the high validity and reliability (20 items) of the Persian version of the CES-DC. In this study, the reliability of this tool was reported at $\alpha = 0.872$. This tool is in accordance with its original version. The study carried out by Tatar *et al.* in 2013 in Turkey showed that the reliability coefficient for the whole test was 0.74 and another study by Betancourt in Rwanda showed that the reliability coefficient (Cronbach's alpha) was equal to 0.86 that is in accordance with the present study. Hence, the tool has a good reliability among Iranian children and youths. Different studies have also shown the reliability coefficient of this test between 0.85 and 0.90.[24] The first published study about this scale showed that the reliability coefficient of test–retest with the interval of 2 weeks was equal to 0.51.[22] In the next studies, the correlation coefficient was between 0.51 and 0.67.[30,31] The results of the reliability from two implementations with a 2-week interval were desirable (r = 0.963, P < 0.005). In another study, the reliability coefficient of test–retest with a 2-week interval was reported as the same (r = 0.055, P < 0.001)[24] and in another study was equal to r = 0.85, P < 0.005[25] that showed the stability of the results in the timeline and is in line with the results of the original version. Furthermore, for reliability, ICC was used that is considered as one of the best methods of test–retest. The results of the study showed that, in internal consistency of each of the factors had desirable values, ICC = 0.97, mean (standard

Table 2: Rotated component matrix

Items	Factors			
	1	2	3	4
I felt like things I did before didn't work out right	0.619			
I did not feel like eating, I wasn't very hungry	0.619			
Didn't sleep as well as I usually sleep	0.597			
I felt like I was too tired to do things	0.594			
It was hard to get started doing things	0.535			
I was bothered by things that usually don't bother me	0.498			
I felt like I couldn't pay attention to what I was doing	0.466			
I was more quiet than usual	0.384			
I felt like crying		0.714		
I felt sad		0.631		
Wasn't able to feel happy, even when my family or friends tried to help me feel better		0.606		
I felt down and unhappy		0.520		
I felt scared		0.418		
I felt like kids I know were not friendly or that they didn't want to be with me			0.808	
I felt people didn't like me			0.695	
I felt lonely, like I didn't have any friends		0.428		
I was happy				0.679
I had a good time				0.649
I felt like something good was going to happen				0.639
I felt like I was just as good as other kids				0.599
Variance	14.158	13.734	11.682	10.869

Table 3: Reliability (internal consistency and stability [subscales and total scale])

Factors label	Questions	Cronbach's alpha	ICC	95% CI	Mean (SD)
Physical problems	1, 2, 5, 7, 9, 11, 13, 20	α=0.75	0.761	0.53-0.88	15.2 (3.01)
Depressed mood	3, 6, 10, 14, 17, 18	α=0.88	0.88	0.56-0.95	10.7 (3.1)
Interpersonal problems	15, 19	α=0.67	0.82	0.65-091	3.04 (1.4)
Positive affect	4, 8, 12, 16	α=0.76	0.79	0.51-091	8.6 (2)
Total		α= 0.87	0.97	0.95-0.99	38.1 (7.7)

CI: Confidence interval, SD: Standard deviation, ICC: Intraclass correlation coefficient

deviation) = 38.1 (7.7), 95% confidence interval: 0.95–0.99. In Betancourt study, ICC was 0.82.[25] Hence, it was in line with the previous studies and has a good reliability. Furthermore, the convergent validity of the tool is desirable. The convergent validity of the criteria that different studies have reported between the scale of CES-D and other scales is: 0.58 for the depression scale (Minnesota Multiphasic Personality Inventory-II),[32] 0.82 for Hamilton's Depression Inventory,[33] 0.73 for Zung's Depression Scale,[24,34,35] and between 0.67 and 0.81 for BDI.[24,32,36,37] Furthermore, for the construct validity, the exploratory factor analysis was used for which the four dimensions of physical problems, positive affect, interpersonal problems, and low temper were confirmed for the main scale. The results of the present study supported the four factors suggested by Radloff, so it is in line with the study of the main developer of this scale.[22] These findings show the stability and uniformity of the population under study.

One of the limitations of the study is the lack of the possibility for the generalizability of the results, since the Persian language was the second language of the subjects and also there was a geographical limit. For confirmation of the reliability of the test, there is a need for studies in more diverse environments. Furthermore, it is suggested that, in the future studies, the validity of the scale is normalized and compared to other scales in Iran. For the completion of the scale, it is suggested to study other types of reliability and validity that were not studied in this study. Then, this scale can be used in the evaluation of the mental health of children and youth.

CONCLUSION

Generally, it could be concluded that the Persian version of CDS, as a reliable and valid tool, is able to be used for the study and screening of depression among Iranian children.

Conflicts of interest

There are no conflicts of interest.

Authors' contributions

A. Ebadi and Z. habibpour contributed to writing the first draft of the manuscript, designing the study and analysis and Z. habibpour performing data collection.

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