

Validation of the Maria Kovacs Children's Depression Inventory to Assess Depression among School Children in Afghanistan

Parvin Mirzaie (PhD)¹, Lida Nazarian (MSc)^{2*}, Hossein Zare (PhD)³

¹Assistant Professor, Department of psychology, Payam Noor University, Tehran, Iran

²Lecturer, Department of Psychology, Eshraq University, Herat, Afghanistan

³Professor, Department of psychology, Payam Noor University, Tehran, Iran

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ABSTRACT

Background & aim: Four decades of war in Afghanistan has led to an increased rate of depression among the population. Given the importance of depression in adolescents, it is essential to introduce an appropriate tool for the early detection of depression in adolescents. Therefore, this study was conducted to standardize the Maria Kovacs Questionnaire among schoolchildren in Herat, Afghanistan.

Methods: In order to validate the Maria Kovacs children's depression inventory for the reference group, 57385 adult girls and boys studying in secondary schools in the Herat were selected during 2016. The 500 high school students (grades 7, 8, and 9) were randomly selected and questionnaires were localized by the researcher. Moreover, the reliability of the test was evaluated by means of a mock-up test in split-half format, and Beck's depression inventor was used as gold standard for identifying depression in school children.

Results: Using the split-half method, the two inventories of Maria Kovacs and Beck were reported to have the reliability of 0.789 and 0.526, respectively. Moreover, the comparison of Maria Kovacs with Beck inventory (as criterion test) indicated that when the score of non-depression in Kovacs inventory ranged 0-8, it had the sensitivity of 97.2%, specificity of 46.1%, positive, and negative predictive value of 85.7%.

Conclusion: According to the obtained sensitivity of the investigated group, Maria Kovacs Depression Inventory has an acceptable level of reliability and validity to be implemented in the target community. So it could be recommended as an appropriate scale to assess depression among school children in Afghanistan.

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Introduction

Sadness and depression in human is a reaction to an external factor that one knows about it and consciously understands its deprivation [1]. In case the state of sadness does not fit with the external stimulus in terms of intensity and duration, the person becomes depressed or indifferent toward what she used to enjoy [2]. Depression is a mood disorder that arises from not only environmental and social stressors but also various physical diseases [3]. Studies have shown that the rate of depression in children

and adolescents in the community ranges 0.4-8.3% [4]. The prevalence of depression in the United States among children, adults, and teenagers within the age range of 15-18 years reported at 0.4-2.5, 4-8, and 14%, respectively [5, 6].

The prevalence of childhood and adolescent depression in Afghanistan is not precisely known due to the lack of a thorough investigation of the country using correct sampling techniques. According to the papers related to the subject of interest, Afghanistan is

* *Corresponding author:* Lecturer, Department of Psychology, Eshraq University, Herat, Afghanistan. Tel: 0093799470815; Email: raihanaalnabi1381@yahoo.com

among the 11 countries with the highest rates of depression in the world. According to the World Health Organization, 1 million people in Afghanistan suffer from depression and 1.2 million people suffer from mental disorders. Furthermore, according to the report by the Ministry of Public Health of Afghanistan, depression is the second cause of mortality in Afghani people aged 15-29 years.

In 2014, on the basis of the report published by the Ministry of Public Health, the rate of mental diseases in Afghanistan was twice the global rate due to domestic violence, poverty, unemployment and about 4 decades of war in Afghanistan. Moreover, Afghanistan Ministry of Public Health reported that 70% of suicidal thoughts among the people resulted from depression. Afghanistan has no definite rate of suicide; however, a study conducted by the Modica Mundial Institute during 2006 in Wardak, Herat, and Kabul provinces showed that in 2,300 people committed suicide in 2006 among whom 95% were women aged 14-19 years. Clinical and epidemiological data have indicated that although depressed adolescents are a huge population, they do not receive much health care [7-10]. Depression in adolescence period during which the personality grow is formed is important and contemplative. In the case of negligence, it causes personality abnormalities and unsustainable talents. Adolescents with depression have a high risk of drug abuse, educational problems, physical problems, behavioral problems, and attempt for suicide [11].

With this background in mind, various approaches, such as clinical interviews, structured interviews, and self-reporting scales have been developed to evaluate symptoms of depression. Self-reporting scales are economic and practical tools for clinical diagnosis and screening purposes in clinical and normal populations [12]. The available self-reporting tools for measuring depression in children and adolescents include Beerslens Depression Self-Reporting Scale, Beck Depression Inventory, Kovacs Children Depression Inventory, and Tisher Children Depression Scale among which the Kovacs Children Depression Inventory is the most commonly used questionnaire [5]. The Persian version of the Kovacs questionnaire is

available and its validity and reliability have been confirmed in a study conducted in Iran. Golzari (1990) validated and standardized the Persian version of the Children Depression Inventory for the general population of Iran. The reliability of this scale using a test-retest technique for a period of 6 weeks was reported at 0.82 and Cronbach's alpha was estimated at 0.96 [14]. Considering the similarity between Persian language commonly spoken Iran and Dari in Afghanistan, the Persian version was reviewed by two proficient psychologists in both languages. The Dari version was developed after a few unfamiliar Persian terms and expressions were replaced by their equivalents in Dari.

Considering the 4 decades of conflict in Afghanistan and its psychological trauma, it is expected that the mental health of both children and adolescents is affected by these conditions. Moreover, given the high rates of depression and depressive related disorders in adult populations and negative developmental pathways related to depression in adolescents, the signs of depression should be measured as soon as possible and timely diagnosis should be performed in this regard.

With regard to the above-mentioned conditions in Afghanistan, there is no proper opportunity for academic studies to assess the depression and its related factors. Given the popularity of Kovacs Children Depression Inventory and dearth of research on the standardization of the mentioned questionnaire in Afghanistan, this study was performed to introduce appropriate criteria for the early diagnosis of depression among children in Herat. Therefore, with regard to the Maria Kovacs questionnaire, it should be made clear that:

- 1-The Maria Kovacs questionnaire has an acceptable level of reliability for implementation in the targeted community (all high school students in Herat)?
- 2- The Maria Kovacs questionnaire has an acceptable level of validity for implementation in the targeted community?

Methods and Materials

The present study employed a descriptive research method. In this regard, the study population was all high school students in Herat

during 2016. Therefore, the sample was composed of 57385 students, including 31142 male and 26238 female students, distributed in 78 male and female secondary and high schools. The sample size was determined as 500 cases based on the Cochran formula at the significance level of 0.05, confidence coefficient of 95%, homogeneity of 0.5, and sampling accuracy of 5% [15]. The study population consisted of 254 female students and 246 male students studying at grades 7-9.

Formal consent was obtained from the Education Department of Herat City to cooperate with the city schools for data collection. In this regard, a multi-stage sampling method was employed in four public schools (two schools for girls and two for boys) and six private schools, which had one shift for girls and one shift for boys. Therefore, among the schools in 12 areas of the city, at first 4 areas, and then from these areas, 10 schools were randomly selected. In the next step, among the seventh, eighth, and ninth grades of each school, one class was randomly selected from each grade. Afterwards, school authorities coordinated with researchers to ask the students to complete the questionnaire. In doing so, necessary explanations were given on how to provide trustworthy answers to the questions, and in fact, the questionnaire.

Meanwhile, participants were assured that they would not be harmed during the research based on the ethics of the research. Moreover, the rights, safety, confidentiality, and dignity of the individuals would be preserved as far as possible. The written consent was obtained from the students by the collaboration of the school authorities and, subsequently, the localized test was distributed by the researcher through simple random sampling. Therefore, 10 students were randomly selected from each class to answer the questionnaire without any prior assumptions. The questionnaire was completed within a 45-min session in each separate class. In the next step, 50 students who completed the Maria Kovacs questionnaire were randomly selected to complete Beck questionnaire after 10 days.

Data collection tools

The employed tools in the current research included Maria Kovacs Children's Depression

Inventory and Beck Depression Inventory. The Maria Kovacs Children's Depression Inventory, which is an edition of the Beck Depression Inventory [16] has been expanded by Kovacs [17] to assess depression in childhood and adolescence. The questionnaire is a self-reporting scale based on psychological symptoms determined by Kovacs in 1982 to measure the behavioral, cognitive, and emotional symptoms of depression in children and adolescents within the age range of 7-17 years. It measures a wide range of depression symptoms, including disturbed mode, hedonic capacity, vegetative performance, low self-evaluation, hopelessness, and interpersonal problems [18].

This test has 27 questions, each question contains 3 alternatives among which a respondent should choose 1 option according to his feelings and thoughts during the last 2 weeks. Regarding the scoring of the questionnaire, 14 questions are presented directly and 13 questions are presented inversely. In the direct questions, the answer scores of A, B, and C are 0, 1, and 2, respectively. However, in the inverse questions, the answer scores of A, B, and C are 2, 1, and 0, respectively. The inverse questions are 2, 5, 7, 8, 9, 10, 11, 13, 15, 16, 18, 21, and 25. The obtained scores are within the range of 0-54. In the interpretation of scores, the scores ranged 0-8 are indicative of healthy individuals, 9-19 refer to those on the threshold of depression, and ≥ 20 is considered as depressed individuals. As a result, the higher the score, the more severe the status of depression [19].

Regarding the localization of the questionnaire, a few words in the Persian version of the Maria Kovacs test were replaced by their equivalents or commonly used ones in Herat. In the next step, the questions were reviewed by two psychology professors who are fluent in both Persian and Dari dialects in terms of the exact word choice. Therefore, the following words were replaced:

- In question 2, "in accordance with desire" was replaced by "according to the law",
- in question 6, "bad event" was replaced by "adverse event",
- in question 15, "homework" was replaced by "assignments",

- in question 16, "hardly" was replaced by "effortlessly",
- in question 21, "maktab" was replaced by "school",
- in question 23, "take" was replaced by "brought".

The second test, namely the Beck Depression Inventory, was performed on 50 students. This 21-question test was designed by Beck in 1961. Each question has four alternatives, ranging from zero (no) to three (severe) answers and the scores range 0-63. The higher the score, the more depressed the subject [19]. In terms of the validity and reliability of Maria Kovacs test, some studies have indicated that Maria Kovacs test has a good level of test-retest reliability and high internal consistency.

The split-half method was used to estimate the reliability of the test in the current study. Due to the large sample size, 100 questionnaires were randomly selected from the completed questionnaires to assess the test reliability. Therefore, the even questions of the questionnaire were considered as one test and the odd questions were considered as another test, and the correlation coefficient was calculated between the two series of the obtained scores. In the next step, the Spearman-Brown formula was used to find the validity of the entire test (Table 2). The criterion validity method was also used to calculate the validity of the test. The second test, Beck Depression Inventory, has been accepted in the world as a valid and reliable test with high validity and reliability in various studies. For instance, Ambrosini et al. (1991) found that Beck Depression Inventory had good retest stability and had high internal consistency (91%) in adolescents with severe depression ($r=87%$) and those referring to the clinic as outpatients. In general, BDI can distinguish depressed adolescents from non-depressed ones (Harrington, 2001) [19]. The criterion test was performed on 50 randomly selected subjects. This procedure was performed due to the large sample size (Table 3).

For the data analysis, SPSS software was used in the current study. Moreover, Pearson correlation coefficient was used to determine the correlation of the obtained scores for Maria Kovacs and Beck tests. On the other hand, the

comparison of Maria Kovacs Depression test and Beck test indicated positive predictive value for sensitivity, specificity, and negative predictive value of Maria Kovacs test. Moreover, the Pearson correlation coefficient was calculated for examining the reliability of the test using the split-half method for Kovacs test.

Results

In the present study, 524 questionnaires were filled out among which 500 questionnaires were completed by 254 female schoolchildren and 246 male high school students (aged 12-16 years), 63 seventh grade students, 170 eighth grade student, and 167 ninth grade students (Table 1). Regarding the validity and reliability of Maria Kovacs Depression Test, the implementation of the split-half method estimated the reliability of the test at 0.789 (Table 2). Considering the criterion validity method, there was a relatively good correlation coefficient between Maria Kovacs Depression Test and Beck test ($r=0.526$; Table 3)

Furthermore, the comparison of Maria Kovacs depression test and Beck test (as a criterion test) indicated that when the score range of 0-8 obtained from Maria Kovacs test was regarded as no depression status, the sensitivity, specificity, positive predictive value, and negative predictive value were 97.2%, 46.1%, 85.7%, and 85.7%. Moreover, when the score of non-depression in Maria Kovacs test ranged 0-19, sensitivity, specificity, positive predictive value, and negative predictive value were 35.1%, 100%, 100%, 35.1%, respectively (Table 4).

Table 1. Frequency distribution of research units by gender and educational group

gender \ educational groups	female	male	Total
seven	82	81	163
Eight	87	83	170
Nine	85	82	167
Total	254	246	500

Table 2. Correlation coefficient between the two halves of the Maria Kovacs depression test in the target community

even	odd	
100	100	N
8/54	7/58	Mean
4/52	4/28	Standard deviation
0/78		correlation coefficient

Table 3. Correlation coefficient between Maria Kovacs depression test and Beck test

Beck test	Maria Kovacs test	
50	50	N
17/42	15/50	Mean
8/52	7/29	Standard deviation
0/52		/correlation coefficient r

Table 4. Comparison of Maria Kovacs depression test and Beck test (criterion test) for the diagnosis of depression in adolescents.

Beck test (criterion test 0-11)	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Maria Kovacs test				
No depression (0-8)	97/2%	46/1%	85.7%	85/7%
No depression (0-19)	35/1%	100%	100%	35/1%

Discussion

Regarding the validity/reliability of the test, the high correlation between the two half-tests ($r=0.789$) assured the reliability, meaning that the test can be implemented for the target community. This proves the stability and validity of the test in diagnostic affairs for the target community. The possible reasons and effective factors on the obtaining of these results is the uniformity of the test, the variables being measured, the student's cultural level, and the method of test implementation, all of which contribute to the achievement of these results. With regard to the test validity, the high correlation between the two half-tests ($r=0.526$) confirmed test validity.

In calculating the test validity, since the correlation between the two half-tests ($r = 0.526$) is a high correlation, the validity of the test is assured and it can be implemented for the target community. This proves the stability and validity of the test in diagnostic affairs for the target community. The possible reasons and effective factors leading to these results included the uniformity of the questions, demographic variables (e.g., age and gender), method of implementation, and method of studying the results. Due to the high sensitivity (97.2%) in the non-depression category (0-8), Maria Kovacs test is appropriate for screening depression in adolescents. Therefore, Maria

Kovacs test can be used for screening and diagnosing depressed adolescents.

Previous international studies have shown that Kovacs Children Depression Inventory has a valid measurement with high internal consistency and Cronbach's alpha of 0.71-0.79 [5, 18, 20-25]. According to Finch et al., this test has high levels of reliability and also validity [19]. The reliability and validity of Kovacs Children Depression Inventory have been also studied in Iran. In a study conducted by Rajabi and Attari, the internal consistency coefficient of the test was 0.88 and test-retest reliability was 0.81 [14]. Moreover, a study conducted by Dehshiry et al. indicated the reliability coefficient of 0.82 and internal consistency of 0.83 for Kovacs Children Depression Inventory [26].

Kovacs in 1992 reported a reliability coefficient of 86% for this tool. This test measures the symptoms of depression, such as low mode, Hedonic capacity, interpersonal behaviors, self-assessment, and educational issues. Furthermore, Bandura et al. (1999) [27] also reported Cronbach's alpha of 88% and reliability coefficient 92%.

This test was first translated and used by Tahmasian (2007) in Iran [28], and the reliability of the test was calculated as 83% through a test-retest over a 2-week interval among 43 high school students in Tehran. In a

similar vein, another study conducted by Castello and Ångeld (1988) indicated that the reliability coefficient of the test was 73%. In their study, the test also had a level of high reliability, as well as appropriate test-retest reliability [19].

In a study performed by Lang and Thyser (1983) [29], the alpha coefficient for children's depression scale on 226 children in Australia was reported to be 0.96. Tonkin and Hudson (1981) [30]; Thyser, Lang, Takasi, and Lang (1992) [31] reported the Cronbach's Alpha of 0.92-0.94 for the Children's Depression Inventory. Bath and Middleton (1981) reported the Gutmann's harmonic coefficient in Australia as 0.90 [32]. In a study carried out by Fenich et al, Maria Kovacs test was performed on 1500 subjects indicating a high validity [19].

The strong points of the current research entailed a relatively high sample size and the inclusion of both genders. Moreover, samples selection provided an equal chance for the selection of each individual in the population. Considering the relatively high prevalence of depression symptoms in high school students as well as the reliability and credibility of the Maria Kovacs test for depression symptoms and the relatively high sensitivity of the Maria Kovacs test, it is suggested to educators in educational affairs to implement this test in schools and educational institutions as a tool for screening depressed students. Furthermore, it seems reasonable to perform timely diagnose and treatment every year, and treat the clinical cases of disorders induced by depression in order to enhance the performance of students and ultimately the entire community.

Conclusion: Regarding the acceptable level of reliability and validity of the Maria Kovacs Depression Inventory, it could be implemented in the target community. Therefore it could be recommended as an appropriate scale for assessment depression among school children in Afghanistan.

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Conflicts of interest

The authors declare no conflicts of interest.

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