



Validity and Reliability of Youth Anxiety Measure for DSM-5 in Iranian Non-Clinical Children and Adolescents

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Abstract

The present study aimed to explore the validity and reliability of the Persian version of the Youth Anxiety Measure for DSM-5 (YAM-5). Two groups of non-clinical children and adolescents were recruited. The first group ($n = 520$) was recruited via 4 schools of Tehran, Iran, and only completed the YAM-5. The second group ($n = 557$) was recruited via 4 schools of Tabriz, Iran. In addition to the YAM-5, they completed another anxiety scale and a depression scale. The exploratory factor analysis of data of the first group revealed a five factor model similar to the original model of the scale. The confirmatory factor analysis showed that the five factor model fit with the data of second group. Also, the convergent validity was supported. The current findings, thus, provide support for validity and reliability of Persian version of the YAM-5 in a nonclinical sample of children and adolescents in Iran.

Keywords Youth anxiety measure for DSM-5 · Validity · Reliability · Iran · Children

Introduction

Anxiety disorders form a prevalent problem among children and adolescents. Epidemiological studies showed that current global prevalence of anxiety disorders is 7.3% (4.8 to 10.9%) [1]. Anxiety disorders is also a common problem among middle East societies [2, 3], specially Iran [4]. Anxiety disorders result in a significant impairment in children's functioning and extenuate risk for development of other psychopathologies [5]. Therefore, screening children and adolescents with anxiety disorders is important, and it needs reliable and valid instruments.

A number of questionnaires assess anxiety symptoms in children and youths. For example, Multidimensional Anxiety Scale for Children [6], the Screen for Child Anxiety Related Emotional Disorders [7], and the Spence Children's Anxiety Scale [8] measure children's fear and anxiety symptoms based on the DSM-IV criteria for anxiety disorders.

However, a few years ago the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, APA, 2013) classification system was published, which presents fundamental changes in the classification of anxiety disorders. These alterations may have implications for assessment. The most vital changes in the anxiety disorders category were as follows: (1) obsessive-compulsive disorder and posttraumatic and acute stress disorder are excluded from anxiety disorders category; (2) selective mutism and separation anxiety are included in this category; (3) agoraphobia is regarded as distinct psychopathology from panic disorder [9]. Thus, the previous self-report instruments do not fit with the new structure of the DSM.

In order to respond to the new assessment needs, the Anxiety Disorders subgroup of the DSM-5 Anxiety, Obsessive–Compulsive Spectrum, Posttraumatic, and Dissociative Disorders workgroup developed dimensional scales to measure anxiety disorders symptoms in children and adolescents [10]. However, although evidence partially supports validity and reliability of the DSM-5 dimensional anxiety scales

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in 8- to 13-year-old children, the convergent and divergent validity of the scales were not good [11]. This issue also applied to the parent–child and father–mother agreement indices. In addition to these psychometric problems, the DSM-5 dimensional scales do not cover selective mutism [10].

In light of the abovementioned limitations of DSM-5 dimensional anxiety scales, Muris, Simon [12] developed the Youth Anxiety Measure for DSM-5 (YAM-5). The YAM-5 consists of two parts: Part I assesses symptoms of separation anxiety disorder, generalized anxiety disorder, panic disorder, social anxiety disorder, and selective mutism, while Part II focuses on symptoms of various types of specific phobias and agoraphobia.

A number of studies demonstrated validity and reliability of YAM-5 in different populations. Muris, Simon [12] reported the scale has good content and face validity, convergent and discriminant validity and satisfactory internal consistency among clinical and non-clinical Dutch adolescents. Two other studies on Dutch children aged 8 to 12 years demonstrated that the self-report version of YAM-5 had good internal consistency, test-retest reliability as well as high concurrent validity [13, 14]. In addition, one of those studies showed five factor model of part I of the YAM-5 fit with the data [13]. Finally, Garcia-Lopez, Saez-Castillo [15] explored psychometric properties of part I of Spanish version of the YAM-5. They found that the part I of the scale has good internal consistency and convergent validity. In addition, exploratory and confirmatory factor analysis provided support for construct validity of the part I of YAM-5.

However, as far as we know there is not any published study about psychometric properties of the YAM-5 in Eastern populations. In addition, Iran is a special case with a collectivistic cultural background, in which people are encouraged to pay more attention to the judgments of others. Therefore, this condition might facilitate development of social anxiety disorder and selective mutism in children and youths. Also, historical events (e.g. wars in the Middle East region) and social and economic circumstances of Iran probably make individuals more vulnerable to other anxiety disorders than western societies. Thus, precise measurement of anxiety disorders in Iranian population is a clinical and research necessity. Therefore, in the present study, we aimed to examine validity and reliability of the part I of the Persian version of the YAM-5 in Iranian children. Thus, the present study aimed to explore factorial validity of the YAM-5 using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), as well as its convergent validity, and its reliability in two group of non-clinical children and adolescents. Based on the literature review, we expected to find a five-factor solution. In order to explore the convergent validity, we predicted that the YAM-5 and its subscales would have positive significant correlation with another measure

of anxiety (Revised Children’s Manifest Anxiety Scale (RCMAS) [16]). In addition, we expected that the YAM-5 show positive relationship with a measure of depression (Child Depression Inventory (CDI) [17]). Based on the literature [14, 18], we predicted that social anxiety disorder and generalized anxiety disorder subscales of YMA-5 would have strongest correlation with CDI scores.

Methods

Participants

Two groups of children and adolescents, 9 to 14 years old, were recruited. The first group consisted of 556 children and adolescents who were recruited from 4 schools of Tehran, Iran. Thirty-six participants missed more than 10% of the items and their data were excluded from analyses. Thus, from this first group, the data from 520 participants (258 girls and 262 boys) were analyzed. The mean age of the boys was 11.52 (SD = 1.71), and corresponding figures for girls were 11.16 (SD = 1.87). There was no any significant difference between excluded participants and those who included in the analyses regarding age and gender. The first group only completed the YAM-5, and their data were used for Exploratory Factor Analysis (EFA).

The second group included 580 children and adolescents who were recruited from 4 schools of Tabriz, Iran. Twenty-three participants missed more than 10% of the items and their data were excluded from the analyses. Thus, data from 557 participants (280 girls and 277 boys) were analyzed. The mean age of the boys was 11.38 (SD = 1.74), and corresponding figures for girls were 11.42 (SD = 1.78). Again, the excluded participants did not differ with the included subjects in terms of age and gender. The second group completed the YAM-5, Revised Children’s Manifest Anxiety Scale (RCMAS) [16], and the Child Depression Inventory [17]. The data of this second group were used for the Confirmatory Factor Analysis (CFA) and to examine the convergent validity of the YAM-5.

Measures

YAM-5 [14] is a self-report inventory that assesses anxiety symptoms in children and adolescents. The present study was devoted to part I of the child self-report version. Part I (28 items) measures symptoms of the DSM-5 major anxiety disorders, and includes the following subscales: separation anxiety disorder, selective mutism, social anxiety disorder, panic disorder, and generalized anxiety disorder. The child is asked to answer items (e.g., “I am afraid to go anywhere without my parents”) using a 4-point Likert scale (ranging from 0 (never) to 3 (always)). As noted earlier, validity and

reliability of the YAM-5 were established in Western societies [12–15].

Revised Children's Manifest Anxiety Scale (RCMAS) [16] is a self-report instrument, which was developed to assess general anxiety in children and adolescents, aged 6 to 19. Participants are asked to determine if the item (e.g., "I get nervous when things do not go the right way for me") describes him/her using Yes or No answers. High scores reflect high levels of anxiety. A number of studies demonstrated good validity and reliability of the RCMAS in western [19] as well as Iranian [20] populations. In the current study, internal consistency of the scale was .87 in the girls, .86 in the boys.

Child Depression Inventory [17] is a 27-item self-report instrument which was developed for children and adolescents. Each item focuses on a specific symptom of depression (e.g., disturbed mood) or its school-related problems (e.g., social rejection). In each item, the participant is asked to choose from three statements, which range from no symptom to severe symptoms. Each item is scored using 3-point Likert scale (0, 1, or 2) is given to each item. The total score ranges from 0 to 54 and higher scores reflect higher level of depression. Good validity and reliability of Persian version of the CDI has been demonstrated [21]. In the current study, internal consistency of the scale was .83 in the girls, .81 in the boys.

Procedure

The research procedure was approved by Ethical Review Board of University of Tabriz. The managers of the schools signed an informed consent. The father or mother of the participants were contacted through the managers of the schools and informed about the study. They also signed a written informed consent. The ethical review board of the university did not require consent form from youth who is under 18 years old.

After obtaining permission from the developer of the scale, it was translated into Persian by an independent translator and back translated into English. The first and second author compared the Persian version with the original version of the YAM-5, independently, and determined that the Persian version matched with the original version of the scale. In order to gather data from children, parents received an information letter along with a consent form. Only children of whom either the mother or the father had provided informed consent, by signing and returning the form, were asked to complete the questionnaires.

Data Analysis

Data Analysis was performed using SPSS-24 and AMOS-23. The missing data was replaced by mean of the item in

the corresponding sample. EFA was utilized to evaluate the factor structure of the YAM-5. At first, the necessary assumptions for running parametric analyses (e.g., normal distribution) were checked using descriptive statistics. In order to test proposed five-factor model of YAM-5, CFA with maximum likelihood estimation and fixing a factor loading to 1 method was performed using AMOS 23. The results of the CFA were examined by χ^2/df ratio, the Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Incremental Fit Index (IFI), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). The internal consistency was investigated using Corrected Item- Total Correlations (CITC), alpha if items removed, and Cronbach's alpha coefficient. The convergent validity of the CBAS were assessed by Pearson correlation coefficients. Finally, we used MANOVA to explore differences between boys and girls regarding YAM-5 total score and its subscales.

Results

Results of the First Group ($n = 520$)

Gender Differences

Table 1 indicates the mean scores (and standard deviations) for the YAM-5-I total score and subscales. MANOVA showed that boys and girls do not differ significantly with regard to the total score of the part I of YAM-5 ($F(1, 518) = 0.11, p < .91$). Boys significantly got higher scores on selective mutism subscale than girls ($F(1, 518) = 4.22, p < .05$). The boys and girls did not show significant difference on the other four subscales of YAM-5.

Internal Consistency

All of the YAM-5 items (except item 2) showed good item-total correlations (ranged from .32 to .62). Item 2 ("At school I don't speak to the teacher at all") showed a weak relationship with the total YAM-5 (CITC = .16). Thus, the item 2 was removed from further analysis. An excellent internal consistency was found for the YAM-5 total score ($\alpha = .90$). Internal consistency of the subscales was as follows: Separation Anxiety Disorder = .77, Selective Mutism = .71, Social Anxiety Disorder = .77, Panic Disorder = .84, Generalized Anxiety Disorder = .82 (Table 2).

Exploratory Factor Analysis

The KMO coefficient was .91, and the Bartlett coefficient was 4942.84 ($p < 0.0001$). The results, based on the criteria of eigenvalues greater than 1 and screeplot revealed a five

Table 1 Mean and standard deviation of The YAM-5 and its subscales in two groups

	First group (n = 520)		Second group (n = 557)	
	Boys	Girls	Boys	Girls
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
<i>Panic disorder</i>	3.56 (3.15)	4.19 (3.52)	2.83 (2.16)	3.51 (3.21)
<i>Generalized anxiety disorder</i>	7.86 (3.75)	7.78 (4.2)	6.81 (3.50)	6.72 (3.49)
<i>Social anxiety disorder</i>	5.79 (3.86)	5.66 (3.74)	4.77 (3.28)	4.87 (3.51)
<i>Selective mutism</i>	2.80 (2.02)	2.48 (1.88)	2.14 (1.78)	2.05 (1.83)
Separation anxiety disorder	7.29 (3.78)	6.86 (4.48)	5.91 (3.60)	6.61 (3.64)
YAM-5 total	27.11 (13.40)	27.05 (14.45)	22.48 (11.35)	23.77 (11.10)

factor solution. The five factors accounted for 52% of the total variance (Table 2). Varimax rotation revealed five factors with similar item loadings to the original version. The first factor explained 13% of the total variance and named panic disorder factor. The second factor explained 12% of the total variance and captured generalized anxiety disorder symptoms. The third factor and fourth factors each explained 10% of the total variance and devoted to social anxiety disorder and selective mutism, respectively. Finally, the fifth factor assesses separation anxiety disorder and explained 7% of the total variance (Table 2).

Results of the Second Group (n = 572)

Gender Differences

Table 1 also indicates the mean scores (and standard deviations) for the YAM-5 total score and subscales of the second group. Again, MANOVA showed that boys and girls do not differ significantly in terms of total score of the part I of YAM-5 ($F(1, 555) = 1.84, p < .17$). Girls significantly got higher scores on panic disorder subscale ($F(1, 555) = 5.8, p < .01$) and separation anxiety disorder ($F(1, 555) = 5.82, p < .01$) than boys. The boys and girls did not show significant difference on the other three subscales of YAM-5.

Internal Consistency

All of the YAM-5 items with one exception showed good item-total correlations (ranged from .35 to .56). Item 2 (“At school I don’t speak to the teacher at all”) showed a weak relationship with the total YAM-5 (CITC = .13). Thus, the item 2 was removed from further analysis. A good internal consistency was found for the YAM-5 total score ($\alpha = .87$). Internal consistency of the subscales was as follows: Separation Anxiety Disorder = .77, Selective Mutism = .70, Social Anxiety Disorder = .73, Panic Disorder = .77, Generalized Anxiety Disorder = .76.

Confirmatory Factor Analysis

A CFA was used to test the five factors model of the part I of the YAM-5 based on the original model of the scale. The goodness-of-fit indices validated that the original five factors model showed adequate fit with the data (χ^2/df ratio = 1.74, GFI = 0.93, AGFI = 0.91, IFI = 0.95, TLI = 0.94, CFI = 0.95, RMSEA = 0.03, 90%CI [0.03, 0.04]) (Fig. 1).

Convergent Validity

In both girls’ and boys’ populations, the total score of YAM-5 showed significant positive associations with both RCMAS and CDI, as predicted (Table 3). Also in both girls and boys, all subscales of the YAM-5 significantly and positively correlated with RCMAS and CDI. As predicted, subscales measuring symptoms of generalized anxiety disorder and social anxiety disorder showed stronger correlation with CDI than other subscales of the YAM-5.

Discussion

As far as we know, this is the first study that evaluated psychometric properties of the YAM-5, in a community sample of 9-14 year-old children adolescents in an Eastern population (i.e. Iran). The exploratory Factor analysis revealed a five-factor solution for the Persian version of the YAM-5 in a large Iranian children and adolescent sample. And this factor structure was verified by confirmatory factor analysis on another sample of children and adolescents. The content of the factors was similar to the original version of the YAM-5 and these scales were thus validated. These findings are generally in line with previous literature [12–15].

In line with our prediction, internal consistencies of part I of the Persian version of the YAM-5 were good, implying that the items of the scale consistently measure major anxiety disorders. Also, almost all subscales showed acceptable to good internal consistency. However, Selective mutism showed minimum acceptable level of internal consistency

Table 2 Factor loading, communalities, item-total correlations, and factor internal consistency scores for principal factor extraction after varimax rotation of the YAM-5 items

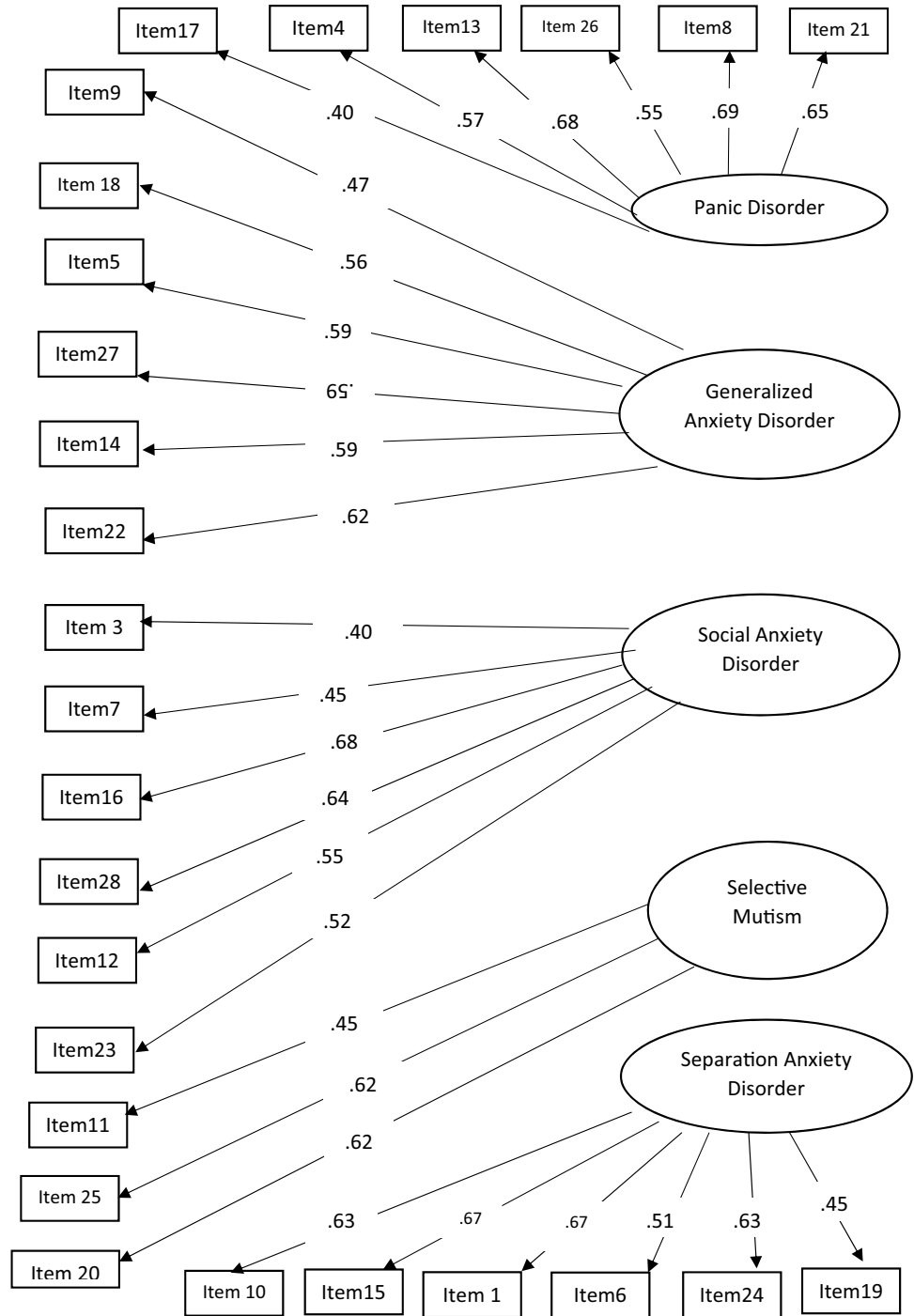
YAM-5 items and factors	Factor loading	item-total correlation	Alpha cronbach in the first group (n = 520)	Alpha cronbach in the second group (n = 557)
<i>Factor 1: Panic disorder</i>			.84	.76
21. I have severe anxiety attacks during which I tremble all over my body	.75	.62		
8. I suffer from anxiety or panic attacks	.72	.56		
26. I am afraid of having a new anxiety or panic attack	.72	.61		
13. All of a sudden I become so scared that my heart starts to beat very quickly	.71	.58		
4. I panic for no reason	.69	.49		
17. When I panic, I am afraid that I could die	.49	.39		
<i>Factor2: Generalized anxiety disorder</i>			.82	.76
9. I think a lot about what can go wrong	.73	.52		
18. I worry a lot about not doing well at school	.68	.54		
5. I worry about a lot of things	.65	.52		
27. I don't feel well because I worry so much	.63	.61		
14. I find it hard to stop worrying	.61	.51		
22. I worry a lot about all the bad things than happen in the world	.58	.54		
<i>Factor 3. Social anxiety disorder</i>			.77	.73
3. I find it scary to meet new people	.66	.51		
7. I find it scary to eat or drink if other people are looking at me	.64	.44		
16. I am afraid that others will see that I blush	.60	.47		
28. I am afraid that I might do or say something stupid in front of others	.53	.55		
12. I am afraid that others will see that I blush	.53	.49		
23. I am very afraid that other kids don't like me	.51	.57		
<i>Factor 4: Selective mutism</i>			.71	.70
11. If I meet a new person, I don't speak at all	.73	.33		
25. I don't speak at all when there is a new visitor at our home	.67	.36		
20. At school I don't speak at all to the kids in my class	.65	.37		
<i>Factor 5: Separation anxiety disorder</i>			.77	.77
10. I am afraid that my parents will leave and never come back	.70	.47		
15. I am afraid that something bad will happen, so I'll never see my parents again	.69	.52		
1. I am afraid to go anywhere without my parents	.66	.46		
6. I get frightened if my parents leave the house without me	.64	.44		
24. I don't feel well when I have to go somewhere without my parents	.60	.48		
19. I have very scary dreams that I lose my parents	.38	.35		
YAM-5 total			.90	.87

in both samples. It is likely because of the limited number of items in this scale (3 items). In addition, selective mutism symptoms have a low prevalence in community samples [12]. Finally, we recruited children over 9 years old in the study. Since selective mutism are more prevalent in younger children [22], we suggest that future research should recruit younger kids to investigate these findings more precisely. Another suggestion would be using a parent version of the questionnaire. Simon, Bos [13] also reported low level of

internal consistency for selective mutism subscale. In general, the results of the present study about good internal consistency of the Persian version of YAM-5 are in line with previous researches [12–15].

The convergent validity of part I of the YAM-5 was established through the positive significant correlations of the YAM-5 and its subscales with another measure of anxiety symptoms (i.e. RCMA5), as well as depression symptoms (measured by CDI). These findings are generally consistent

Fig. 1 Factor structure of YAM-5, standardized regression weight is reported



with the results of previous researches that demonstrated good convergent validity of the YAM-5 in different populations [12, 14, 15, 19]. Results showed that the part I of YAM-5 have stronger relationship with another anxiety scale than to a depression scale. This finding implied that part I of the YAM-5 has been developed in such a way that there is minimal symptom overlap with depression [14]. On the other hand, the significant relationship between YAM-5 and CDI is consistent with strong evidence indicating co-occurrence

and comorbidity of anxiety and depression [23–25]. Finally, the stronger relationship of social anxiety disorder and generalized anxiety disorder subscales with the CDI is in line with previous literature which showed that these two anxiety disorders have most robust relationship and prevalent comorbidity with depression [18].

This research had a number of strengths, but also some limitations which are noteworthy. An important strength was two relatively large children and adolescent’s samples

Table 3 Association of the YAM-5 with CDI and RCMAS

Measure	RCMAS		CDI	
	Boys (n = 277)	Girls (n = 280)	Boys (n = 277)	Girls (n = 280)
YAM-5 total score	.61*	.61*	.48*	.42*
Separation anxiety disorder	.39*	.31*	.33*	.30*
Selective mutism	.25*	.31*	.21*	.30*
Social anxiety disorder	.49*	.48*	.41*	.37*
Panic disorder	.53*	.50*	.38*	.38*
Generalized anxiety disorder	.52*	.57*	.39*	.41*

RCMAS revised children's manifest anxiety scale, CDI child depression inventory, YAM-5 youth anxiety measure for DSM-5

*p<0.01

that were recruited. Another strength was establishing factor structure of YAM-5 through both exploratory and confirmatory factor analysis strategies. However, we did not investigate validity and reliability of the YAM-5 in clinical samples. Thus, future researches should explore psychometric properties of Persian version of YAM-5 in clinical samples. In addition, investigating sensitivity and specificity of the YAM-5 could be next valuable step in assessment of anxiety disorders.

Summary

This is the first study that investigated psychometric properties of the YAM-5, in a relatively large community sample of children and adolescents in an Eastern population (i.e. Iran). Our results indicated that exploratory factor analysis revealed a five-factor solution for the Persian version of the YAM-5 in the sample. Also, this factor structure was verified by confirmatory factor analysis on another sample of children and adolescents. The content of the factors was similar to the original version of the YAM-5 and these scales were thus validated. Thus, these results suggest the YAM-5 would be a useful mean for assessing anxiety symptoms in Iranian children and adolescents.

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Compliance with Ethical Standards

Conflict of interest The authors have no actual or potential conflicts of interest including any financial, personal or other relationships with other people or organizations within three years of beginning the work submitted that could inappropriately influence their work.

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