ORIGINAL ARTICLE

Psychometric Properties of the Obsessive Compulsive Inventory-Child Version in Iranian Clinical and Community Samples

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Abstract

This study evaluated the psychometric properties of the Persian version of the Obsessive–Compulsive Inventory–Child Version (OCI-CV) in clinical and community samples. Factor structure (confirmatory factor analysis), validity (convergent/discriminant, and predictive), and reliability (internal consistency, and 4-week retest) of the Persian version of the OCI-CV were investigated in a sample of 391 children and adolescents 7–17 years comprised of two groups: a clinical sample of youth with OCD (n = 62), and a community sample (n = 329). Participants completed the OCI-CV, Multidimensional Anxiety Scale for Children (MASC), Children's Depression Inventory (CDI), and Child Behavior Checklist (CBCL). Similar to the English version of the OCI-CV, the Persian version of the scale demonstrated a stable six-factor structure, good convergent and discriminant validity through its correlations with other specific measures of pediatric psychopathology, acceptable sensitivity and specificity for the detection of OCD, and good reliability in terms of internal consistency and temporal stability. These findings suggest that the OCI-CV is a valid and reliable measure to assess obsessive–compulsive symptom dimensions in Iranian youth. Findings provide cross cultural support on the utility of OCI-CV as a self-report measure of obsessive–compulsive symptomology.

Keywords Obsessive–compulsive disorder · Obsessive–compulsive inventory–child version · Children · Adolescents · Validity · Reliability

Introduction

Obsessive–Compulsive Disorder (OCD) is a neuropsychiatric condition characterized by obsessions and/or compulsions [1] which often onsets during childhood [2] and runs a chronic course without adequate intervention [3–5]. OCD is a highly heterogeneous and disabling condition that affects 1–3% of children and adolescents internationally [6, 7]. Childhood OCD incidence is fairly consistent across countries where surveillance has been conducted, including Iran. In a large national epidemiological survey of Iranian youth 6–18 years, OCD was one of the most prevalent disorders, with a prevalence rate of 3.5% [8]. In a systematic review study [9], OCD was the second common disorder among Iranian youth, with prevalence ranging from 1 to 11.9%.

Although, pediatric OCD is a prevalent and disabling condition, it remains frequently underdiagnosed and undertreated [10], especially in Iran. Due to the heterogeneous nature of pediatric OCD, a range of potentially comorbid conditions, and potentially limited insight [11–13], development of valid pediatric OCD assessment instruments is

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challenging. Given pressing clinical challenges, it is necessary to have a self-report screening instruments for Iranian youth with OCD that are brief and psychometrically sound, assess multiple dimensions of the disorder, have adequate diagnostic sensitivity and specificity in both clinical and community settings, and facilitate treatment planning and monitoring [11, 14–16].

There is a movement towards evidence-based assessment (EBA) in child and adult psychiatry, and assessment techniques from clinical research are becoming more commonplace in practice settings [12]. This move has fostered the development, validation and adaptation of several self-report measures to rate OCD symptoms [11, 17]. The existence of well-established instruments to assess pediatric OCD symptoms is critically important for the development and dissemination of effective interventions, as well as for initiatives aimed at early detection and treatment [18]. The Obsessive Compulsive Inventory-Child Version (OCI-CV; [19], is a well-established self-report instrument that assesses frequency and distress related to varied obsessive–compulsive dimensions. Other self-report measures, such as the Children´s Florida Obsessive–Compulsive Inventory (C-FOCI; [20], the Child Saving Inventory (CSI; [21], the Children's Obsessional Compulsive Inventory (CHOCI; [22], and the Short OCD Screener (SOCS; [14] are promising tools for assessing OCD symptoms and severity, but they do not assess the obsessive–compulsive dimensionality.

The OCI-CV [19] is the only self-report measure that captures symptom heterogeneity in children and adolescents. This measure assesses the severity of six dimensions of OCD symptoms defined as Doubting/Checking, Obsessing, Hoarding, Washing, Ordering, Neutralizing, as well as providing an overall severity score. This instrument consists of 21 items scored on a 3-point Likert scale (0 = Never, 1 = Sometimes, and 2 = Always) and it can be used with youth 7–17 years. This scale demonstrates high internal consistency and correlates significantly with other measures of OCD. Furthermore, the psychometric properties of the OCI-CV have been validated in the original study by Foa, Coles [19], as well as subsequent studies in clinical [16, 23, 24] and non-clinical samples [25–31] in different countries.

For example, in the original validation study employing a clinical sample of youth with OCD, Foa, Coles [19] reported a 6-factor structure, good test–retest reliability, and adequate sensitivity to change during treatment. Subsequently, Jones, De Nadai [23] administered the OCI-CV to a clinical sample of youth with OCD and found an adequate fit of the original six-factor structure. Both studies found that total scores on the OCI-CV and the CY-BOCS tended to correlated in the small range, with stronger correlations between the OCI-CV and self-report measures of depression [19, 23].

In other languages, the validity of Italian [30], Swedish [24], Spanish [26, 27], Chilean [25], and Nigerian [31]

versions of the OCI-CV were examined with clinical and non-clinical samples. The authors found the OCI-CV to be a reliable and valid measure of OCD, and to possesses a similar six-factor structure as in the original study. These findings establish the case for more studies in non-Western cultures. Recently, the OCI-CV has also been proposed as an effective screen for pediatric OCD using empirically derived cut-scores [16].

Evaluation of pediatric OCD has received relatively very little consideration in Iran [32]. The paucity of data on pediatric OCD in Iranian populations is likely due in part to the absence of a psychometrically sound measure for use with youth. Therefore, availability of a valid measure capable of reliably measuring OCD dimensions in both clinical and research settings is crucial. To our knowledge, no data have been reported to date on the psychometric properties of the OCI-CV in either clinical or community samples of Iranian population. The aim of this study was to examine the psychometric properties of a Persian version of the OCI-CV in both an Iranian clinical sample of youth with OCD and a non-clinical community sample. We examined the factor structure (confirmatory factor analysis), validity (convergent and predictive), and reliability (internal consistency, and 4-week retest) of the Persian version of the OCI-CV.

Methods

Participants

Participants included a total of 391 children and adolescents 7–17 years belonging to either a clinical (n = 62) or community sample (n = 329). Inclusion criteria for both groups included: (a) being within the 7 and 17 years; (b) having adequate Persian language skills; (c) not having a previous diagnosis of a developmental disability; and (d) a primary diagnosis of OCD for those in the clinical sample. Table 1 summarizes the demographic characteristics of the sample.

The clinical sample was comprised of 62 youth with a primary diagnosis of OCD (M_{age} = 15.82 ± 1.70; 67.7% female). Participants from this group were recruited from psychiatric outpatient clinics for day admission in Sanandaj (Kurdistan, Iran). Patients were diagnosed with a primary diagnosis of OCD by clinically trained and experienced psychiatrists. Diagnoses were established by a structured diagnostic interview (SCID-5-CV; [33] following DSM-5 criteria. For the clinical sample, 51.8% of the participants had other comorbid disorders, with the most prevalent being anxiety disorders (48.3%), followed by ADHD (27.6%), and depression (19.4%).

The community sample was comprised of 329 elementary and high school student volunteers (M_{age} = 15.60 ± 1.92; 60.5% female) recruited from several schools in Sanandaj

Table 1 Means and standard deviations for study measures

	Clinical (N=62)		Community (N=329)	
	M	(SD)	M	(SD)
OCI-CV				
Total score	21.76	5.84	15.07	6.78
Doubting/checking	5.04	2.10	3.24	2.11
Obsessing	4.50	1.98	3.05	1.95
Washing	3.06	1.66	2.09	1.50
Hoarding	2.74	1.31	2.04	1.35
Neutralizing	2.17	1.64	1.27	1.32
Ordering	4.22	1.70	3.35	1.82
MASC				
Total score	49.95	13.77	46.39	14.57
Physical symptoms	12.66	5.44	11.25	5.81
Harm avoidance	16.27	4.70	15.52	4.79
Social anxiety	10.67	4.89	10.77	4.97
Separation/panic	10.33	4.20	8.83	4.60
CDI				
Total score	26.32	3.39	17.79	9.97
Negative mood	6.29	1.63	3.72	2.73
Ineffectiveness	7.67	1.76	1.95	1.96
Interpersonal problems	5.24	1.01	3.12	1.67
Anhedonia	7.67	1.76	5.69	3.18
Negative self-esteem	4.72	1.14	3.28	2.23
CBCL				
Total score	48.66	27.75	43.20	25.39
Anxious/depressed	8.08	5.17	6.86	4.61
Withdrawn/depressed	3.37	2.58	2.68	2.04
Somatic complains	3.19	2.28	2.27	1.82
Social problems	5.21	3.53	4.00	3.29
Thought problems	7.90	4.76	6.83	4.61
Attention problems	3.81	3.21	4.70	3.10
Rule-breaking behavior	7.31	4.65	7.30	4.98
Aggressive behavior	9.79	6.00	8.43	5.31

OCI-CV Obsessive Compulsive Inventory–Child Version, *MASC* Multidimensional Anxiety Scale for Children, *CDI* Children's Depression Inventory, *CBCL*=Child Behavior Checklist

(Kurdistan, Iran). Participants in the community group were randomly selected by averages of random cluster sampling, in which the classroom was the cluster, stratified by schools and educational years. All participants in both clinical and community sample were matched by age and gender. There were no statistically significant differences regarding age and gender between clinical and community samples. All participants completed a packet of questionnaires including the OCI-CV, Multidimensional Anxiety Scale for Children (MASC; [34], Children's Depression Inventory (CDI; [35], and Child Behavior Checklist (CBCL; [36]. Questionnaires within packets were presented in randomized order to

minimize potential order effects. As incentive to participate in the study, each person who completed the questionnaires were given a high quality pen.

Measures

Obsessive–Compulsive Inventory-Child Version (OCI-CV; [19])

The OCI-CV is a 21-item self-report instrument developed to assess symptom presence and dimensionality of OCD in youth 7–17 years over the past month. The OCI-CV assesses the symptoms across six different dimensions: (1) doubting/ checking (e.g. Doubting if one did things), (2) obsessing (e.g. Upset by bad thoughts), (3) hoarding (e.g., Collect stuff that gets in way), (4) washing (e.g. Wash more than others), (5) ordering (e.g. Upset if people move things), and (6) neutralizing symptoms (e.g. Repeating numbers). Items are scored on a 3-point Likert-type scale (0=never, 1=sometimes, 2=always), and are summed to produce a total score ranging from 0 to 42 points. Evidence supports its good psychometric properties. In the original study, the OCI-CV total score showed good internal consistency and good to adequate retest reliability. Convergent validity was good as evidenced by significant correlations with clinician-rated measures of OCD severity [19]. The OCI-CV was translated from English into Persian by accredited translators in accordance with gold standard back translation techniques [37, 38].

Multidimensional Anxiety Scale for Children (MASC; [34])

The MASC is a 39-item self-report scale that measures anxiety symptom severity in youth 8–19 years. Items are scored on a 4-point Likert-type scale ranging from 0 (not true) to 3 (very true). The MASC is comprised of four subscales: physical symptoms (assessing somatic symptoms of anxiety), harm avoidance (assessing worry about/avoidance of negative outcomes), social anxiety, and separation/panic. An overall anxiety score is also computed. The MASC has demonstrated adequate psychometric properties [34, 39]. The MASC has internal reliability ranging from 0.69 to 0.90 and discriminant validity ranging from 0.70 to 0.75 [40]. The MASC total score demonstrated good reliability in the present study (Cronbach's α=0.84).

Children's Depression Inventory (CDI; [35])

The CDI is a 27-item self-report measure that assesses depressive symptom severity during the last two weeks in youth 7–17 years. Items are scored from 0 to 2 and summed into a total score (0–54). The CDI has exhibited good psychometric properties with adequate internal consistency,

sufficient retest reliability, and the ability to distinguish between clinical and non-clinical populations [41]. The CDI demonstrated excellent reliability in the present study (Cronbach's α = 0.90).

Child Behavior Checklist (CBCL; [36])

The CBCL is a 113-item parent-report checklist that assesses emotional and behavioral functioning during the past six months in youth 6–18 years. It provides subscales assessing internalizing and externalizing symptoms across the following domains: anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior. Items are scored on a 3-point Likert-type scale ranging from 0 (not true) to 2 (very true). The CBCL has strong psychometric properties, including retest reliability, inter-rater agreement, and internal consistency [42–44]. The CBCL total score demonstrated excellent reliability in the present study (Cronbach's α = 0.96).

Procedure

Participants completed a Persian version of the OCI-CV [19]. The process of translation was carried out according to international standards for a parallel back-translation procedure [37, 38], including a translation from English to Persian and an independent translation back to English. The first translation was made independently by two native Iranian clinical psychologists with excellent knowledge of the English language, and reviewed by a bilingual Iranian professional translator. After, a native bilingual professional translator who was unaffiliated to the study back-translated this version to English. Subsequently, a new version was obtained by comparing the original and the back-translated versions during a meeting with professionals who participated in the translation process and the first author, who settled minor discrepancies in the translation through consensus. This version was then pilot tested with 40 youth in their school. Interviews for pilot testing were conducted by psychologists to examine issues with wording, conceptualization, semantic equivalence, comprehensibility and content validity. As this version was considered clearly understood, it was used for the study as the final version of the Iranian OCI-CV.

This study was approved by the University of Kurdistan Research Ethics Committee. The ethical conditions of participation including voluntary participation, privacy, anonymity and confidentiality were explained to the respondents. Written informed consent was obtained from all parents or guardians, and assent was obtained from all youth. After study procedures were explained, participants completed assessments with a master's-level research assistant who provided instructions and responded to any questions. Participants completed the questionnaires individually, which took approximately 90 min.

Analytic Strategy

The measures total scores were calculated if > 75% of items were complete, and a multiple imputation strategy was used to impute missing data points. Of 400 participants who were involved in the study, 391 returned completed measures and analyses were conducted with the 391 participants. Statistical analyses were conducted using SPSS for Windows, version 22. (IBM Crop., Allen, Bennett [45], LISREL 8.8 [46], and R [47].

Confirmatory Factor Analysis (CFA)

To test the factor structure, CFA was carried out using structural equation modeling on the whole sample (clinical and community samples combined, N = 391). Four previously tested models [19, 25, 48] were evaluated through CFA: a single-factor model, the six independent factor model, the six correlated factor model, as found in the original validation study [19], as well as a bifactor model with a higher order factor and six lower order factors.

To assess CFA, the model fit was evaluated by the following criteria: Chi-Square Index (χ^2), χ^2 divided by degrees of freedom (χ^2/df), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). χ^2/df ≤ 2, CFI, GFI, and AGFI ≥ 0.95, and SRMR and RMSEA ≤ 0.05 show a good fit. χ^2/df ≤ 3, CFI, GFI, and AGFI ≥ 0.90, and RMSEA and SRMR ≤ 0.08 indicate an acceptable fit (Browne & Cudeck, 1993; Kline, 2015).

Convergent and Divergent Validity

After confirming the original factor structure for the data, we examined convergent validity by examining correlations between the OCI–CV total and its subscales, and scores of the CDI, CBCL, and MASC subscales using Pearson's correlation coefficients on the total sample (N = 391). Partial correlations are reported in Table 4.

Pearson correlations (*r*) were used to assess convergent validity and retest reliability. Cohen's criteria [49] were used to assess the values of correlation coefficients: correlations between 0.10 and 0.29 are considered as weak, correlations from 0.30 to 0.49 are defined as of moderate strength, correlations above 0.49 reflect a strong correlation.

Predictive Validity

Predictive validity (diagnostic accuracy) of the measures was assessed using the Receiver Operating Characteristic (ROC) curve analysis through which area under the curve values (AUC), sensitivity, specificity, positive and negative predictive values (PPV and NPV), and Youden Index were calculated. ROC analyses were conducted using MedCalc version 14.8.1.

The ROC curve analyses were carried out to evaluate the ability of the OCI-CV to distinguish between the patient with and without a diagnosis of OCD (diagnostic accuracy). The ROC curve analysis uses the relationship between sensitivity and specificity to evaluate the area under the curve (AUC) in order to show how well a measure differentiates between positive (i.e., a diagnosis of OCD) and negative (i.e., an anxiety disorder or lack of psychopathology) cases.

Although the AUC is the most widely used global index of diagnostic accuracy, the Youden Index [50] is a commonly used measure of overall diagnostic usefulness. The Youden Index corresponds to the cut-off point that optimizes sensitivity and specificity. As a result, the Youden Index was mainly used here to choose the more appropriate cut-off score.

We followed the traditional academic point system for classifying the accuracy of a diagnostic measure and interpreted the AUC as follows: AUC ≤ 0.5 no discrimination, 0.51–0.69 unacceptably low 0.70–0.79 acceptable, 0.80–0.89 excellent, and ≥ 0.90 outstanding [51].

Reliability

The internal consistency of the OCI-CV was calculated for the total and subscale scores using Cronbach's α and McDonald's omega coefficient with casewise missing data deletion. McDonald's omega coefficient were assessed in R Studio version 1.1.447 using the R packages lavaan, psych, and semTools as free statistical software [47]. To determine test–retest reliability, a subset of 65 non-clinical healthy participants was randomly selected and completed the OCI-CV for a second time four weeks later. Acceptable internal consistency is indicated by an α/omega-value > 0.70 and adequate internal consistency is indicated by an α/omega-value > 0.30 [52]. A value of $p < 0.05$ was considered to be statistically significant.

Results

Confirmatory Factor Analysis (CFA)

For the single-factor model, the indexes considered suggested inadequate fit of the model to the data. In addition, the six independent factor model as well as the bi-factor model with six factors and a higher order factor were tested, but they did not show improved fit. The findings indicated that the six correlated factor model demonstrated a good fit for all the indexes ($\chi^2 = 331.06$, df = 170, χ^2/df = 1.95, CFI = 0.91, GFI = 0.93, AGFI = 0.91, RMSEA = 0.05, SRMR = 0.02). Therefore, the study hypothesis regarding the six correlated factor structure of the OCI-CV was supported. An overview of fit indexes for the tested models of the OCI–CV is provided in Table 2. All standardized factor loadings were greater than 0.30 and were statistically significant (0.39–0.80) (Table 3).

Convergent and Discriminant Validity

OCI-CV total scores were significantly correlated with subscales of the CDI, CBCL, and MASC (p < 0.01), supporting the convergent validity of the OCI-CV. Correlations between the OCI-CV total and subscale scores and subscales of the MASC, CDI, and CBCL are presented in Tables 4 and 5. Overall, the correlations ranged from small to moderate in magnitude, with the strongest correlations found between OCI-CV total scores and the physical symptoms and separation/panic subscales of MASC; the negative mood, anhedonia, and self-esteem subscales of CDI; and anxious/depressed subscale of the CBCL. Significant correlations between the OCI-CV and the subscales of the MASC, CDI, and CBCL scores demonstrated that the Persian version of the measure has good convergent and discriminant validity.

Table 2 Fit Indexes for the tested models of the Obsessive Compulsive Inventory–Child Version (OCI-CV) (*N*=391)

Models	X^2	df	X^2/df	CFI	GFI	AGFI	RMSEA	SRMR
Single factor model	858/505*	189	4.54	0.65	0.80	0.76	0.09	0.04
Six independent factors model	917.08*	189	4.85	0.61	0.74	0.78	0.10	0.04
Six correlated factors model	331.06*	170	1.95	0.91	0.93	0.91	0.05	0.02
Bifactor model (six factors with a higher order factor)	462.49*	183	2.53	0.85	0.89	0.87	0.06	0.03

CFI Comparative Fit Index, *GFI* Goodness of Fit Index, *AGFI* Adjusted Goodness of Fit Index, *RMSEA* Root Mean Square Error of Approximation, *SRMR* Standardized Root Mean Square Residual

*p < 0.01

Table 3 Standardized factor loadings of the six-factor model of the OCI-CV using CFA (*N*=391)

OCI-CV subscales	Items	Factor loading	t-value
Doubting/Checking	20	0.59	11.22
	13	0.65	12.54
	5	0.61	11.61
	4	0.54	10.13
	15	0.44	8.15
Obsessing	18	0.46	8.70
	14	0.76	15.73
	11	0.80	16.70
	1	0.45	8.47
Washing	21	0.49	9.14
	10	0.66	12.89
	2	0.62	12.04
Hoarding	16	0.39	5.68
	7	0.48	6.93
	3	0.59	8.10
Neutralizing	12	0.61	10.97
	9	0.55	9.99
	6	0.47	8.29
Ordering	19	0.76	15.51
	17	0.69	13.83
	8	0.67	13.46

OCI-CV Obsessive Compulsive Inventory–Child Version, *CFA*: confirmatory factor analysis

Predictive Validity

The diagnostic efficiency of the OCI-CV was analyzed by examining the accuracy of various cut-off scores between youth with and without OCD. First, ROC curve analysis for the OCI-CV total score was conducted to determine the scale that best discriminated between individuals with OCD versus members of the healthy group. The OCI-CV total score showed an AUC=0.77 (SE=0.013; $p < 0.001$; lower limit 95% CI 0.73, upper limit 95% CI 0.82; n=404), which indicates outstanding discriminatory power. These results suggests that there is a 77% probability that a participant with OCD will have a higher score on the OCI-CV than a youth without OCD. According to these results, the decision was made to choose the OCI-CV total score to maximize the diagnostic accuracy of the questionnaire. The sensitivity, specificity, positive and negative predictive values, and Youden Index were calculated. As shown in Table 6, the optimal cut-off score was a OCI-CV total score of 17.5.

Reliability

Across the full sample, the total OCI-CV demonstrated good internal consistency ($\alpha = 0.84$; omega=0.85). Further,

4-week test–retest correlations also evidenced excellent temporal stability for the total OCI-CV ($r = 0.95$). Table 4 presents the internal and temporal reliability levels for the OCI-CV total score and its subscales.

Discussion

In the Iranian context, there is a lack of validated assessment tools of OCD subtypes for youth. This study evaluated the psychometric properties of the Persian version of the OCI-CV among clinical OCD patients and community sample of Iranian youth. Findings demonstrated that the Persian version of the OCI-CV has sound psychometric properties consistent with the findings from the original English version [19], and other language versions [23–31]. Given that the instrument was translated and examined in an Iranian sample, the scale can also be said to have cross-cultural meaningfulness and utility.

This study replicated the six correlated factor structure evidenced in Foa, Coles [19]. Consistent with the original English validation study [19], as well as previous studies in other languages with clinical [23, 24] and non-clinical samples [26, 27, 29–31], our study indicated six correlated factors of the OCI-CV in Iranian youth, defined as doubting/checking, obsessing, washing, hoarding, neutralizing, and ordering. All the items of the Persian OCI–CV saturated on the same factors as in the original version [19], suggesting that the Persian version of the OCI-CV can be used for multidimensional assessments of OCD.

Evidence of convergent and discriminant validity was provided by the small to moderate correlations between the OCI-CV total and subscale scores, and the MASC, CDI, and CBCL subscales. This pattern was also noted on the original report of the OCI-CV in which the correlations between the OCI-CV total scores and CY-BOCS and MASC scores were small to moderate in range [19]. In general, the results regarding the convergent and discriminant validity of the OCI-CV scores were similar to those found in previous studies with clinical samples [16, 19, 23, 24] and non-clinical samples [25–30]. On the other hand, it is notable that there appears to be significant rates of OCD, anxiety, depression, and related symptoms in community sample as evidenced by mean scores on OCI-CV, MASC, CDI and CBCL. Based on previous reports [8, 9] this may be due to high prevalence of OCD, anxiety, depression, and related symptoms in Iranian community youth.

Predictive validity of the OCI-CV was assessed by examining the accuracy of various cut-off scores in different patients with a primary diagnosis of OCD from non-clinical healthy participants. ROC analysis of the AUC allows us to determine the overall utility of the OCI-CV in distinguishing youth with OCD from youth without

Table 4 Convergent/divergent validity of the total sample ($N = 391$)

Scales	OCI-CV total	Doubting/Checking	Obsessing	Hoarding	Washing	Ordering	Neutralizing
MASC							
Physical symptoms	0.34**	0.29**	0.34**	0.09	0.20**	0.12*	0.27**
Harm avoidance	0.28**	0.21**	0.16**	0.08	0.19**	0.20**	0.25**
Social anxiety	0.17**	0.16**	0.04	0.01	0.16**	0.23**	0.03
Separation/panic	0.44**	0.30**	0.50**	0.24**	0.17**	0.20**	0.32**
CDI							
Negative mood	0.37**	0.29**	0.42**	0.16**	0.20**	0.14**	0.23**
Ineffectiveness	0.25**	0.17**	0.29**	0.11*	0.16**	0.09	0.15**
Interpersonal problems	0.31**	0.25**	0.35**	0.14**	0.15**	0.15**	0.18**
Anhedonia	0.30**	0.19**	0.34**	0.14**	0.18**	0.18**	0.17**
Negative self-esteem	0.34**	0.22**	0.40**	0.16**	0.20**	0.14**	0.23**
CBCL							
Anxious/depressed	0.31**	0.27**	0.40**	0.09	0.18**	0.08	0.16**
Withdrawn/depressed	0.14**	0.12*	0.16**	0.06	0.08	0.04	0.07
Somatic complaints	0.16**	0.14**	0.21**	0.09	0.08	0.03	0.06
Social problems	0.20**	0.21**	0.22**	0.11*	0.09	0.02	0.13**
Thought problems	0.19**	0.18**	0.31**	0.03	0.06	0.02	0.11*
Attention problems	0.21**	0.24**	0.26**	0.08	0.07	0.01	0.12*
Rule-breaking behavior	0.18**	0.20**	0.27**	0.09	0.04	−0.01	0.10*
Aggressive behavior	0.23**	0.24**	0.29**	0.15**	0.06	0.04	0.11*

OCI-CV Obsessive Compulsive Inventory–Child Version, *MASC* Multidimensional Anxiety Scale for Children; *CDI* Children's Depression Inventory, *CBCL* = Child Behavior Checklist

**$p < 0.01$; *$p < 0.05$

Table 5 Reliability (internal consistency and 4-week retest) for scales of the OCI-CV

Scales	Internal consistency		Retest reliability
	Alpha	Omega	
Total OCI-CV	0.84	0.85	0.95
Doubting/Checking	0.69	0.70	0.68
Obsessing	0.71	0.72	0.83
Hoarding	0.50	0.51	0.77
Washing	0.65	0.66	0.75
Ordering	0.75	0.76	0.73
Neutralizing	0.55	0.56	0.64

OCI-CV Obsessive Compulsive Inventory–Child Version

Table 6 Receiver operating characteristic (ROC) analysis of the Obsessive Compulsive Inventory–Child Version (OCI-CV) to predict OCD disorder diagnosis

Criterion	OCD patients versus community sample
	OCI-CV total
AUC [95% CI]	0.77 (0.73–0.82)
Best cut-off value	> 17.5
Sensitivity (%)	0.77
Specificity (%)	0.63
PPV	0.28
NPV	0.94
Youden Index	0.40

AUC [95% CI] Area Under Curve [95% Confidence Interval], *PPV* positive predictive value, *NPV* negative predictive value

OCD across the cut-off score range from 0.73–0.82. In general, values of around 0.75 are considered representative of acceptable discriminant power [51]. According to our data, the optimal cut-off point for the total OCI-CV was 17.5, with a sensitivity of 0.77 and a specificity of 0.63. The present findings highlight the potential clinical utility of this scale in pediatric OCD research and treatment, reflected by the predictive validity of this measure in predicting OCD symptoms in youth.

Finally, we examined the internal consistency and temporal stability of the measure. Internal consistency and 4-week test–retest were high for the OCI-CV total. All the values of Cronbach's α and omega coefficients and retest reliability were higher than the recommended value of 0.70 proposed by Nunnally and Bernstein [52]. Consistent with findings

from previous studies [19, 23–27, 29, 30], our results provided strong support for the reliability of the Persian version of the OCI-CV. Similarly, internal consistency and temporal stability of Persian version of the scale was also well established.

Several limitations warrant mention. First, our clinical sample was modest in size. Further research is required in a large clinical sample to replicate the present findings. Second, the community sample was not interviewed to investigate whether some of the students warranted a diagnosis of OCD or other conditions. On balance, this provided a more stringent test of the OCI-CV. Third, further investigation of the convergent validity of the OCI-CV relative to most widely-used measures of OCD is needed, particularly those assessing the major OCD symptom dimensions (e.g., the CY-BOCS). Fourth, the use of self-reported outcomes is vulnerable to social desirability biases.

In conclusion, the Persian version of the OCI-CV demonstrated sound reliability and validity. Considering the classification of evidence-based assessments (EBA; [53]), the OCI-CV meets the criteria required for a well-established pediatric OCD assessment instrument. Our findings add to the growing literature and provide cross-cultural support on the utility of the OCI-CV as a self-report measure to capture OCD heterogeneity in Iranian children and adolescents.

Summary

Pediatric OCD is a clinically heterogeneous and disabling condition often causing marked functional impairment in several domains and if left untreated, running a chronic or recurrent course. We examined the psychometric properties of the Persian version of the OCI-CV in clinical and community samples. Factor structure (confirmatory factor analysis), validity (convergent/discriminant, and predictive), and reliability (internal consistency, and 4-week retest) of the Persian version of the OCI-CV were investigated in a clinical sample of youth with OCD and a non-clinical student sample. Similar to the original version of the OCI-CV, results indicated that the Persian version of the scale has a sound six-factor structure, good convergent and discriminant validity through its significant correlations with other specific measures of pediatric psychopathology, acceptable sensitivity and specificity for the detection of OCD, and good reliability in terms of internal consistency and temporal stability. These findings suggest that the OCI-CV is a valid and reliable measure to assess OC symptom dimensions in Iranian clinical and research settings. Findings add also to the growing literature and provide cross cultural support on the utility of OCI-CV as a self-report measure to capture OCD heterogeneity in children and adolescents.

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