Psychometric properties of Persian version of child and youth resilience measure-revised in children

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Abstract:

BACKGROUND: Resilience is both the individuals' capacity to navigate their way to the resources that sustain their well-being in the context of exposure to adversity and their capacity to negotiate for resources to be accessed. Hence, it is crucial for clinical settings and research centers to have access to a valid and reliable scale that can measure different components of resilience. This study aimed to determine the psychometric properties and cultural adaptation of the Persian version of the Child and Youth Resilience Measure-revised (CYRM-R) in Children.

MATERIALS AND METHODS: This cross-sectional study includes the standard procedure of translation of the CYRM-R and Person Most Knowledgeable–Child and Youth Resilience Measure–revised (PMK-CYRM-R), exploration of the goodness-of-fit, and confirmatory factor analysis (CFA) of a sample of 200 parents or caregivers and their children aged 5 to 9 years who were selected by convenient sampling in Tehran, Iran. CYRM-R, PMK-CYRM-R, and The Strengths and Difficulties Questionnaire (SDQ) were completed by participants. Also, internal consistency, face, content, and criterion validity were investigated.

RESULTS: A two-factor structure of CYRM-R for Iranian children was identified by CFA: Personal and Caregiver. Results indicated adequate goodness-of-fit and strong internal consistency (Cronbach's alpha = 0.88). Acceptable face, content, and criterion validity of the CYRM-R were reported by positive correlation to the PMK-CYRM-R. No significant relation was found between CYRM-R and SDQ.

CONCLUSION: Findings of the present study support the robust psychometric properties and cultural adaptation of the CYRM-R in Iranian children.

Keywords:
Children, CYRM-R, reliability, resilience, validity

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Introduction

Resilience is both the individuals' capacity to navigate their way to the cultural, psychological, physical, and social resources that sustain their well-being in the context of exposure to adversity and the collective and individual capacity to negotiate for resources to be accessed in culturally meaningful ways.[1] This concept explains the interaction between personal and environmental components, which leads to positive development in terms of physical, social, and psychological aspects.[2] The resilience studies revealed that life adversity experiences in childhood are able to negatively affect the interaction between these factors and negatively impact mental health.[3] Ungar explained that resilience and its protective processes are fundamental to helping children exposed to high-level risks in childhood and can bring positive outcomes.[4] Therefore, it is crucial to have the proper tool for assessment and, in the next level, to evaluate particular protocols in order to increase the children's resilience.

Several measures have been designed and validated for measuring resilience in children and youth, including the Youth Resilience (YR), which focuses on developmental strengths,[5] Child and Youth Resilience Measure-Revised (CYRM-R), which measures resilience in the field of the environment and personal aspects, and Wagnild Resilience Scale (RS) that evaluates the individual level of resilience.[6,7]

Among these measures, CYRM-R has some advantages, which prioritize it for the assessment of resilience in children. One of the most important qualities for resilience scales is culture-independency. Among the available tools, only CYRM-R has been created to assess resilience in different socio-cultural contexts.[8] CYRM-R was explored in more than 11 countries in more than 20 languages and can measure resilience in different cultures and countries.[9] The second merit of the CYRM-R is that it includes two subscales: personal and caregivers, so researchers and clinicians can be aware of different components of children's resilience from internal and external aspects.[1] Another advantage of the CYRM-R is the presence of parallel forms for three different age groups: children, adolescents, and adults. By using these forms, researchers are able to apply suitable measurements based on the age of participants and compare the resilience of participants of different ages simultaneously (for instance, parents and their children). Furthermore, this scale is offered in a 3- and 5-point response scale, with simplified and standard wording and figures. This variety helps researchers and clinicians apply the appropriate measure based on their participants' abilities. Specifically for children, the use of figures can lead to a better understanding of measures.[1]

In 2018, Jefferies *et al.*[7] designed CYRM-R as a valid, reliable, and culture-independent scale for resilience assessment. They used Rasch-validate revision to improve its psychometric properties by removing culturally and linguistically biased items. Robust psychometric properties for both subscales and a good fit were found for the Rasch model. CYRM has several versions with different item numbers, including CYRM-28, CYRM-12, and CYRM-17, though the original authors recommended CYRM-17 (or CYRM-R) for researchers and practitioners in order to measure the resilience across diverse countries and cultures.[1]

There are several studies on the psychometric properties of CYRM-28 in adolescents. Exploring the English and French versions of CYRM-28 indicated acceptable validity and reliability.[5,9-11] An Arabic version of CYRM-12 and CYRM-28 was tested by Panter-Brick and showed suitable properties.[12] Several studies confirmed these results in Iranian adolescents.[13,14] The research conducted about CYRM-R indicated similar results in adolescents. For the first time, Jefferies investigated this scale using Rasch analysis and reported suitable psychometric properties. Then, Borualogo *et al.* adapted and validated CYRM-R successfully in Indonesia.[15]

Some investigations revealed the relationship between resilience and other variables. The results showed that CYRM score is positively associated with prosocial function[16,17] and negatively related to mental health difficulties, stress,[18] and internalizing behaviors.[12,19-21]

To the best knowledge of the authors, especially based on CYRM and ARM user manual (2022), no research has been conducted on the psychometric properties of CYRM-R for children in any language except English.[1] The present study aimed to adapt CYRM-R in a sample of Iranian children and explore the psychometric properties of the Persian version. The examined properties included face, content, and criterion validity, as well as confirmatory factor analysis and internal consistency.

Materials and Methods

Study design and setting
The present psychometric research on CYRM-R used questionnaires that were filled by caregivers and children in Tehran, Iran, in 2021.

Study participants and sampling
Participants of this study included 200 parents or caregivers and their children, who were selected by convenient sampling. The inclusion criteria were the children of age 5 to 9 years and consent of study participation by children and their parents or caregivers. Uncompleted and unfinished questionnaires were excluded.

Since CYRM-R consisted of 17 items, according to Schreiber, 10 to 1 is an adequate N: q ratio; therefore, 200 participants were accepted as an adequate sample size.[22]

Data collection tool and technique
Data collection measures in the present study were CYRM-R, PMK-CYRM-R, and SDQ.

Child and youth resilience measure-revised (CYRM-R)
CYRM-R, which is a 17-item scale, was designed to measure resilience in youths aged 5 to 9 years by Jefferies *et al.* in 2018.[7] The CYRM had two subscales: Personal or caregiver. The study of Rasch analysis of CYRM-R showed good psychometric properties for both subscales. This tool can differentiate children of varying levels of resilience. There are two forms of 3- and 5-response scales for children, both with standard forms. CYRM-R has

been translated into different languages, and researchers have explored its psychometric properties.[1]

The content validity and face validity of CYRM-R are acceptable, and subscales demonstrated internal reliability and good fit statistics.[5] The test/retest reliability of this scale was above. 7 for 2 weeks and 3 months. The CYRM-R's Cronbach's alpha was reported to be .82. The Cronbach's alpha for the relational and personal subscales are .87 and .82. Pearson's coefficient of internal consistency is .74 showing good reliability.[7]

Person most knowledgeable—Child and youth resilience measure—revised (PMK-CYRM-R)

PMK-CYRM-R was designed by Jefferies *et al*.[7] which was completed by someone familiar with the target child. PMKs can be caregivers, teachers, older siblings, care workers, and others with a significant role in the children's lives and are familiar with children's opportunities, challenges, and resources.

PMK-CYRM-R is offered in a 5- or 3-point response scale. The 5-point version used in this study includes the following options: Not at all, A little, somewhat, quite a bit, and A lot. The 5-point scale can provide richer responses to the items, though the 3-point tool is appropriate for individuals with comprehension difficulties.[1]

Strengths and Difficulties Questionnaire (SDQ)

The SDQ was designed by Goodman in 1997 for children aged 3 to 17 years and used as a brief behavioral screening questionnaire. It consists of 25 questions divided into five subscales, including emotional symptoms, conduct problems, hyperactivity/inattention, peer problems, and prosocial behavior. This questionnaire is completed by parents or caregivers on a 3-point scale ranging from 0 (not true) to 2 (certainly true). Beyond 25 questions, it has two follow-up questions about the chronicity of problems related to 6 months.[23] A score range for each of the five subscales is 0 to 10. The test/retest reliability was .84, and internal consistency was showed .73 to .78.[24]

The validity and reliability of the Persian version of SDQ were found acceptable. The Cronbach's alpha of total scale, emotional, conduct, hyperactivity, peer problems, and prosocial subscales were .77.,71.,75.,85.,64, and .83, respectively, indicating good reliability.[25] The total difficulty score was generated by summing from all scales except the prosocial subscale and ranging between 0 and 40. The SDQ prosocial subscale consists of five items about being helpful and caring, which is used to assess prosociality.[12]

The translation process of the CYRM-R

Forward translation: First, permission for research was received from the original author. Persian version of CYRM-R was prepared using the forward-backward translation method. Two professional translators who mastered Persian and English languages translated the questionnaire items into Persian. Based on the literature, it is recommended that two independent bilingual translators perform the forward translation from the original language separately.[22] Discrepancies between two translators were discussed and resolved by an unbiased translator.

Backward translation: Next, the questionnaire was translated from Persian to English using the back translation method by two other proficient translators in Persian and English. Final English and Persian versions of the questionnaires were sent to the original author, Dr. Jefferies. The questionnaire was edited several times until being approved.

Pilot study: In the next step, the pre-final questionnaire was assessed with a sample of 30 girls and 30 boys aged 5 to 9 years using convenient sampling. The items and figures were explained to children and their parents. Based on collaborating with all participants, the unclear items were changed to prepare the last version.

Face validity

Face validity is defined as the appropriation of the measure's appearance for collecting the aimed information from the respondents' perspective. In this study, 30 girls and boys aged 5 to 9 years and their parents or caregivers were interviewed face-to-face by the researchers about their views on difficulty, the amount of inconsistency, and the ambiguous expressions or inadequacies in the meanings of words and figures used in the questionnaire. Finally, their opinions about the questionnaire were asked. The items of CYRM-R were edited based on the participants' comments, and some words were changed into understandable ones.

To determine the quantitative face validity of all questionnaire items on the 5-point Likert scale, 20 girls and boys and their parents or caregivers were surveyed. They were asked about each item and its importance by researchers. Finally, the average rating of each item was calculated and multiplied by the percentage of participants who considered that item important and very important. A final score was calculated for each item. All 17 items of this measurement were acceptable since they had a score above 1.5, which is considered statistically significant.[26]

Content validity

The content validity assessment is performed to ensure the ability of the questionnaire to measure the

concept for which it is designed. In the qualitative method, considering this questionnaire designed to assess the resilience of Iranian children, 10 university professors in counseling, clinical psychology, statistics, and educational psychology were asked to mention their corrective views after the careful study of the questionnaire. In evaluating the quality of content validity, experts should focus on appropriate words, grammar, the appropriateness of their placements, the essential roles of the questions, and the time needed to complete the designed tool. After considering experts' opinions, some changes were noticed, specifically several corrections in grammar and vocabulary.

To determine the quantitative validity of the content of the CYRM-R, 14 experts in different fields, including counseling, psychology, and statistics, were asked to explain their opinion on all items of the questionnaire as the following: not necessary, not necessary but useful, and necessary. The results were calculated based on the CVR formula and matched with the "Lawshe" table numbers. The minimum appropriate CVR value considering the number of experts in this study is .51.[27,28] No items were removed since all items had a CVR of higher than .51. The overall CVI for CYRM-R is more efficient than the individual CVR report in most cases; hence, the total CVI was also calculated. The final value was .83, which is acceptable.

Statistical methods: LISREL and SPSS software version 26 were applied for data analysis at alpha = 0.5. Missing data were below 5%, therefore was replaced by means.

In the current study, a 5-point response scale version of CYRM-R for children was used. Furthermore, SDQ and 5-point response scale version PMK-CYRM-R were applied for the assessment of criterion validity. Since prosocial behaviors and mental health difficulties have, respectively, positive and negative relationships with resilience, SDQ was chosen.[16-18] Due to the content and structure similarity of PMK-CYRM-R and CYRM as two tools for resilience assessment,[1] it is applied for concurrent validity as well.

All questionnaires in this study were gathered by several psychologists with bachelor's or master's degrees who were trained in the research by the clinical psychologist (first author).

Cronbach's alpha correlation and CFA were done to assess the internal reliability and construct validity, respectively. Criterion validity was calculated using Pearson correlation between the total scores of PMK-CYRM-R and SDQ with CYRM-R.

Ethical considerations
The ethics code for the current study is obtained from the Ethics Committee of Iran University of Medical Sciences (IR.IUMS.REC.1399.963). The participants were given the necessary ethical information about the research and completed written informed consent. Researchers explained the confidentiality and the right to cancel participation in this research.

Results

Two hundred children and their parents or caregivers participated in this study. The mean age was 6.89 (SD = 1.46), 97 (47.5%) were girls, and 105 (52.5%) were boys. The age of the participants ranged between 5 and 9 years. The adult participants in the present study included 189 mothers (94.5%), 6 fathers (3%), 2 siblings (1%), 2 relatives (1%), and 1 babysitter (.5%). There were no significant differences between age and gender with CYRM-R [Table 1].

Confirmatory factor analysis
As different studies on the psychometric properties of the CYRM-R showed an overall resilience score and two subscales (personal and caregivers), CFA was used in this study.[1] CFA was applied to prove content infrastructural dimensions and homogeneity of the CYRM-R items.

Several fitness characteristics were calculated to evaluate factor analysis models using LISREL software. The root mean square error of approximation (RMSEA) was 0.065. The goodness-of-fit characteristics for the CYRM-R in the children population are listed in Table 2.

In the obtained model [Figure 1], the standardized coefficient diagram of the structure path of the CYRM-R shows no relationship between the data according to the Goodness-of-Fit Index (GFI) and the Adjusted Goodness-of-Fit (AGFI) value and the Comparative Fit Index (CFI) and Normed Fit Index (NFI) indicators. The CFI and NFI scores, respectively.,892 and. 845, demonstrate the acceptable fit of this model.

Table 1: Age and Gender

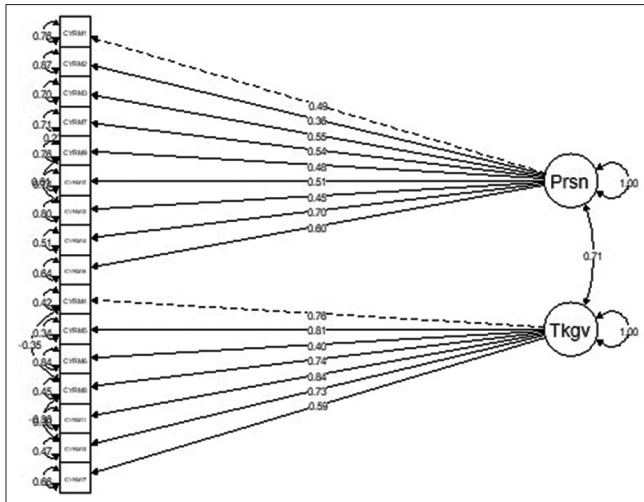| Scale	Gender (Mean (SD))		*t*-test, *t* (df), *P*	Age (Mean (SD))		*t*-test, *t* (df), *P*
	Girl	Boy		Younger Youth	Older Youth	
CYRM-R	71.62 (8.39)	70 (7.92)	1.38 (193), 0.169	69.97 (8.09)	71.36 (8.21)	−1.171 (193), 0.243
Personal resilience subscale	40.61 (.55)	39.00 (.54)	2.05 (193), 0.04	38.98 (5.63)	40.34 (5.30)	−1.718 (193), 0.87
Caregiver resilience subscale	31.01 (.39)	31.00 (.37)	0.020 (193), 0.98	30.98 (3.65)	31.01 (3.86)	−.55 (193), 0.957

Figure 1: The standardized coefficient diagram of the structure path of the CYRM-R

Table 2: Good-of-fit statistics for CYRM-R

Characteristics	CYRM-R
SRMR	0.065
SRMR	0.055
GFI	0.918
AGFI	0.887

CYRM-R: Child and Youth Resilience Measure-Revised

A total of seven items were loaded on the caregivers' subscale, nine items were loaded on the personal subscale, and no factor load was found in the case of question 13.

Reliability
Internal consistency was used to determine the reliability of CYRM-R. The results show that Cronbach's alpha for the total score and the personal and the caregiver subscales were 0.88, 0.89, and. 85, respectively, showing high internal correlations.

Criterion validity
PMK-CYRM-R was used for concurrent validity, and SDQ was applied for divergent validity. The Pearson correlation results are shown in the table below [Table 3].

Accordingly, there is a significant positive correlation between the total score of the CYRM-R and PMK-CYRM-R. No significant correlation was found between CYRM-R with prosocial and total difficulties scores [Table 4].

Discussion

There is a high correlation between adverse childhood experiences with developmental and physical problems and mental health disorders. Early assessment of resilience based on a socioecological framework is important in detecting at-risk children.[9,12] Moreover,

it can help clinicians understand the effect of resilience programs on children. As resilience manifests differently based on developmental levels and cultures,[5] resilience studies require proper measurement tool(s) based on age and culture to receive valid information.

The CYRM-R measures individual and social factors related to resilience.[1] It displays suitable content, face, construct, and Rasch validity, as well as acceptable internal reliability. This version of CYRM, which is short, was recommended by the original authors (Jefferies *et al*.) for researchers and clinicians.[1,7]

To the best knowledge of the authors, no research on psychometric properties of CYRM-R in children (5 to 9 years old) was found; thus, the result of the present study was compared with studies on CYRM for adolescents, which has similar concepts and structure.

Results revealed no correlation between the resilience score and gender in the present study. It is a controversial issue in previous studies, and some researchers believe that resilience components might alternately favor females and males.[5,10,12] They suggest more studies to clarify this relation.[5] Moreover, no significant differences were found between resilience scores and age groups. Jefferies found similar results with CYRM-R in adolescents.[7]

CFA revealed two factors (personal and caregiver) which are consistent with the findings of other studies.[1,7] Studies on resilience since the late 1980s and early 1990s showed the same construct for resilience.[5] Accordingly, resources besides personal capacity are two components of resilience in children. The key point of most studies is the more resources people have, the more positive and fewer negative outcomes they experience. Resources would be related to the individual's strengths and social environment, such as caregiver's support.[29] Supportive relationships and caregivers have been found to be essential factors in enhancing children's mental health and well-being.[15,30]

Analysis showed that item 13 of the CYRM-R does not have a strong factor loading on any of the components. This item measures fair child treatment. Therefore, replication is needed to decide on the exclusion of this item from the Persian version of CYRM-R. It is compatible with a previous study on the French version of CYRM-28 in which three items had different functions or biases in the new culture.[5] Since culture affects how resilience is perceived by children, choosing useful items has to be based on the context. Some researchers suggested identifying a set of core items about resilience that are applicable to different cultures as well as a set of items for all cultures.[5]

Table 3: Factor analysis with factor loadings per item with a total score

Items	English/Persian	Personal	Caregiver
1	Do you share your things with others?	0.488	
2	Is doing well at school important to them?	0.356	
3	Do you know how to behave or act in different situations (like school, home, holy places)?	0.550	
4	Do you feel that your parent (s)/caregiver (s) always know where you are and what you are doing?		0.764
5	Do you feel that your parent (s)/caregiver (s) really knows you very well (for example about what makes you scared or happy or sad)?		0.813
6	When you feel hungry, does enough food stuffs exist in your home?		0.402
7	Do other children like to play with you?	0.536	
8	Do you talk to your family/caregiver (s) about how you feel (for example when you are hurt or feeling scared)?		0.743
9	Do you have friends that care about you?	0.485	
10	Do you feel that you adjust with other children?	0.508	
11	Do you think your family/caregiver (s) care about you in hard times (like when you get sick or do something wrong)?		0.836
12	Do you think your friends care about you in hard times (like when you get sick or do something wrong)?	0.449	
13	Are you treated fairly?		
14	Do you have chances to show others that you are getting an adult and you can do things by your own?	0.697	
15	Do you feel safe when you are with your family/caregivers?		0.728
16	Do you have chances to learn things that will be useful for you when you are older (like cooking, working and helping others)?	0.598	
17	Do you like the way your family/caregiver (s) celebrates things (such as holiday or learning about your culture)?		0.585

Table 4: Correlations between the CYRM-R, PMK-CYRM-R, and SDQ

Scale	CYRM-R	PMK-CYRM-R	SDQ-emotional symptoms	SDQ-conduct problems	SDQ-hyper activity	SDQ-peer relationships	SDQ-total problem	SDQ-prosocial
CYRM-R	1	0.82**	−.017	−.078	0.031	−.111	−.004	−.036
PMK-CYRM-R	0.82**	1	−.031	−.019	0.039	−.099	−.036	−.007
SDQ-emotional	−.017	−.031	1	0.389**	0.110	0.256**	0.811**	−.096
SDQ-CONDUCT	−.078	−.019	0.389**	1	0.138	0.128	0.673**	−.180*
SDQ-HYPER	0.031	0.039	0.110	0.138	1	−.019	0.475**	0.203**
SDQ-PEER	−.111	−.099	0.265**	0.128	−.019	1	0.433**	0.030
SDQ-total problem	−.004	−.036	0.811**	0.673**	0.475**	0.433**	1	−.031
SDQ-prosocial	−.036	−.007	−.096	−.180*	0.203**	0.030	−.031	1

**P<0.001/CYRM-R: Child and Youth Resilience Measure-Revised/PMK-CYRM-R: Person Most Knowledgeable- Child and Youth Resilience Measure-Revised/ SDQ: Strengths and Difficulties Questionnaire

The internal reliability for the total score and two subscales are acceptable. Other studies on this scale indicated high internal reliability/consistency.[1,10,15] Furthermore, the Cronbach's alpha for the CYRM-R in this study (0.88) is similar to the results of other studies using the CYRM-28 in Iran.[13,14]

The CYRM-R and PMK-CYRM-R are designed to assess resilience from the perspectives of children and parents. The strong correlation between their scores showed acceptable concurrent validity. No significant correlation was found between CYRM-R and SDQ (prosocial and total difficulties scores). Since there is no gold standard for comparing with the CYRM score, researchers should apply the variables that correlate with adaptation or resilience.[5] Especially in children, a few tools are suitable for this purpose which can be used with some limitations.

For instance, researchers who apply SDQ reported low alpha for the prosocial subscale, which leads to construct heterogeneity or poor item interrelatedness.[12,31]

The CYRM-R is congruent with the theoretical definition of resilience as a multidetermined concept.[5] It is one of the few resilience tools that can report multiple aspects of resilience. Acceptable psychometric properties of the Iranian version can help practitioners and researchers to assess resilience and its subscales.

Conclusion

Since the next wave of resilience research has to be scalable, systematic, culturally relevant, and applicable,[16,32] valid, reliable, and contextually relevant scales are useful. Studying the underlying constructs of

children's distress needs proper measures of resilience.[33] The CYRM-R has been adapted successfully to Iranian children, and it was proved to be appropriate to be used for research and clinical practice in this culture. It can be used for measuring the social-ecological aspects of resilience in children aged 5 to 9 years.

Study limitations and recommendations

This study is associated with several limitations. First, it was conducted in one city, and further investigation is required in more cities. Second, item 13 in this measurement does not have any factor load on CFA; thus, replication is recommended before deciding about this item. Third, more studies would be needed to determine the relation between CYRM-R and the total score of SDQ and its subscales in children.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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