Psychometric evaluation of the Chinese version of the Resilience Scale for Children: abridged secondary publication

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KEY MESSAGES

1. The Chinese version of the 10-item Resilience Scale for Children (RS-10) is a reliable and valid tool to assess resilience among Hong Kong Chinese children with cancer.
2. The Chinese version of the RS-10 can be used to evaluate the effectiveness of nursing interventions to enhance resilience and promote mental well-being among children with cancer.
3. Confirmatory factor analysis confirms the two-factor structure of the Chinese version of RS-10.

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Introduction

Resilience is associated with positive mental health outcomes in children and adolescents such as reduced levels of anxiety, depression, and obsessive-compulsive symptoms.[1] Assessment of responses to stress and adversity in children with cancer may help design appropriate psychological interventions to enhance resilience of children and foster development of coping mechanisms and positive mental well-being. Most studies have focused on promoting resilience in parents, caregivers, or other family members of children with cancer.

The 25-item Resilience Scale was developed by Wagnild and Young,[2] based on a conceptual model derived from a qualitative study of women who exhibited adaptation after a major life event. Subsequently, the 10-item Resilience Scale for Children (RS10) was developed to measure children's capacity to respond to life changes.[3] The RS10 is positively worded and easily understood by children as young as 7 years old and has been translated from English into Arabic and Swedish. This study aims to translate the RS-10 to Chinese and evaluate its linguistic and cultural equivalence as well as its psychometric properties.

Methods

Children aged 7 to 14 years who were diagnosed with cancer within the previous 6 months and under active treatment were recruited from the paediatric oncology units of Queen Mary Hospital and Hong Kong Children's Hospital in Hong Kong. Children younger than 7 years may have limited verbal and cognitive capacities were excluded, as were children with cognitive and learning problems.

Participants were asked to respond to the Chinese version of RS-10, Center for Epidemiologic Studies Depression Scale for Children (CES-DC), and the Rosenberg's Self-Esteem Scale (RSES).

A panel of experts was set up to test the semantic and content equivalence of the Chinese version of the RS-10. For semantic equivalence, the panel rated each item in a four-point scale from 1 (not equivalent) to 4 (most equivalent). Any item that was considered not equivalent (being rated 1 or 2 by >20% of respondents) was amended. For content equivalence, the panel rated each item in a 4-point scale from 1 (not relevant) to 4 (very relevant).

Convergent validity was determined by correlations between scores on the Chinese versions of the RS-10 and the RSES. Discriminant validity was determined by correlation between scores on the RS-10 and the CES-DC.

Factorial validity was evaluated by confirmatory factor analysis. The Tucker-Lewis index, root-mean-square error of approximation, comparative fit index, goodness-of-fit index, and standardised root-mean-square residual were used to evaluate the goodness of fit, with cut-off values being ≥0.95, ≤0.06, ≥0.95, ≥0.90, and ≤0.08, respectively.[4] The diagonally weighted least square estimator was used to assess the ordinal variables in the RS-10, with values of 0.32, 0.45, 0.55, 0.63, and 0.71 indicating poor, fair, good, very good, and excellent factor loadings, respectively. Items with factor loadings of <0.40 were removed. Initial one-factor and two-factor model analyses were performed using the Analysis of Moment Structures software.[5]

Reliability of the Chinese version of the

RS-10 was determined by its internal consistency (Cronbach's α). Participants were asked to respond to the RS-10 again after 2 weeks via telephone. The intraclass correlation coefficient was used to estimate the test-retest reliability coefficient.

Results

A total of 100 boys and 86 girls (mean age, 10.4±2.5 years) were recruited. 20 (10.8%) participants were from single-parent families. The most common diagnosis was leukaemia (46.2%), followed by brain tumour (23.1%). 58.6% of the participants received chemotherapy only, whereas 36.5% received more than one cancer treatment.

The semantic equivalence of the items in the Chinese version of the RS-10 ranged from 86% to 100% indicating high equivalence to those in the original version. The content validity index was 96% indicating validity. Thus, no item of the Chinese version of the RS-10 required modification.

The Chinese version of the RS-10 was negatively correlated with the CES-DC (r= -0.52, P=0.01) and positively correlated with the RSES (r=0.61, P=0.01). This indicates that greater resilience was associated with fewer self-reported depressive symptoms and higher levels of self-esteem. Thus, convergent and divergent validity of the Chinese version of the RS-10 were supported.

In confirmatory factor analysis, factor loadings ranged from 0.51 to 0.79, with positive correlations between parameters (Fig). The modified two-factor model performed well across all fit indices: Chi-square divided by degrees of freedom=2.34, Tucker-Lewis index=0.951, root-mean-square error of approximation=0.053, comparative fit index=0.962, goodness-of-fit index=0.948, and standardised root-mean-square residual=0.052 (Table). The factor structure of the Chinese version of the RS-10 and the observed data were good fit.

The intraclass correlation coefficient of the Chinese version of the RS-10 at 2-week intervals was 0.89, whereas the internal consistency was confirmed by a Cronbach's α of 0.83. The corrected item-total correlation coefficients ranged from 0.38 to 0.61. All items correlated with the total score on the scale.

Discussion

The Chinese version of the RS-10 has good internal consistency and test-retest reliability, excellent content validity, and appropriate convergent and discriminant validity. The two-factor structure is supported. The Chinese version of the RS-10 can be used to assess and monitor levels of resilience in Hong Kong Chinese children with cancer. As resilience can prevent development of mental health problems and promote positive mental health outcomes, appropriate psychological interventions are recommended to enhance resilience of children with cancer and foster coping mechanisms and positive mental well-being.

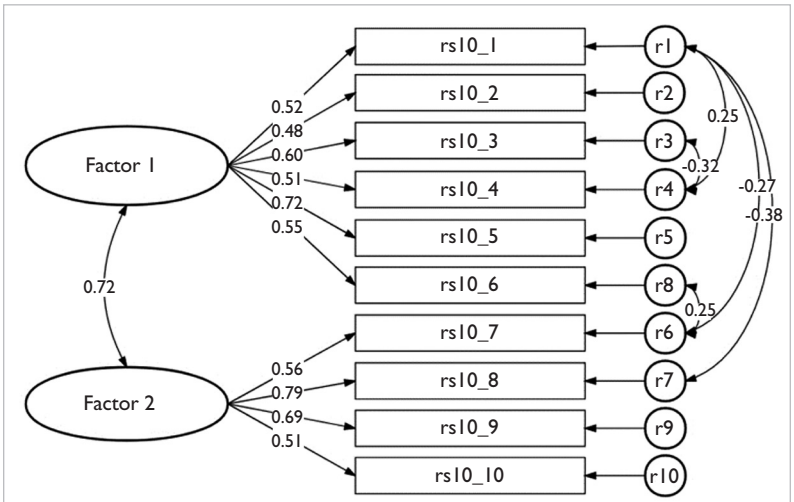

FIG. Confirmatory factor analysis for the two-factor structure model of the Chinese version of the 10-item Resilience Scale for Children

TABLE. Fit statistics for the factor structure models of the Chinese version of RS-10

	χ^2	Degree of freedom	χ^2/degree of freedom	Tucker-Lewis index	Root-mean-square error of approximation	Comparative fit index	Goodness-of-fit index	Standardised root-mean-square residual
One-factor model								
Initial	179.793	35	5.137	0.622	0.151	0.706	0.834	0.096
Modified	83.042	29	2.864	0.830	0.101	0.890	0.920	0.070
Two-factor model								
Initial	136.668	34	4.02	0.724	0.129	0.792	0.876	0.085
Modified	62.443	28	2.34	0.951	0.053	0.962	0.948	0.052
Cut-off value				≥0.95	≤0.06	≥0.95	≥0.90	≤0.08

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Disclosure

The results of this research have been previously published in:

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