Testing the psychometric properties of the Turkish culture version of the self-efficacy scale for pediatric chronic illness

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Abstract

The aim of the study was to evaluate the validity and reliability and to test the psychometric properties of the Turkish culture version of the Pediatric Rating of Chronic Illness Self-Efficacy Scale (PRCISE). The sample of this methodological study consisted of adolescents with chronic disease who were followed up in pediatric polyclinics. 220 adolescents aged 10–17 were included in the study. The study was conducted between April and November 2019 at a university hospital in Turkey. Data were collected using face-to-face interviews with the participants visited to the outpatient clinic in the hospital. Questionnaires (personal information form and Pediatric Rating of Chronic Illness Self-Efficacy Scale) were administered to the adolescents. Psychometric testing consisted of internal consistency reliability (item-total correlations and Cronbach alpha coefficient), test-retest reliability, and validity (exploratory factor analysis and confirmatory factor analysis). In the exploratory factor analysis, Barlett's sphericity test was ($\chi 2(105) = 497.953; p = 0.000$). The five-factor model with an eigenvalue value of more than 1 in the exploratory factor analysis obtained the best and acceptable fit indices in the confirmatory factor analysis. The factor structure was verified by the confirmatory factor analysis. In the confirmatory factor analysis, the model fit indices of this scale were obtained as follows: Goodness-of-Fit Index = 0.92, Comparative Fit Index = 0.87, and Root Mean Square Error of Approximation = 0.55. Cronbach alpha value indicating the internal consistency of the entire scale was .703. The PRCISE is a reliable and valid instrument for Turkish adolescents with chronic illness.

Keywords Children · Chronic illness · Self-efficacy

Introduction

Self-efficacy is an individual's belief in his or her success in overcoming change or outcomes. This belief shapes the person's ability to adopt and sustain a behavior. Self-efficacy, which is an important part of Albert Bandura's social cognitive theory, is one of the most important indicators of an individual feeling strong in the face of a negative life event such as disease (Bandura 2004; Herts et al. 2017). The concept of self-efficacy is particularly important for adolescents with chronic conditions. Chronic illnesses involve challenging processes of special education, long-term care and monitoring for the rehabilitation of pediatric patients. Adapting to irreversible life changes is difficult for adolescents (Boyse et al. 2012; Emerson et al. 2018). Chronic illnesses are distinctly different from other illnesses regarding their requirement for self-management and ongoing health care (Iannotti et al. 2006). Patients with chronic illnesses should have a long-term sense of self-efficacy to adhere to treatment regimens and self-management, as well as to obtain information about their disease (Ryan and Sawin 2009).

Studies have demonstrated that self-efficacy is associated with disease adaptation, disease management (Herts et al. 2017), and quality of life (Kocaaslan and Akgün Kostak 2019). Chronic illness management includes medication compliance, healthy eating, physical activity, self-care and self-management. The latter means that patients and their parents have an active role in decision-making, learning about the disease, recognizing symptoms, and seeking help to prevent possible chronic illness-related complications. The factors that pediatric patients need to control and manage are drug use, symptoms, daily life activities and

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emotional problems (Lorig and Holman 2003; Lozano and Houtrow 2018).

Chronic illnesses almost always require a sense of self-management, in which an individual must regularly adhere to various treatments, or lifestyle changes (Schulman-Green et al. 2012). Previous studies have confirmed that self-efficacy can positively influence the self-management and self-care behaviors of pediatric patients with chronic illnesses (Bravo et al. 2020; King et al. 2010; Sawyer et al. 2007). Strong strategies to cope with disease symptoms and active self-management play important roles in preventing negative effects on the health of adolescents (Bennett et al. 2015). The medical care costs of pediatric patients with chronic illnesses account for a large proportion of the pediatric population health care expenditure (Berry et al. 2013; Cohen et al. 2011). Effective symptom management of pediatric patients with chronic conditions and a reduction of symptoms and repetitive hospitalizations contribute to cost-effective health care and optimal health outcomes (Nelson et al. 2016).

Various interventions such as education or behavioral methods, increase the self-efficacy of adolescents with chronic illnesses (Herts et al. 2017; Kocaaslan and Akgün Kostak 2019). Determining and increasing the self-efficacy level of adolescents with chronic diseases related to the disease and treatment process mediates disease management (Moattari et al. 2012). The problem-solving ability of patients with chronic diseases reflects behavior-specific self-efficacy (King et al. 2010). When patients with chronic diseases encounter a problem related to their disease, self-solving requires high self-efficacy. Adolescents with high self-efficacy can produce creative solutions that they cannot predict when faced with new situations and believe that they have control over their environment in these situations (Moattari et al. 2012).

Problem Statement

Adolescents with low self-efficacy may experience difficulties in self-management, adapting to disease, and altering their behavior, as well as decreased self-esteem and self-respect (Caprara et al. 2013). In Turkish culture, parents or caregivers of pediatric patients with chronic illnesses play an active role in disease management to support their children (Atagün et al. 2011; Erdem et al. 2013). However, since a sense of independence is especially important for adolescents, parental control during the hospitalization process or in medical treatment management can disturb them. Adolescents with chronic illnesses not adhering to treatment regimens and engaging in risky behaviors may result in negative health outcomes (Compas et al. 2012; Sawyer et al. 2007). Therefore, pediatric patients with chronic illnesses in Turkey may have behavior

problems and need support to adapt to their disease (Akkuş and Ayhan 2018).

Scientific studies need to evaluate the disease management of the pediatric population with chronic illnesses to facilitate early recognition of symptoms and prevent complications. Future studies should develop and test strategies that would promote self-efficacy to improve the health outcomes of pediatric patients with chronic illnesses in Turkey. Despite the importance of this concept to the chronic illness management of the pediatric population, only disease-specific (eg. epilepsy, type 1 diabetes and asthma) self-efficacy scales have been adapted to Turkish culture (Çevik and Çelebioğlu 2012; Güven and İşler 2015; Ozturk et al. 2017). A validated and reliable tool for measuring the self-efficacy of pediatric patients with chronic illness is not yet available in Turkey.

Researchers predict that adapting PRCISE to Turkish culture will facilitate self-efficacy studies on pediatric patients with multiple chronic disease types. The use of this measurement tool contributes to the detailed identification and evaluation of the self-efficacy of adolescents with chronic illnesses. This study was designed to adapt the Pediatric Rating of Chronic Illness Self-Efficacy (PRCISE) Scale and specifically to determine the validity and reliability of a Turkish culture version of this scale. The aim of the study was to test the psychometric properties of the PRCISE Scale for Turkish pediatric patients with chronic illnesses. It is thought that further research could be inspired by the outputs of the studies using objective measurement tools.

Method

Study Design

This descriptive and methodological study was designed to test the validity and reliability of the Turkish language and culture adaptation of the PRCISE Scale. The procedure of this study was conducted in two phases: the process of cultural and the language adaptation and evaluation of psychometric properties. This study, which examines the psychometric properties of the Turkish culture version of the PRCISE Scale, was conducted in accordance with the international scientific methods suggested in adaptation studies. The study was conducted according to the suggestions of the Guidelines for Translating and Adapting Tests by the International Test Commission (Commission, I. T 2018).

Participants

The sample consisted of 220 adolescents with chronic illnesses. Participants ranged in age from 10 to 17 (M = 13.83 ± SD = 2.35). The mean time passed since diagnosis was 72.03 ± 64.25 months, and 47.3% were male. The sample

was recruited from adolescents who attended follow-ups for their chronic illnesses in pediatric hematology and oncology, pediatric cardiology, pediatric nephrology, pediatric endocrine, pediatric allergy and immunology, pediatric gastroenterology and other polyclinics (neurology, etc.) at the university hospital. When adapting a scale to another culture, it is recommended that there should be 5–10 times more scale items (maximum 20 times more) in determining the sample size (Brown 2015). İn addition, for a confirmatory factor analysis, a sample size of less than 100 is seen as "small" and between 100 and 200 is considered "medium". More than 200 participants is seen as "large" and suitable for most models. Therefore, the desired sample size of this study was more than 200 (Hair et al. 2010; Kline 2015). In this study, based on the sample size in the original study, approximately 15 times more samples were decided (items = 15). The inclusion criteria were as follows: adolescents and their parents agree to participate the study; adolescents are able to read, understand, and speak Turkish; and adolescents are aged between 10 and 17. The exclusion criterion was adolescents having more than one chronic disease.

Data Collection

The data collection process was conducted between April and November 2019 at a university hospital in Turkey. The university hospital is a comprehensive health complex with a bed capacity of 983, accepting 3700 new patients a day and serving approximately 900,000 patients annually. Health services are provided in polyclinics of various departments for pediatric patients under the age of 18. In addition, hospital staff, professional health teams, technical equipment, financial support, the outpatient clinic, and hospital beds is a representing position of Turkey. Recruitment was conducted by a research assistant with sufficient communication skills and clinic experience related to pediatric nursing. At the beginning of the study, the researcher met each participant and his/her parent during their visit to the pediatric outpatient clinic (polyclinic) at the hospital. Adolescents were invited to participate in the research voluntarily and were informed about the aim and procedure of the study. Participants and their parents were given the opportunity to ask any questions they had and receive satisfactory answers. Participants and their parents were told that the findings of the study would be used only for academic and scientific purposes and that personal data would be protected. In the outcomes measuring phase, data were collected using the face-to-face interview method. Questionnaires (personal information form and PRCISE Scale) were administered to the adolescents only once. Each interview took approximately 10–15 min.

Instruments

The Personal Information Questionnaire

The personal information form contains a total of 5 questions covering the socio-demographic characteristics of the sample, including age, sex, diagnosis, time passed since diagnosis, and educational status.

The Pediatric Rating of Chronic Illness Self-Efficacy Scale

The PRCISE Scale is a measuring instrument developed by Emerson et al. (2018). It is an 11-point Likert-type scale with 15 items, all of which are positive. Answers on the scale are numbered from 0 to 1, and consist of statements such as "not at all sure" (for 0) and "very sure" (for 10). The score for each item on the scale varies between 0 and 10. On the scale, evaluated out of 150, the self-efficacy level increases as the score increases. The Cronbach alpha value, used as a reliability criterion to determine the internal consistency of the original scale, was found to be 0.94, and this was found to be a very reliable scale.

Phase 1: The Process of Cultural and Language Adaptation

According to the World Health Organization. Process of Translation and Adaptation of Instruments (2015), what is important in the language translation phase is not word-for-word translation, but the ability to choose the concept that best corresponds to the meaning of the word and that is the most relevant in the current culture. In this respect, attention was paid to using clear language that participants could understand.

Forward-Back Translation

In the language validity phase of this study, the back translation method was used. The process of translating the scale from English to Turkish was performed by four experts. Considering these data, the scale items were combined in a single translation by the researchers. The items obtained were evaluated for clarity and understandability, and the appropriate corrections were made meticulously. The scale was translated back to English by another expert.

Face and Content Validity

Regarding content validity, expert opinions on the scale items were obtained from 10 people using the Lawshe technique in order to determine the quality to be measured (fitness for purpose) and that it could be clearly and easily understood by the

target audience. In this method, developed by Lawshe and widely used in content validity, experts are asked to give each item a score out of 3, where 1 = unnecessary, 2 = useful/insufficient, and 3 = necessary. Each item is scored independently by experts. In this way, the content validity index (CVI) was calculated for each item. It is stated in the literature that a mean CVI score of 0.80 or above is acceptable for validity (Wilson et al. 2012). After all these phases, the scale items were prepared for psychometric evaluation.

Pilot Application

After the content validity analysis, a pilot application was applied to 10 participants who met the inclusion criteria. The scale items then took their final form. The data of these adolescents were not included in the study. In this study, the Turkish version of the scale was named PRCISE-Tr.

Phase 2: The Evaluation of Psychometric Properties

Statistical Analysis

The Statistical Package for Social Science (SPSS) 23.0 was used to analyze the data obtained from the study. Confirmatory factor analysis was calculated using the Analysis of Moment Structures (AMOS) 21.0 package program. Support and confirmation were received from another expert in the statistical analysis of the study. There was no data loss or missing data in the study. The data collection process was fully completed. The methods used to evaluate the study data are given below.

Construct Validity Analysis

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to test and evaluate the construct validity of the scale. Prior to factor analysis, the Kaiser-Meyer-Olkin (KMO) test was performed to determine the sample size and the suitability of the correlation matrix for factor analysis, in addition to Bartlett's test to determine whether the correlation matrix was suitable for factor analysis. In order for the sample size to be considered suitable, it is recommended that the KMO value be greater than 0.50 (Polit and Beck 2013). Principal component analysis and direct oblimin methods were used in the EFA. The factor construct was determined by selecting items with eigenvalues ≥1. The items with factor load values ≥ .32 were included in the evaluation (Büyüköztürk 2018). CFA was performed to support the findings obtained in the EFA. During this analysis, the fit indexes, which are goodness-of-fit index (GFI), the chi-square test (χ^2), χ^2/SD, comparative fit index (CFI), root mean square error of approximation (RMSEA), and adjusted GFI (AGFI), were assessed by the research team.

Reliability Analysis

In this study, the Cronbach alpha coefficient recommended in the literature to determine the internal consistency of a Likert-type scale was checked. As the Cronbach alpha coefficient approaches 1, the reliability of the measuring instrument increases. A Cronbach alpha coefficient less than .40 means not reliable, .40–.59 means poor reliability, .60–.79 means high reliability, and between .80 and 1.00 means very high reliability (Tavakol and Dennick 2011). To demonstrate test reliability and time invariance, PRCISE-Tr was applied twice to the same group of 23 adolescents at least 2 weeks apart. Then, the test-retest reliability coefficient of the scale was determined from the scores obtained from the first and second application using Spearman correlation analysis and a paired-samples t-test (Tekindal 2017). In addition, corrected item-total correlation coefficients, one of the internal consistency indicators, were calculated. It is suggested in the literature that the acceptable value of each item should be above .20 (Bland and Altman 1997). The values obtained in this study are presented in Table 3. The Kolmogorov-Smirnov test was used to evaluate normality tests of numerical variables in the scale. An independent samples t-test and a one-way Anova test were performed to compare the differences between the descriptive characteristics of the sample and self-efficacy levels.

Ethics

In order to adapt the PRCISE Scale to Turkish, permission was received from Natacha D. Emerson, who developed the scale, via e-mail. In order to conduct the study, permission was obtained from a University Clinical Research Ethics Committee (approved no: 846, date: 12.12.2018), in addition to verbal and written permission from university hospital. Before starting the study, participants gave verbal and written consent. Adolescents volunteered to participate in the study. Parental consent was obtained during the researcher's first encounter with them at the polyclinic.

Results

The Total Mean Score of the Pediatric Rating of Chronic Illness Self-Efficacy Scale According to Demographic Characteristics

The mean score of PRCISE-Tr for females is 109.20 ± 18.04 out of 150, and the mean score for males is 104.64 ± 17.62. The total mean score of self-efficacy was determined as 106.80 ± 17.92 (Min = 58.00, Max = 143.00). Participant characteristics, with data on age, sex, diagnosis, time passed since diagnosis, and education status are summarized in Table 1. As a result of the one-way Anova and post hoc

Table 1 Distribution of PRCISE-Tr mean scores by demographic characteristics

Characteristics					
Age (year) (M = 13.83 ± SD = 2.35)	N	%	$\bar{x}$ ±SD	F*	p
10	24	10.9	104.70 ± 19.74	1.872	0.066
11	16	7.3	105,75 ± 17.87		
12	26	11.8	108,61 ± 18.02		
13	39	17.7	108,71 ± 15.77		
14	30	13.6	112,60 ± 16.24		
15	25	11.4	112,52 ± 13.90		
16	19	8.6	103.05 ± 20.35		
17	41	18.6	99.17 ± 20.34		
Sex			$\bar{x}$ ±SD	t**	p
Female	104	47.3	109.20 ± 18.04	1.893	0.060
Male	116	52.7	104.64 ± 17.62		
Educational Status			$\bar{x}$ ±SD	t**	p
Secondary Education	119	54.1	107.95 ± 17.59	1.040	0.299
High School	101	45.9	105.43 ± 18.30		
Total	220	100.0			

t ** = Independent t Test; F* = One-way ANOVA test; $\bar{x}$= Mean; SD = Standard deviation; n = sample size; $p < 0.005$ was taken for the acceptable significance value

(Tukey) tests, it was determined that there were no significant differences in the self-efficacy level of participants according to their age (F = 1.872, p = 0.066). In addition, there was no significant difference in the total average self-efficacy score compared to the time passed since diagnosis (F = 1.451, p = 0.067). As a result of the independent samples t-test analysis, no significant difference was found according to the educational status (t = 1.040, p = 0.299) and sex (t = 1.893, p = 0.060) variables (Table 1). However, there were significant differences in the total mean self-efficacy scores of adolescents according to some disease types (Table 2).

Phase 1: The Process of Cultural and Language Adaptation

Experts suggested that all items in the PRCISE-Tr measuring instrument were valid, but, that some items should be made a little more explicit. Necessary corrections were made accordingly, and the scores given by the experts for PRCISE-Tr were calculated. CVI scores were determined between .80 and 1.00, and the mean CVI score was determined as .96. A pilot practice was conducted with 10 participants and it was determined that participants had no difficulty in understanding and there were no language problems. Expert opinions and pilot practice

Table 2 Comparison of PRECISE-Tr Mean Scores by independent samples t-test and disease type (n = 220)

Illness Type	Allergy/ Immunology	Other	Nephrology	Cardiology	Endocrinology	PRCISE-Tr Score Mean (SD)	Age Mean (SD)
Hematology/ Oncology (n = 54)	t = −0.589, p = 0.557	t = −544, p = 0.588	t = −969, p = 0.335	**t = −2.219, p = 0.029**	**t = −3.06, p = 0.003**	102.46 (16.37)	13.66 (2.52)
Allergy/ Immunology (n = 27)		t = −0.026, p = 0.979	t = 0.267, p = 0.790	t = −1.369, p = 0.176	**t = 1.998, p = 0.050**	104.74 (16.44)	12.81 (1.94)
Other (n = 25)			t = 0.205, p = 0.838	t = 1.095, p = 0.278	t = 1.710, p = 0.092	104.88 (22.10)	14.44 (1.95)
Nephrology (n = 43)				t = −1.073, p = 0.287	t = 1.889, p = 0.062	105.90 (18.59)	14.79 (2.11)
Cardiology (n = 32)					t = 0.927, p = 0.357	110.06 (13.41)	13.71 (2.56)
Endocrinology (n = 39)						113.76 (19.06)	13.38 (2.32)

Acceptable level of significance was taken as $p < 0.05$

results were evaluated, and the current scale items took their final form.

Phase 2: The Evaluation of Psychometric Properties

Construct Validity

In the EFA, the KMO coefficient was found as 0.715, and Bartlett's sphericity test was ($\chi 2(105) = 497.953$; $p = 0.000$). According to these findings, it was accepted that the data came from a multivariate normal distribution. These results also show that the sample size is appropriate for performing EFA and psychometric tests. First, EFA and CFA were performed based on the original scale construct (single-factor model) developed in Emerson et al. (2018). However, the results showed that the 15-item single-factor model was not suitable in CFA, and the RMSEA, AGFI, CFI, and GFI were not validated because they were not acceptable. The five-factor model with an eigenvalue value of more than 1 in EFA obtained the best and acceptable fit indices in CFA (Fig. 1). In the Turkish version, the scale items were loaded to different factors in mixed order (Table 3). Consistent findings were obtained with EFA and CFA evaluation. Principal component analysis and varimax rotation methods were used in EFA. The factor load values of the scale items are shown in Table 3.

As stated in Table 3, the factor load values of PRCISE-Tr Scale items vary between .408 and .803. The Turkish version of the scale contains the same items as the original form. No items were added or omitted by the researchers. The defined scale construct explained 55.531% of the total variance. CFA was performed to verify the model resulting from the EFA. The findings of model fit indexes are shown in Table 4. There is no single truth in the compliance test phase of the model. Many fit index values should be evaluated simultaneously (Hair et al. 2010).

Reliability

The Cronbach alpha value indicating the internal consistency of the entire scale was found as .703. This finding shows that PRCISE-Tr is a highly reliable measuring instrument. The Cronbach alpha coefficients of scale factors vary between .437 and .593. This means that the sub-dimensions have a poor level of reliability. In the internal consistency analysis, the item-total score correlation coefficients range between .110 and .475 (Table 3). The coefficients of the first and second items of the scale are below .20, but it was decided to keep these items.

Findings related to Spearman's correlation analysis and paired-samples t-test analysis at the test-retest analysis phase are given in Table 5. In the correlation analysis, it was observed that there was a high-level correlation between the mean scores, and in the t-test, there was no significant difference between the mean scores. In this way, the consistency, time invariance, and reliability of the scale were demonstrated.

Discussion

In this study, the PRCISE Scale was adapted to the Turkish language and culture. Also, self-efficacy levels of adolescents were evaluated. Findings show that the Turkish version of the scale is a measuring tool that meets acceptable validity and reliability criteria. PRCISE is a comprehensive instrument used to assess self-efficacy and is the only scale specifically designed to measure the self-efficacy level of pediatric patients with chronic diseases. No adaptation study of the original version of PRCISE in another country has been found in the literature.

Considering the scale characteristics, it is seen that the mean self-efficacy score of pediatric patients with chronic diseases in Turkish society is lower than that of the participants measured by the original scale (Emerson et al. 2018). Perhaps these findings could be explained by the impact of cultural differences. This information may inspire other researchers to plan the necessary interventions to increase self-efficacy in clinical practice. When self-efficacy is not at the desired level, adolescents may experience ineffectiveness in disease/treatment management and difficulties in coping with the disease process (Caprara et al. 2013).

Adolescents monitored in the endocrinology outpatient clinic had the highest self-efficacy score, whereas adolescents monitored in the hematology/oncology outpatient clinic had the lowest self-efficacy score. Similar to our finding, the self-efficacy of diabetes patients was found to be the highest in the original scale study (Emerson et al. 2018). It is thought that the reason for this difference is that adolescents with diseases related to the endocrine system play an active role in disease management. Conversely, adolescents with cancer can experience difficulties in dealing with disease symptoms, which can reduce their confidence and belief. The effectiveness of self-efficacy enhancement interventions can be evaluated with this scale.

In our study, it was determined that the level of self-efficacy does not change significantly depending on the age, sex, time passed since diagnosing, and education level. However, another study indicated that as the level of education increases, the seeking of treatment, and adherence to medical recommendations increase (Osborn et al. 2011). It is also stated in the literature that the intrinsic motivation and self-efficacy level of adolescents may increase over the years or decrease compared to previous years (Wigfield and Wagner 2005). In the light of this information, it is thought that the self-efficacy level of adolescents can be affected by other

Table 3 Explanatory factor analysis results for PRCISE-Tr (n = 220)

Scale items	Mean (SD)	Factor loading	Corrected items-Total correlation	Eigenvalue	% of the variance explained	Cronbach's alpha
Factor 1				3.09	20.645%	.592
Item 1. How sure are you that you can exercise regularly?	5.84 (2.92)	.591	.186			
Item 10. How sure are you that you can continue to do your hobbies and things you enjoy?	7.57 (2.48)	.711	.370			
Item 11. How sure are you that you can go to school without having your health get in the way of your learning?	5.76 (3.47)	.734	.200			
Item 14. How sure are you that you can keep your health problems from getting in the way of what you want to do?	6.66 (2.83)	.574	.475			
Factor 2				1.86	12.413%	.593
İtem 9. How sure are you that you can complete your household chores?	7.67 (2.42)	.560	.302			
Item 12. How sure are you that you can reduce your physical discomfort or pain?	4.67 (2.81)	.772	.382			
Item 13. How sure are you that you can make yourself better when you feel sick?	6.00 (2.70)	.719	.437			
Factor 3				1.18	7.925%	.437
Item 2. How sure are you that you can get help from family with tasks and activities such as homework or chores?	8.21 (2.57)	.495	.110			
Item 5. How sure are you that you can ask your doctor questions when you are worried or unsure about your health?	7.84 (2.66)	.766	.301			
Item 7. How sure are you that you can tell when feelings in your body mean that you should see a doctor again?	8.75 (2.09)	.683	.337			
Factor 4				1.12	7.480%	.462
Item 6. How sure are you that you can follow your doctor's advice everyday?	7.33 (2.55)	.660	.287			
Item 8. How sure are you that you stay away from things that make you feel bad?	7.50 (2.47)	.625	.301			
Factor 5				1.06	7.069%	.460
Item 3. How sure are you that you can get family to help you when you are feeling sad or worried (such as listening or talking about problems)?	8.45 (2.48)	.571	.293			
Item 4. How sure are you that you can get friends to help you when you are feeling sad or worried (such as listening or talking about problems)?	6.99 (3.10)	.803	.318			
Item 15. How sure are you that you can keep from feeling sad about your health?	7.48 (2.82)	.408	.369			
Total:					55.531%	.703

Note: The table contains factor load values that are above 0.32

factors in their lives. The reason for these different findings should be examined in more detail in future studies.

In current study, the psychometric properties of the scale were analyzed in terms of content validity, construct validity, and reliability. In the first phase, the items of PRCISE-Tr were examined in terms of cultural compatibility. Accordingly, in order to obtain quantitative evidence of content validity, academic experts were asked to evaluate the items. Following the expert opinions, it is recommended that the CVI value of each item calculated should be more than .80 (Wilson et al. 2012).

Since the scale has a high CVI score, the 15-item PRCISE-Tr was determined to have high content validity. Thus, it has been determined that the items are both understandable and culturally compatible.

In this study, both EFA and CFA were used to evaluate the construct validity of the measuring instrument. EFA was performed to test the construct validity in the original version of PRCISE. Emerson et al. (2018) obtained a single-factor model with a total variance of 55.52%. However, in this study, a different factor pattern was detected in the Turkish
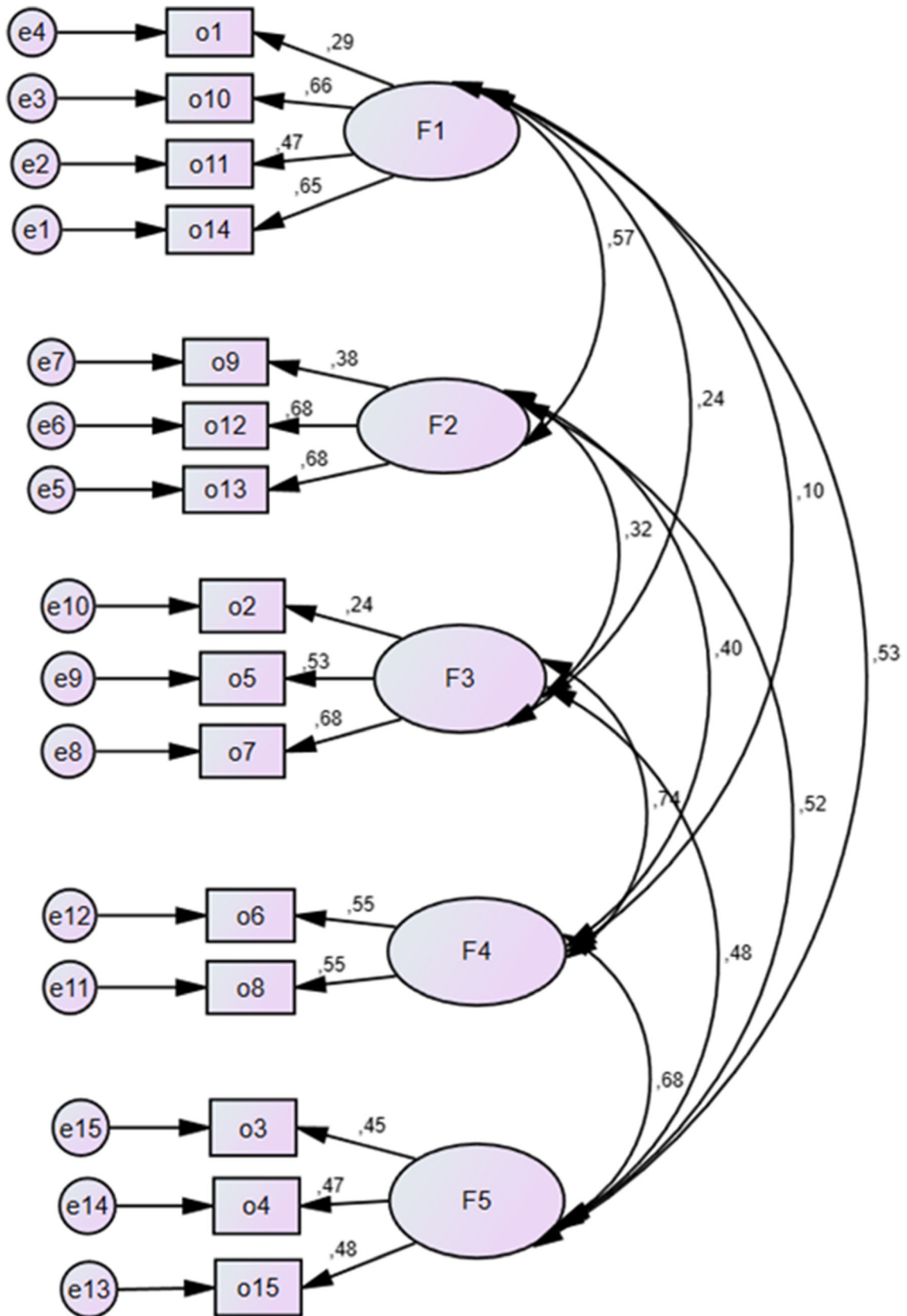
Fig. 1 Path Diagram: Confirmatory factor analysis results of PRCISE-Tr F1: Factor 1, F2: Factor 2, F3: Factor 3, F4: Factor 4, F5: Factor 5

Table 4 Results of confirmatory factor analysis for PRCISE-Tr (n = 220)

Fit index	Excellent	Acceptable	Five-factor model
P	>0.05*	<0.05*	0.000
χ2/ DF	≤2	2–5	1.652
RMSEA	≤0.05	≤0.08	0.055
IFI	≥0.95	≥0.90	0.879
GFI	≥0.95	≥0.90	0.926
AGFI	≥0.95	≥0.90	0.890
CFI	≥0.95	≥0.90	0.872

Abbreviations: RMSEA = Root mean square error of approximation; IFI = Incremental fit index; GFI = Goodness-of-fit index; AGFI = Adjusted goodness-of-fit index; CFI = Comparative-fit-index (Byrne 2016)

version of PRCISE compared to the original version. A five-factor construct that best fit the data obtained in the study was defined and the current model explained 55.53% of the total variance. The factor load value range obtained in our study and the factor load value range of the original version of the scale are similar. Hence, the findings met the limit of a factor load value of 0.30 or higher (Marsh et al. 2006). All items on PRCISE-Tr are identical to the original scale. The corrected item-total correlation scores of the first and second items are low.

In Turkish culture, adolescents' physical activity level is insufficient (Alpkaya 2019; Kin-Isler et al. 2009). In addition, since the sample of this study is adolescents with different types of diseases, their participation in physical exercise also varies. For this reason, the corrected item-total correlation coefficient of the first scale item is low. For example, adolescents diagnosed with asthma may have more belief that they can exercise, while adolescents with cancer may not due to factors such as multiple symptoms and isolation.

The ability of adolescents to seek help from someone when they need it is a self-efficacy indicator. Getting help increases academic success. In Turkey, parents usually help their children when they need support. However, adolescents are also

Table 5 Analysis of test retest scores PRCISE-Tr (n = 23)

Applications	Mean (SD)	r	P	T
Test	97.26 (17.62)			
Retest	99.86 (13.19)			
Spearman's correlation analysis		0.810	0.000	
Paired-samples t test			0.298	-1066

Note: Acceptable level of significance was taken as p < .05

expected to do their homework and take care of their responsibilities themselves and not get help from their families. In addition, adolescents can perceive asking for help as a threat to their sense of independence (Erdoğan 2020; Koç 2016). It is thought that our sample group was confused or gave various answers while responding to this item. Therefore, the corrected item-total correlation coefficient of the second scale item is low.

CFA was performed to verify whether the set of variables obtained by EFA were compatible. CFA was not performed in the original version of the scale. CFA findings of the PRCISE Scale were obtained for the first time with the Turkish sample group. It is seen that the model fit indices emerging within the framework of the new five-factor structure of PRCISE-Tr meet the level required for acceptable fit. For the reliability of the scale, the Cronbach alpha coefficient, used to test the reliability of the Likert-type scale and expressed as the internal consistency coefficient, was calculated as .703. As a result of these calculations, considering the acceptable limits, the scale was found to be highly reliable (Tavakol and Dennick 2011). In the original scale, the Cronbach alpha coefficient was determined to be 0.94. The Cronbach alpha value in this study is considered to be lower since it was conducted on a heterogeneous group with different experiences in the Turkish population who gave a wide variety of answers to the scale questions. Results supported both the construct validity and reliability of PRCISE-Tr, demonstrating its feasibility for adolescents with chronic illnesses.

Strengths and Limitations of the Study

The strength of the current study is that it validated an instrument that assessed self-efficacy, which is highly relevant for adolescents' chronic illness self-management/control. The research team was able to collect a diverse group of patients with chronic illnesses that in terms of their medical characteristics were as similar as possible to the sample of Emerson et al. (2018).

In the data collection process of the study, it is thought that the data analysis scores are rather low because the sample group is heterogeneous: adolescents have different experiences and give different answers. It is suggested that future studies should be carried out on a homogeneous sample group in order to obtain more consistent answers.

Conclusions

The PRCISE-Tr is a reliable and valid instrument that can be applied as a relevant outcome measure in future research on Turkish-speaking adolescents with chronic illnesses.

PRCISE-Tr is a useful scale consisting of 15 items that health care professionals can easily apply to adolescents. The findings of this study suggest that PRCISE-Tr can be an effective tool in assessing the self-efficacy of adolescents with chronic diseases in Turkey. Besides, the findings show that adolescents with chronic diseases do not have a high self-efficacy level. Therefore, future experimental studies involving interventions to increase the level of self-efficacy in this sample in Turkey are recommended. The role of self-efficacy in the illness management of pediatric patients with chronic illnesses could be confirmed and hence should be borne in mind in future studies.

Implications for Nursing Practice

The results of the study show that PRCISE-Tr is a valid and reliable measuring instrument. With the use of PRCISE-Tr, researchers can obtain more evidence regarding the self-efficacy levels of pediatric patients with chronic diseases. This study can help guide future experimental studies in the field of nursing in Turkey and evaluate the effectiveness of interventions.

Data Availability Statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Compliance with Ethical Standards

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