

# Turkish Validity and Reliability Study of Psychosocial Assessment Tool Oncology Version

Kamer Kalip , Deniz Odabaş 

Department of Public Health, Ankara University School of Medicine, Ankara, Turkey

## What is already known on this topic?

- A child with cancer diagnosis experiences a grieving process with the family. The Psychosocial Assessment Tool (PAT), which enables to manage the psychosocial risks in this process, was adapted to many languages and used commonly in some countries.

## What this study adds on this topic?

- The Turkish version of the PAT is valid and reliable. The PAT could be used by families of 2- to 18-year-old children with newly diagnosed cancer at pediatric oncology units. The PAT provides a classification of the families by psychosocial risk categories.

## ABSTRACT

**Objective:** Children diagnosed with cancer and their families may not be able to overcome the effects of cancer diagnosis. Because there may be risk factors for some psychosocial problems. It is important to evaluate these risk factors and plan early interventions for risks such as depression, anxiety, suicide, and cessation of treatment. Psychosocial Assessment Tool was adapted to many languages. This study aimed to conduct the Turkish language adaptation of the Psychosocial Assessment Tool oncology version in families of 2- to 18-year-old children with newly diagnosed cancer.

**Materials and Methods:** The steps used in the cultural adaptation of the scale were content validity, construct validity, criterion-related validity, surface validity, standard deviation and item analysis, internal consistency analysis, and test-retest reliability. We used the following scales for receiver operating characteristic analysis and correlations: the Pediatric Quality of Life Scale, the Hospital Anxiety Depression Scale, and Negative Problem Orientation Questionnaire.

**Results:** The reliability of Psychosocial Assessment Tool was strong [Kuder Richardson-20: 0.84], and the KR-20 values of the subdimensions ranged from 0.524 to 0.798. The Psychosocial Assessment Tool was moderately correlated with Pediatric Quality of Life Scale and Hospital Anxiety Depression Scale. Most families (49.4%) were classified in medium-risk category (targeted), 34.9% in low-risk category (universal), and 15.7% in high-risk category (clinical).

**Conclusion:** The study confirms that the Turkish version of the Psychosocial Assessment Tool is a valid and reliable scale and could be used in pediatric oncology units for psychosocial evaluation and interventions in families of children with cancer.

**Keywords:** Neoplasms, psychological tests, depression, anxiety, quality of life

## INTRODUCTION

When a person is faced with a chronic disease, accepting the disease is a long maturation process that all individuals in his/her family must go through. The patient experiences the grieving process with the family and environment.<sup>1</sup> There are psychosocial hazards for the family members, such as mood disorders, social isolation, substance use, anxiety, depression, and suicidal behavior during the process.<sup>2</sup>

The capacity to continue treatment regularly, which is often grueling for those with chronic disease, depends on many interacting factors. For example, family and social environment are thought to be related to the patient's motivation to maintain self-care and adherence to treatment.<sup>1</sup> Culture, beliefs, family's access to the health care, social values, family, and school situations are also associated with the motivation. It is necessary to consider the child, family, and social support network together in the assessment of children with chronic

### Corresponding author:

Kamer Kalip

✉ kamerkalip@hotmail.com

Received: July 20, 2022

Accepted: August 31, 2022

Publication date: December 29, 2022

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



**Cite this article as:** Kalip K, Odabaş D. Turkish validity and reliability study of psychosocial assessment tool oncology version. *Turk Arch Pediatr.* 2023;58(1):20-27.

diseases and their families.<sup>3</sup> So, the person is a whole with his/her environment and cannot be isolated from each.<sup>4</sup>

The Psychosocial Assessment Tool (PAT) was developed in 2001,<sup>5</sup> became user friendly in 2008,<sup>6</sup> and covered all age groups in childhood in 2008.<sup>7</sup> It is a short screening scale developed for families of children with newly diagnosed cancer who are at risk of ongoing psychosocial problems. Higher PAT scores were associated with increased psychosocial risk.

The participating family is ranked into 3 categories according to the PAT score. Thus, efforts are made to maximize cost-effectiveness by carefully targeting the provision of psychosocial services for each family at the time of diagnosis.<sup>8</sup> Therefore, the Pediatric Psychosocial Preventive Health Model (PPPHM) with 3 categories has been developed.<sup>9</sup> The base of the model (universal category) is the patient and family group, which includes most of the people who apply to the health center for the diagnosis and treatment of diseases. These are families who can cope with the unexpected onset of the child's health problems or an exacerbation of the current situation. They are the least likely to receive psychosocial assessment or treatment. Families in the targeted category have conditions that make them ready for ongoing challenges. For example, there may be preexisting child problems, psychosocial stress factors (e.g., poverty and unemployment), or family problems. The coping skills of these families may be inadequate, particularly when the child's health deteriorates. Families in the clinical category have at least one of the comorbid pediatric and familial psychosocial problems, such as persistent anxiety disorder, depressive symptoms, substance abuse, and forensic problems. These families are defined as in need of additional psychosocial support.<sup>9,10</sup> When PAT and PPPHM are used as a guide in the follow-up of families with cancer, the psychosocial needs of children and caregivers can be determined systematically. The universal category needs (e.g., social workers, child life coaches, spiritual counseling and guidance services, creative arts programs, family-centered care programs, and financial counselors) are basic needs that can be offered or referred to in health-care institutions. In addition to these, there are many evidence-based intervention methods for the targeted category. These are multicomponent interventions for adherence to medical regimens or cognitive behavioral therapy in relation to pain and behavior. In the clinical category, a specialist treatment team is usually required to evaluate mental health and provide more intensive interventions for behaviors such as anxiety, withdrawal and aggression, and suicide, in addition to general services that families will usually receive.<sup>10</sup>

There are scales in the Turkish language that evaluate the quality of life, depression, and satisfaction levels of children and adults. However, there is no scale that systematically examines a child diagnosed with cancer and the environment in which the child interacts. Our research is important because it has brought to our country a measurement tool that can comprehensively detect the psychosocial risks of caregivers of children diagnosed with cancer. After the PAT began to be used by families of children with cancer, it was successfully adapted to 30 different chronic diseases such as cystic fibrosis, sickle-cell anemia, metabolic diseases, bleeding disorders, and kidney failure. We used the oncology version of the PAT. Therefore, we

conducted a Turkish validity and reliability study of the oncology version of the PAT in families of 2- to 18-year-old children with newly diagnosed cancer. It also emphasized the importance of a systematic approach to cancer patients with the information obtained.

## MATERIALS AND METHODS

The study was conducted in 2 centers. Families of patients newly diagnosed with cancer constitute the population of the study. A maximum of 45 days from the date of diagnosis was defined as "newly diagnosed" due to clinical significance. Malignancies, aggressive tumors, and malignant relapses are defined as cancer. In other words, benign neoplasms such as hemangiomas were excluded from the study. All assessments were obtained from the caregiver of the patient. The study inclusion criteria are as follows: families who agreed to participate in the study, families with maximum 45 days after the diagnosis of childhood cancer, and families with a child diagnosed with cancer between the ages of 2 and 18. Families outside this scope and families with children who were referred for palliative treatment only and who had benign neoplasms were excluded. Diagnoses were made by bone marrow aspiration and flow cytometry results for leukemia, by tissue biopsy for lymphoma, and by excisional mass biopsy for all other solid tumors. Solid tumors were diagnosed by mass excision or tissue sampling in those who were suitable for surgery at the beginning of diagnosis.

After the application of the PAT, answered high-risk items were added to obtain 7 subdimension points (Structure/Resources, Social Support, Patient Problems, Sibling Problems, Family Problems, Stress Reaction, and Family Beliefs). Subdimension scores were obtained by dividing the number of risky items answered in the subdimension by the total number of questions in that subdimension. A total score between 0.00 and 7.00 was obtained by summing the 7 subdimension scores. Higher total score or extreme subdimension scores were associated with increased psychosocial risks. According to the PAT score, the category of the family in the PPPHM pyramid was determined. If a PAT score was  $<1.00$  it was classified as the universal category; if  $1.00 \leq \text{PAT score} < 2.00$  it was classified as the targeted category; and if the PAT score was  $\geq 2.00$  it was classified as the clinical category. If a score above 0.50 was obtained from any subdimension, the family category was moved from the universal category to the targeted category. In our study, the oncology version of the PAT was used. The PAT English version, PAT Turkish version, PAT scoring scale, PAT English user manual, and PAT Turkish user manual are attached in the supplements.

### Other Scale Forms

We used the Negative Problem Orientation Questionnaire (NPOQ).<sup>11</sup> A higher score indicates a negative attitude toward problems in adults. The scale showed excellent internal consistency ( $\alpha$ : 0.90), test-retest reliability ( $r$ : 0.65,  $P < .05$ ; for a 3-week test-retest), and good convergent validity in the study conducted in 2016 by Akyay.<sup>12</sup> It is a Likert-type scale. The score that can be obtained from the scale is between 12 and 60.

We used the parent forms of the Pediatric Quality of Life Inventory 4.0 (PedsQL). A higher PedsQL score indicates a better health-related quality of life (QOL). After the Turkish validity

and reliability studies, the internal consistencies (Cronbach's alpha) were 0.85, 0.86, 0.84, and 0.87, respectively. The cutoff point of the Likert-type scale to be used in receiver operating characteristic (ROC) analysis was reported as 83 for 8 years old and 78 for 8 years old and above after literature research. Turkish validity and reliability studies were conducted by Uneri et al and Memik et al<sup>13-15</sup> between 2007 and 2008. To evaluate the QOL, 3 different forms were used for the 2-4 age group, the 5-7 age group, and the 8-12 and 13-18 age groups together. The data obtained from all these forms are given regardless of the age group.

We used the Hospital Anxiety Depression Scale (HAD)<sup>16</sup> to determine the risk of anxiety and depression in adults. High scores indicate increased depression and anxiety. A Turkish validity and reliability study was conducted by Aydemir,<sup>17</sup> and the form consists of 14 Likert-type questions.

### Validity and Reliability Steps

After the translation of the PAT into Turkish by 2 researchers, a bilingual researcher backtranslated the scale. The backtranslation form and the original translation were sent to the scale owner institution and the institution approval was obtained.

For surface validity of the finalized scale, the scale was administered to 15 monolingual parents of pediatric patients. A different researcher reviewed the compliance of the scale with grammar and spelling rules. The Davis technique is used to evaluate the content validity with the contribution of 5 expert opinions.<sup>18</sup> The methods we used in our validity and reliability study are summarized in Table 1.

### Ethical Procedure

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Ethics Committee approved the study on February 4, 2019, in the following acceptance numbers: no. 56786525-050.04.04/7539.

Required ethical permission and necessary permissions from scale holders and consent from participants were obtained. The principle of volunteering was fulfilled by participating in this study.

<b>The translation process of the PAT into Turkish</b>	
<b>Validity category</b>	<b>Method</b>
Content validity	Expert opinion
Construct validity	Factor analyses (exploratory)
Criterion-related validity	Correlation with the reference scale (ROC)
Surface validity	Administered to 15 monolingual parents
<b>Reliability category</b>	<b>Method</b>
SD and item analysis	
Internal consistency analysis	Cronbach's alpha coefficient
Test-retest reliability	Intraclass correlation coefficients and Kuder Richardson

PAT, Psychosocial Assessment Tool; ROC, receiver operating characteristic.

### Statistical Analyses

The data obtained in the study were evaluated with SPSS 21 (Statistical Package for the Social Sciences) package program. Microsoft Excel was used to calculate the content validity of the data. Principal component analysis and the Varimax rotation method were used in the SPSS program for exploratory factor analysis (EFA) of the scale. Kaiser-Meyer-Olkin (KMO) test was used for the sample suitability test, and the Bartlett test was used to evaluate the suitability of the data for factor analysis. In order for the KMO value to be set, at least 0.50, the *P*-value of the Bartlett sphericity test should be at most .05.<sup>19,20</sup> Items with factor loadings below 0.30 were excluded from the evaluation.<sup>21</sup> Items that were collected under different factors and the difference between them was 0.10 were accepted as overlapping.<sup>22</sup> Test-retest evaluations were made with intraclass correlation coefficients and Kuder Richardson-20 (KR-20) coefficients were used in dichotomous variables for internal consistency analysis. Kuder Richardson-20 coefficient was used for the PAT scale since it contains dichotomous items, and Cronbach's alpha coefficient was used for the other scales because of the Likert-type items. As a general opinion, a KR-20 above 0.50 indicates that the reliability is reasonable.<sup>23</sup> Receiver operating characteristic analysis was performed using reference scales to determine sensitivity and specificity. In the analysis performed, the cases that were below 5% of the Type-1 error level (*P* < .05) were interpreted as statistically significant.

### RESULTS

The families of 83 children newly diagnosed with cancer were included in the study, which was conducted between February and November 2019. The median age of children diagnosed with cancer aged 2-17 years was calculated as 5. Almost half of the children (53%) diagnosed with cancer were male. The most common cancer was found to be leukemia. Of the families, 15.7% were in the clinical category, 49.4% were in the targeted category, and 34.9% were in the universal category.

### Validity

The content validity index was calculated as 1.0 from 5 different expert opinions.

The subdimension score was obtained by dividing the number of risky options marked from the dichotomous items in the subdimensions by the number of items in the subdimension. The PAT scores ranging from 0 to 7 were obtained by summing 7 subdimension scores. Descriptive statistics regarding the PAT, NPOQ, PedsQL, and HAD scales applied to the participants are given in Table 2.

A comparison was made between the scores obtained from other tests measuring the same or similar structures and the scores obtained from PAT and its subdimensions. A moderate and significant relationship was found in the same direction between the total score of the PAT and the HAD-anxiety score (*r*: 0.690, *P* < .01) and the HAD-depression score (*r*: 0.645, *P* < .01). A moderate, inverse, and significant correlation was found between the PAT-patient problems score and the PedsQL-psychosocial health score (*r*: -0.476, *P* < .01) and the PedsQL-total score (*r*: -0.430, *P* < .01). The relationship between the PAT stress response score and NPOQ score (*r*: 0.487, *P* < .01),

**Table 2.** Descriptive Statistics of PAT, NPOQ, PedsQL, and HAD Scales

	Mean	SD
PAT	1.392	0.7579
Family Structure/Resources	0.2051	0.22135
Social Support	0.0151	0.11282
Patient Problems	0.3129	0.1403
Sibling Problems	0.2429	0.17052
Family Problems	0.2157	0.19784
Stress Reaction	0.2916	0.29517
Family Beliefs	0.1072	0.14715
NPOQ	16.4	4.02
PedsQL	81.22	12.82
PedsQL-physical health	82.07	20.95
PedsQL-psycho social health	80.53	11.72
HAD-anxiety	4.67	3.63
HAD-depression	4.71	3.73

PAT, Psychosocial Assessment Tool; NPOQ, Negative Problem Orientation Questionnaire; PedsQL, Pediatric Quality of Life; HAD, Hospital Anxiety Depression.

and HAD-anxiety score ( $r: 0.639, P < .01$ ), and HAD-depression score ( $r: 0.517, P < .01$ ) was in the same direction, moderate, and significant (Table 3).

After the first EFA, it was observed that some items in which the scale’s eigenvalues were greater than 1 were collected in 22 factors and gave a load value of more than 1 factor. Then, the retaining of the scale in 7 factors as in the original was examined. Kaiser–Meyer–Olkin (0.52) and Bartlett sphericity test values (3973.721 and  $P < .01$ ) were acceptable. For easier interpretation, the total variance explained by this solution after the Varimax rotation method was 52%. While the first component of the factors explained 12% of the total feature attempted to be measured, the second component accounted for 29%, the third component 36%, the fourth component 40%, the fifth component 46%, the sixth component 48%, and the seventh component accounted for 52%. We observed that items 2a, 2b, 9k, 9p, 9t, 10b, 10d, 10v, 11c, 11h, 12b, 14a, 14d, 14g, and 14j were overlapped, and after rotation, the items were under the factors in the original scale (Supplementary Table 1).

**Reliability**

The KR-20 values of the subdimensions were as follows: Family Structure/Resources: 0.672; Social Support: 0.798; Patient Problems: 0.524; Sibling Problems: 0.727; Family Problems: 0.724; Stress Reaction: 0.724; and Family Beliefs: 0.606. The KR-20 coefficient of the PAT was founded as 0.846.

A total of 21 participants were reached again 2–4 weeks after the first application ( $\bar{x}: 18$  days). There was no statistically significant difference between the test and retest mean scores. Intraclass correlation coefficients were above 0.93 for subdimensions and PAT. The test–retest reliability of PAT was strong ( $r: 0.989, P < .01$ ).

A cutoff point of 1.0, which is used to classify families into PPPHM categories, was used. The sensitivity and specificity of the PAT in identifying targeted and clinical families were found to be 86% and 62% compared with PedsQL, respectively. Compared with HAD-anxiety, these values were found to be 100% and 52%, respectively, and 100% and 52%, respectively, compared to HAD-depression. The area under the curve (AUC) for PedsQL was 0.776 ( $P < .001$ ), the AUC for HAD anxiety was 0.892 ( $P < .001$ ), and the AUC for the HAD depression was 0.889 ( $P < .001$ ). To determine the sensitivity and specificity of the PAT optimally, cutoff points for all other scales were examined, and sensitivity and specificity values were compared. The optimum cut point was determined as 1.43. Sensitivity and specificity values for 1.43 cutoff point were 71% and 75%, respectively, compared to PedsQL. Compared to HAD-anxiety, these values were 87% and 73%, respectively, and 87% and 73%, respectively, compared to HAD-depression (Figure 1).

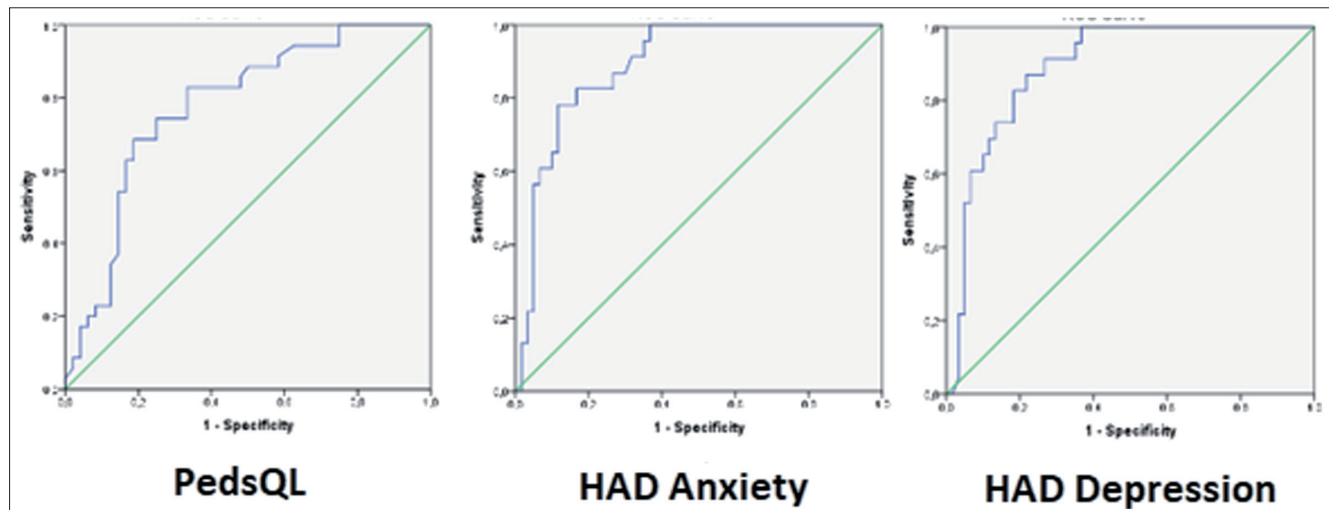
**DISCUSSION**

The content validity of the scale was sufficient, and it was concluded that there was no item that should be removed from the scale. To evaluate the construct validity of the scale, its correlation with other scales measuring similar domains was examined. The PAT and its subdimension scores were compared with the PedsQL and its subdimensions, NPOQ, HAD-anxiety and HAD-depression scales. A correlation coefficient between 0.4 and 0.6 indicates a medium level, and a correlation between 0.6 and 0.8 indicates a high level of correlation for the scales

**Table 3.** Internal Consistency of Scales Used for Validity and Correlations with PAT Scores

	Cronbach’s Alpha	r-Values							
		PAT	Family Structure/Resources	Social Support	Patient Problems	Sibling Problems	Family Problems	Stress Reaction	Family Beliefs
PedsQL	0.824	-0.514**	-0.276*	-0.050	-0.430**	-0.275*	-0.253*	-0.168	-0.178
PedsQL-physical health	0.815	-0.365**	-0.264*	-0.027	-0.122	-0.240*	-0.119	-0.134	-0.318**
PedsQL-psycho social health	0.722	-0.467**	-0.249*	-0.079	-0.476**	-0.258*	-0.249*	-0.103	-0.069
NPOQ	0.773	0.543**	0.186	-0.097	0.058	0.050	0.447**	0.487**	0.384**
HAD-anxiety	0.827	0.690**	0.335**	-0.069	0.144	0.327**	0.457**	0.639**	0.304**
HAD-depression	0.826	0.645**	0.299**	0.000	0.303**	0.346**	0.304**	0.517**	0.258*

The  $r$ -values for the correlations and the Cronbach’s alpha coefficients for the scales are given.  
 PAT, Psychosocial Assessment Tool; NPOQ, Negative Problem Orientation Questionnaire; PedsQL, Pediatric Quality of Life; HAD, Hospital Anxiety Depression.  
 \* $P < .05$ ; \*\* $P < .01$ .



**Figure 1.** ROC curve of the Psychosocial Assessment Tool based on the Quality of Life Scale for Children, the HAD-anxiety scale, and the HAD-depression scale. ROC, receiver operating characteristic; HAD, Hospital Anxiety Depression.

used in psychiatry and sociology.<sup>24,25</sup> The PAT showed significant correlations with all other scales applied, and the highest correlation coefficient was with the HAD-anxiety scale. Psychosocial Assessment Tool correlations were moderate and significant with the HAD-depression scale, NPOQ, PedsQL-total, and PedsQL-psychosocial health score. The correlation with the PedsQL-physical health score was weak and significant. While the psychosocial risks of the families were increasing according to the PAT score, the risks of anxiety and depression were also increasing, and the QOL of children was decreasing. Barrera et al<sup>26</sup> reported that there was a significant and moderate correlation ( $r: 0.53, P < .001$ ) between the PAT and The State-Trait Anxiety Inventory (STAI) and a moderately inverse and significant correlation between the PAT and the oncology form of PedsQL ( $r: -0.44, P < .001$ ). In another study,<sup>27</sup> it was moderately significant ( $r: 0.47, P < .01$ ); a moderate and significant ( $r: 0.41, P < .01$ ) correlation was reported in the same direction with the HAD-depression scale.<sup>27</sup> In other studies, the correlation of PAT with other applied scales ranged from 0.16 to 0.69.<sup>12,26-28</sup> The correlation of Family Structure and Resources subdimensions was not compared with other scales in other studies. In the subdimension of Family Structure and Resources, demographic information such as the age of caregivers, the number of children under the age of 18 living in the same house, and the presence of financial problems in the family were measured. The Social Support subdimension was not correlated with any scales in our study. The findings of our study for the Social Support subdimension were different from those of other validity and reliability studies. There should be no one who provides parental support, emotional support, financial support, information support, and daily support to the child for the family to be considered as risky in the Social Support subdimension. Children are not deprived of social support due to the benevolent and hospitable nature of Turkish culture and the obligation of care, education, or support arising from the family law specified in the legislation. We found that the mean value of social support was 0.0238, and the number of families considered risky in this area was too few. This value varied between 0.04 and 0.12 in other studies.<sup>26-28</sup> The Patient Problems subdimension was significantly and

moderately correlated with the Psychosocial Health subdimension and the total score of the PedsQL in our study. The value of the PedsQL-total was close to the findings of the Canadian sample ( $r: -0.49, P < .01$ ).<sup>26</sup> While caregiver problems subdimension was significantly, moderately, and positively correlated with HAD-anxiety dimension and NPOQ, it was weakly correlated with HAD-depression dimension in our study. The caregiver problems subdimension was moderately correlated with posttraumatic stress disorder and stress thermometer in a Spanish sample,<sup>28</sup> while it was moderately correlated with the strengths and difficulties scale and the McMaster family assessment tool in another study.<sup>7</sup> A low level of correlation was reported between caregiver problems and HAD-anxiety ( $r: 0.34, P < .01$ ) and HAD-depression ( $r: 0.23, P = .01$ ) scales in the Dutch sample.<sup>27</sup> We found moderate, positive, and statistically significant correlations between PAT stress response and HAD-anxiety, HAD-depression, and NPOQ. In an adaptation study of PAT, a moderate correlation was reported between PAT stress response and the HAD-anxiety ( $r: 0.58, P < .01$ ) and HAD-depression ( $r: 0.45, P < .01$ ) scales.<sup>27</sup> The Family Beliefs subdimension was significantly but weakly correlated with NPOQ, HAD-anxiety, HAD-depression scale, and PedsQL-physical health dimension. It has been reported in the literature that this subdimension was moderately correlated with the McMaster family assessment tool<sup>7</sup> and was weakly correlated with the posttraumatic stress disorder scale<sup>27</sup> and the health cognition scale.<sup>27</sup> Comparisons can be made with scales that better correspond to this subdimension in future studies.

The Turkish version of the PAT has high reliability compared with other language adaptation studies. Kuder Richardson-20 values were found to be 0.69 in the Netherlands sample,<sup>27</sup> 0.75 in the Canadian sample,<sup>26</sup> 0.81 in the US sample,<sup>7</sup> and 0.76 in the Spanish sample.<sup>28</sup> Family Structure and Resources subdimension KR-20 coefficient was found to be between 0.60 and 0.70 as in the adaptations made,<sup>12,26,27</sup> but it was reported as 0.52 in the Spanish sample.<sup>28</sup> The coefficient of Social Support subdimension KR-20 was found to be 0.798 in our study, 0.19 in the Dutch sample,<sup>27</sup> and between 0.59 and 0.69 in other samples.<sup>7,28</sup>

The Turkish version of the scale had the lowest internal consistency (0.524) in the Patient Problems subdimension. This value is 0.59 in the Canadian sample,<sup>26</sup> and it varies between 0.78 and 0.82 in other samples.<sup>12,27,28</sup> In our study, the KR-20 coefficient found for PAT and for the Social Support subdimension was slightly higher than in other studies, and the other subdimensions were similar to the literature findings.

The sensitivity and specificity of PAT were found to be 86% and 62%, respectively, compared to PedsQL, 100% and 52% compared to HAD-anxiety, and 100% and 52% compared to HAD-depression. With a cutoff value of 1.0, PAT identifies all patients at risk of depression and anxiety compared with the HAD-anxiety and HAD-depression scale, but the false positive rate is high. Although it is not actually risky in terms of HAD-anxiety and HAD-depression, the PAT scale might recommend that this family be included in the clinical evaluation. It may be because it creates a score that belongs not only to the caregivers but also to the whole family. Although we determined the optimal cutoff point as 1.43, keeping it at 1.0 will be more appropriate in determining risky families in future studies. It may be useful if the 1.43 cutoff point is evaluated by clinicians in terms of clinical significance in centers where the scale will be routinely used. In a study,<sup>28</sup> the sensitivity of PAT was 66.1% according to the posttraumatic stress disorder scale, 80.6% according to the strengths and difficulties scale, and 43% according to the stress thermometer; the specificity values were reported as 76.7%, 68.8%, and 85.5%, respectively.

It is recommended to exclude items with zero variance or close to zero from the calculation to perform scale validity and reliability analyses and to create models.<sup>29</sup> When the EFA results of the PAT were analyzed, it was seen that it explained 52% of the total variance when it was collected in 7 factors as in the original scale, using the Varimax rotation method. This value must be at least 50%.<sup>30,31</sup> Factor loadings for single-factor and multifactor models were between 0.3 and 0.8. The factor loadings of the items in the original scale ranged from 0.6 to 0.83.<sup>12</sup> Explanatory factor analysis was performed on 66 items by subtracting 8 items with low variances and factor loadings and 4 items related to problems under the age of 2. In order for the total score that can be obtained from the relevant subdimension of the removed item to vary between 0 and 1, the loads of the other items in the subdimension were adapted to make the sum of 1. Some items whose variance was determined as zero during the adaptation of the scale to other languages and were excluded from the scoring are as follows: type of transportation to hospital, number of children under 18 years old living at home, age of primary caregivers, suicide attempt of child and sibling, alcohol and substance use, and crime or violence status of being a victim.<sup>12,27,28</sup> Eight items removed from the Turkish version of the scale were as follows: Social Support 3 (Who provide financial support to the child?) and Social Support 4 (Who are those who provide information support to the child?), Patient Problems 13 (Does he/she use drugs, alcohol, or other substances?) and Patient Problems 17 (Does he talk about suicide or has he attempted suicide?), Sibling Problems 6 (Does his under-2 sibling have problems with his sleep routine?) and Sibling Problems 7 (Does the under-2 sibling have problems with their eating habits?) and

Sibling Problems 8 (Does his under-2 sibling do not want to be close to you?) and Sibling Problems 21 (Does a 2-year-old or older sibling talk about suicide or have attempted suicide?)

In this study, the Turkish version of the PAT was found to be valid and reliable and can be used for psychosocial assessment and interventions in families of children with cancer in pediatric oncology units.

### Limitations

There are 3 limitations to our study. First, PedsQL was used to obtain a standard for measuring QOL in children. Additionally, there was no valid and reliable Turkish scale for 0-2 age QOL scale. Therefore, patients under the age of 2 years were excluded from the study. Second, a scale was not applied to evaluate the patient's sibling. Lastly, the number of new patients at both centers during data collection was found to be much lower than the usual average number of new patients. Thus, the estimated sample size could not be reached, and the data collection process was terminated. It is recommended to study in larger samples and in different hospitals. Thus, the factor loads of the PAT items might increase, and it will mediate the revealing of the scale structure. If factor loadings are at the limit of 0.50 in EFA, the sample size is 200 and above<sup>32</sup>; if factor loads are at the limit of 0.40, it is said that a sample size of 150 and above is sufficient in cases where the number of indicators per factor is 10.<sup>33</sup> In case the factor loads are low, this figure can be lowered.<sup>34</sup> Although it is uncommon, good results can be obtained with EFA with a minimum sample size of 50 people; in some sources, there is information that it is sufficient to have 1 person for each variable in the scale when factor loads are not overlapping.<sup>35</sup> It is recommended that an exploratory analysis be conducted first, considering cultural differences.<sup>36</sup> Our study met this need.

### CONCLUSION

Psychosocial problems such as depression, anxiety, suicidal tendencies, and social isolation may be present in family members with a child newly diagnosed with cancer. The public health approach requires risk assessment before consequences occur. Widespread use of PAT in clinical practice will enable early detection of the psychosocial risks of cancer patients and the individuals they interact with. The Turkish form of PAT oncology version is valid and reliable scale and could be used in pediatric oncology units for psychosocial evaluation and interventions in families of 2- to 18-year-old children with cancer. With the PPPHM pyramid, the PAT can mediate the evaluation of the family systematically. A multidisciplinary team and the organization of this team are required for the implementation of PAT as an important clinical and primary prevention measure.

Availability of Data and Material The datasets analyzed in the current study are available from the corresponding author on reasonable request.

**Ethics Committee Approval:** This study was approved by Ethics committee of Ankara University, (Approval No: 56786525-050.04.04/7539, Date: Feb 30, 2019).

**Informed Consent:** Written informed consent was obtained from the parents of the children included in the study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – K.K., D.O.; Design – K.K., D.O.; Supervision – D.O.; Funding – K.K.; Materials – K.K., D.O.; Data Collection and/or Processing – K.K.; Analysis and/or Interpretation – K.K.; Literature Review – K.K.; Writing – K.K.; Critical Review – K.K., D.O.

**Acknowledgments:** The authors would like to thank Consultation-Liaison Psychiatry and Child and Adolescent Psychiatry departments of Ankara University for their clinical support to the families at psychosocial risk.

**Declaration of Interests:** The authors have no conflict of interest to declare.

**Funding:** The authors declared that this study has received no financial support.

## REFERENCES

- Laacroix A, Assal JP, Eğitimi HT. *Palme Yayıncılık* Piyal B, Tabak RS, eds.; 2003.
- American Cancer Society. Caregiver resource guide. *Published Online February, 2019*. Available at: <https://www.cancer.org/content/dam/cancer-org/cancer-control/en/booklets-flyers/american-cancer-society-caregiver-resource-guide.pdf>. Accessed August 2022.
- Gökler I. *Sistem Yaklaşımı ve Sosyal-Ekolojik Yaklaşım Çerçevesinde Oluşturulan Kavramsal Model Temelinde Kronik Hastalığı Olan Çocuklar ve Ailelerinde Psikolojik Uyumun Yordanması* (Yayımlanmış Doktora Tezi). Sosyal Bilimler Enstitüsü Psikoloji Anabilim Dalı, Ankara Üniversitesi; 2008.
- Akdur R, Piyal B, Çalışkan D, Ocaktan ME. Sağlık Hizmetleri ve Politikaları. In: Piyal B, ed. *Halk Sağlığı*. 1st ed. Ankara Üniversitesi Uzaktan Eğitim Yayınları; 2011.
- Kazak AE, Prusak A, McSherry M, et al. The psychosocial assessment tool (PAT)©: Pilot data on a brief screening instrument for identifying high risk families in pediatric oncology. *Fam Syst Health*. 2001;19(3):303-317. [CrossRef]
- Pai ALH, Patiño-Fernández AM, McSherry M, et al. The psychosocial assessment tool (PAT 2.0): psychometric properties of a screener for psychosocial distress in families of children newly diagnosed with cancer. *J Pediatr Psychol*. 2008;33(1):50-62. [CrossRef]
- Kazak AE, Hwang WT, Chen FF, et al. Screening for Family Psychosocial Risk in Pediatric Cancer: Validation of the Psychosocial Assessment Tool (PAT) Version 3. *J Pediatr Psychol*. 2018;43(7):737-748. [CrossRef]
- Alderfer MA, Mougianis I, Barakat LP, et al. Family psychosocial risk, distress, and service utilization in pediatric cancer: predictive validity of the psychosocial assessment tool. *Cancer*. 2009;115(18) (suppl):4339-4349. [CrossRef]
- Kazak AE. Pediatric Psychosocial Preventative Health Model (PPPHM): research, practice, and collaboration in pediatric family systems medicine. *Fam Syst Health*. 2006;24(4):381-395. [CrossRef]
- Kazak AE, Didonato S, Schneider SJ, Pai ALH. Assessing family psychosocial risks in pediatric cancer. In: *Pediatr Psychosoc Oncol Textbook Multidiscip Care Publ Online*; 2016:51-65. [CrossRef]
- Gosselin P, Ladouceur R, Pelletier O. Évaluation de l'attitude d'un individu face aux différents problèmes de vie : le questionnaire d'attitude face aux problèmes (QAP). *J Ther Comput Cogn*. 2005;15(4):141-153. [CrossRef]
- Akyay A. *Endişe ve anksiyete ölçeği, Problemlere Karşı Olumsuz Tutum Ölçeği ve Bilişsel Kaçınma Ölçeğinin Türkçeye Uyarlanması, Geçerliliği ve Güvenilirliği* (Yayımlanmış Yüksek Lisans Tezi). Üsküdar Üniversitesi. Sosyal Bilimler Enstitüsü Klinik Psikoloji Anabilim Dalı. TC Üsküdar Üniversitesi; 2016.
- Uneri OS, Agaoglu B, Coskun A, Memik NC. Validity and reliability of Pediatric Quality of Life Inventory for 2- to 4-year-old and 5- to 7-year-old Turkish children. *Qual Life Res*. 2008;17(2):307-315. [CrossRef]
- Çakin Memik N, Ağaoğlu B, Coşkun A, Karakaya I. Çocuklar için Yasam Kalitesi Ölceğinin 8-12 Yaş Çocuk Formunun Geçerlilik ve Güvenilirliği. *Turk J Child Adolesc Ment Health*. 2008;15(2):87-98.
- Çakin Memik N, Ağaoğlu B, Coşkun A, Uneri OS, Karakaya I. The validity and reliability of the Turkish pediatric quality of life inventory for children 13-18 years old. *Turk Psikiyatri Derg*. 2007;18(4):353-363. Available at: <https://www.acarindex.com/turk-psikiyatri-dergisi/cocuklar-icin-yasam-kalitesi-olceginin-13-18-yas-ergen-formunun-gecerlik-ve-guvenilirli-121597>
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361-370. [CrossRef]
- Aydemir O. Reliability and Validity of the Turkish version of Hospital Anxiety and Depression Scale. *Turk J Psychiatry*. 1997;8(4):280-287. Available at: <https://www.turkpsikiyatri.com/turkceOzet?id=308>.
- Almanasreh E, Moles R, Chen TF. Evaluation of methods used for estimating content validity. *Res Social Adm Pharm*. 2019;15(2):214-221. [CrossRef]
- Yong AG, Pearce S. A beginner's guide to factor analysis: focusing on exploratory factor analysis. *Tutor Quant Methods Psychol*. 2013;9(2):79-94. [CrossRef]
- Williams B, Onsmann A, Brown T. Exploratory factor analysis: a five-step guide for novices. *Australas J Paramedicine*. 2010;8(3):1-13. [CrossRef]
- Hair JF, Black WC, Babin BJ, Anderson RE. *Multivariate data analysis*; 2013. London: Pearson Education Limited. Available at: <https://books.google.com.tr/books?id=VvXZnQEACAAJ>
- Şencan H. *Sosyal ve Davranışsal Ölçümlerde Güvenilirlik ve Geçerlilik*. 1st ed. Seçkin Yayınevi; 2005.
- Seref T. Misuses of KR-20 and Cronbach's alpha reliability coefficients. *Eğitim Bilim*. 2009;34:101-112. Available at: <http://egitimvebilim.ted.org.tr/index.php/EB/article/viewFile/595/7524>
- Frost J. *Introduction to Statistics: an Intuitive Guide for Analyzing Data and Unlocking Discoveries*. Statistics By Jim Publishing; 2020.
- Dancey CP, Reidy J. *Statistics without Maths for Psychology*. 8th ed. London: Pearson Education; 2020.
- Barrera M, Hancock K, Rokeach A, et al. External validity and reliability of the psychosocial assessment tool (PAT) Among Canadian parents of children newly diagnosed With cancer. *Pediatr Blood Cancer*. 2014;61(1):165-170. [CrossRef]
- Sint Nicolaas SM, Schepers SA, Hoogerbrugge PM, et al. Screening for psychosocial risk in Dutch families of a child with cancer: reliability, validity, and usability of the Psychosocial Assessment Tool. *J Pediatr Psychol*. 2016;41(7):810-819. [CrossRef]
- Kazak AE, Hwang WT, Chen FF, et al. Validation of the Spanish version of the psychosocial assessment tool (PAT) in pediatric cancer. *J Pediatr Psychol*. 2018;43(10):1104-1113. [CrossRef]
- Kuhn M, Johnson K. *Applied Predictive Modeling*. Springer Science+Business Media; 2013.
- Bandalos DL, Finney SJ. Factor analysis: exploratory and confirmatory. In: *The Reviewer's Guide to Quantitative Methods in the Social Sciences*. Routledge; 2018:98-122.
- Shrestha N. Factor analysis as a tool for survey analysis. *Am J Appl Math Stat*. 2021;9(1):4-11. [CrossRef]
- Schreiber JB. Issues and recommendations for exploratory factor analysis and principal component analysis. *Res Social Adm Pharm*. 2021;17(5):1004-1011. [CrossRef]
- Büyüköztürk Ş, Şekercioğlu G, Çokluk Ö. *Sosyal Bilimler İçin Çok Değişkenli İstatistik: SPSS ve LISREL Uygulamaları*. 3rd ed. Ankara: PEGEM Akademi; 2018.

34. Mundfrom DJ, Shaw DG, Ke TL. Minimum sample size recommendations for conducting factor analyses. *Int J Test.* 2005;5(2): 159-168. [\[CrossRef\]](#)
35. de Winter JCF, Dodou D, Wieringa PA. Exploratory factor analysis With small sample sizes. *Multivariate Behav Res.* 2009;44(2): 147-181. [\[CrossRef\]](#)
36. Orcan F. Exploratory and confirmatory factor analysis: which one to use first? *Eğitimde Psikol Ölçme Değerlendirme Derg.* 2018: 414-421. [\[CrossRef\]](#)



**Supplementary Table 1. Factor Loadings of The Items in The Scale**

	Factor Loadings						
	F1	F2	F3	F4	F5	F6	F7
Caregiver age	,493						
Count of children living in the same home with the patient	,420						
Caregiver educational level	,524						
Caregiver marital status	,675						
Type of transport to the clinical appointments	,679						
Existence of financial problems in the child's family	,510						
Areas of financial problems in the child's family	,403						
2a	,402	,786					
2b	,411	,918					
9a					,304		
9b					,336		
9c					,344		
9d					,344		
9k					,372		
9l					,262		
9m					,305		
9n					,362		
9o					,406		
9p					,302		
9q					,421		
9r					,483		
9t					,350		
9u					,617		
9v					,425		
10a						,348	
10b						,449	
10c						,302	
10d						,460	
10g						,312	
10k						,402	
10l						,311	
10m						,461	
10n						,440	
10o						,300	
10p						,600	
10q						,452	
10r						,824	
10s						,462	
10t						,414	
10u						,520	
10v						,320	
11a			,382				
11b			,579				
11c			,310				
11d			,417				
11e			,542				
11g			,942				
11h			,546				
11i			,489				
11j			,442				
11l			,407				
12a				,620			
12b				,442			
12c				,386			
12d				,303			
12e				,320			
14a							,527
14b							,443
14c							,328
14d							,463
14e							,477
14f							,822
14g							,520
14h							,452
14i							,490
14j							,453