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Original Research Article

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Screening for Family Psychosocial Risk in Pediatric Cancer: Validation of the Psychosocial Assessment Tool (PAT) Version 3

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Abstract

Objective Family psychosocial risk screening is an important initial step in delivering evidence-based care. The Psychosocial Assessment Tool (PAT) is a brief parent report screener based on the trilevel Pediatric Psychosocial Preventative Health Model (PPPHM; Universal, Targeted, Clinical). The current article validates a revised PAT (version 3.0) in pediatric oncology that includes new items (for families of younger patients; clinically relevant risk items) and applicable to broad health literacy levels (a 4th grade reading level). **Methods** Primary caregivers of 394 children newly diagnosed with cancer participated in this multisite investigation, completing the PAT and validation measures using REDCap. **Results** The original structure of the PAT, with seven subscales (Family Structure, Social Support, Child Problems, Sibling Problems, Family Problems, Stress Reactions, and Family Beliefs) was supported using a confirmatory factor analysis. Internal consistency for the total score (Kuder–Richardson 20 coefficient [KR20] = 0.81) and the subscales (KR20 = 0.59–0.85) was moderate to strong. Moderate to strong correlations with the criteria measures provided validation for the total and subscale scores. The validation measures varied significantly, as expected, across the three levels of the PPPHM. Receiver operating characteristic (ROC) analyses showed that the PAT total and subscale scores can discriminate families above and below clinical thresholds. **Conclusions** Results reinforce the psychometric properties of this approach for screening of family psychosocial risk. The PAT provides an evidence-based screener that identifies families at three levels of risk and can provide the basis for further evaluation and treatment of children with cancer and their families.

Key words: cancer; families; health-care delivery; pediatrics; psychosocial; Psychosocial Assessment Tool (PAT); risk screening.

A social ecological model offers a broad, well-accepted perspective on child and family adjustment in pediatric health and illness. Understanding risks and resiliencies across the family's social ecology is an essential initial step in providing psychosocial care that matches the needs of patients and families. The Pediatric Psychosocial Preventative Health Model (PPPHM; Supplemental File 1, Kazak, 2006) provides a trilevel conceptual model for family psychosocial risk screening. The PPPHM is a pyramid and rests on

the assertion that screening should involve *all* families entering a pediatric health setting rather than a more select screening of families thought to be at elevated risk. Using a public health framework, Universal Risk is at the base. This is the largest group of families, typically one half to two thirds of families (Kazak, Schneider, DiDonato, & Pai, 2015), with the fewest psychosocial risks and the most favorable outcome and ability to cope and adjust to health challenges (Kazak, 2006). The middle tier of the pyramid is called Targeted and represents families, generally one quarter to one third of families (Kazak, Abrams et al., 2015), with some identifiable challenges and psychosocial risks (Kazak, 2006). These families may benefit from a range of evidence-based interventions. At the tip are Clinical families, the smallest groups at up to 15% of families (Kazak, Abrams et al., 2015), where there are generally more serious or chronic psychosocial challenges, and more intensive treatment and resources are necessary to promote family adjustment (Kazak, 2006).

To our knowledge, the Psychosocial Assessment Tool 2.0 © (PAT; Kazak, Schneider et al., 2015; Pai et al., 2008) is the only validated brief parent report screener of family psychosocial risk. Subsequent to an initial version (Kazak et al., 2001, 2003), the PAT was modified and PAT2.0 was determined to be a reliable and valid instrument with a total score that maps on to the levels of the PPPHM (Pai et al., 2008). Psychosocial risk classification is generally stable across time (Alderfer et al., 2009). Screening with the PAT 2.0 can be completed shortly after the diagnosis of cancer (Kazak, Barakat, Ditaranto et al., 2011) and can facilitate the delivery of psychosocial care (Kazak, Barakat, Hwang et al., 2011).

Subsequent to the publication of the PAT 2.0 (Pai et al., 2008), interest in the PAT for family psychosocial risk screening increased, and it was disseminated through the Center for Pediatric Traumatic Stress (CPTS; SM581139). The PAT 2.0 is used in pediatric cancer, in the United States and other countries (Barrera, Hancock, Rokeach, Atenafu et al., 2014; Barrera, Hancock, Rokeach, Cataudella et al., 2014; Gilleland et al., 2013; Karlson, et al., 2013; McCarthy et al., 2009; McCarthy, DeGraves et al., 2016; McCarthy, Wakefield et al., 2016; Schepers et al., 2018; Sint Nicolaas et al., 2016), and currently in 28.9% of U.S. cancer programs (Scialla et al., 2018). We developed guidelines for adapting the PAT for other pediatric illnesses and worked with users to complete adaptations for other groups: sickle cell disease (Crosby et al., 2016; Karlson et al., 2012; Reader et al., 2017), organ transplantation (Pai, Tackett, Ittenbach, & Goebel, 2012), inflammatory bowel disease (Pai et al., 2014), congenital heart disease (Hearps et al., 2014), chronic pain (Woods & Ostrowski-Delahanty, 2017), and mixed samples of chronically ill infants and children (McCarthy, Hearps et al., 2016). In completing these adaptations, we found that the PAT items were largely acceptable, as is, for other conditions. We collected quarterly data from all users as well as other feedback. The PAT has been used equally in cancer and other diseases, with over 12,000 administrations (Psychosocial Assessment Tool, 2018).

Although the PAT 2.0 has strong psychometric properties and it has been used widely, we undertook steps to make improvements. Our goals were to ensure optimal utility and to refine items that assess key clinical care issues while also assuring accessibility for a broad range of families. In generating the third version of the PAT (which we now call simply PAT), we made the following changes, based on research and the user feedback—added items for families of infants and young children, broadened the types of clinically important risks included (e.g., mental health treatment, suicidality), and lowered the reading level to ensure applicability across health literacy levels. While similar to the PAT 2.0, the revised (third) version had not been evaluated.

The purpose of the present article was to evaluate the psychometric properties of the revised (third) version of the PAT in English in a new multisite pediatric cancer sample at diagnosis that is about three times larger than that in prior studies. Using the seven theoretically derived risk areas from the PAT 2.0, confirmatory factor analysis (CFA) was conducted with the expectation that these preestablished risk areas would be robust components of family psychosocial risk. Each risk area was validated against an established measure of a comparable construct, and the total score is examined in association with these measures. The three levels of the PPPHM were validated and the ability of the PAT to identify families at clinical risk was evaluated.

Method

Design

The data were drawn from a multisite prospective study validating the PAT in Spanish and English in pediatric cancer.[1] Study sites were Nemours (A. I. du Pont Hospital for Children [AIDHC]; Wilmington, DE, Nemours Children's Hospital [NCH]; Orlando, FL), the Children's Hospital of Philadelphia (CHOP; Philadelphia, PA), and the University of Texas MD Anderson Cancer Center (MDA; Houston, TX). The baseline data point (used in this study) was within 45 days of the child's diagnosis with cancer.

Participants

Inclusion requirements were being the parent/caregiver of a child ages birth through 17 years newly diagnosed with a first pediatric neoplasm that required

1 Data in this article are based on the English version of the PAT, using the complete (closed) data set from the baseline data collection. The Spanish version will be analyzed separately.

Table I. *Sample Demographics (n = 394)*

		Caregivers			Child with cancer	
		N	%		*N*	%
Age in years	<21	11	2.8	<1	16	4.1
	>21	383	97.2	1–4	119	30.2
				5–9	98	24.9
				10–14	103	26.1
				15–17	58	14.7
Gender	Female	353	89.6		191	48.5
	Male	41	10.4		202	51.3
Race	Caucasian	285	72.3		274	69.5
	African-American	62	15.7		64	16.2
	Asian	16	4.1		13	3.3
	Other	19	4.8		15	3.9
	Multiracial	11	2.8		27	6.9
	Not reported	1	0.3		1	0.3
Ethnicity	Non-Hispanic	350	88.8		346	87.8
	Hispanic	38	9.6		47	11.9
	Not reported	6	1.5		1	0.3
Education	<Grade 12	14	3.6			
	High school	68	17.3			
	Some college	73	18.5			
	BA or equivalent	156	39.6			
	Postgraduation study	18	4.6			
	Graduation degree	65	16.5			
Marital status	Single	75	19.0			
	Married/partner	289	73.4			
	Separated/divorced	27	6.9			
	Widowed	2	0.5			
	Other/not reported	1	0.3			
Child's diagnosis	Leukemia	144	36.5			
	Lymphoma	67	17.0			
	Brain tumors	54	13.7			
	Solid tumors	121	30.7			
	Other	7	1.8			
	Not reported	1	0.3			

chemotherapy and/or radiation. There were no exclusion criteria based on disease although patients referred directly to palliative care or hospice at diagnosis (not expected to live for 2 months) and those not fluent in English or Spanish were considered ineligible.

Participants were English-speaking caregivers of 394 patients newly diagnosed with a first pediatric malignancy (Table I).[2] The majority were married (73.4%), with 19% single parents and 6.9% separated or divorced. Participation was open to either one or two caregivers in the family, although data from only one parent per family were used in this report. The mother or female caregiver in a two-participant family was designated as the primary caregiver. If only one caregiver in a family participated, this person was designated as the primary caregiver regardless of gender and relationship to the child. The sample consisted of 353 female caregivers (351 mothers, 2 grandmothers) and 41 male caregivers (fathers). The average size of the families was 4.6 people, including the patient, with an average of 1.5 siblings. There was a range of educational levels among the participants, with about one-third having less than a college degree (Table I). The patients ranged in age from birth through 17 years of age (Table I). Approximately half (51.3%) were male. Race and ethnicity reflected diversity: Caucasian (69.5%), African-American (16.2%), Asian (3.3%), Multiracial (6.9%), and other (3.9%). A minority identified as Hispanic (11.9%). The cancer diagnoses were: leukemias (ALL, AML, CML; 36.5%), solid tumors (30.7%), lymphomas (17.0%), brain tumors (13.7%), and others (2.1%).

Procedure

This study was approved by the institutional review board at each site. Families were enrolled over

2 Two caregivers were eligible to participate. In this article, only data from one are included.

34 months (December 2013–October 2016). New patients at each site were identified through review of admission and tumor registry lists and collaboration with oncology teams. Families were approached for study participation by a clinical research coordinator during an inpatient hospitalization or an outpatient appointment. After providing written informed consent, caregivers completed a 45-min battery of self-report measures administered through a REDCap portal on a tablet computer. Participants understood that they could complete the study using a paper and pencil copy of the REDCap survey if they preferred; this option was also used in cases where the Internet connection was weak or unstable (90 families completed the study in paper and pencil). The overwhelming majority of participants completed the study online at the hospital, although a link to the REDCap survey or an e-mailed questionnaire was used in a small number of cases. Participants received a $10 gift card as appreciation for their participation.

Measures

The PAT[3]

The PAT (Kazak, Schneider et al., 2015; Pai et al., 2008) is a brief parent report screener of family psychosocial risk based on a social ecological model of families that assesses psychosocial risks across the child's social environment. The PAT generates a total score and seven subscale scores (e.g., Structure/Resources, Social Support, Child (Patient) Problems, Sibling Problems, Family Problems, Stress Reactions, and Family Beliefs) by summing the number of endorsed high-risk items (subscale scores) and as a weighted average (total score). The total score, which is a sum of the subscales, maps on to the PPPHM (Kazak, 2006) with three tiers of risk—Universal, Targeted, and Clinical.

PAT 2.0 (Pai et al., 2008) is the "parent" of the currently tested third version. Based on user feedback, the following changes were made. For families of children aged <2 years, four items were added, specific to families of infants and preschoolers (McCarthy, Hearps et al., 2016). These replaced the longer set of child items and shortened the PAT for these families. Users indicated that items about more urgent clinical concerns would be helpful. Two risk items were added about child and sibling aggression and suicidality. Three risk items were added to the family problems subscale about suicide, crime and abuse, and mental health treatment. One question about whether the child (patient, sibling) takes medication for behavioral concerns was also added. In each case, a literature review was conducted to identify item structure and determine high-risk responses. Draft items were shown to health-care providers for feedback and revision. All changes were written to be nonspecific as to disease/condition to facilitate the use of the PAT in diverse pediatric samples. As the PAT is now usually administered on a tablet or computer (Web version), modifications were introduced to facilitate administration (e.g., branching options). Branching options shortened the questionnaire for families by skipping nonrelevant items. In general, the added items did not substantively change the amount of time needed to complete the PAT.

Consistent with recommendations for optimizing health literacy (The Joint Commission, 2010), PAT and its instructions were analyzed using the Flesch–Kincaid reading level/reading ease feature in Microsoft Word. Each item was tested individually, and an overall average reading level was generated. The wording of items that exceeded 4th grade was adjusted to achieve a 4th grade reading level or below whenever possible. Some multisyllabic technical medical or psychological terms were retained. Simple wording was used to put these words in context to simplify them.

Caregiver-Report Validation Measures

The following well-validated measures were completed by caregivers. They were selected to correspond with subscales of the PAT and to validate the total PAT score based on psychometric characteristics and brevity—to minimize participant burden.[4,5]

Barratt Simplified Measure of Socioeconomic Status

The Barratt Simplified Measure of Socioeconomic Status (BSMSS) (Barratt, 2006) is a self-report updated variation of the Hollingshead Four Factor Index of Social Status (Hollingshead, 1975). The BSMSS total score consists of two items: education (seven levels) and occupation (nine levels). The total score ranges from 8 to 66. The BSMSS was used to validate the Structure/Resources subscale of the PAT. The BSMSS has been used in pediatric oncology (Tillery et al., 2014) with scores used to define five levels of SES.

The Medical Outcomes Study Social Support Survey

The Medical Outcomes Study Social Support Survey (MOS-SSS) (Sherbourne & Stewart, 1991) is a 19-item scale. Items are rated on a five-point Likert scale from 1 (*None of the time*) to 5 (*All of the time*). Higher scores represent more support. The MOS-SSS has been used in pediatric cancer (Rosenberg et al., 2014). Cronbach's alpha for the current sample is 0.97. The MOS-SSS is used to validate the Social Support subscale.

3 The Psychosocial Assessment Tool (PAT) is a copyrighted instrument and may not be used without written permission. Please contact us at psychosocialassessmenttool@nemours.org for information about using the PAT.

4 The measures differ from those used in Pai et al (2008), although the constructs are the same.

5 There were no differences in the outcomes measures by study site.

The Strengths and Difficulties Questionnaire

The Strengths and Difficulties Questionnaire (SDQ) (Goodman et al. 1998) is a 20-item measure of adjustment of children from 3 to 17 years old. A total difficulties score (0–40) is derived, with a cutoff of 14. The SDQ has strong psychometrics and has been used in pediatric oncology (Williams et al., 2013). The SDQ validates the Child (SDQ-C) and Sibling (SDQ-S) subscales. Cronbach's alphas for the current sample are 0.77 (C) and 0.80 (S).

The McMaster Family Assessment Device–General Functioning Subscale

The McMaster Family Assessment Device–General Functioning Subscale (FAD-GF) (Epstein et al., 1983) is a 12-item self-report scale with a four-point Likert scale from 1 (*Strongly Agree*) to 4 (*Strongly Disagree*). Lower scores indicate better functioning. It has been used in families with a child with cancer (Schmitt et al., 2008). Cronbach's alpha for the current sample is 0.89. The FAD-GF was used to validate the Family Problems subscale.

PTSD Checklist-Civilian-6

The PTSD Checklist-Civilian-6 (PCL-C-6) (Lang & Stein, 2005) is a six-item self-report screening instrument for assessing posttraumatic stress symptoms and severity. It uses a five-point Likert scale from 0 (*Not at all*) to 5 (*Extremely*) and has excellent concurrent validity and strong specificity and sensitivity, with a clinical cutoff of 14. The sample Cronbach's alpha is 0.86. The PCL-C-6 is used to validate the Stress Reactions subscale.

Children's Hospital of Philadelphia-Self Efficacy Scale

The Children's Hospital of Philadelphia-Self Efficacy Scale (CHOP-SES) 12-is a brief version of CHOP-SES (Best et al, 2001) that assesses parent perceptions of self-efficacy specific to medical care for their child. The scale uses a five-point Likert scale from 1 (*Not at all confident*) to 5 (*Extremely confident*). Sample internal consistency (Cronbach's alpha) is 0.90. The CHOP-SES is used to validate the Family Beliefs subscale.

The Distress Thermometer

The Distress Thermometer (DT) (National Comprehensive Cancer Network, 2003) is a brief self-report visual analog measure of psychological distress from 0 (*No Distress*) to 10 (*Extreme Distress*). It has been used in pediatric cancer and other childhood illnesses, generally with a clinical cutoff of 4 or 5 (Wiener et al., 2017). It is used to validate the PAT total score.

Data Analysis

The guidance of Holmbeck and Devine (2009) for measure validation was followed. The early stages of measure development were previously described in Pai et al (2008), with a focus on internal reliability, external validation, and clinical utility of the revised version in the present article. Descriptive statistics were used to summarize participant and family characteristics. There were 78 binary items on the PAT, including prior and new items. Each item was scored using prespecified risk/no risk criteria from the research literature and/or clinical consensus. Items were scored as 1 (endorsed) or 0 (not endorsed).

Because PAT was developed based on seven empirically derived risk areas and included both theoretically and clinically meaningful items, the evaluation began by examining the factor structure of the seven risk areas separately: Family Structure/Resources, Social Support, Child Problems, Sibling Problems, Family Problems, Stress Reactions, and Family Beliefs. A CFA followed to evaluate the hypothesized seven-factor model. Items with low endorsement or low factor loadings were excluded. Model fit statistics including chi-square values, comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA) were used to ascertain the fit of a factor solution. Common recommendations for good fit are RMSEA $< .06$ and CFI/TLI both $>= .95$ (Hu & Bentler, 1999). The estimation of the factor analysis was done using weighted least squares with means and variance adjustment (WLSMV) with Geomin oblique rotation as recommended for binary items (Brown, 2006).

Risk area-specific subscale scores were calculated by summing binary items. Ten items were removed because of low factor loadings. The total score was the sum of the subscale scores, weighted by the number of items in the subscale. The range for each subscale score is 0.00–1.00 and 1.00–7.00 for the total score. The Kuder–Richardson 20 coefficient (KR20) was used to calculate internal consistency because the risk items are binary. For construct validity, the total and relevant subscales are correlated with criteria variables and among the seven factors using correlation coefficients. A two-sided p-value of $< .05$ was applied and correlation coefficients of $\geq .4$ were considered clinically significant. PAT cutoff scores were used to classify families into the three levels of the PPPHM, based on theory and prior empirical analyses (Pai et al., 2008). Total scores < 1.00 are Universal, ≥ 1.00 and ≤ 2.00 are Targeted, and over 2.00 are Clinical. To further validate the cutoffs, scores on the PCL-6, SDQ-C, and FAD were compared across the three PPPHM levels using one-way analysis of variance. Finally, receiver operator characteristic (ROC) analyses were used to evaluate the ability of the PAT total

Table II. *Fit Statistics for PAT Risk Area-Specific One-Factor Models and the Seven-Factor Model*

Model tested	Items	χ^2	*df*	RMSEA (CI)	CFI	TLI
One-factor models						
Family structure	6	15.61	9	.043 (.000–.078)	.979	.965
Social support	5	7.90	5	.038 (.000–.087)	.977	.955
Child problems	15	306.47	90	.078 (.069–.088)	.888	.870
Sibling problems	15	225.52	90	.064 (.054–.074)	.959	.952
Family problems	13	137.62	65	.053 (.041–.066)	.880	.856
Stress reactions†	3	0.00	0	—	—	—
Family beliefs	11	85.50	44	.049 (.033–.064)	.889	.862
Seven-factor model	68	2,568.55	2,250	.019 (.015–.022)	.910	.906

Note. † = saturated model with three items. χ^2 = chi-square statistics; CI = confidence interval; CFI = comparative fit index; *df* = degrees of freedom; PAT = Psychosocial Assessment Tool; RMSEA = root mean square error of approximation; TLI = Tucker–Lewis index; WLSMV = weighted least squares with means and variance adjustment, estimation method with binary items was used.

and subscale scores to discriminate clinical levels of child or parent distress, using the DT, PCL-6, and SDQ-C. Factor analysis was conducted using Mplus version 8, and other statistical analyses were performed with SPSS version 24.

Results

Caregiver Accrual and Flow Through the Study

English-speaking families ($n = 463$) were approached for participation. Of these, 47 families refused participation and 416 were consented (90% participation rate). Seven consented families withdrew before baseline data collection and one was withdrawn because of ineligibility. After removing data from 22 families with responses missing for >50% of the items, surveys of the primary caregiver from 394 families were analyzed.

Factor Structure of the PAT

The first set of analyses demonstrated that one-factor models are appropriate for each of the seven risk areas with satisfactory fit indices (CFI/TFI, RMSEA). This allowed a CFA to test the originally hypothesized seven-factor model. Goodness-of-fit indices showed a good fit of the model (RMSEA all < .1, CFI .880–.979, TLI .856–.965; Table II). The loadings of the individual items on the latent subscales in the seven-factor model were strong (Table III), ranging from .60 to .83 for Family Structure/Resources, .68 to .93 for Social Support, .59 to .88 for Child Problems, .58 to .93 for Sibling Problems, .36 to .80 for Family Problems, .91 to .97 for Stress Reactions, and .41 to .95 for Parental Beliefs. Correlations between factors showed consistent and positive relationships as expected (Supplemental File 2).

PAT Descriptive Statistics and Internal Consistency

Descriptive statistics for the total PAT score and the seven subscales are presented in Table IV. Internal consistency for the total score was strong (KR20 = 0.81). Child Problems, Sibling Problems, and Stress Reaction had KR20 > 0.80. Family Structure/Resources, Social Support, Family Problems, and Family Beliefs were adequate but lower, from 0.59 to 0.64.

Subscale Validation

Descriptive statistics for the validation measures and relations with the PAT total and subscale scores used are in Table V. Moderate to strong correlations between the seven specific risk area subscales and the corresponding validation measures were found. Specifically, the PAT total score correlated in the expected direction with the measures of parental distress (DT, PCL-6), child (patient) and sibling behavior (SDQ), family functioning (FAD), self-efficacy (CHOP-SES), and SES (BSMSS). Each of the predicted associations between PAT subscales and validation measures was supported, although some measures correlated strongly on more than one factor (e.g., FAD had a higher correlation with Family Beliefs than Family Problems). Moreover, divergent validity of the subscales was also supported in that low correlations were observed between subscale scores and unrelated measures.

Validation of the PPPHM Levels

Using PAT total scores, 62.5% of the sample scored at the Universal Level of the PPPHM (total score < 1.0), 26.9% were at the Targeted Level (1.0–2.0), and 10.6% were in the Clinical tier (>2). Mean scores were significantly different for the three tiers of the PPPHM for the DT, PCL-6, FAD, MOS-SSS, BSMSS, and SDQ-C (all $p < .0001$, Table VI), except for the BSMSS. Post hoc comparisons showed that Universal risk level families had significantly lower PCL-6, FAD-GF, SDQ-C, SDQ-S, and DT scores and higher CHOP-SES and MOS-SSS scores than those at the Targeted (effect sizes .10–1.03) and Clinical level (effect sizes .34–1.65). There were also significant differences in PCL-6, and CHOP-SES scores between Targeted and Clinical level families ($p < .05$).

Table III. *Factor Loadings of the Seven-Factor CFA Model for PAT*

Item description by factor[a]	Risk (%)	FS	SS	CP	SP	FP	SR	FB
Family structure								
Caregiver age <21 years	3	.65						
Level of education of participant	4	.60						
Marital status	26	.80						
Planning to become pregnant or adopt	4							
Getting to the appointments	12	.71						
Health-care coverage/insurance	33	.62						
Is your family having money problems?	15	.83						
Child schooling status	10							
Social support								
Help/w childcare/parenting	1		.93					
Help/w emotional support	1		.93					
Help/w money/financial support	10		.79					
Help/w information	5		.68					
Help/w every tasks	4		.87					
Child problems								
Seem moody/change moods a lot	70			.59				
Seem sad/does not want to be .others	42			.45				
Have developmental problems	12			.60				
Victim of crime, or abuse, or violence	2							
Have a mental health problem	4			.81				
Act younger than his/her age	10			.68				
Get upset. the doctor or dentist	35			.61				
Seem overly active or cannot sit still	21			.62				
Have problems paying attention	23			.84				
Cry or get upset easily	39			.73				
Get distracted easily	33			.80				
Worry a lot	33			.61				
Have a learning problem/problems school	12			.76				
Use drugs, alcohol, or other substances	0.3							
Act shy or cling to you or other adults	29			.61				
Problems making or keeping friends	8			.75				
Steal, lie, or act aggressively toward others	2			.88				
Talk about suicide/suicidal attempt	0.3							
Sibling problems								
Seem moody/change moods a lot	24				.81			
Seem sad/does not want to be. . .others	10				.79			
Have developmental problems	5				.85			
Victim of crime, or abuse, or violence	2							
Have a mental health problem	5				.81			
Act younger than his/her age	6				.87			
Get upset. . .the doctor or dentist	12				.58			
Seem overly active or cannot sit still	13				.87			
Have problems paying attention	16				.93			
Cry or get upset easily	19				.77			
Get distracted easily	20				.89			
Worry a lot	17				.73			
Have a learning problem/problems school	9				.84			
Use drugs, alcohol, or other substances	1							
Act shy or cling to you or other adults	10				.57			
Problems making or keeping friends	5				.89			
Steal, lie, or act aggressively toward others	1				.68			
Talk about suicide/made a suicidal attempt	1							
Family problems								
Worry, fear, or anxiety at times	58					.69		
Drugs or alcohol problems in the family	5					.68		
Sad or depressed at times	56					.80		
Problems paying attention, staying focused	20					.71		
Relationship problems breaking up/divorce	17					.60		
Trouble with the law or in jail	6					.59		
Drinks too much alcohol	5					.62		

Table III. *Continued*

Item description by factor[a]	Risk (%)	FS	SS	CP	SP	FP	SR	FB
Legal problems or fight with child custody	4							
Talked about or attempted suicide	1					.60		
Victim crime, abuse, or domestic violence	7					.54		
Really sick have a serious medical problem	8					.45		
Any other mental health problems	5					.75		
Family member died during the past year	13					.36		
In-patient treatment mental health	3					.72		
Stress reactions								
Upsetting thoughts, memories bad dreams	18						.91	
Upset at things	21						.93	
Jumpy, startle, heart beat fast	15						.97	
Family beliefs								
The doctors/nurses will know what to do	2							.93
I can express my concerns to medical team	3							.83
We can make good treatment decisions	2							.95
I will be a good parent through all of this	3							.66
Our family will be closer because of this	10							.50
There are people I can turn to for help	11							.73
My child will be in a lot of pain (R)	34							.41
Everything happens for a reason (R)	60							
This is a disaster (R)	31							.52
Cancer is a death sentence (R)	5							.52
We are going to beat this	3							.74
Our family life will get worse. . .this (R)	8							.63

[a]Items are paraphrased or abbreviated for table.

Note. CP = Child Problems; FB = Family Belief; FP = Family Problems; FS = Family Structure; PAT = Psychosocial Assessment Tool; SP = Sibling Problems; SR = Stress Reactions; SS = Social Support.

Table IV. *Descriptive Statistics and Internal Consistency Coefficients for PAT Total and Subscale Scores*

Scale/total score	*M*	*SD*	Range	KR20
Family Structure/Resource	0.15	0.20	0–0.83	0.61
Social Support	0.04	0.12	0–1	0.59
Child Problems	0.25	0.20	0–1	0.80
Sibling Problems	0.11	0.18	0–0.80	0.85
Family Problems	0.16	0.14	0–0.62	0.64
Stress Reactions	0.18	0.33	0–1	0.84
Family Beliefs	0.10	0.12	0–0.82	0.59
Total score	0.97	0.71	0–3.64	0.81

Note. Binary items were used to compute sum subscale score and weighted total score. PAT = Psychosocial Assessment Tool.

Clinically Significant Outcomes

ROC analyses further demonstrated that the PAT total score can discriminate clinical or risk levels of the PCL-6 and the SDQ-C with area under the curve (AUC) as .773 and .839, respectively ($p < .001$). PAT subscale scores for child (patient) problems and stress reactions were also associated with high AUCs for the corresponding validation measures and .708 (PCL-6 and .901 (SDQ-C). Using the cutoff of 1.0 for PAT total scores (i.e., universal vs. target or clinical), PAT has a sensitivity of 66.1% (PCL-6) and 80.6% (SDQ-C) and specificity of 76.7% (PCL-6) and 68.8% (SDQ-C) for detecting clinical or at risk levels. The AUC for the DT (cutoff of 4) was .675 with a specificity of 85.5% and a sensitivity of 43.0%.

Discussion

Screening families for psychosocial risk is an important component of care in pediatric cancer. The Standards for Psychosocial Care in Pediatric Cancer (Wiener, Kazak, Noll, Patenaude, & Kupst, 2015) include as a first standard of care, "Youth with cancer and their family members should routinely receive systematic assessments of their psychosocial health care needs," based on a systematic review of evidence from 149 studies published between 1995 and 2015 (Kazak, Abrams et al., 2015). The revised (third) version of the PAT is a psychometrically sound screener of family psychosocial risk in pediatric cancer that can be used to meet this standard. The rigorous validation process in a multiinstitutional sample of caregivers of children newly diagnosed with cancer supported the seven conceptual factors of the PAT and the total score reflected tiered risk on the PPPHM. Overall, the psychometric properties are similar to the PAT2.0 (Pai et al., 2008) although the revised version has the advantages of a lower reading level, attention to a wider range of developmentally and clinically important risks, and Web-based administration.

Internal consistency of the total PAT score is strong, and this is also the case for the Child Problems, Sibling Problems, and Stress Reactions subscales. The more general and broad family subscales (Social Support, Family Structure/Resources, Family

Table V. *Descriptive Statistics and Internal Consistency for Validation Measures and Relations With PAT Total and Subscale Scores*

	M	*SD*	Alpha	PAT total score	Family Structure	Social Support	Child Problems	Sibling Problems	Family Problems	Stress Reactions	Family Beliefs
MOS-SSS	83.04	14.27	0.97	−.40***	−.20***	**−.35*****	−.18**	−.11*	−.28***	−.22***	−.37***
SDQ-C	7.40	4.88	0.77	.48***	.20***	.23***	**.70*****	.34***	.24***	.16**	.14*
SDQ-S	6.84	5.11	0.80	.44***	.14*	.17**	.32***	**.62*****	.35***	.13*	.22**
FAD-GF	1.60	0.47	0.89	.43***	.18**	.22**	.21**	.13*	**.39****	.26**	.42**
PCL-6	12.19	4.94	0.86	.58***	.14**	.22**	.28**	.20**	.36**	**.53****	.45**
CHOP-SES	53.14	6.23	0.90	−.23***	(.05)	(−.02)	−.17**	(−.06)	−.13**	−.23**	**−.35****
BSMSS[a]	–	–	–	−.16**	**−.40****	−.21**	(.02)	(.04)	(−.01)	(−.00)	(−.06)
DT	6.02	2.57		**.43*****	.11*	.21***	.24***	.13***	.28***	.38***	.32***

[a]BSMSS levels (high to low): I (*N* = 39, 9.9%), II (*N* = 65, 16.5%), III (*N* = 97, 24.6%), IV (*N* = 76, 19.3%), V (*N* = 93, 23.6%), unknown (*N* = 24, 6.1%).

*$p < .05$; **$p < .01$; ***$p < .001$.

BSI-18 = Brief Symptom Inventory; BSMSS = Barratt Simplified Measure of Socioeconomic Status; CHOP-SES = Children's Hospital of Philadelphia-Self Efficacy Scale; DT = Distress Thermometer; FAD-GF = the McMaster Family Assessment Device–General Functioning Subscale; MOS-SSS = the Medical Outcomes Study Social Support Survey; SDQ = the Strengths and Difficulties Questionnaire; PAT = Psychosocial Assessment Tool; PCL-C-6 = PTSD Checklist-Civilian-6.

Table VI. *Mean Validation Measures by PPPHM Categories*

	Universal	Targeted	Clinical	*F*	*p*	d (U vs. T)	d (U vs. C)	d (T vs. C)
PCL-6*	10.20	14.38	17.92	74.76	.000	−.97	−1.65	−.67
FAD-GF**	1.46	1.73	1.97	29.36	.000	−.62	−1.03	−.45
SDQ (patient)**	5.77	8.85	11.79	29.88	.000	−.67	−1.24	−.53
SDQ (sibling)**	4.92	9.62	10.55	39.54	.000	−1.03	−1.14	−.17
CHOP-SES***	53.28	53.82	48.54	11.75	.000	−.10	.67	.76
MOS-SSS**	90.47	83.86	78.54	15.74	.000	.44	.77	.29
BSMSS	41.50	39.18	36.50	2.64	.073	.17	.34	.18
DT**	5.28	7.05	7.82	31.74	.000	−.76	−1.08	−.36

*All post hoc comparisons significant at $p < .05$ Universal versus Targeted, Universal versus Clinical, Targeted versus Clinical.

**Post hoc comparisons significant at $p < .05$ for Universal versus Targeted, Universal versus Clinical. Not significant for Targeted versus Clinical.

***Post hoc comparisons significant at $p < .05$ for Universal versus Clinical, Targeted versus Clinical. Not significant for Universal versus Targeted.

BSMSS = Barratt Simplified Measure of Socioeconomic Status; CHOP-SES = Children's Hospital of Philadelphia-Self Efficacy Scale; DT = Distress Thermometer; FAD-GF = the McMaster Family Assessment Device–General Functioning Subscale; MOS-SSS = the Medical Outcomes Study Social Support Survey; SDQ = the Strengths and Difficulties Questionnaire; PAT = Psychosocial Assessment Tool; PPPHM = Pediatric Preventative Psychosocial Risk Model.

Problems, Family Beliefs) were less internally consistent, perhaps because they assess broader concepts and are less likely to adhere to a narrow singular construct of family functioning and social support. In a brief screener that covers a broad range of content, construct validation is critical. The PAT demonstrated significant associations with all the validation measures, indicating that the total score on the PAT reflects multiple components of family psychosocial risk. Each of the subscales was also significantly correlated with its chosen validation measure, establishing convergent validity. Discriminant validity was evident in that subscales did not correlate with theoretically unrelated measures. The ability of the PAT to identify clinical cases on the PCL-6 and the SDQ-C was strong. While the specificity for the DT was strong, the sensitivity was not. The PAT is intended to measure diverse aspects of family risk rather than the individual and more unidimensional construct of distress used in the DT. In sum, these analyses highlight the strength of the PAT validation, using rigorous methods, and its ability to assess important and diverse aspects of the social ecology.

The trilevel structure of the PPPHM is essential to its ability to readily identify families at different tiers of risk and use in delivering clinical care matched to the needs of families. The distribution of risk across the three levels of the PPPHM in this study is highly consistent with other samples (Kazak, Abrams et al., 2015). The Universal level is the largest, with close to two thirds of families falling into this classification. Those families at elevated risk are smaller in number,

with about one third at the Targeted level (indicating some degree of already apparent risk) and 10% or less falling in the Clinical range. Importantly, scores on validating measures clearly differentiated among the three levels of the PPPHM based on PAT scores, confirming their clinical utility. Finally, the PAT demonstrated specificity to detect clinical scores in terms of parent distress and child (patient) behavior.

Although the PAT is used broadly and can help meet the assessment standard, rigorous evaluation of how screening with the PAT changes clinical care is an important future goal. Indeed, with a third-generation measure and evidence of consistently strong psychometric properties, an important next step is to implement the PAT in clinical practice more broadly. The PAT provides a potential answer to the important challenge of identifying psychosocial risk in an effective and efficient manner so as to be able to develop treatment strategies matched to the PPPHM levels and families' needs. Multidisciplinary pediatric oncology providers report that screening is important in facilitating clinical care and in engaging families in the process (Kazak et al., 2017). Providing training to sites about use of the PAT and assuring the presence of champions for screening are key factors in implementation (Kazak et al., 2017).

Although this study addresses the PAT in pediatric cancer, several other disease groups have taken active steps to assure evidence-based psychosocial screening. There are published international guidelines for type I diabetes (Delamater, de Wit, McDarby, Malik, & Acerini, 2014), screening patients aged $\geq$12 years for anxiety and depression is a recommended part of care in cystic fibrosis (Quittner et al., 2016), and family assessment is recommended in neonatology (Hynan & Hall, 2015). Almost all of the items on the PAT are disease-neutral, making adaptation for other health conditions feasible. Validation studies in other samples, including other oncology-related groups (e.g., patients undergoing hematopoetic stem cell transplantation, those with brain tumors treated with surgery only) are important as are investigations of the utility of screening at various points in the course of illness and treatment and research on the value added of screening for clinical care.

Next steps in family risk assessment using the PAT include validation of the Spanish version. With PAT subscales related to socioeconomic considerations, this will allow for linking psychosocial risk assessment with key issues related to health-care access and equity. This revised version of the PAT is ready for use and can be administered online with automated scoring and communication of family risk information. It is unique in terms of providing an evidence-based screener that taps into issues across the social ecology and that can be used to meet the assessment standard (Kazak, Abrams et al., 2015). With an evidence-based tool, identification of barriers to screening will offer opportunities to investigate how screening can be conducted and integrated into testable clinical pathway models to assure that screening is translated into improved, efficient, and cost-effective care for children and families.

Supplementary Data

Supplementary data can be found at: http://www.jpepsy.oxfordjournals.org/.

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