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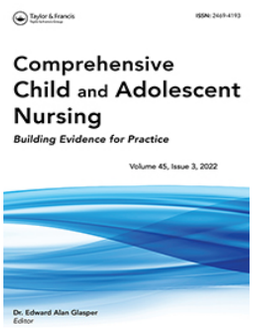

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Psychometric Properties of the Turkish Version of the Pain Flexibility Scale for Parents of Children with Cancer

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ABSTRACT

This study aimed to test the validity and reliability of the Pain Flexibility Scale for Turkish parents of children with cancer. The study was carried out on 240 parents of cancer-stricken children between November 2020 and April 2021. The results were tested with validity and reliability analyzers such as factor analysis, Cronbach's alpha, and item-total score analysis. The scale comprised 24 items including three sub-dimensions. The scales explained 56.93% of the total variance. In both exploratory and confirmatory factor tests, the overall factor loading was greater than 0.30. In the confirmatory factor analysis, all the goodness of fit indexes were greater than 0.91, and the root mean square error of approximation was less than 0.08. The Cronbach's alpha coefficient of the scale was 0.88, with Cronbach's alpha values ranging between 0.79 and 0.85 for the subscales. The Pain Flexibility Scale for Parents was found to be a valid and reliable scale for the Turkish population.

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KEYWORDS
Pain flexibility; psychometric properties; validity; reliability; cancer; parent

Introduction

Pain is one of the most frequently reported symptoms in children with cancer; it adversely affects their quality of life (Twycross et al., 2015). Pain is experienced as a consequence of the condition itself, side effects of cancer therapy, and/or surgical procedures (Linton & Shaw, 2011). Once the child is diagnosed with cancer, the role of parents is important both in the treatment period and symptom management. Parents have a significant role in the management of major symptoms like pain, nausea, vomiting, and neutropenia (Hedén et al., 2013; Pöder et al., 2010). Having a child under cancer treatment poses many psychosocial problems for parents. Parents' coping levels play an important role in this difficult situation, as it affects both the child and the parent. Parental problems and resilience affect the child's situation (Lautenbacher et al., 2010). Literature reports that the higher the parental acceptance and resilience, the lower is the distress experienced by the child. Parental resilience becomes especially important in the symptom management phase (McCracken & Gutiérrez-Martínez, 2011; Vowles et al., 2014). One of the most important of all symptoms is pain, and it has been found that pain triggers anxiety in children with cancer (Hedén et al., 2013) and anxiety increases the experience of pain (Cioffi et al., 2016). Literature states that psychological acceptance for pain is evident, especially in children with chronic pain (McCracken & Gutiérrez-Martínez, 2011; Vowles et al., 2014). One of the most important facets of psychological stability

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is recognition. The goal of acceptance and engagement counseling, in particular, is to assist individuals in integrating problems into their lives rather than resisting uncomfortable stimuli. This is achieved by increasing psychological resilience. Therapeutic acceptance of pain is described as "living with pain without responding, criticizing, or attempting to lessen or reduce it" (McCracken, 1998). This emphasizes active participation in significant life activities during pain, rather than putting life on hold and waiting for the pain to pass (Zeidan et al., 2010, 2011).

Developing and evaluating a tool that measures parental resilience for pain would contribute to both determining parental resilience as well as developing interventions to be implemented. Also, a tool to measure parental resilience is needed as it can affect the child's pain and coping strategies (Thorsell Cederberg, Dahl, Von Essen, & Ljungman, 2017; Thorsell Cederberg, Weineland Strandskov, Dahl, & Ljungman, 2017b). In Turkey, no tool has been reported to measure the endurance of parents whose children experience pain. Determining the parental acceptance of pain would shed more light on the intervention studies that must be carried out to explore this subject area (Thorsell Cederberg, Weineland Strandskov, Dahl, and Ljungman, 2017a). Therefore, the development of valid and reliable tools measuring parents' pain acceptance is important. Hence, this study was conducted to test the validity and reliability of the Pain Flexibility Scale for parents in Turkey, which was developed by Thorsell Cederberg, Weineland Strandskov, et al. (2017a).

Aim

This research aimed to test the validity and reliability of the Pain Flexibility Scale for Turkish parents of children with cancer.

Methods

Design and sampling

This methodological, descriptive, and correlational research investigated the validity and reliability of the Pain Flexibility Scale for Turkish parents of children with cancer.

This study was carried out between November 2020 and April 2021 on parents of children with cancer who were treated at a university hospital in the western part of the country. The literature recommends calculating the sample size to be at least over 100 and at least 5 per item, for factor analysis of scale validity and reliability studies (Çapık et al., 2018; Özdamar, 2015; Şencan, 2005). First, a total of 245 parents of children with cancer who were receiving therapy were invited. Five of them did not want to participate in the research, and a total of 240 parents volunteered to take part in the study. The data were collected from the parents in a private room.

The final study group comprised 240 parents of children who were under 18 years of age, parents of children who were treated in hematology-oncology units, those who volunteered to participate in the study and could read, write, and communicate in Turkish.

Data collection tools

The parent information form consisted of five questions that included information about the participants, such as the age and gender of the child and the parents and diagnosis of children.

Pain Flexibility Scale for parents

The Pain Resistance Scale for Parents was developed by Thorsell Cederberg and colleagues in 2017. It consists of 24 items and three sub-dimensions (Thorsell Cederberg, Weineland Strandskov, et al., 2017a). The sample of the original scale study consisted of parents of children aged 0–18 who were treated for cancer in Sweden. The original scale study involved 243 parents. The development process included three psychologists who were both theoretically and clinically familiar with the concept of acceptance. In the context of pediatric cancer pain, a sketch depicting different aspects of acceptance was created. The new scale was developed using the basic framework of the Swedish version of the Chronic Pain Acceptance Questionnaire (CPAQ) (Thorsell Cederberg, Weineland Strandskov, et al., 2017a; Pielech et al., 2017). There is no English version of the scale, and it has been recommended to study the validity and reliability of the English version (Thorsell Cederberg, Weineland Strandskov, et al., 2017a)

The scale has been designed to measure the pain acceptance of the parents of children with chronic pain. The pain resistance sub-dimension is characterized by resisting, avoiding, or trying to control the feelings of a child's pain. The valued actions' sub-dimension is characterized by the child continuing to do something while the parent worrying about the child's pain. The subdimension of the pain fusion is characterized by fusion, its judgments, and interpretations about the pain itself and how it affects the child. The scale for scoring was prepared according to the seventh Likert system. The answer is 0 = "I totally disagree (never true), 6 = " I completely agree (always correct). In the scale, 2,4,5,7,8,9,10,12,13,15,16,17,19,21,23 and 24 items were reverse coded. The higher the scale score, the higher was the acceptance level. The Cronbach alpha coefficient of the scale ranges from 0.81 to 0.93 (Cederberg, Strandskov et al., 2017).

The scale developers' permission was sought at the beginning of the study. Three language specialists translated the scale from English to Turkish. The Turkish type was sent to a linguist, who then translated it into English. The scale was given to seven different specialists, including nurses working in pediatrics, oncology, and psychiatry departments. The scale's final form was assessed by the experts. The selection validity index was used to assess the expert opinions depending on the products and size. After a good match among experts was obtained, the scale was piloted on 20 parents. Since the scale's comprehensibility was considered to be sufficient in the pilot, it was used in the study.

Statistical analysis

IBM SPSS Statistics 22.0 and IBM SPSS Amos 26.0 were used for data processing. The descriptive figures were calculated using percentages and mean ratings. The reliability analysis determined the internal accuracy of the scale and its subscales. The content validity index (CVI) and factor analysis were also used. EFA (exploratory factor analysis) assessed

the relationship between item and factor. A CFA (Confirmatory Factor Analysis) was conducted with a full estimate of the maximum likelihood using IBM SPSS Amos version 26.0. Cronbach's alpha coefficient was used to evaluate the internal accuracy of the scale and subscale. Pearson's correlation analysis was used to analyze the item–total score. Tukey's test and Hotelling's T-square test were also included in the statistical analysis. The margin of error was set at $p = .05$.

Ethical approval

An e-mail was sent to Jenny Thorsell Cederberg, the scale's creator, seeking permission to use the Pain Flexibility Scale for Parents. Institutional permissions were obtained prior to the study. The Ethics Committee of Non-Interventional Research gave their consent right away (5758-GOA-2020/27–07). The parents' verbal and written permission was also obtained.

Results

The study population comprised 80% (n = 192) female parents and 20% (n = 48) male parents. Among them, 36.3% were aged between 40–49 years. Among the children, 51.2% (n = 123) were males and 48.8% (n = 117) were females and 38.8% were aged between 7–12 years. Of all, 37.5% (n = 90) of the children were diagnosed with leukemia, 25% (n = 60) had central nervous system tumors, while 37.5% (n = 90) had other tumors (Ewing's sarcoma, osteosarcoma etc.)

The scale-level content validity index (S-CVI) was 0.95. The item–content validity index (I-CVI) ranged between 0.86 and 0.98.

The KMO coefficient was 0.913, while Bartlett's test X^2 value was 5754.398 ($p < .01$). The three subdimensions were pain resistance, valued action, and pain fusion, respectively. The explained total variance and factor loads of the scale and its sub-dimensions have been given in Table 1. The CFA results have been depicted in Table 2 and Figure 1.

Tukey's test was used to assess the scale's additivity; the scale was found to have additivity ($F = 0.187$; $p = .672$). Hotelling's T-square value was obtained to be 964.527, $F = 42.657$ ($p < .01$), and no reaction bias was found.

The Cronbach's alpha coefficient (α) of the entire scale was 0.88, and α of three sub-dimensions were 0.80, 0.79, and 0.85, respectively. The results of the split-half analysis have been given in Table 3, and the results of the items-scale total score correlation have been depicted in Table 4.

Discussion

The study found both I-CVI and S-CVI values to be greater than 0.80, which was in agreement with the literature (Polit et al., 2007; Terwee et al., 2007). The I-CVI and S-CVI results revealed expert consensus, the scale accurately assessed the subject, and material validity was assured.

The literature states that the KMO value should be at least 0.60, and Bartlett's sphericity test value should be statistically relevant when conducting factor analysis (DeVellis, 2012; Hayran & Hayran, 2011; Jonhson & Christensen, 2014; Terwee et al., 2007). The KMO value was greater than 0.60, and Barlett's sphericity test value was $p < .05$ in this analysis. Factor interpretation was possible due to the database and sample size (DeVellis, 2012; Hayran &

Table 1. Results of the exploratory factor analysis (n = 240).

	Sub-Scale		
Items	First Sub-dimension (Pain Resistance Sub Dimension)	Second Sub-dimension (Valued Action Sub-Dimension)	Third Sub-dimension (Pain Fusion Sub-Dimension)
1		0.707	
2			0.730
3			0.827
4			0.640
5	0.693		
6		0.769	
7			0.656
8	0.792		
9			0.393
10			0.661
11		0.598	
12	0.673		
13	0.424		
14		0.780	
15	0.672		
16	0.524		
17		0.725	
18		0.719	
19		0.840	
20		0.632	
21	0.693		
22		0.769	
23	0.656		
24	0.792		
Eigenvalue	8.706	2.892	2.067
Explained Variance (%)	36.277	12.049	8.611

Table 2. Model fit indices of the pain flexibility scale for parents.

	X^2	DF[a]	X^2/DF	RMSEA[b]	GFI[c]	CFI[d]	IFI[e]	RFI[f]	NFI[g]	TLI[h]
Three Factor Model	396.684	94	4.220	0.067	0.96	0.96	0.96	0.93	0.91	0.91

a: Degree of Freedom; b: Root Mean Square Error of Approximation; c: Goodness of Fit Index; d: Comparative Fit Index; e: Incremental Fit Index; f: Relative Fit Index; g: Normed Fit Index; h: Trucker-lewıs Index.

Hayran, 2011; Jonhson & Christensen, 2014; Terwee et al., 2007). The sample size and datasets used in this analysis were close to those used by the authors, Thorsell Cederberg, Weineland Strandskov, et al. (2017b), of the original scale (Thorsell Cederberg, Weineland Strandskov, et al., 2017a)

The three-factor scale illustrated 56.93% of the overall variation in this report. In multi-dimensional scales, the explained variance should be greater than 40% to obtain a better construct validity (Çam & Baysan Arabacı, 2010; Hayran & Hayran, 2011). The construct validity of the scale was shown by these findings.

The minimum factor load, in general, should be 0.30 or above; items with a minimum factor load below this value are excluded from the scale (DeVellis, 2012; Hayran & Hayran, 2011; Jonhson & Christensen, 2014; Terwee et al., 2007). The fact that all the sub-scales factor loadings were greater than 0.30 indicated that the scale had a high factor build in this analysis. The factor loadings of the scale items are 0.37–0.95 in the scale developed by Thorsell Cederberg, Weineland Strandskov, et al. (2017b). The factor loadings in the

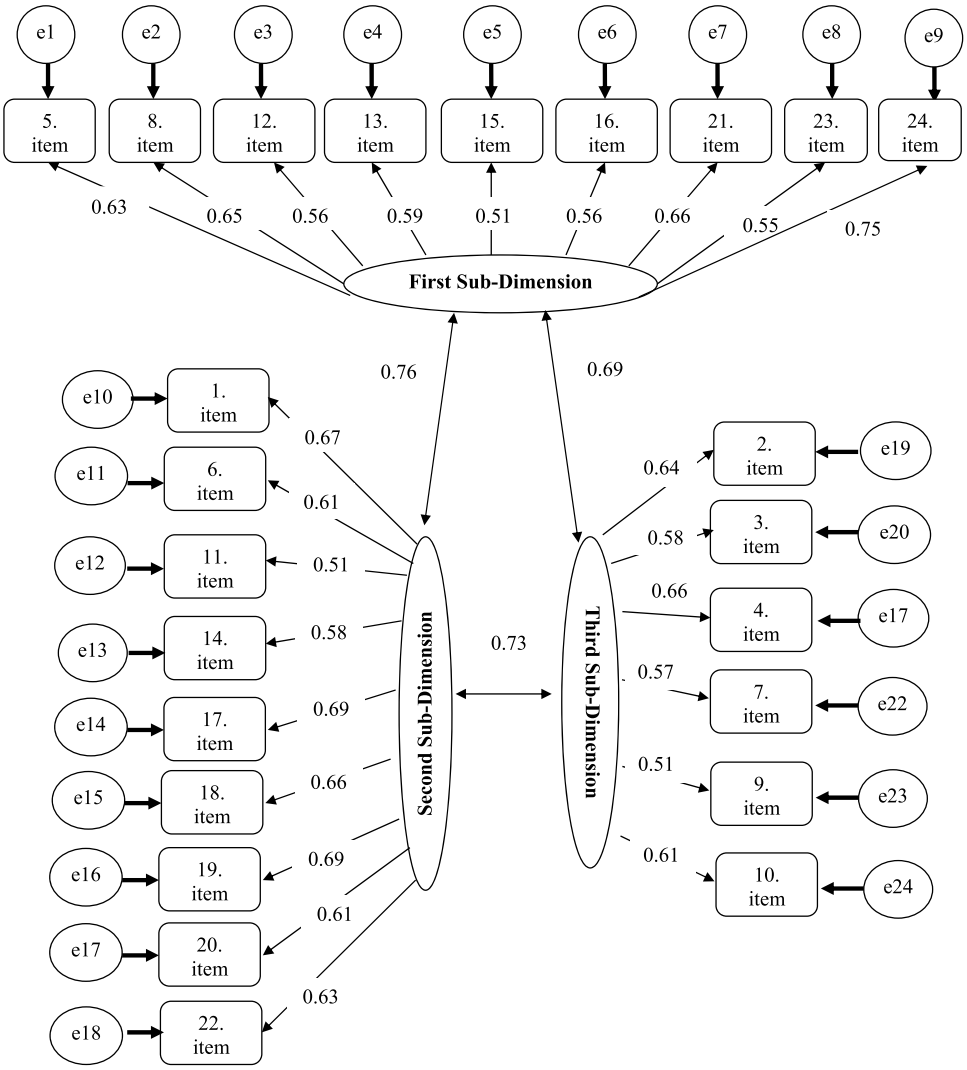

Figure 1. Confirmatory factor analysis of three factor model.

original scale were closest to the values obtained in this analysis (Thorsell Cederberg, Weineland Strandskov, et al., 2017a)

The CFA should examine the build obtained by the EFA (Hooper et al., 2008; Marsh et al., 2020). The proposed scale, unlike the initial scale, had three subscales. All the subscale component loadings were greater than 0.30, the goodness of fit indices was greater than 0.90, and the RMSEA was less than 0.080 in the three-factor CFA. As the confirmatory factor analysis results were not presented in the study by Thorsell Cederberg, Weineland Strandskov, et al. (2017b), the comparison could not be made (Thorsell Cederberg, Weineland Strandskov, et al., 2017a)

The Cronbach's alpha coefficient should be as near to one as possible. The scale is highly reliable if it has a value between 0.80 and 1.00 (DeVellis, 2012; Nunnally & Bernstein, 2010). In the present study, the overall and subscale Cronbach's alpha values were found to be

Table 3. Results of the reliability analysis of the scale and sub-dimensions (n = 240).

Sub-dimensions	Cronbach α	First half of Cronbach α	Second half of Cronbach α	Spearman-Brown	Guttman split-half	Correlation between two halves	M ± SD (Min-Max)
Scale Total	0.889	0.841	0.840	0.965	0.965	0.933	95.27 ± 14.99 (0–144)
First Sub-dimension	0.804						36.71 ± 6.14 (0–54)
Second Sub-dimension	0.799						35.63 ± 6.05 (0–54)
Third Sub-dimension	0.851						22.92 ± 4.13 (0–36)

Table 4. Correlation of the item–total score and sub-dimension total score (n = 240).

Items	X ± SD	Item-Total Score Correlation *(r)**	Item-Subscale Total Score Correlation *(r)**
1. Even if it is difficult for me to see my child in pain I know that I can handle it.	4.00 ± 1.01	0.65	0.75
2. I refuse to allow my child to be in pain.	4.26 ± 0.97	0.68	0.67
3. Sometimes it feels ok for me when my child is in pain.	3.38 ± 1.14	0.57	0.64
4. My child should never have to experience pain.	3.80 ± 1.08	0.63	0.61
5. I need to focus on getting rid of the worry over my child's pain.	4.17 ± 0.97	0.63	0.74
6. There are many things I can do simultaneously while worrying over my child being in pain.	3.97 ± 0.93	0.61	0.68
7. My child being in pain makes me worried.	4.00 ± 1.02	0.56	0.56
8. I need to control my worry over my child's pain.	3.85 ± 1.05	0.76	0.71
9. Worrying over my child's pain is always difficult for me.	4.06 ± 1.15	0.43	0.59
10. I am very affected by my child being in pain.	3.40 ± 1.16	0.59	0.73
11. Even though it is difficult to see my child in pain I have learned that I can actually handle it.	4.01 ± 1.10	0.51	0.54
12. I am afraid of my child's pain.	3.91 ± 1.06	0.54	0.62
13. I have to struggle to do things when my child is in pain.	4.49 ± 0.94	0.50	0.62
14. I can focus on other things even while I am worried about my child being in pain.	4.20 ± 1.09	0.57	0.61
15. My child's pain always feels like a threat to me.	4.23 ± 1.01	0.47	0.51
16. Seeing my child in pain is too difficult for me.	4.00 ± 1.26	0.52	0.66
17. My child's pain needs to pass before I can focus on anything else.	4.01 ± 1.00	0.67	0.71
18. I continue doing things even when I am worried about my child being in pain.	4.25 ± 0.98	0.66	0.70
19. When my child is experiencing pain, I can do nothing else.	3.39 ± 1.13	0.58	0.55
20. I feel that I can cope with my worry.	3.80 ± 1.08	0.61	0.66
21. I can't think about anything else when my child is in pain.	4.17 ± 0.97	0.63	0.74
22. I continue to do things that are important to me even while I am worried about my child being in pain.	3.97 ± 0.93	0.61	0.68
23. If I try to feel what I really actually feel, it is more difficult.	4.00 ± 1.02	0.56	0.58
24. I do things to flee from my worry over my child's pain.	3.85 ± 1.05	0.76	0.71

* $p<0.001$

greater than 0.70 and its subscales were highly reliable. In the study by Thorsell Cederberg, Weineland Strandskov, et al. (2017b), the total Cronbach's alpha values of the scale were greater than 0.70 (Thorsell Cederberg, Weineland Strandskov, et al., 2017a). Thus, the scale used in this analysis is identical to the original one and has a high level of internal accuracy.

The split-half analysis results were found to be greater than 0.70, indicating a clear and important association between the halves (Nunnally & Bernstein, 2010). While these findings demonstrated the scale's strong internal validity, they could not be compared to those of the initial report since a split-half test was not performed.

Item–total score review explains the relationship between the scores derived from each section of the measure and the overall score of the scale. It is a metric for determining whether or not the products on a scale corresponding to the target level of quality. This value must be greater than 0.20, positive, and as close to 1 as possible (DeVellis, 2012; Jonhson & Christensen, 2014; Şencan, 2005). The correlation coefficients between item-total score and item-subscale total score were both positive and greater than 0.20. The findings of this report could not be compared to those of the original study by Thorsell Cederberg, Weineland Strandskov, et al. (2017b) as the item–total score was not analyzed in the original study (Thorsell Cederberg, Weineland Strandskov, et al., 2017a). Furthermore, these results showed that the analysis was internally consistent.

Limitations

A limitation of this study is that the study data was collected during the Covid-19 situation. The fact that it was carried out in a single center and the collection of data during the Covid-19 period resulted in a prolonged data collection process.

Conclusion

The Pain Flexibility Scale for Parents was found to be a valid and reliable measuring instrument in Turkey. Professionals may use this test to assess pain tolerance among Turkish parents of children with cancer. It may also be used for cross-cultural comparison research.

The findings of this study are consistent with those of the evaluation of the scale's original edition. The Pain Flexibility Scale for Parents is a useful and effective tool for assessing the pain flexibility of Turkish parents of cancer-affected children. Both healthcare professionals and their parents play important roles in managing the pain of children with cancer. Parents' flexibility to withstand the pain their children experience is important for managing the pain symptom. It is thought that a multidisciplinary study (pediatric nurse, psychiatric nurse, pediatrician, psychiatrists, etc.) is necessary to determine the pain flexibility of parents and to improve the coping levels of parents with low pain resistance. For this reason, it is thought that the pain resistance scale of the parents will be useful in the practice of nursing, which is a professional job in itself.

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Conflicts of interests

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Contributors' statement

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