RESEARCH ARTICLE

Reliability and Validity of Turkish Versions of the Child, Parent and Staff Cancer Fatigue Scales

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Abstract

This study was designed to adapt the Turkish versions of scales to evaluate fatigue in children with cancer from the perspectives of the children, parents and staff. The objective of this study was to validate "Child Fatigue Scale-24 hours" (CFS-24 hours), "Parent Fatigue Scale-24 hours" (PFS-24 hours) and "Staff Fatigue Scale-24 hours" (SFS-24 hours) for use in Turkish clinical research settings. Translation of the scales into Turkish and validity and reliability tests were performed. The validity of the translated scales was assessed with language validity and content validity. The reliability of the translated scales was assessed with internal consistency. The scales were evaluated by considering the following: calculation of the Cronbach alpha coefficient for parallel form reliability with 52 pediatric cancer patients, 86 parents and 43 nurses. The internal consistency was estimated as 0.88 for the Child Fatigue Scale-24 hours, 0.77 for the Parent Fatigue Scale-24 hours, and 0.72 for the Staff Fatigue Scale-24 hours (Cronbach's α). The Turkish version of the Child Fatigue Scale -24 hours, the Parent Fatigue Scale -24 hours and the Staff Fatigue Scale -24 hours were judged reliable and valid instruments to assess fatigue in children and showed good psychometric properties. These scales should assist in understanding to what extent initiatives can minimize or eliminate fatigue. Our scales are recommended for further studies and use in pediatric oncology clinics as routine measurements and nursing initiatives should be planned accordingly.

Keywords: Fatigue scale - cancer - child - parent - staff - validity-reliability

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Introduction

For the last two decades, new approaches have been adapted like increasing the chemotherapy doses and/or using various combinations of chemotherapy drugs in order to generate a more enhanced response in pediatric cancers, which, eventually, was reported to prolong survival for 5 years. However, using chemotherapy drugs in higher doses caused children to experience multiple symptoms or symptom related problems (Hedström et al., 2005). One of such symptoms is fatigue defined by the National Comprehensive Cancer Network as "a distressing persistent, subjective sense of physical, emotional and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning" (Mock, 2000). As a cancer related symptom, fatigue has often been focused in a number of studies from a variety of perspectives and several scales have been consequently developed to identify the symptom in detail and adapted into different languages (Cleeland et al., 2000; Radbruch et al., 2003; Wang et al., 2004; Lin et al., 2006; Shun et al., 2006; Wu et al., 2006). Neverthless, it is worth noting that the studies on fatigue in pediatric populations still remain insufficient and based on one group (Hinds et al., 1999a: 1999b; Hinds and Hockenberry, 2001; Hockenberry et al., 1998: 1999).

Verbal and cognitive capacities of children are rarely potentially adequate to allow them to express themselves. It might be possible to gain insight into their experiences about the disease and the treatment procedures by interviewing their parents and staffs. Hedström et al. (2003) conducted a study on the causes of stress in children and adolescents with cancer and found two main categories, physical and emotional. It was further observed that stress related factors might vary in different age groups depending on the perceptions of children/adolescents with cancer, parents and nurses. It is of utmost importance that perception based symptoms be reported by different observers. People may prioritize certain qualifications in defining wellness due to their physical, social, psychological and personal characteristics and hence experience the disease in different ways, which accentuates the significance of meticulous evaluation of objective and subjective fields. Objective evaluation includes the potential of children and adolescents, their life conditions, the environmental and educational functionality, and their social relations while subjective evaluation refers to the physical, emotional and social functionality of children. Some researchers argue that subjective evaluation bears much significance as it reflects the self-perception. On the other hand, it has often been proposed that parent scales prove to be more dependable because of the age of children (Memik et al., 2007). It is therefore concluded that both subjective and objective

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evaluation would provide the most precise data in the assessment of fatigue as a perception based symptom in children and adolescents. An analysis of the pediatric oncology literature illustrated that the cancer related fatigue has been evaluated not only by children with cancer but also by their parents and staffs (Hockenberry et al., 1998: 2003; Hinds et al., 1999b; Hinds & Hockenberry-Eaton 2001; Braud et al., 2003; Gibson et al., 2005: 2006; Ekti and Conk, 2008; Yeh et al., 2008; Perdikaris et al., 2009). Children and their parents may be adversely influenced when the symptoms can't be managed effectively during the long and painstaking cancer treatment which may lead to disintegrity and dysfunctionality in the family, the deterioriation of the quality of life, loss of energy, and increasing care burden and despair (Woodgate and Degner, 2004). The management of cancer treatment requires the cooperation of children, parents and staffs to ascertain the symptoms in children and an effective management will definitely smooth the progress of the return to normality for children (Miaskowski, 2006). The management of chemotherapy related symptoms calls for an active involvement of the staff as well as the parents. Developing an insight into the factors that influence the frequency and intensity of postchemotherapy symptoms will inspire the future nursing initiatives and enhance the quality of life of the patients by minimizing and eliminating the symptoms. A scale that enables children with cancer, their parents and staffs to evaluate fatique hasn't been developed in Turkey so far and the lack of a reliable and valid scale to measure cancer related fatigue in children prevents clinicians from properly identifying the symptom and assessing the problem (Yilmaz et al., 2010).

The effective diagnosis and treatment of fatigue not only enhances patients' quality of life, but it also improves the quality of care that staffs are able to provide. It is thought that to prevent fatigue from having a negative impact on children, all the factors contributing to their fatigue should be identified, then the signs of fatigue should be recognized, and finally, effective interventions should be planned to relieve their symptoms of fatigue. The lack of availability of scales that can be used to assess fatigue makes it difficult for clinicians and researchers to accurately assess and describe this symptom in pediatric oncology patients in Turkey. This study will facilitate the development of valid and reliable scales for evaluating cancer related fatigue in children by themselves, parents and staffs in Turkey so that fatigue can be routinely defined and diagnosed at early stages to allow the implementation of nursing initiatives. The goal of the study was to assess reliability and validity of Turkish versions of the Child Fatigue Scale-24 Hours, Parent Fatigue Scale-24 Hours and Staff Fatigue Scale-24 Hours.

Materials and Methods

Participants and settings

A cross-sectional design study was conducted with the pediatric cancer patients, their parents and nurses from clinics and polyclinics of 3 pediatric oncology hospitals (Ege University Hospital, Behçet Uz Children's State Hospital, and Tepecik State Hospital) located in Izmir, Turkey, between March and July 2010.

To assess the validity and reliability of CFS-24 hours, 7-12 year old pediatric cancer patients (n: 52) were included in the study. The inclusion criterias in the study were as follows: the children must be between 7-12 years old, inpatient, diagnosed with cancer, hospitalized and received chemotherapy treatment for a week, able to read and understand Turkish, they must consent to participate in the study and they must not be in the terminal stages of the disease.The participants mustn't be suffering from a chronic or neuromuscular disease apart from cancer and they mustn't be diagnosed with depression and have any sight or hearing problems or loss of cognitive function. Parents of pediatric cancer patients (n: 86) were included in the study to assess the validity and reliability of PFS-24 hours. The inclusion criterias for the study were taking the responsibility of the child's primary care, consenting to participate in the study and having no sight or hearing problems.

Oncology/hematology nurses of pediatric cancer patients (n: 43) were included in the study to assess the validity and reliability of SFS-24 hours. The criteria for nurses were taking part in the primary care of a child with cancer aged 7-12 and consenting to participate in the study. Written permission was obtained from Pamela Hinds to adapt the scales into Turkish and to use the instrument in this study. Written consent was granted from the Board of Ethics at Ege University Faculty of Nursing. Verbal consent was obtained from the pediatric cancer patients, their parents and nurses.

Instruments

The child identification profile. It was completed by the researcher and contained items such as age, gender, diagnosis, duration after the diagnosis, receiving corticosteroid/radiotherapy/surgery treatment which were used to characterize the samples.

The scales used in this sudy developed by Hockenberry et al. (2003). Before they developed week forms that "The Fatigue Scale-Child for 7 to 12-Year-Olds, The Fatigue Scale: Parent Version and The Fatigue Scale: Staff Version". These scales regards child's, parent's and staff's perception of the child's fatigue during the past week. Then they revised these scales and composed 24 hours forms that "CFS-24 hours, PFS-24 hours and SFS-24 hours" (Hockenberry et al., 2003; Hinds et al., 2007a: 2007b).

The CFS-24 hours. This self-report, one-part instrument consists of 10 items that provide an overall fatigue intensity score for 7 to 12 year olds. Each item is measured with a five point Likert-type scale. Intensity ratings range from 10 (no fatigue) to 50 (high fatigue). Higher scores correspond to greater amounts of fatigue. The CFS-24 hours requires 5-7 minutes to complete. Cronbach's alpha ranged from 0.64 to 0.72 (Hinds et al., 2007b).

In order to test the parallel-forms reliability of the CFS-24 hours, The Fatigue Scale-Child for 7 to 12-Year-Olds-week was used.

The Fatigue Scale-Child for 7 to 12-Year-Olds-week.

This scale was developed by Hockenberry et al. (2003) and consists of 14 items regarding parents' perceptions of their child's fatigue intensity on a 5-point Likert-type scale. Intensity ratings range from 14 (no fatigue) to 70 (high fatigue), and completion times ranged from 6-8 minutes (Hockenberry et al., 2003). Validity and reliability of the instrument in Turkish have already been performed by Ekti and Conk (2008).

The parent identification profile. It was completed by the researcher and contained demographic items such as mother's age, business, financial situation, number of children.

The PFS-24 hours. It is a 17-item instrument that measures the parents' perception of their child's fatigue intensity on a five-point Likert-type scale. Intensity scores range from 17 (no fatigue) to 85 (high fatigue), and completion times ranged from in 6-8 minutes. Cronbach's alpha for the PFS-24 hours ranged from 0.78 to 0.90 (Hinds et al., 2007b).

In order to test the parallel-forms reliability of the PFS-24 hours, The Fatigue Scale: Parent Version-week was used. The PFS-24 hours was the same with the first part of Fatigue Scale: Parent Version-week (Ekti and Conk, 2008).

The Fatigue Scale: Parent Version-week. This scale is a 17-item instrument that measures the parents' perception of their child's fatigue intensity on a five-point Likert-type scale. Intensity scores range from 17 (no fatigue) to 85 (high fatigue) (Hockenberry et al., 2003). Validity and reliability of the instrument in Turkish have already been performed by Ekti and Conk (2008).

The nurse identification profile. It was completed by the researcher and contained demographic items such as age, marital status, education, period of working oncology/hematology unit.

The SFS-24 hours. It is a 9-item instrument that measures the staff's perceptions of the patient's fatigue intensity during the past 24 hours. Intensity ratings are on a four-point Likert-type scale, range from 9 (no fatigue) to 36 (high fatigue), with higher scores indicating more intense fatigue symptoms. The SFS-24 hours was the same with The Fatigue Scale: Staff Version. Cronbach's alpha of the SFS-24 hours ranged from 0.86 to 0.95 (Hockenberry et al., 2003).

Procedures

The number of items in the scales was taken into consideration when determining the appropriate sample size for the study (Tavşancil, 2002). The goal for the study sample was based on having three to five subjects for each item in the instruments; this set the sample size at 52 pediatric cancer patients, 86 pediatric cancer patients' parents, and 43 oncology/hematology nurses. Children meeting the study criteria were identified by examining the files in the pediatric oncology/hematology clinics at the hospitals. Children and parents were informed verbally and in writing about the study, the procedure was explained and they were asked for their consent to participate in the study. Because it was thought that the parents and children may have an influence on each other, the researchers filled in the scale forms using a face to face interview technique, with children separated from parents for which a quiet and relaxed environment was already ensured.

The pediatric cancer patients' files were referred to when obtaining information for the child identification form on diagnosis, diagnostic period, corticosteroid-radiotherapy-surgery treatment. As the scale evaluates the child's last 24 hours, the CFS-24 hours and the PFS-24 hours were completed by the child and the parent respectively at 16.00 p.m. due to the end of treatment. Then "The Fatigue Scale-Child for 7 to 12-Year-Olds and The Fatigue Scale: Parent Version" were completed by the child and parent. The SFS-24 hours was completed by nurses at the end of their shifts at 16.00 p.m. As nurses evaluate the fatigue among children with cancer aged 7-12, the nurses' task lists were examined and the SFS-24 hours was applied to a different nurse for each child. Polyclinic nurses were excluded from the study on the grounds that they had insufficient contact with the children. The researchers checked for missing data. The data collection instrument took 5 minutes to complete for children, parents and nurses.

Statistical Analysis

Statistical analysis was performed using Statistical Package for Social Sciences 16.00 packet program and statistical significance was regarded as a level of $p<0.05$. Descriptive statistics were used to describe the socio-demographic characteristics of the sample. Translation and retranslation were performed for language validity. For the content validity, the interclass correlation coefficient, Kendall's coefficient of concordance for content rating and the content validity index were calculated. Reliability was assessed using the Cronbach alpha coefficient, and inter-item correlation, the correlation between the two halves, two equal halves Spearman Brown reliability coefficient, Guttman Split-Half reliability coefficient calculations and the parallel form reliability method.

The language equivalence and content validity analyses having been performed for the CFS-24 hours and the SFS-24 hours, these analyses were not done for the PFS-24 hours. The developers of the original scale were consulted. In consultation with the scale's developers the language equivalence and content validity was not done for the PFS-24 hours, due to the fact that the items in the PFS-24 hours are the same as those of the Fatigue Scale: Parent Version-week, for which the Turkish validity and reliability have already been performed in our country by Ekti and Conk (2008).

This study particularly focused on the correlation between the scales designed for the children, the parent and the nurse to evaluate the cancer related fatigue in the same patient.

Results

Socio-demographic characteristics

Demographic characteristics of patients, parents and nurses are presented in Table 1. The average age of 52 children was 9.67±1.89, 51.9% were male, 44.2% of children were receiving corticosteroid treatment, 21.2%

radiotherapy and 25% surgery, 59.6% had been diagnosed with leukemia, 11.5% with lymphoma, and 28.9% with other diseases (rhabdomiosarcorma, neuroblastoma, osteosarcoma, Ewing's sarcoma, medulloblastoma, pons glioma). With regard to the period after the diagnosis 7.7% had been ill less than 1 month, 26.9% between 1 to 3 months, 25.0% between 4 to 6 months and 40.4% longer than 6 months, while 67.3% were aware of their illness. Mothers of the patients were the primary care givers for all of the 86 pediatric cancer patients. It was established that the average age of the mothers was 35.61±7.02 and that 77.9% were housewives, 51.2% of the mothers described themselves being in a difficult financial situation. It was also found that, including the children with cancer, 14.0% the mothers had 1 child, 46.5% of the mothers had 2 children, 22.1% had 3 children and 17.4% had 4 or more children. It was ascertained that the average age of the 43 nurses was 33.00±7.20, 53.5% were married and 46.5% were university graduates. The work profile of nurses showed that 34.8% of the nurses had worked in a oncology/hematology unit for less than 1 year, 23.6% for between 1 and 3 years, and 23.6% for more than 3 years.

Validity Test

Language and content validity for each scale were used.

Language Validity, as a first step in the research, the scale was translated into Turkish for the language equivalence of the CFS-24 hours and SFS-24 hours. Various methods were used in translating the CFS-24 hours and SFS-24 hours from English to Turkish to ensure content, semantic and technical equivalence. Semantic equivalence ensures that the meaning of each item remains the same after translation into the target language. A frequently recommended method for semantic equivalence is the blind back-translation method (Beck et al., 2003). In this method, the person who translates the instrument has not seen the original form of the items. In this study the process involved four stages. Step 1, five bilingual experts working in the field of pediatric oncology translated the scale independently from English to Turkish. Step 2, discrepancies between the iterations were discussed and reconciled into a single Turkish version. Step 3 Back translations from Turkish into English using blind back-translation procedures was completed by an expert who had not seen the original English version of the scales and who knew both languages, but whose native language was Turkish. Step 4, we sent the back- translated version to Hinds for review. No important differences in meaning were found.

Table 1. Socio-Demographic Characteristics of the Study Sample

ariables		Data
Children (N:52)		
Sex		N (%)
Male		27 (51.9%)
Age, mean years (SD)		9.67±1.89
Diagnosis:	Leukemia	31 (59.6%)
	Lymphoma	6 (11.5%)
	Other diagnosis	15 (28.9%)
The duration after the diagnosis:		
	< 1 month	4 (7.7%)
	1-3 month	14 (26.9 %)
	4-6 month	13 (25.0 %)
	> 6 month	21 (40.4%)
Corticosteroid treatment		23 (44.2%)
Radiotherapy treatment		11 (21.2%)
Surgery treatment		13 (25.0%)
Mother (N:86)		
Age, mean years (SD)		35.61±7.02
Occupation (housewives)		67 (77.9%)
Financial situation (bad)		44 (51.2%)
Number of Children (including the children with cancer) (of the mothers had 2 children)		40 (46.5%)
Nurse (N:43)		
Age, mean years (SD)		33.00±7.20
Marital status (were married)		23 (53.5%)
Educational level (were university graduates)		20 (46.5%)
Time for working in the oncology/hematology unit (less than 1 year)		15 (34.8%)

Content Validity, content appropriateness was established by determining whether the content of each item of the instrument is relevant to the target culture. In order to evaluate the scales in terms of content validity, the scales were given to 10 academics working in the fields of pediatrics and oncology to assess the each item on a scale of 1 to 4 points. The Content Validity Index (CVI) was used to assess the opinions offered by these experts using the Davies technique. In accordance with this technique, every item in the instrument was evaluated by 10 academics, who chose one of the following four options for each item: a) appropriate, b) item should be reviewed, c) item should be profoundly reviewed, d) inappropriate. The Content Validity Index (CVI) for every item was obtained by dividing the total number by the number of professors who had chosen the (a) or (b) option for each particular item (Karasar, 2000). In accordance with the views expressed by the academics, the items requiring improvement were reviewed once again and the necessary changes were made. Following the assessment of the experts' evaluation points for the CFS-24 hours and SFS-24 hours with Kendall W analysis, the experts' points were not found to be statistically different (CFS-24 hours Kendall W= 0.155, p= 0.12; SFS-24 hours Kendall W= 0.138, p= 0.198) and there was agreement among the experts. The opinions of experts in the academic field were obtained to ensure the scale items were applicable and intelligible. At the same time, the points given by the experts to the scale's items were assessed using The Intraclass Correlation Technique and the intraclass correlation coefficient for the CFS-24 hours was found to be 0.82 and SFS-24 hours was found to be 0.94.

Pilot Study, purpose of pilot study was to test feasibility. To determine the clarity and precision of the items, a trial involving 10 children and 5 nurses was undertaken before the study began. It was confirmed that the items were clear and precise and that there was no need to change the items.

Reliability Test

Reliability is a basic property every measuring instrument should have and, moreover, it is the ability to conduct an error-free survey with an instrument. It is

this property that proves that the instrument collects data correctly and that it is replicable (Akgül, 1999; Erkuş, 2003). The item point averages of the CFS-24 hours vary between 2.96±1.13 (item 2) and 1.67±1.11 (item 9), while the item point averages of the PFS-24 hours vary between 3.31±1.42 (item 9) and 1.96±1.34 (item 4) and those of the SFS-24 hours are between 2.58± 0.98 (item 1) and 2.06± 0.98 (item 7).

Internal Consistency

Calculation of the Cronbach Alpha Coefficient, Two Half-Test Reliability and Item analysis were used to ascertain the internal consistency of the scales.

The reliability coefficient was determined by calculating correlations. By accumulating the scale items' points, the total scale point for every contributor was calculated. The total point average and standard deviation of the CFS-24 hours is 22.75±8.33, for the PFS-24 hours is 45.79±10.51 and for the SFS-24 hours is 20.81±4.82. The Cronbach Alpha coefficient for internal consistency was ascertained for the CFS-24 hours as 0.83; for the PFS-24 hours as 0.77 and for the SFS-24 hours as 0.72 (Table 2).

The correlation between the two half parts of the CFS-24 hours can be stated to be 0.68. The Cronbach Alpha Coefficient of the first half (5 items) was found to be 0.65 and for the second half the Cronbach Alpha Coefficient (5 items) it was found to be 0.78. The Spearman-Brown Coefficient (prophecy formula) and the Guttman Split-Half Coefficient were found to be 0.81 for each (Table 2).

The correlation between the two half parts of the PFS-24 hours is 0.60. The Cronbach Alpha Coefficient of the first half (9 items) was found to be 0.72 and for the second half the Cronbach Alpha Coefficient (8 items) it was found to be 0.52. The Spearman-Brown Coefficient and the Guttman Split-Half Coefficient were found to be 0.75 and 0.72 respectively (Table 2).

The correlation between the two half parts of the SFS-24 hours was determined to be 0.44. The Cronbach Alpha Coefficient of the first half (5 items) was found to be 0.64 and for the second half the Cronbach Alpha Coefficient (5 items) it was found to be 0.59. The Spearman-Brown Coefficient and the Guttman Split-Half Coefficient were found to be 0.61 (Table 2).

A correlation coefficient is calculated in order to ascertain to what extent the items of a measuring instrument are correlated to the entire scope of the instrument for the reliability analysis, and for the item analysis (used very often for the selection of items).

The correlation values of the CFS-24 hours were found to be between 0.29 and 0.69 when the scales' Item-Scale Total Correlations were examined. The correlation values of PFS-24 hours were found to be between -0.39 and 0.65, while the item-scale total correlations of items 9, 13 and 15 were found to be below 0.2. As the Cronbach Alpha value does not change in the event of revocation of these three items, this option was rejected. No items were taken removed from the scales. The item-scale total correlations of the SFS-24 hours were found between 0.09 and 0.56. The total correlation point of item 2nd is below 0.2. As the Cronbach Alpha value does not change in case of invalidation of this item, the item was not removed from the scale (Table 2).

Parallel Forms Reliability, parallel-forms reliability is gauged by comparing to different tests that were created using the same content. This is accomplished by creating a large pool of test items that measure the same quality and then randomly dividing the items into two separate tests. The two tests should then be administered to the same subjects at the same time (Karasar, 2000).

In order to test the parallel forms reliability of the CFS-24 hours, The Fatigue Scale-Child for 7 to 12-Year-Olds-week was used and to test the parallel-forms reliability of the PFS-24 hours, the first part of Fatigue Scale: Parent Version-week was used. A significant positive relation of an advanced level between the scales was ascertained (Table 3).

Correlation of CFS-24 hours, PFS-24 hours and

Table 2. Internal Consistency of CFS-24 Hours, PFS-24 Hours and SFS-24 Hours

	CFS-24hr	PFS-24hr	SFS-24hr
Number of participants	52	86	43
Number of item	10	17	9
Scale Average Mean (SD)	22.75±8.33	45.79±10.51	20.81±4.82
Cronbach Alpha coefficient	0.83	0.77	0.72
Alpha if item deleted (between)			
	0.80 (Item 1,6,7)	0.74 (Item 7,8)	0.67 (Item 5,7)
	-0.83 (Item 2)	-0.82 (Item 9)	-0.75 (Item 2)
Item-Scale Total Correlations (between)			
	0.29 (Item 2)	0.39 (Item 9)	0.09 (Item 2)
	-0.69 (Item 7)	-0.65 (Item 6)	-0.56 (Item 7)
The correlation between the two half parts			
	0.68	0.60	0.44
Guttman Split-Half Coefficient	0.81	0.72	0.61
Spearman-Brown Coefficient	0.81	0.75	0.61

Table 3. Correlation of the Scales for Parallel Form Reliability

	r	p
CFS-24 hours (n:52)	0.69	p= 0.000
The Fatigue Scale-Child for 7 to 12-Year-Olds-week (n:52)		p< 0.01
PFS-24 hours (n:86)	0.78	p= 0.000
The Fatigue Scale: Parent Version-week (n:86)		p< 0.01

Table 4. Correlation of the Scales (n: 43 child, parent, nurse)

		CFS-24hr	PFS-24hr	SFS-24hr
CFS-24hr	r	-	0.570**	0.138
	p	-	0.000	0.379
PFS-24hr	r	0.570**	-	0.097
	p	0.000	-	0.536
SFS-24hr	r	0.138	0.097	-
	p	0.379	0.536	-

* 'P<0.01

Table 5. Cronbach Alpha Values of The Scales

	CFS-24 hours	PFS-24 hours	SFS-24 hours
Hockenberry et al (2003)	-	-	0.86
Hinds et al (2007a)	0.64-0.72	0.78-0.90	0.86 0.95
Hinds et al (2007b)	0.72-0.81	0.91-0.92	-
Hinds et al (2010)	0.76	-	-
Yeh et al (2008)	-	0.61-0.87	-

SFS-24 hours, the fatigue symptom for the same patient was evaluated by the child, the parent and the nurse. As the study included 43 nurses, it mainly dealt with the correlation between the evaluations carried out by 43 children, parents and nurses. The results pointed out a strong positive correlation between the mean scores of CFS-24 hours and PFS-24 hours ($p<0.01$) while no such relation was reported between SFS-24 hours, CFS-24 hours and PFS-24 hours ($p> 0.05$) (Table 4).

Discussion

The first studies evaluating the cancer related pain in pediatric oncology patients were carried out by Ekti and Conk (2008) in Turkey and they adapted The Fatigue Scale-Child for 7 to 12-Year-Olds-week and The Fatigue Scale: Parent Version-week to Turkish. The scales whose validity and reliability were tested in our study were found to be appropriate for the routine clinical use in oncology units since it was short and succesfully provided data about the last 24 hours of patients.

Our study clearly permitted children, parents and nurses to evaluate the cancer related fatigue in children with the scales tested for validity and reliability. The correlation analysis between the scales illustrated a relation between CFS-24 hours and PFS-24 hours while it didn't suggest a similar relation between SFS-24 hours, CFS-24 hours and PFS-24 hours. It may imply that nurses assume different perceptions of fatigue in comparison to patients and parents. It was additionally reported in a recent study that factors causing stress may change in different age groups depending on the perceptions of children/adolescents with cancer, parents or nurses (Hedström et al., 2003).

Yeh et al. (2008) investigated the cancer related fatigue in pediatric oncology patients taking chemotherapy and noted that fatigue as reported by patients and parents may significantly vary in degree and that parents complained about fatique more than patients in the first days of chemotherapy. The relation between the chemotherapeutic agent and the cancer related fatique was found to be different in the self- reports of patients and parents. In compliance with relevant studies in literature, it is strongly recommended that these scales be evaluated not only by children themselves but also by their nurses and parents considering the stress levels and their age.

The linguistic validity was primarily tested in adapting the scales into Turkish with blind back translation. Having established the linguistic validity, an expert confirmed the availability and clarity of the items in the content validity. For the sake of an objective evaluation, the content was also assessed with Kendall's Coefficient of Concordance, which yielded parallel results with that of the expert. The Cronbach alpha coefficient of the scales was found to be 0.83 for CFS-24 hours, 0.77 for PFS-24 hours and 0.72 for SFS-24 hours. The Cronbach alpha coefficient for the internal consistency need be measured between -1 and +1 with a desired value of 0.70 (Tavşancıl, 2002). The results acknowledged that the scales were reliable and sufficiently homogenic. Relevant studies with the same scales similarly affirmed the Cronbach Alpha Coefficients found in our study (Hinds et al., 2007a: 2007b: 2010; Yeh et al., 2008) (Table 5).

The Fatigue Scale-Child for 7 to 12-Year-Olds-week included 3 subdimensions, loss of energy, altered sleeping patterns and mental changes while Fatigue Scale: Parent Version- week had 4 subdimensions, insufficient energy, insufficient function, altered sleeping patterns and mental changes. However, the originals of the 24 hour forms didn't contain any subdimensions (Hinds et al., 2007a: 2007b: 2010). The factor analysis carried out to determine the potential of any classifications illustrated that the items couldn't be categorized under certain subdimensions.

Studies with fatigue scales maintained that the mean scores significantly changed in pediatric cancer patients during the treatment procedures (Ream et al., 2006; Perdikaris et al., 2009). Hockenberry and Hooke (2007), for instance, reviewed the influences of pain, need of sleep and fatigue on children and adolescents with cancer and their physical performances and reported sleeping problems along with fatigue as stated by children, parents and staffs. Fatigue can be accompanied with other symptoms in pediatric oncology patients.

The limitations of this study included that the participants must be taking chemotherapy and they mustn't be in the terminal phase. As a result, the study sample only included the pediatric oncology patients internalized in the clinic, which suggested that the study results be handled conscientiously taking these limitations into consideration. As fatigue is a perception based and unsteady symptom, it wasn't possible to gauge test-retest reliability.

Consequently, the Turkish versions of CFS-24 hours, SFS-24 hours and PFS-24 hours were reaffirmed as valid and reliable in evaluating cancer related fatigue. These scales are considered to assist to understand to what extent initiatives can minimize or eliminate fatigue. Our scales are deliberately recommended in further studies and in pediatric oncology clinics as routine measurements and nursing initiatives should be planned accordingly.

References

Akgül A (1999). Tıbbi araştırmalarda istatistiksel analiz teknikleri. 1. Basım. Ankara: Yükseköğretim Kurulu Matbaası (in Turkish).

Beck CT, Bernal H, Froman RD (2003). Methods to document semantic equivalence of a translated scale. *Res Nurs Health*, **26**, 64-73.

Braud AC, Genre D, Leto C, et al (2003). Nurses' repeat measurement of chemotherapy symptoms. *Cancer Nurs*, **26**, 468-75.

Cleeland CS, Mendoza TR, Wang XS, et al (2000). Assessing symptom distress in cancer patients The M. D. Anderson Symptom Inventory. *Cancer*, **89**, 1634-46.

Ekti-Genc R, Conk Z (2008). Impact of effective nursing interventions to the fatigue syndrome in children who receive chemotherapy. *Cancer Nurs*, **31**, 312-7.

Erkuş A (2003). Psikometri üzerine yazılar. 1. Basım. Ankara: Türk Psikologlar Derneği Yayınları (in Turkish).

Gibson F, Garnett M, Richardson A, et al (2005). Heavy to carry: a survey of parents' and healthcare professionals' perceptions of cancer-related fatigue in children and young

people. *Cancer Nurs*, **28**, 27-35.
Gibson F, Edwards J, Sepion B, et al (2006). Cancer-related fatigue in children and young people: survey of healthcare professionals' knowledge and attitudes. *Eur J Oncol Nurs*, **10**, 311-6.
Hedstrom M, Haglund K, Skolin I, et al (2003). Distressing events for children and adolescents with cancer: child, parent and nurse perceptions. *J Pediatr Oncol Nurs*, **20**, 120-32.
Hedstrom M, Ljungman G, Essen L (2005). Perceptions of distress among adolescents recently diagnosed with cancer. *J Hematol Oncol*, **27**, 15-21.
Hinds PS, Hockenbery M, Gilger E, et al (1999a). Comparing patient, parent and staff descriptions of fatigue in pediatric oncology patients. *Cancer Nurs*, **22**, 277-89.
Hinds PS, Hockenberry-Eaton M, Quargnenti A, et al (1999b). Fatigue in 7- to 12-year-old patients with cancer from the staff perspective: an exploratory study. *Oncol Nurs Forum*, **26**, 37-45.
Hinds PS, Hockenberry-Eaton M (2001). Developing a research program on fatigue in children and adolescents diagnosed with cancer. *J Pediatr Oncol Nurs*, **18**, 3-12.
Hinds PS, Hockenberry M, Rai SN, et al (2007a). Clinical field testing of an enhanced-activity intervention in hospitalized children with cancer. *J Pain Symptom Manage*, **33**, 686-97.
Hinds PS, Hockenberry MJ, Gattuso JS, et al (2007b). Dexamethasone alters sleep and fatigue in pediatric patients with acute lymphoblastic leukemia. *Cancer*, **110**, 2321-30.
Hinds PS, Yang J, Gattuso JS et al (2010). Psychometric and clinical assessment of the 10-item reduced version of the fatigue scale-child instrument. *J Pain Symptom Manage*, **39**, 572-8.
Hockenberry-Eaton M, Hinds PS, Alcoser P, et al (1998). Fatigue in children and adolescents with cancer. *J Pediatr Oncol Nurs*, **15**, 172-82.
Hockenberry-Eaton M, Hinds P, Howard V, et al (1999). Developing a conceptual model for fatigue in children. *Euro J Oncol Nurs*, **3**, 5-11.
Hockenberry MJ, Hinds PS, Barrera P, et al (2003). Three instruments to assess fatigue in children with cancer: the child, parent and staff perspectives. *J Pain Symptom Manage*, **25**, 319-28.
Hockenberry M, Hooke MC (2007). Symptom clusters in children with cancer. *Semin Oncol Nurs*, **23**, 152-7.
Karasar N (2000). Bilimsel araştırma yöntemi. Ankara: Nobel Yayın Dağıtım Ltd. Sti (in Turkish).
Lin CC, Chang AP, Chen ML, et al (2006). Validation of The Taiwanese version of the brief fatigue inventory. *J Pain Symptom Manage*, **32**, 52-9.
Miaskowski C (2006). Symptom clusters: establishing the link between clinical practice and symptom management research. *Support Care Cancer*, **14**, 792-4.
Memik NÇ, Ağaoğlu B, Çoşkun A, et al (2007). The validity and reliability of the Turkish pediatric quality of life inventory for children 13-18 years old. *Turk Psikiyatri Derg*, **18**, 353-63.
Mock V, Atkinson A, Barsevick A, et al (2000). National comprehensive cancer network, NCCN practice guidelines for cancer-related fatigue. *Oncology (Williston Park)*, **14**, 151-61.
Perdikaris P, Merkouris A, Patiraki E, et al (2009). Evaluating cancer related fatigue during treatment according to children's, adolescents' and parents' perspectives in a sample of Greek young patients. *Eur J Oncol Nurs*, **13**, 399-408.
Radbruch L, Sabatowski R, Elsner F, et al (2003). Validation of the German version of the brief fatigue inventory. *J Pain Symptom Manage*, **25**, 449-58.
Ream E, Gibson F, Edwards J, et al (2006). Experince of fatigue in adolescents living with cancer. *Cancer Nurs*, **29**, 317-26.
Shun SC, Beck SL, Pett MA, et al (2006). Psychometric testing of three Chinese Fatigue Instruments in Taiwan. *J Pain Symptom Manage*, **32**, 155-67.
Tavşancıl E (2002). Tutumların Ölçülmesi ve SPSS İleri Veri Analizi. 1. Basım. Ankara: Nobel Basımevi (in Turkish).
Wang XS, Hao XS, Wang Y, et al (2004). Validation study of the Chinese version of the Brief Fatigue Inventory (BFI-C). *J Pain Symptom Manage*, **27**, 322-32.
Woodgate RL, Degner LF (2004). Cancer symptom transition periods of children and families. *J Adv Nurs*, **46**, 358-68.
Wu HS, Wyrwich KW, McSweeney M (2006). Assessing fatigue in persons with cancer: further validation of the wu cancer fatigue scale. *J Pain Symptom Manage*, **32**, 255-65.
Yeh CH, Chiang YC, Lin L, et al (2008). Clinical factors associated with fatigue over time in paediatric oncology patients receiving chemotherapy. *Br J Cancer*, **99**, 3-29.
Yilmaz HB, Taş F, Muslu GK, et al (2010). Health professionals' estimation of cancer-related fatigue in children. *J Pediatr Oncol Nurs*, **27**, 330-7.