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Psychometric Properties of the Turkish Version of the Memorial Symptom Assessment Scale in Children Aged 7–12 with Cancer

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ABSTRACT

The aim of study was to evaluate of the psychometric properties of the Turkish version of the Memorial Symptom Assessment Scale in children aged 7–12 with cancer. The 8-item scale is used to evaluate symptoms of pain, lethargy, sadness, nausea, itch, worry, lack of appetite, and insomnia experienced by pediatric oncology patients in the last two days. Each symptom is rated as "yes" or "no". Then, the frequency, severity and distress of symptoms are rated between 0 point and 3 points. The frequency is scored as "A very short time", "A medium amount" and "A lot". The severity is scored as "A little", "A medium amount" and "A lot". Distress of the symptoms is scored as "Not at all", "A little", "A medium amount" and "Very much". As the score obtained from the scale increases, it indicates that the negative effects of symptom on child increase. The sample consisted of 70 children. Internal consistency reliability (item-total correlations and Cronbach alpha coefficient), test-retest reliability, and validity (Kendall's coefficient of concordance and exploratory factor analysis) was used for psychometric testing. In exploratory factor analysis, Barlett's chi-square test was (X^2 =161.485; p = 0.000). Kendall's coefficient of concordance was found to be W= 0.75. The test-retest reliability of the scale was r =0.91, and the internal consistency Cronbach α value was 0.83. Correlations between all items were significantly higher (p <.01). According to the results, the Memorial Symptom Assessment Scale 7-12 is a valid and reliable tool for Turkish pediatric oncology patients.

Key Words: Cancer, children, reliability and validity, symptom.

1. INTRODUCTION

Childhood cancers are one of the leading causes of death of children today. Each year, 400,000 children are diagnosed with cancer in the world (1). Over 3000 cases are expected in the 0-14 age group every year in Türkiye. Current treatment approaches for cancer cure about 70% of childhood cancers (2).

The methods used in the treatment of pediatric oncology patients are surgery, radiotherapy, chemotherapy, and immunotherapy (3). Children with cancer experience a multitude of physical and psychological symptoms. Prevalent symptoms in children throughout diagnosis and cancer treatment processes include nausea, vomiting, loss of appetite, anemia, leukopenia, thrombocytopenia, hair loss, mucositis, anorexia, skin problems, insomnia, neurological problems, pain, weakness, and fatigue (4-7).

Throughout the treatment process, these symptoms remain a challenge for both children and nursing care (8).

The symptoms experienced by children with cancer can lead to more intense symptom experiences if they are not identified and treated (9). Untreated symptoms can cause significant psychosocial symptoms in children undergoing cancer treatment (10). Managing the symptoms is crucial to improving the child's quality of life (11). The first step in symptom management is effective assessment each symptom. But, standardized approaches to the

assessment of child-specific symptoms in clinics are lacking (7). In defining symptoms, the frequency, intensity and severity of each symptom should be evaluated multidimensionally (6, 12). There is a limited number of valid and reliable assessment scales in the world to evaluate developing symptoms specific to children undergoing cancer treatment (11-17). Similarly, in Türkiye, the tools for assessing the symptoms that may develop in children undergoing cancer treatment are quite limited (18). The 8-item Memorial Symptom Assessment Scale (MSAS) 7–12 (15) has facilitated the recruitment of younger children. There isn't any valid and reliable scale for symptom assessment for children aged 7-12 years in Türkiye. Therefore, the aim of this study is to adapt the MSAS 7-12 to Turkish culture and to analyze its psychometric properties for Turkish pediatric oncology patients.

2. MATERIALS AND METHODS

2.1. Study Design

This methodological descriptive study was planned to adapt MSAS 7-12 to Turkish culture and to analyze its psychometric properties for pediatric oncology patients.

2.2. The Sample

The sample consisted of 70 pediatric oncology patients whose ages ranged from 7 to 12 (M= 9.53± SD = 1.91). The mean time of first diagnosis of the children was 9.97±9.51 months, and 55.7% were male. The sample was taken from pediatric oncology patients at a university hospital. When adapting a scale to another culture, the sample size should be 3 -10 times larger than the number of items in the scale (19, 20). Approximately 8 times more samples were taken in this study (items = 8). Children aged 7-12 years diagnosed with cancer who could understand and complete the questionnaire were included in the study. Children in the terminal period were not included in the study.

2.3. Tools

2.3.1. The Personal Information Form

In accordance with the literature, a form prepared by the researchers consists of 10 questions (21-23). The first three questions include the child's sociodemographic characteristics, including age, gender, and educational status. The next 7 questions include the child's diagnosis, disease and treatment duration, the treatment protocol applied, the presence of physical special needs, the number of treatment courses, and the baseline myelosuppression level. Information on the sociodemographic characteristics of the child was obtained from the child himself, and information on the diagnosis, duration of the disease, and treatment were obtained from the child's hospital file.

2.3.2. The Memorial Symptom Assessment Scale 7–12

It is an 8-item scale adapted by Collins et al. (2002) from a form of children aged 10-18 for children aged 7-12. It is used to evaluate the symptoms of pain, lethargy, sadness, nausea, itch, worry, lack of appetite, and insomnia experienced by pediatric oncology patients in the last two days. Each symptom in MSAS 7-12 is rated as "yes" or "no". After that, the frequency, severity and distress of the symptoms are rated between 0 point and 3 points. The frequency is scored as "A very short time (1 point)", "A medium amount (2 points)" and "A lot (3 points)". The severity is scored as "A little (1 point)", "A medium amount (2 points)" and "A lot (3 points)". Distress of the symptoms is scored as "Not at all (0 point), "A little (1 point)", "A medium amount (2 points)" and "Very much (3 points)". As the score obtained from the scale increases, it indicates that the negative effects of the symptom on the child increase. The internal consistency reliability (Cronbach's alpha) of the MSAS 7-12 was reported to be 0.67 (15). The internal consistency reliability (Cronbach's alpha) of the Turkish version of the MSAS 7-12 for this study was 0.83.

2.4. Data Collection

The data collection process was conducted between February 2019 - March 2020 at the pediatric oncology service and polyclinic at a university hospital in Türkiye. The service has 42 beds and five nurses including the responsible nurse, four assistants, and a specialist doctor work during the

daytime. Four nurses, including a training nurse, two assistants, and a specialist doctor work in the polyclinic. In the polyclinic, there is a chemotherapy treatment room with a capacity of fifteen children in which outpatient chemotherapy treatment is applied to pediatric oncology patients. The researchers met each participant and his/her caregiver during their treatment at the pediatric oncology service and polyclinic. Children were informed about the aim and procedure of the study. And then, they were invited to participate in the research voluntarily. When children and their caregivers had any questions, they were answered by the researchers. Children and their caregivers were told that their personal data would be protected and the findings of the study would be used only for academic and scientific purposes. The time taken to complete the MSAS 7–12 was recorded. Each interview took approximately 10 minutes. Data were collected using the face-to-face interview method. Firstly, the questionnaire was administered to all the patients once. Then, test–retest reliability was evaluated by asking 36 patients who completed the MSAS 7–12 to complete again within three to seven days. Eligible patients were randomly selected to eliminate observer bias. All patients who needed help in completing the forms were given verbal response support by the researcher.

2.5. Procedure

Firstly, three linguists independently translated the scale into Turkish. Then, the Turkish translations of the scale were revised by the researchers. The scale was revised by a Turkish language expert and the Turkish version was then back-translated into English by another linguist.

In order to determine the content validity of a scale, the opinion of at least three experts should be sought (24-26). A total of twelve experts, including seven instructors from the Department of Pediatric Nursing, one instructor from the Department of Internal Medicine Nursing, two physicians from the Department of Pediatric Oncology and Hematology, and two specialist nurses from the Department of Pediatric Oncology and Hematology, were evaluate the scale. The original form of scale and the Turkish draft form were given to the experts and they were asked to rate the scale from 1 to 4 (1=not at all appropriate, 4=completely appropriate). Kendall Coefficient of Concordance (W) was used for evaluated the scores. According to the experts' opinions, the draft form of scale was revised and it was applied to 10 pediatric oncology patients who met the study sampling criteria. Since there was no negative feedback, it was decided to continue the study. The 10 pediatric oncology patients participating in the pilot study were not included in the study sample.

Test-retest measurements are one of the most frequently used reliability analyses that evaluate the invariance of the measurement tool. For test-retest analysis, the group should consist of at least 30 people, the time between the two tests should not be short enough to remember the answers given in the first application, and not long enough for the respondents to change significantly in terms of the feature measured by the scale (27). It is recommended that the duration be between 2-6 weeks on average (27). However, there is no definite range for the test-retest application period of symptom evaluation scales, and it is reported that the correlation is insignificant in the retests applied after one week. For this reason, in validity and reliability of symptom assessment scales, the application time for retesting is recommended as a minimum of two and a maximum of seven days (28, 29). In line with this, the scale was reapplied to 36 children three to seven days later for the test-retest analysis of the study and reliability and validity analyses of the scale were conducted with 70 children.

2.6. Statistical Analyses

The Statistical Package for Social Science (SPSS) 23.0 was used for data analysis. Percentages, means, standard deviations, and ranges for each item of the MSAS 7–12 were used in order to determine the frequency and variances. Data were normally distributed according to the Shapiro-Wilk test. Kendall W compliance analysis was performed after

the experts' opinions were received. Internal consistency was calculated for structural validity and corrected item-total correlation coefficients were calculated. The Kaiser-Meyer-Olkin (KMO) test was used to determine the sample size and the suitability of the correlation matrix for factor analysis. In addition, the Bartlett test was also performed to determine whether the correlation matrix is suitable for factor analysis. Explanatory factor analysis (EFA) was performed to evaluate the construct validity of the scale. The factor construct was determined by selecting items with eigenvalues ≥1. The significance level was taken as p = 0.000. Reliability study of the scale was evaluated by t test in dependent groups, Spearman correlation analysis and a paired-samples t test were used for determined the test-retest reliability coefficient of the scale (30). Cronbach alpha coefficient and an item-total score correlation analyses were used for the reliability analysis.

3. RESULTS

3.1. Demographic and Clinical Characteristics

According to Table 1, the mean children age was 9.53 + 1.91 years. Of all the participants, 55.7% (n = 39) were male, 67.1% (n = 47) were first-year of cancer diagnosis. In addition, average duration of treatment 9.94 + 9.49 months, and average duration of chemotherapy 24.37 + 18.75 days. Participant characteristics were summarized in Table 1.

3.2. Prevalence and Symptom Characteristics of Children with Cancer

According to Table 2, children with cancer experience multiple symptoms. Symptom prevalence in 48 hours before the completion of the questionnaire included lethargy (74.3%), lack of appetite (74.3%), sadness (72.9%), itch (70.0%), insomnia (68.6%), worry (67.1%), pain (65.7%), and nausea (64.3%).

Table 1. Demographic and clinical characteristics of the participants (*n* = 70)

	M±SD	**Range**
Age (year)	9.53±1.91	7-12
Duration of the illness (month)	9.97±9.51	1-45
Duration of the treatment (month)	9.94±9.49	1-45
Duration of receiving chemotherapy (day)	24.37±18.75	3-90
Treatment day	12.14±12.85	1-56
	n	**%**
Sex		
Female	31	44.3
Male	39	55.7
Type of cancer		
Leukemia	47	67.1
Bone cancer	1	1.4
Lymphoma	7	10.0
Neuroblastoma	4	5.7
Brain tumor	1	1.4
Sarcoma arising from soft tissue	10	14.3
Other cancer types	47	67.1
Number of chemotherapy courses		
First	11	15.7
Second	13	18.6
Third	10	14.3
Fourth	10	14.3
Fifth-tenth	24	34.3
Over tenth	2	2.8

Note. M= Mean; SD = Standard deviation; *n* = sample size

Table 2. Prevalence and characteristics of symptoms of the participants

		Degree when symptom was present		
Symptom	Overall Prevalence *n* (%)	Intensity Medium Amount–A Lot *n* (%)	Frequency Medium Amount–Almost All the Time *n* (%)	Distress Medium Amount–Very Much *n* (%)
Lethargy	52 (74.3)	28 (40.0)	12 (17.1)	12 (17.1)
Lack of appetite	52 (74.3)	19 (27.1)	24 (34.3)	9 (12.9)
Sadness	51 (72.9)	25 (35.7)	24 (34.3)	2 (2.9)
Itch	49 (70.0)	26 (37.1)	16 (22.9)	7 (10.0)
Insomnia	48 (68.6)	28 (40.0)	12 (17.1)	12 (17.1)
Worry	47 (67.1)	17 (24.3)	30 (42.9)	.
Pain	46 (65.7)	14 (20.0)	19 (27.1)	13 (18.6)
Nausea	45 (64.3)	27 (38.6)	10 (14.3)	8 (11.4)

More than half the children who approved lethargy, insomnia, nausea and itch as a symptom rated their lethargy, insomnia, nausea and itch symptoms as a "medium amount" to "a lot". Sadness was less likely to be causes of high distress than pain, lethargy, and insomnia (Table 2).

3.3. Mean Scores of Children with Cancer on MSAS 7-12

According to Table 3, The mean score of children with cancer on the scale was 0.95±0.19. The children obtained the lowest mean score on the lethargy and lack of appetite items (0.90±0.30) and the highest mean score on the worry item (1.00±0.00) (Table 3).

3.4. Evaluation of Psychometric Properties

By using Kendall's coefficient of concordance analysis (W), the fit between the twelve experts' opinions was analyzed. It was found strong agreement according to Kendall's agreement coefficient among the experts who evaluated the scale (W=0.75, p=0.000). The results of the EFA showed that the Bartlett X2 was 161.485 (p= 0.000) and the KMO coefficient was 0.842.

According to Table 3, A positive and high item-total score correlation indicates that the items exemplify similar behaviors and the internal consistency of the test is high. The high correlation obtained for each item shows that the item is effective and sufficient in measuring the intended behavior. The acceptable coefficient be greater than 0.20-0.25 in item selection (31). The item-total score correlations of the scale was found to be between 0.44-0.64.

To determine the internal consistency of the scale, the Cronbach's alpha reliability coefficient was checked. The reliability of the scale increases as the

Table 3. The mean scores of the participants, the item total score correlations and Cronbach alpha coefficients of the Memorial symptom assessment scale 7-12 (*n*=70)

Items	**M±SD**	**Correlation**	**Cronbach alpha**
Lethargy	0.90±0.30	0.53	0.80
Sadness	0.94±0.23	0.63	0.82
Itch	0.94±0.23	0.49	0.82
Pain	0.96±0.20	0.44	0.81
Worry	1.00±0.00	0.50	0.81
Lack of appetite	0.90±0.30	0.57	0.80
Nausea	0.99±0.12	0.64	0.82
Insomnia	0.99±0.12	0.62	0.80
Mean	**0.95±0.19**	**Total Cronbach alpha**	**0.83**

Note. M= Mean; SD = Standard deviation; *n* = sample size

Table 4. Analysis of test - retest scores the Memorial symptom assessment scale 7-12 (*n* = 36)

Applications	**M±SD**	**r**	***p***	**t**
Test	7.43±1.10			
Retest	7.58±0.81			
Spearman's correlation analysis		0.913	0.000	
Paired-samples t test			0.032	-2.223

Note. M= Mean; SD = Standard deviation; n = sample size; *p* = *p* value, Acceptable level of significance was taken as $p < .01$

Cronbach's alpha coefficient approaches 1. If the Cronbach's alpha coefficient is between .80 and 1.00 means very high reliability; between .60 –.79 means high reliability; between .40–.59 means weak reliability, and less than .40 means the scale is unreliable (32). The Cronbach alpha reliability coefficient of the scale was found to be 0.83. The Cronbach's alpha value for symptom frequency of the scale was 0.72, the Cronbach alpha value for symptom severity was 0.62, and the Cronbach alpha value for distress of the symptom was 0.73. The Cronbach's alpha value for each item varies between 0.80 and 0.83 (Table 3).

In test-retest reliability, the test was re-administered to a randomly selected number of individuals from the same sample at two different times, and the correlation coefficient between both measurements was calculated (Table 4).

4. DISCUSSION

MSAS 7–12 is a specific instrument for the measurement of physical and psychological symptoms in young children with cancer. Previous self-report measures of symptoms for young children have measured only severity or distress of symptoms and not frequency (17, 33).

In this study, children completed MSAS 7-12 in a short time and easily. The results of the scale show that meaningful and consistent information can be obtained about children's symptom experiences.

A detailed assessment of the severity, frequency and distress associated with individual symptoms, such as sadness, worry, or pain, which can be assessed with MSAS 7-12, is essential for the detection and treatment of symptoms. Measuring the frequency, severity, or distress of a symptom provides findings that cannot be determined by symptom checklists alone. For example, the prevalence of sadness was relatively high (72.9%), but not too distressing for most patients who experienced it.

The results of the content validity analysis showed that there was a strong agreement between the expert opinions. This proved that the items of the scale adequately represented the symptoms to be measured (34-36). The results supported the content validity of the Turkish version of MSAS 7-12. Content validity analysis results were not provided for the original scale (15); therefore, these results could not be compared.

According to the KMO coefficient and the Bartlett chi -square test, the sample size and the data were adequate for EFA (34, 36). The EFA result showed that the Turkish version of the scale consisted of one dimension explaining more than 50% of the total variance. All factor loads on the Turkish version were determined to be 0.30 and above. The factor loadings of the original scale were not provided. Thus, these results could not be compared (15). For an item to be included in the scale, its factor load must be at least 0.30 (25, 34, 37). According to the EFA results, factor loads in the original scale and the Turkish version are similar. Since the original scale structure is preserved in the Turkish version, it is seen that it has a valid and strong construct validity.

The Cronbach's alpha coefficient is a criterion for internal consistency of scale items. Higher Cronbach's alpha coefficient indicates higher consistency between the items of a scale (25, 36). The Cronbach's alpha coefficient of the MSAS 7-12 was found to be 0.83 in this study. Collins et al. (2002) found the Cronbach's alpha coefficient of the MSAS 7-12 to be 0.67 in their study. The result of this study showed that the Turkish version of the MSAS 7 -12 was highly reliable.

Item-total score analysis shows the extent to which the items in a scale are related to the scale or subscale and each other, and whether they measure the quality to be measured, and the correlation is expected to be positive and higher than 0.20 (24, 25, 36, 37). The item-total score correlations were all positive and higher than 0.20 in the Turkish version of the MSAS 7-12. This finding showed that the scale items adequately measured the desired feature and the items were highly reliable. The results of the item-total score analysis for the original scale were not included (15); therefore, these results could not be compared.

5. CONCLUSION

The results of the study show that MSAS 7-12 is a valid and reliable measuring instrument. With the use of MSAS 7-12, researchers can obtain more evidence regarding the symptoms' frequency, severity, and distressing of pediatric patients with cancer. In future studies, using this scale to determine the symptoms correctly and to measure the effects of planned interventions for symptoms can provide a source for accurate results.

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Ethical Statement: Written permission for the Turkish adaptation and use of the MSAS 7-12 were obtained through e-mail. In order to carry out the present study, ethical approval was first obtained from a University Clinical Research Ethics Committee (approved no: 59, date: 16.01.2019). Patients were invited to the study and their caregivers provided signed informed consent. All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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