RESEARCH COMMUNICATION

Reliability and Validity of the Turkish Version of the Memorial Symptom Assessment Scale in Cancer Patients

Yasemin Yildirim[1*], Yasemin Tokem[2], Nilüfer Bozkurt[3], Cicek Fadiloglu[1], Meltem Uyar[4], Ruchan Uslu[5]

Abstract

Aim: The Memorial Symptom Assessment Scale (MSAS) is a multidimensional tool developed to evaluate measure the prevalence, characteristics and distress of common symptoms related to cancer. A validated Turkish version has now become available. The aim of this study was to evaluate its reliability and validity Methods: One hundred-twenty patients were included into this study. The MSAS, The Rotterdam Symptom Checklist (RSCL), and Karnofsky Performance Status Scale (KPSS) were used for data collection. Content and criterion validities were examined. Reliability analyses of the MSAS were performed using internal consistency reliability and test-retest reliability. Results: The most frequently reported symptom (90%) was problems with sexual interest or activity. Item–total correlations ranged between 0.03 and 0.64. There was a high correlation between total MSAS and the RSCL (r=0.875, p<0.01). The internal consistency reliabilities of subscales of the MSAS and total MSAS were moderately high, with Cronbach alpha coefficients ranging from 0.71 to 0.84. The MSAS's test - re-test reliability was 0.78. Conclusion: The MSAS for cancer patients was determined to be a valid and reliable instrument for the use in the Turkish population. It is recommended that the MSAS-Turkish version can be used as a tool for comprehensive symptom assessment in planning nursing care for cancer patients.

Keywords: Cancer - memorial symptom assessment scale - nursing, reliability - validity - symptom assessment

Asian Pacific J Cancer Prev, **12**, 3389-3396

Introduction

Cancer, which is one of the most prevalent and mortal diseases, is an important health problem in the world. According to cancer statistics report by the Turkish Ministry of Health, the incidence of cancer in Turkey is about 174:100.000 (Turkish Cancer Statistics, 2005). Diagnosis and management of physical and psychological symptoms caused by the treatment applied to cancer patients has gained great importance in the last 10 years. No matter what stage of the disease especially diagnosing of symptoms, their severity and frequency as well as the burden imposed on the patient is a fundamental component of cancer treatment and palliative care, and it guides health professionals in applying patient-specific care and treatment (individual care and management) (Chang et al., 2000b; Naughton & Homsi, 2002; Cheng et al. 2009).

Health professionals should make a comprehensive and fast symptom diagnosis in order to provide effective management of symptoms at every stage of cancer treatment and to give a high level of care. As stated also in literature, diagnosing symptoms in certain periods is more important when the number of disturbing symptoms experienced by hospitalized patients increases after the applied treatment. Chang et al. (2000a) reported in their study that the most commonly observed symptoms in cancer patients receiving inpatient or outpatient treatment were lack of energy (62%), pain (59%) and dry mouth (54%). In addition, it was determined that cancer patients receiving inpatient treatment had a higher extent of some symptoms such as weight loss, dyspnea, constipation, sexual problems and aphagia compared to patients receiving outpatient treatment. Can et al. (2004) investigated the changes in the intensity of physical and psychological symptoms before and after the adjuvant cancer treatment and reported a significant increase in the intensity of all symptoms experienced in post-treatment period. It was also demonstrated in several studies that unrelieved symptoms cause great disturbance in cancer patients and decrease their quality of life to a significant extent (Portenoy et al. 1994; Knight et al., 1998; Chang et al., 2000a). Therefore, a comprehensive and reliable symptom diagnosis by appropriate tools and a suitable symptom management is essential for increasing the quality of life in cancer patients.

Little is known about the prevalence, severity and distress caused by symptoms in the Turkish cancer population. One of the barriers to conducting such studies has been the lack of validated comprehensive symptom assessment tools which can be used in this population. In

*[1]Department of Internal Medicine Nursing, [3]Nursing Faculty, [4]Anesthesiology Department, Pain Clinic, [5]Division of Medical Oncology, Tulay Aktas Oncology Hospital, Faculty of Medicine, Ege University, Bornova, [2]Department of Nursing, Faculty of Health Science, Izmir Katip Celebi University Izmir, Turkey *For correspondence: yasemin.kyildirim@ege.edu.tr*

our country, there is only one symptom scale, Rotterdam Symptom Check List (RSCL) that is used for the identification of the frequency of the symptoms that cancer patients experience, and whose validity and reliability has been established (Can et al., 2004). However, since RSCL evaluates only the frequency aspect of the symptoms in cancer patients, it cannot provide rich and comprehensive information concerning the symptoms related to cancer. The Memorial Symptom Assessment Scale (MSAS) is one of the tools that can be used comprehensive and multidimensional cancer-related symptom assessment. The format of MSAS developed by Portenoy et al. not only reveals symptom prevalence, but also allows for more detailed analyses of 32 physical and psychological symptoms severity and distress. Twenty-four symptoms are evaluated with respect to frequency, intensity, and distress, and eight symptoms are evaluated in terms of severity and distress. The scale consisted of the The Global Distress Index (GDI), The Physical Symptom Distress Scores (PHYS) and The Psychologic Symptom Distress Scores (PSYCH). The Total MSAS score (TMSAS) is the average of the symptom scores of all 32 symptoms in the MSAS. In a original study, the reliabilities (Cronbach's alpha) of the three subscales were 0.83, 0.87, and 0.85, respectively (Portenoy et al., 1994).

High number of the symptoms inquired and their multidimensional investigation institute the superiority of MSAS over RSCL. Therefore, it is believed that MSAS is a more convenient tool for periodic and comprehensive definitions. The MSAS have been widely used and validated in several languages, in studies of patients with ovarian carcinoma (Kornblith et al., 1995), breast carcinoma (Seidman et al., 1995; Hann et al., 1997), head and neck carcinoma (Harrison et al., 1997). Up to now, its Turkish validity and reliability in adult cancer population has not been established yet. Because of known advantages of adapting an existing scale to other cultures, which include cost-effectivity, time saving and comparability characteristics of the existing scale (Jamieson, 2004), we attempted to adapt to MSAS into Turkish population instead of developing a new scale. Testing the reliability and validity of the MSAS in a Turkish population will help nurses and other health professionals to assess cancer-related symptoms and will contribute to symptom management. Therefore, the aim of this study, which was planned in line with this necessity, was to evaluate the validity and reliability of the MSAS in adult cancer population in Turkey.

Materials and Methods

Setting and sample

The research was a psychometric study. The study performed between November 2006 and January 2007, was conducted in a outpatient chemotherapy unit at a university hospital in Izmir, Turkey. The number of items in the MSAS (n = 32) was taken into consideration in determining the appropriate sample size for the study. At least 3 or more patients are recommended for each scale item in the scale study (Sönmez, 1999). The number of patients included in this study was 4 times of the number of MSAS items. The inclusion criteria were: being received diagnosis of cancer; aged 18 years or over; able to read and understand the Turkish language; and no history of psychiatric or neurological disorders.

Almost all the patients with cancer in the Aegean region of Turkey, particularly those living in the vicinity of Izmir, receive cancer treatment in oncology hospital. The outpatient chemotherapy unit also provides chemotherapy to patients who have several cancer such as breast, gastrointestinal system, or gynecologic cancer. Approximately 25-30 patients apply to the outpatient chemotherapy unit daily. Throughout the research 183 newly diagnosed cancer patients applied to the institution for chemotherapy. Since the investigator is present at the chemotherapy unit at certain times of the day, 55 patients could not be contacted. Since 8 of 128 patients, who met study criteria, refused to participate in the study, the research sample consisted of 120 patients. The response rate was 94%.

Instruments

The data were collected using a demographic data form, the Karnofsky Performance Status Scale (KPSS), the Rotterdam Symptom Check List (RSCL), and the MSAS.

Demographic data form

The Demographic Data Form developed by the authors included fifteen questions about socio-demographic variables (e.g., gender, age, marital status, education level) and disease and treatment-related variables (e.g., type of cancer, stage of disease, presence of metastasis, and duration of cancer).

Karnofsky performance status scale

Patients' performance status were assessed by using the KPSS. The KPSS is rated on an 11-point scale from 0 (dead) to 100 (normal function), in steps to 10 (Karnofsky and Burchenal, 1948).

Rotterdam Symptom Check List (RSCL)

The RSCL was originally developed as a tool to measure the symptoms reported by cancer patients. This checklist includes four domains, physical symptom distress, psychological distress, activity level and overall quality of life that may be used independently if needed. In this research, the physical and psychological symptom distress scales were used. The 2 scales assess severity of physical and psychological symptoms experienced by the patients in the past week. The physical symptom distress scale consists of 23 items referring to different physical symptoms. Some symptoms such as headaches or fatigue may be experienced by people in general as well as by cancer patients. Other symptoms are more specifically related to cancer or cancer treatment: e.g gastro-intestinal and chemotherapy related symptoms. The psychological distress scale consists of 7 items regarding different symptoms that may be experienced by cancer patients. The responses to the items are given on 4-point Likert-type scales. For the patients' symptom experience of both physical and psychological distress responses range from

'not at all' to 'very much' (de Haes et al., 1996).

The validity and reliability of the Turkish version of the RSCL was established by Can et al. (2004). Cronbach's alpha for the physical symptom distress and psychological symptom distress scales were reported to be 0.75 and 0.79 respectively (Can et al., 2004).

Memorial Symptom Assessment Scale

The MSAS is a patient-rated instrument, was developed by Portenoy et al. (1994) for evaluating frequency, severity and distress of symptoms related to cancer during the previous 7 days. Twenty-four symptoms are evaluated with respect to frequency, intensity, and distress, and eight symptoms are evaluated in terms of severity and distress. In the MSAS, each symptom is recorded as present or absent, and if present, is rated using a four- or five-point rating scale for frequency, severity, and associated distress during the previous seven days, with higher scores indicating greater frequency, more severity, and higher distress. If a symptom is absent, each dimension is scored as 0 and the score for that symptom is 0. If a symptom is present, the symptom score is an average of its dimensions. MSAS subscales include The GDI, The PHYS and The PSYCH. The GDI is the average of the frequency of four psychological symptoms (feeling sad, worrying, feeling irritable, and feeling nervous) and the distress associated with six physical symptoms (lack of appetite, lack of energy, pain, feeling drowsy, constipation, dry mouth). The PHYS is the average of the score for the 12 symptoms: lack of appetite, lack of energy, pain, feeling drowsy, constipation, dry mouth, nausea, vomiting, change in taste, weight loss, feeling bloated, and dizziness. The PSYCH is the average of the score for the six symptoms: worrying, feeling sad, feeling nervous, difficulty sleeping, feeling irritable, and difficulty concentrating. The Total MSAS score (TMSAS) is the average of the symptom scores of all 32 symptoms in the MSAS (Portenoy et al., 1994).

Validity procedures

Language validity, content validity and concurrent validity were examined.

Translation procedures/Language validity: Language validity of the scale was established in the first stage of the research. Expressions in English were translated into Turkish, and back translation into English was done to ensure that the translated expressions carried the same meaning as their English originals. When translating an existing instrument, the back-translation method has been considered the preferred method of obtaining a culturally equivalent instrument (Erkut et al., 1999).

At first, the original form of MSAS was translated from English to Turkish by three nursing instructors, two medical oncology specialists and an English language expert. The translations were combined into one Turkish text by the authors. After the first translation, the Turkish version of the MSAS was translated back from Turkish into English by two language experts whose English was credible and by an American nurse living in Turkey. None of experts had seen the original English text of the tool. When the original version and the back-translated version were compared with the original English statements, they were found to be nearly the same. Finally, the Turkish form was accepted for final use by consensus of the translation committee. The Turkish version of the scale can be provided by the authors upon request.

Content validity: Content validity of the Turkish version of the MSAS was assessed by eight experts. These professionals comprised of 4 medical oncologists and 2 oncology nurses who worked at the oncology hospital and handled diagnosis, treatment and care of oncology patients and carried out clinical researches in the field, along with 2 nurse lecturer at the university. Every item was evaluated for its distinctiveness, understandability and appropriateness for the tool's purpose by these specialists. Changes were made in the statements based on their recommendations of the experts, and the tool was given its final form.

Concurrent validity: Concurrent validity is demonstrated where a test correlates well with a measure that has previously been validated. The two measures may be for the same construct, or for different, but presumably related, constructs (McIntire and Miller, 2005). Schiavetti and Metz's (2006) refer to concurrent validity as the comparison of an instrument or measure against an outside validation criterion administered at the same time. If the two related measures can be expected to produce similar results, a new instrument can be compared to an established instrument to evaluate the concurrent validity of the former. In our study, the RSC, which has been tested for validity and reliability with Turkish cancer patients, was used to test the concurrent validity of the MSAS.

Pilot study

The Turkish version of the MSAS was pre-tested with 10 cancer patients to assess if the MSAS was acceptable and understandable for them. The pilot study was conducted at the outpatient oncology clinic where the main study was to be carried out. The participants in the pre-test did not report any significant problem with item comprehension and identified no culturally irrelevant item in the MSAS. Results showed that the questions were understandable for these individuals therefore it was dedicated that the questionnaire can be application larger study populations. Also, the results of this pilot study were not included in the larger study.

Reliability procedures

Reliability studies of the MSAS were assessed by internal consistency and homogeneity and test–retest stability.

Internal consistency and homogeneity: To determine internal consistency reliability for the MSAS, Item-total Correlations and Cronbach's alpha reliability coefficient were calculated. Cronbach's alpha reliability coefficient is the indicator of the homogeneity of the items included in the scale. An alpha within the range of 0.70-0.95 was accepted as satisfactory for internal consistency

(Tezbasaran, 1997; Erefe, 2002; Polit & Beck, 2004). The higher the cronbach's alpha coefficient is, the more consistent the items in the scale are with one another and the more it consists of items questioning the elements of the same feature (Karasar, 1995; Baykul, 2000). It is recommended that the acceptable item-total correlation for each item should be 0.30 (Farketich, 1991; Lobiondo-Wood and Haber, 2002)

Test-retest reliability: To stability of the scale over time, the test-retest reliability measurement was used. Test–retest reliability refers to the stability of an outcome repeatedly measured in the same way without intervening influences on the outcome (St Louis et al., 2009). For test-retest analyses the group should consist of at least 30 patients, and the duration between two tests should be short enough to remember the answers given in the first application and long enough to allow a considerable change in responders in terms of the features measured by the scale (Tavsanel, 2002). In this current study, the scale was administered, for the retest procedure total of 32 cancer patients completed the same instrument again weeks after the first test of the MSAS. Two weeks was jugged to be optimum retest interval; this would be sufficiently long for patients to forget their initial responses to the 32 symptoms, but not so long that most health domain would change substantially. The Pearson product–moment correlation coefficient was used to examine the correlation between the data collected the first and second times (Tezbasaran, 1997; Erefe, 2002).

Ethical Considerations

Before the study was started, permission to use the MSAS was obtained from the author who developed the tool to use it in Turkey. For application of the research, Ege University School of Nursing Ethics Committee's permission and written consent from the institution were taken. The patients were informed about the purpose and nature of the study and were assured of their right to refuse participation or to withdraw from the study at any stage. Informed consent was taken from each participant. Also, the researchers guaranteed patients that their identities and answers would be kept confidential.

Data collection

A researcher visited the outpatient chemotherapy unit on five working days every week conducted interviews with the patients. Instruments were administered by means of face to face interviews in the waiting room of the outpatient clinics. The questions were read to the participants and then their answers were marked on the questionnaires. The interviews were completed approximately 15 minutes.

Data analysis

Statistical analysis was performed with the Statistical Package for The Social Sciences 10 for Windows. For all analysis, $p<0.05$ was considered significant. Participants' demographic and disease-related informations were performed as a distribution in number and percentage. Also, frequency each of the symptoms and summary scores for the MSAS was calculated.

In order to determine concurrent validity, Pearson pairwise correlation coefficients were calculated between the physical symptom distress subscale of the MSAS and the physical symptom distress subscale of the RSCL and between the psychologic symptom subscale of the MSAS and the psychological symptom distress subscale of the RSCL. Cronbach's alpha coefficient and item total correlation were calculated to establish internal consistency reliability of the MSAS. The Pearson correlation coefficient was performed to assess the test–retest coefficient for the scale.

Table 1. Characteristics of the Study Sample (n=120)

Characteristics		n	%
Gender	Male	89	74.2
	Female	31	25.8
Marital status	Married	98	81.7
	Single	6	5
	Widowed /Divorced	16	13.3
Educational level	Literate	13	10.8
	Primary school	57	47.5
	High school	21	17.5
	University	29	24.2
Occupation	Housewife	57	47.5
	Retired	33	27.5
	Worker/Employment	27	22.5
	Student	3	2.5
Living style	With partner	51	42.5
	With partner and children	46	38.3
	Others	16	13.4
	Lonely	7	5.8
Cancer Site	Breast	63	52.5
	Gastrointestinal	26	21.7
	Gynecologic	8	6.7
	Lung	5	4.2
	Others	18	14.9
Stage	Stage 1	3	2.5
	Stage 2	44	36.7
	Stage 3	46	38.3
	Stage 4	27	22.5
Precense of metastasis	Yes	61	50.8
	No	59	49.2
The KPS	70	13	10.8
	80	2	1.7
	90	99	82.5
	100	6	5
		Mean	SD
Age, years		52.13	11.78
Duration of disease (months)		11.13	15.26
The KPS		88.16	6.85

Results

Sample characteristics

Of the patients, 74.2 % were male, 81.7 % were married, and 47.5 % had graduated from primary school. Approximately, half were housewives, 42.5% were living with a partner, and all participants had health insurance. Age ranged from 18 to 75 years, with a mean of 52.13±11.78 years, the mean number of disease years was 11.13±15.26. Primary cancer sites were breast (52.5%) and gastrointestinal system (21.7%). Half of all patients had

Table 2. Summary of Frequency and Severity of Symptoms and Level of Symptoms Distress by MSAS

Item	Prevalence		Frequency (%)*				Severity (%)**				Distress (%)***				
	n	%	1	2	3	4	1	2	3	4	0	1	2	3	4
Difficulty concentraing	24	20	13.1	65.2	21.7	-	27.3	59.1	13.6	-	21.7	56.5	17.4	4.4	-
Pain	72	60	5.6	68	22.2	4.2	11.1	61.1	25	2.8	4.2	63.9	18.1	6.9	6.9
Lack of energy	103	85.8	1.9	52.4	33.1	12.6	1.9	53.9	32.4	11.8	1	51.4	27.2	8.7	11.7
Cough	31	25.8	32.3	61.2	6.5	-	48.4	45.1	6.5	-	25.8	58.1	16.1	-	-
Feeling nervous	81	67.5	4.9	69.2	18.5	7.4	4.9	65.5	22.2	7.4	2.5	65.4	14.8	9.9	7.4
Dry mouth	79	65.8	13.9	65.8	11.4	8.9	17.7	62	11.4	8.9	7.6	69.6	12.7	1.2	8.9
Nausea	69	57.5	13	69.6	14.5	2.9	14.5	66.7	15.9	2.9	10.1	68.2	17.4	1.4	2.9
Feeling drowsy	49	40.8	10.2	57.1	18.4	14.3	10.2	55.1	18.4	16.3	18.4	63.2	6.1	4.1	8.2
Numbness/tingling in hands/feet	48	40	27.1	45.8	12.5	14.6	27.1	52.1	8.3	12.5	6.2	68.8	8.3	4.2	12.5
Difficulty sleeping	54	45	7.4	66.7	16.7	9.2	11.1	61.1	20.4	7.4	7.4	59.3	14.8	7.4	11.1
Feeling bloated	44	36.7	25	59.1	11.4	4.5	27.3	54.5	13.7	4.5	11.4	63.6	13.6	6.9	4.5
Problems with urination	25	20.8	50	34.6	7.7	7.7	53.8	34.7	7.7	3.8	26.9	53.8	15.4	-	3.8
Vomiting	39	32.5	25.6	66.7	5.1	2.6	28.1	59	10.3	2.6	12.8	66.7	15.3	2.6	2.6
Shortness of breath	30	25	33.3	63.4	3.3	-	36.7	56.7	3.3	3.3	23.3	66.7	6.7	-	3.3
Diarrhea	42	35	23.8	64.3	7.1	4.8	24.4	61	7.3	7.3	14.3	66.7	7.1	7.1	4.8
Feeling sad	60	50	10.3	63.8	15.6	10.3	13.6	59.3	18.6	8.5	6.8	64.4	8.5	8.5	11.8
Sweats	91	75.8	5.5	61.5	18.7	14.3	9.9	57.1	18.7	14.3	1.1	63.3	14.4	7.8	13.3
Worring	63	52.5	12.7	61.9	14.3	11.1	15.9	60.3	14.3	9.5	6.3	61.9	15.9	4.8	11.1
Problems with sexual interest or activity	108	90	1.9	15.7	31.5	50.9	1.9	18.5	29.6	50	44.9	42.1	12.1	0.9	-
Itching	34	28.3	41.2	50	2.9	5.9	47.1	41.2	8.8	2.9	17.6	67.6	5.9	5.9	2.9
Lack of appetite	61	50.8	13.2	55.7	9.8	21.3	14.8	54.1	6.6	24.5	13.3	53.4	13.3	1.7	18.3
Dizziness	37	30.8	13.5	75.7	10.8	-	18.9	73	8.1	-	8.1	81.1	5.4	5.4	-
Difficulty swallowing	25	20.8	36	52	8	4	36	48	12	4	24	56	12	4	4
Feeling irritable	49	40.8	4	62	22	12	2	61.3	20.4	16.3	-	61.2	16.3	8.2	14.3
Mouth sores	28	23.3	39.3	39.3	14.3	7.1	39.3	39.3	14.3	7.1	21.4	53.6	7.1	3.6	14.3
Change in the way food tastes	87	72.5	12.6	50.6	25.3	11.5	12.6	50.6	25.3	11.5	7.1	47.7	25	8.3	11.9
Weight loss	40	66.7	40	45	75	7.5	40	45	7.5	7.5	22.5	57.5	10	2.5	7.5
Hair loss	74	61.7	8.1	16.2	12.2	63.5	8.1	16.2	12.2	63.5	73.3	10.7	4	5.3	6.7
Constipation	55	45.8	32.7	41.8	14.5	10.9	32.7	41.8	14.6	10.9	7.4	63	14.8	3.7	11.1
Swelling of arms 21 or legs	17.5	33.3	38.1	19	9.5	33.3	38.1	19.1	9.5	14.3	52.4	9.5	14.3	9.5	
"I don't look like myself"16		13.3	25	50	12.5	12.5	25	50	12.5	12.5	18.8	43.7	12.5	12.5	12.5
Changes in skin	10	8.3	50	20	30	-	50	20	30	-	40	20	30	10	-

*Rarely 2: Occasionally 3: Frequently 4: Almost constantly, **Slight 2: Moderate 3: Severe 4: Very severe, ***Not at all 1: A little bit 2: Somewhat 3: Quite a bit 4: Very much

metastasis and all patients were receiving chemotherapy. The mean Karnofsky performance status was 88.2±6.85 (Table 1).

Symptoms of the MSAS

As shown in Table 2, symptom prevalence in the patients ranged from 90.0% for problems with sexual interest or activity to 8,3 % for changes in skin. The most frequently symptoms reported by the patients were problems with sexual interest or activity (90 %), lack of energy (85.8 %), sweats (75.8%), and change in the way food tastes (72.5%). The majority of patients experienced symptoms "occasionally." The mean number of symptoms was 13.8 (range, 0–32 symptom) for the study population. The mean±SD of the GDI, PHYS, PSYCH, and TMSAS scores were 1.13±0.63, 0.94±0.54, 0.92±0.71, and 0.82± 0.40, respectively. The mean scores of the subscales of MSAS and the mean scores of the subscales of RSCL are at the lower end, indicating a low level of symptom distress (Table 3).

Concurrent validity

The concurrent validity between the MSAS and the RSCL was examined by Pearson correlation analysis. There was a high correlation between total MSAS and the RSC ($r=0.875$, $p<0.01$). Also, physical and psychological subdomains of two instruments were correlated with each other ($r=0.806$, $p<0.01$; $r=0.740$, $p<0.01$, respectively).

Internal Consistency

Descriptive statistics of the Turkish version of the

Table 3. Summary Scores for MSAS and RSCL

Scale		Mean	SD	Range
MSAS-T	GDI	1.13	0.63	0,10-3., 2
	PHYS	0.94	0.54	0,13-2,65
	PSYCH	0.92	0.71	0-3,5
	TMSAS	0.82	0.4	0,17-2,06
RSCL	PHYS	1.75	0.39	1,10-3,00
	PSYCH	1.48	0.5	1,00-3,43
	TRSCL	1.68	0.35	1,15-2,78

Table 4. Item Analysis and Internal Consistency of the MSAS

Items	Mean	SD	Item-total Correlation	If Item Deleted Alpha
Difficulty concentrating	0.3	0.68	0.55	0.83
Pain	1.18	1.11	0.47	0.83
Lack of energy	1.95	1.11	0.55	0.83
Cough	0.36	0.68	0.14	0.84
Feeling nervous	1.38	1.14	0.26	0.84
Dry mouth	1.23	1.11	0.42	0.84
Nausea	1.02	1	0.35	0.84
Feeling drowsy	0.81	1.12	0.45	0.83
Numbness/tingling in hands /feet	0.75	1.11	0.4	0.84
Difficulty sleeping	0.9	1.1	0.41	0.84
Feeling bloated	0.6	0.9	0.23	0.84
Problems with urination	0.3	0.7	0.22	0.84
Vomiting	0.5	0.8	0.37	0.84
Shortness of breath	0.4	0.7	0.31	0.84
Diarrhea	0.6	0.9	0.3	0.84
Feeling sad	1	1.1	0.37	0.84
Sweats	1.6	1.2	0.3	0.84
Worring	1	1.1	0.33	0.84
Problems with sexual interst or activity	2.2	0.8	0.03	0.84
Itching	0.4	0.7	0.3	0.84
Lack of appetite	1	1.2	0.51	0.83
Dizziness	0.5	0.8	0.23	0.84
Difficulty swallowing	0.3	0.7	0.32	0.84
Feeling irritable	0.9	1.2	0.64	0.83
Mouth sores	0.4	0.8	0.28	0.84
Change in the way food tastes	1.4	1.2	0.37	0.84
Weight loss	0.5	0.8	0.35	0.84
Hair loss 1.2	1.1	0.27	0.84	
Constipation	0.8	1.1	0.27	0.84
Swelling of arms or legs	0.3	0.8	0.42	0.84
"I don't look like myself"	0.2	0.7	0.36	0.84
Changes in skin	0.1	0.4	0.35	0.84

MSAS scores are presented in Table 3. Mean item scores ranged from 0.1 to 2.2.

Item-total Correlations were used to determine internal consistency reliability for the MSAS. Item total correlations for nine items (cough, feeling nervous, feeling bloated, problems with urination, problems with sexual interst or activity, dizziness, mouth sores, hair loss, and constipation) were found to be lower than 0.30 (Table 4). The item-total correlations for other 23 items of the scale were adequate criteria.

The Cronbach alpha coefficient of the GDI, PHYS, and PSYCH subscales were 0.75, 0.75, and 0.71, respectively. The total scale Cronbach's alpha coefficient for all 32 items (TMSAS-T) was high as 0.84.

Test-retest reliability

The test–retest reliability measurement was calculated to evaluate the stability of the MSAS. Pearson correlations for test-retest realibility were r= 0.95 for the GDI, r= 0.86 for the physical symptom distress (PHYS), r=0.96 for the psychologic symptom distress (PSYCH), and r= 0.78 for the total MSAS. It is show that test-retest correlation coefficients are quite high both total MSAS and its subscales. Test-retest correlation values were observed to be considerably high for the subscales and the total scale.

Discussion

The validation study of the Turkish version of the MSAS shows that this scale has adequate pyschometric properties of internal consistency, test-retest reliability, and concurrent validity when applied to Turkish patients with cancer, and these values are good, and similar to those of the original scale (Portenoy et al., 1994).

In comparison with the original version (Portenoy et al., 1994) and the study carried out in China (Cheng et al., 2009), in our study problems with sexual interest or activity were the most frequently reported symptoms. When our country's structure is taken into account, it is surprising that this symptom, which is only among the first 20 symptoms that were reported in the original study, has been the most frequently reported. Nevertheless, problems with sexual interest or activity are not reported to be among the most disturbing symptoms for patients with cancer.

It is supposed that keeping other symptoms under control is more important, especially for patients with a condition with poor prognosis such as cancer. Besides, half of our sample group had metastases. Therefore, it is also believed that these symptoms do not disturb the patients, although they frequently experience problems with sexual interest or activity.

In this study, the internal reliability coefficients of the total MSAS met good criteria (Cronbach's alpha coefficient= 0.84). The alpha coefficients were 0.75, 0.75, and 0.71 for the subscales. Cronbach's alpha coefficient ranges between 0 and 1 and the closer to 1 means the greater the reliability of a tool (Karasar, 1995; Tezbasaran, 1997) and literature suggests that a reliability of 0.70 is considered acceptable (Tezbasaran, 1997; Erefe, 2002; Polit and Beck, 2004). In the original validation study carried out by Portenoy et al., the internal consistency of the scale was found to be between 0.83-0.88 (Portenoy et al., 1994); whereas, it was between 0.79-0.87 in the validation study carried out in China (Cheng et al., 2009). In spite of the fact that the results in this present study are lower, the reliability coefficients obtained in this study were similar to those of the original version of the MSAS (Portenoy et al., 1994) and of the studies from China (Cheng et al., 2009) and the USA (Chang et al., 2000c).

Item coefficients ranged from 0.03 to 0.64. and item total correlations coefficients of nine items found lower 0.30 criteria. Items with a correlation coefficient lower than 0.30 generally are recommended to be removed from the tool, but this is not a hard rule. To remove an item from the scale, it also was necessary to evaluate the "change in alpha" if the item was deleted. If the alpha coefficient increased when some items were removed from a tool, then that item decreased the reliability of the tool and needed to be removed. Conversely, if the alpha value fell

below the general alpha value when an item was removed, then that item was necessary for the tool (Ozdamar, 1997). These 9 items were not removed because the general alpha value was 0.84 and they were 0.84 when these items were deleted. Cheng et al., item coefficients vary between 0.18-0.69 and no items were removed from the scale in this study as well (Cheng et al., 2009).

The results of test-retest study showed a high correlation coefficient for the overall scale and its subscales. Portenoy et al. (1994) did not report test-retest reliability for the original scale. In this study, the test-retest reliability for the whole scale was found to be similar to those in other studies (Cheng et al., 2009; Collins et al., 2002). Sufficiently high correlation coefficient both indicates the consistency of the measurement obtained from the test and demonstrates that the measured features have not changed during the time between two applications (Baykul, 2000).

In current study, the RSCL was used to test the concurrent validity of the MSAS. High positive correlations were determined between the total MSAS and the RSCL ($p<0.01$). Also, physical and psychological subdomains of two instruments were correlated with each other ($p<0.01$). In line with these results, it is possible to state that these two tools may be used in the evaluation of the symptoms in cancer patients. In the original study, a correlation was found between the MSAS with the Functional Living Index-Cancer and with the Karnofsky Performance Status Scale (KPS) (Portenoy et al. 1994). Another studies showed that there was a correlation with the FACT-G Sum Quality of Life (Chang et al. 2000c; Cheng et al., 2009).

Since cancer patients have more than one physical and psychological symptom, a comprehensive symptom diagnosis is required to provide sufficient symptom control (Chang et al., 2000b). Assessment of the symptoms should be an essential part of nursing practice. In guiding nursing applications, it is highly important to examine the symptoms through a one-dimensional approach and to determine symptom severity reported by the patient and the disturbance caused by the symptom.

The MSAS is a useful and provides rich information about the expression/definition of severity and interference of patients' multiple symptoms during cancer therapy. This instrument can be used as a clinical checklist because it is comprehensive and easy to use by nurses and other healthcare professionals. These data on the MSAS-T can be kept in clinical records or patient's charts, which would allow to longitudinally follow-up the patient's symptom experiences. Also, identification of such common physical and psychological symptoms can be enable appropriate and timely nursing interventions.

In conclusion, the study confirmed that the MSAS in cancer patients was determined to be valid and reliable instrument for use in the Turkish population. It is recommended that the MSAS-Turkish version can be used as a tool for comprehensive symptom assessment in planning of nursing care for cancer patients. It is recommended that this scale should be further evaluated both in different regions of Turkey with larger samples and in diverse populations.

Acknowledgements

The authors wish to thank the authors' of the MSAS for their permission to translate and use it. Also, the authors thank all patients who participated in this study.

References

Atay S, Conk Z, Bahar Z, et al (2007). Memorial semptom değerlendirme ölçeğinin (MDSÖ 10-18) Türkçe geçerlik ve güvenirlik çalışması. *Ege Pediatri Bülteni*, **14**, 93-9.

Baykul Y (2000). Egitimde ve psikolojide olcme. In "Klasik Test Teorisi ve Uygulaması", Eds Baykul Y. OSYM Yayınları, Ankara pp 141-99/201-23.

Can G, Durna Z, Aydiner A (2004). Assessment of fatigue in and care needs of Turkish women with breast cancer. *Cancer Nurs*, **27**, 153-61.

Chang VT, Hwang SS, Feurman M (2000a). Validation of the Edmonton Symptom Scale. *Cancer*, **88**, 2164-71.

Chang VT, Hwang SS, Feurman M, et al (2000b). The Memorial Symptom Assessment Scale Short Form (MSAS-SF) Validity and Reliability. *Cancer*, **89**, 1162-71.

Chang VT, Hwang SS, Feuerman M, et al (2000c). Symptom and quality of life survey of medical oncology patients at a veterans affairs medical center: a role for symptom assessment. *Cancer*, **88**, 1175-83.

Cheng KK, Wong EM, Ling WM, et al (2009). Measuring the symptom experience of Chinese cancer patients: a validation of the Chinese version of the memorial symptom assessment scale. *J Pain Symptom Manage*, **37**, 44-57.

Collins JJ, Devine TD, Dick GS, et al (2002). The measurement of symptoms in young children with cancer: the validation of the Memorial Symptom Assessment Scale in children aged 7-12. *J Pain Symptom Manage*, **23**, 10-6.

de Haes JC, Olschewski M, Fayers P, et al (1996). Measuring the Quality of Life of Cancer Patients with The Rotterdam Symptom Checklist (RSCL)—A Manual. The Netherlands: University of Groningen; http://www.rug.nl/gradschoolshare/research_tools/assessment_tools/RSCL_handleiding.pdf

Erefe I (2002). Veri toplama araçlarının niteligi. In: "Hemsirelikte Arastirma, Eds Erefe I. Odak Ofset, İstanbul pp 169–88.

Erkut S, Alarcon O, Garcia Coll C, et al (1999). The dual focus approach to creating bilingual measures. *J Cross-Cult Psychol*, **30**, 206–18.

Farketich S (1991). Focus on psychometrics: Aspects of item analysis. *Res Nurs Health*, **14**, 165–8.

Hann DM, Jacobsen PB, Martin SC, et al (1997). Quality of life following bone marrow transplantation for breast cancer: A comparative study. *Bone Marrow Transplant*, **19**, 257–64

Harrison LV, Zelefsky MJ, Pfister DG, et al (1997). Detailed quality of life assessment in patients treated with primary radiotherapy for squamous cell cancer of the base of the tongue. *Head Neck*, **19**, 169–75.

Karasar N (1995). Bilimsel Arastırma Yontemi, 7. Basım, Ankara pp 147-151.

Karnofsky DA, Burchenal JH (1948). The clinical evaluation of chemotherapeutic agents in cancer. In "Evaluation of Chemotherapeutic Agents", Eds Macleod CM. Colombia University Pres, New York pp 191-205.

Knight SJ, Chmiel JS, Kuzel T, et al (1998). Quality of life in metastatic prostate cancer among men of lower socioecomomics status: Feasiblity and criterion related validity of 3 measures. *J Urol*, **160**, 1765-9.

Kornblith AB, Thaler HT, Wong G, et al (1995). Quality of life of women with ovarian cancer. *Gynecol Oncol*, **59**, 231–42.

McIntire SA, Miller LA (2005). Foundations of Psychological Testing, Sage Publishing Co, 2nd Edition.
Naughton M, Homsi J (2002). Symptom assessment in cancer patients. *Curr Oncol Rep*, **4**, 256-63.
Ozdamar K (1997). Paket Programlar ile Istatistiksel Veri Analizi. Anadolu Universitesi Yayinlari, Eskisehir.
Polit DF, Beck CT (2004). Nursing Research, Principles and Methods, PA: Lippincott Williams & Wilkins, 7th ed. Philadelphia.
Portenoy RK, Thaler HT, Kornblith AB, et al (1994). The Memorial Symptom Assessment Scale: An instrument for the evaluation of symptom prevelance, characteristics and distress. *Eur J Cancer*, **30**, 1326-36.
Schiavetti N, Metz DE (2006). Evaluating Research in Communicative Disorders, 5th ed. Boston: Pearson.
Seidman AD, Portenoy RK, Yao TJ, et al (1995). Quality of life in phase II trials: A study of methodology and predictive value in patients with advanced breast cancer treated with paclitaxel plus granulocyte colony-stimulating factor. *J Natl Cancer Inst*, **87**, 1316–22.
Sönmez V (1999). Bilimsel araştırmalarda yapılan yanlışlar. *Hemşirelikte Araştırma Geliştirme Dergisi*, **1**, 13-22.
St Louis KO, Reichel IK, Yaruss JS, et al (2009). Construct and concurrent validity of a prototype questionnaire to survey public attitudes toward stuttering. *J Fluency Disord*, **34**, 11-28.
Tavsanel E (2002). Tutumların Olçülmesi ve SPSS ile veri analizi. Atlas Yayınevi, Ankara, 16-61.
Tezbaşaran A (1997). Likert tipi ölçek geliştirme kılavuzu. Turk Psikologlar Derneği Basımevi, Ankara, 19-51.
Turkish Ministry of Health, Department of Fighting with Cancer, Turkish Cancer Statistics 2005, http://ketem.org/istatistik.php.