The West Haven Yale Multidimensional Pain Inventory: Reliability and validity of the Turkish version in individuals with cancer

Arife Altin Cetin [a], Hicran Bektas [b,*], Mustafa Ozdogan [c]

[a] Akdeniz University Hospital, Hematology Unit, Antalya, Turkey
[b] Akdeniz University Faculty of Nursing, Department of Internal Medicine Nursing, Antalya, Turkey
[c] Memorial Antalya Hospital, Medical Oncology Unit, Antalya, Turkey

ABSTRACT

Purpose: Pain is a complex, multidimensional and subjective phenomenon that is common in patients with cancer. The translation of existing pain measurement scales is considered important in producing internationally comparable measures for evidence based practice. In measuring the pain experience, the WHYMPI is a widely used instrument to measure assessment of clinical pain, and it has not been validated in Turkey. The present study aimed to assess the reliability and validity of the Turkish version of the West Haven Yale Multidimensional Pain Inventory (WHYMPI).

Method: In this methodological study, the scale was translated into simplified Turkish by the cross-culture translation method, and 520 participants with cancer were assessed. The internal consistency, item analysis, and test-retest methods were used to determine the reliability of the Turkish WHYMPI. Content validity, criterion validity, convergent/divergent validity, and exploratory factor analysis were used to test the construct validity of the Turkish WHYMPI.

Results: Cronbach's alpha and item-total correlations results suggested that there was good internal reliability. The Cronbach's alpha for internal consistency of the pain experience, responses by significant others, and daily activities were 0.85, 0.60, and 0.83, respectively. The internal consistency coefficient for test-retest reliability of the pain experience, responses by significant others, and daily activities were acceptable: 0.82, 0.66, and 0.81, respectively. Factor loadings were significant, with standardised loadings ranging from 0.40 to 0.92.

Conclusions: WHYMPI is reliable and valid instrument for the measurement of pain in patients with cancer in Turkey. Its use is recommended for clinical and research purposes.

© 2015 Elsevier Ltd. All rights reserved.

Introduction

Cancer is the second highest cause of death among adults and the mortality rate for all cancers was 163 per 100 000 people in 2008 in Turkey (World Health Organization, 2012). Patients with cancer often experience multiple symptoms related to the disease itself and its treatment. Throughout this period, patients with cancer suffer from multiple physical and psychological symptoms like pain, nausea, anorexia, fatigue, mucositis, to feelings of sadness, worrying, anxiety, and irritability (Smeltzer et al., 2010; Yarbro et al., 2011).

Pain is among the most prevalent symptoms experienced by patients with cancer (Cherny, 2000). The experience of pain in people with cancer is highly variable and subjective. It consists of several dimensions such as physiologic, sensory, affective, cognitive, behavioural, sociocultural, and is affected by many factors (McGuire, 2004). Pain is not a trivial symptom of cancer. It can interfere with all aspects of a patient's life, such as their sleep, work, leisure and relationships (Potter et al., 2003). Cancer pain is known to be a multidimensional and complex experience that can cause severe suffering and can lessen the quality of life (Dedeli and Karadeniz, 2009). It can affect the quality of life in physical (decreased functional capability, diminished strength, endurance, nausea, poor appetite, poor or interrupted sleep), psychological

(diminished leisure, increased anxiety, fear, depression, personal distress, difficulty concentrating, loss of control), social (diminished social relationships, decreased sexual function, affection, altered appearance, increased caregiver burden) as well as spiritual ways (increased suffering, altered meaning, reevaluation of religious reliefs etc.) (Gehdoo, 2006).

Despite numerous education programs, intervention strategies and multidisciplinary pain societies, approximately 60% of patients with cancer are experiencing pain (Yıldırım and Uyar, 2006). Up to 80% of patients with cancer experience significant pain as a result of their disease and/or its treatment (Potter et al., 2003). These unacceptably high prevalence rates exist in spite of great medical, pharmacological and technological advances, supplemented by the increased interest in pain assessment methods (Hjermstad et al., 2009). Treatment of pain is, therefore, a vitally important component in the management of the patients with cancer (Potter et al., 2003).

In spite of being the most common reason for which people seek healthcare, pain measurement is a complex issue. Unidimensional measurement scales such as the visual analogue scale, the verbal rating and the numerical rating scales have been successfully employed in recording the intensity of pain sensation. However, they are not adequate tools to collect information on the affective component or other dimensions of the painful experience (de C Williams et al., 2000; Georgoudis et al., 2000). The complexity of assessing the sensation of pain has led to the development of multidimensional pain measures. The West Haven Yale Multidimensional Pain Inventory (WHYMPI) scale was developed based on cognitive-behavioural concepts applied to chronic pain, which allows researchers to evaluate the cognitive, behavioural and emotional aspects of pain (Kerns et al., 1985; Lousberg et al., 1999; Laliberte et al., 2008). Moreover, this tool has been used with a variety of pain conditions such as fibromyalgia, whiplash-associated disorder, systemic lupus erythematosus, chronic pelvic pain, pain associated with cancer and chest pain (Turk et al., 1998; Andreu et al., 2006). The research in the literature with WHYMPI and patients with cancer was the eight-item Multidimensional Pain Inventory-Screening Chinese version (MPI-sC), and in this study MPI-sC was used to examine multidimensional pain-related experiences of 106 terminal cancer patients in Taipei (Lai et al., 2009). Zaza et al. (2000) examined the generalizability of the non-malignant pain patient profiles based on the Multidimensional Pain Inventory (MPI) to patients with cancer-related pain.

The WHYMPI has been validated in English (Kerns et al., 1985) and has been used cross culturally. The WHYMPI has been translated into several languages including German (Flor et al., 1990), Swedish (Bergstrom et al., 1998), Dutch (Lousberg et al., 1999), Italian (Ferrari et al., 2000), and French (Laliberte et al., 2008). No reports on translation or validation of WHYMPI to Turkish language has been reported earlier. The need is felt for a concentrated, well-defined attempt to identify the WHYMPI determinants among patients with cancer.

The validation of translated scales improves cross-cultural utility of the source tool. The purpose of this study was to examine whether the Turkish version of the WHYMPI is a valid and reliable tool to assess pain and to be used as a clinical and research instrument. This study was carried out to translate the WHYMPI into Turkish and to test the reliability and validity of pain in patients with cancer.

Methods

A methodological design, specifically psychometric testing was used to address the purpose of the study.

Translation

A permission to conduct a Turkish version, reliability and validity study and make changes found to be necessary for Turkish culture was personally obtained from Robert Kerns and his collegues via internet correspondence. After obtaining a consent from the authors' of WHYMPI, employing standard 'forward-backward' translation procedure, the English version of the inventory was translated into Turkish by four health professionals. The Turkish translations were then compared for inconsistencies. The final Turkish version was then given to three native English speakers who were unaware of the English version, to translate back to English. The English translation was then compared with the original English WHYMPI by seven bilingual experts, including two PhD lecturers and five academic members in the field of medical oncology and nursing faculty, who were independent from the research team. They selected the most appropriate translation for each item from the reconciled or independent forward translations or provided alternative translations to improve items with inadequate pre-existing translations and to determine the cultural appropriateness of the tool. To ensure that the adapted version still retains its equivalence in an applied situation, the last stage of the adaptation process is to test the pre-final version in a pilot study. The translated instrument was pilot-tested for understandability with a 10-patients with cancer and at the conclusion the instrument's language and content validity was approved. In this pilot study, it was determined that the questions could be understood and no changes were made. The patients in the pilot test were not included in the research.

Questionnaires

The West Haven Yale Multidimensional Pain Inventory

The original version of the WHYMPI was developed by Robert Kerns and his colleagues, and it is a self-administered rating scale designed to assess cancer pain. The WHYMPI comprises 52 items contains 12 scales divided into 3 parts: 1) pain interference, support and self control, pain severity, pain perception, and negative mood; 2) punishing responses, solicitous responses, and distracting responses; and 3) household chores, outdoor work, activities away from home, and social activities. The first section was designed to be the most comprehensive and focused especially on the evaluation of perceived pain intensity and the impact of pain on various aspects of the patients' lives. The second section was designed to evaluate patients' perceptions of the responses of significant others to their communications of pain. The final section evaluated the frequency of patients' performance of common activities. The respondents record their response to each item on a 7-graded scale. The response scale has fixed scores between 0 and 6, where 0 corresponds to 'no, not at all, never' and 6 corresponds to 'yes, very much, very frequently'. Individual WHYMPI factor scores are obtained by summing the responses to the items that load on that particular factor. A score was calculated for each section. In the first section of the WHYMPI, for the pain interference, pain severity, and negative mood subscales, higher scores indicate worse pain interference, pain severity, and negative mood, respectively. However, for the support and self control, and pain perception subscales are scored in the opposite direction; higher scores indicate better life control, and pain perception. In the second section, solicitous responses, and distracting responses subscales, higher scores indicate better response, but punishing responses subscale is scored in the opposite direction, and higher scores indicate worse responses. In the third section, high scores in each sub-scale indicate better performance of common activities. The instrument is recommended for use in conjunction with behavioural and

psychophysiological assessment strategies in the evaluation of chronic pain in clinical settings (Kerns et al., 1985; Lai et al., 2009; Laliberte et al., 2008).

The internal reliability coefficients of all WHYMPI scales range from 0.70 to 0.90; the test-retest reliabilities of these scales over a 2-week interval range from 0.62 to 0.91. The validity of the WHYMPI has been supported by the results of confirmatory and exploratory factor analytic procedures. The WHYMPI has been shown to be both valid and reliable. The procedures revealed that the WHYMPI scales were significantly correlated with several criterion measures of anxiety, depression, marital satisfaction, pain severity, and health locus of control (Kerns et al., 1985).

Beck Depression Inventory

The original WHYMPI scale scores for patients from the sample were correlated with their scores on different scales from well-known and established questionnaires such as the Present Pain Intensity, the Beck Depression Inventory (BDI), and the Depression Adjective Check List. The BDI is useful to compare correlations with other instruments measuring the same construct (Kerns et al., 1985; Lousberg et al., 1999). The BDI has been translated into Turkish. Convergent/divergent validity was investigated by correlation between Turkish WHYMPI and BDI.

The BDI was developed by Aaron T. Beck and his colleagues, and it is a 21-item, self-report rating inventory that measures characteristic attitudes and symptoms of depression. Each of the 21 items corresponding to a symptom of depression is summed to give a single score for the BDI. There is a four-point scale for each item ranging from 0 to 3. Cut score guidelines for the BDI are given with the recommendation that thresholds be adjusted based on the characteristics of the sample, and the purpose for use of the BDI. The item scores are added to obtain a total depression score, which can range from 0 to 63, with higher scores indicating more severe depression. Total score of 0–9 is considered minimal range, 10–15 is mild, 16–23 is moderate, and 24–63 is severe depression. (Beck et al., 1961). The BDI demonstrates high internal consistency, with alpha coefficients of 0.86 and 0.81 for psychiatric and non-psychiatric populations respectively (Beck et al., 1988).

The BDI was translated to Turkish and was pilot tested by Hisli (1988). To examine the linguistic equivalence of the Turkish and English versions of the BDI, they were both administered to a group of bilingual Turkish students. The correlation between the scores of these students on the Turkish and the English versions ranged between 0.73 and 0.81, thus supporting their linguistic equivalence (Hisli, 1988). In support of the reliability of the Turkish version of the BDI, the split-half reliability coefficient was 0.78 for Turkish students and 0.61 for depressed psychiatric inpatients (Tegin, 1987).

Patients, data collection and statistical analysis

The study was planned to adapt the WHYMPI culturally to the Turkish language and to evaluate the validity and reliability of the Turkish version. The study was performed in daily chemotherapy unit of university hospital which is the biggest daily chemotherapy hospital in Antalya, in the Mediterranean region in Turkey. The sample size can be taken 3–10 fold of the number of items in inventory (Lobiondo-Wood and Haber, 2002; Tavsancıl, 2005). In this study, in order to determine the sample size, ten-fold of items in the scale was taken. In this regard, as there are 52 items in the scale, the scale was applied to a total of 520 people agreeing to participate in the study. The sample size was kept larger to increase validity and reliability of the study. A total of 580 patients with cancer who had been receiving medical therapy in daily chemotherapy unit between January–April 2010 could be reached, 520 (89.6%) patients agreed to participate in the study. The major reasons for study

refusal were: (1) too weak to be interviewed (n = 25), (2) already having too much stress to complete the questionnaire (n = 16) (3) lack of time (n = 11) and (4) lack of interest (n = 8). All patients participated to the study were asked to provide informed consent.

A personal data form, WHYMPI, and BDI were completed by each participant. All data were collected by the authors during the face-to-face interviews. A detailed medical history was obtained in all patients. Information about diagnosis and treatment was noted from the medical records. Both male and female patients, aged over 18 years and under 65 years to distinguish age-related pain problems, diagnosed to have cancer, ability to understand and respond to the Turkish language, not have a history of prior or current psychiatric and neuropsychological disorders and not have verbal communication disability (hearing and speaking) were included in the study.

After the linguistic validation of the inventory was done, all patients were interviewed under the same conditions. All patients were assessed in the waiting room of the daily chemotherapy unit. Patients were explained the aim and study protocol. Thereafter, the inventory designed to be filled out by the interviewer was administered to patients after their written consent.

All items were coded and scored, the completed questionnaires were included in the data set. All the data were entered, checked for missing values and analysed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA) statistical programs. The means and standard deviations were determined to describe the demographic data of the patients.

Reliability analysis

The internal consistency, item analysis, test-retest and parallel form methods were used to determine the reliability of the Turkish version of the WHYMPI. The Cronbach's alpha was calculated to assess the internal consistency of the total questionnaire and each subscales. To determine internal consistency, Cronbach's alpha, the corrected item total correlations, the alpha-if-item total correlations were included in the analysis. Reliability coefficients range from 0.00 to 1.00, with higher coefficients indicating higher levels of reliability (Kimberlin and Winterstein, 2008).

Stability of measurement, or test-retest reliability, is determined by administering a test at two different points in time to the same individuals and determining the correlation or strength of association of the two sets of scores. Test-retest method is very simple and powerfull approach to evaluate the reliability (White, 2003; Phelan and Wren, 2005; Kimberlin and Winterstein, 2008). The test-retest reliability was calculated by the internal reliability coefficients. In order to assess test-retest reliability, the Turkish WHYMPI was completed twice after three-week interval by a subgroup of 50 patients with cancer (independent from the reliability study) who had been receiving medical therapy in daily chemotherapy unit three weeks later. A total of 62 patients with cancer who participated in the first analysis could be reached, 50 patients agreed to participate in the study.

Validity analysis

Construct validity refers to the appropriateness of inferences made on the basis of observations or measurements (often test scores), specifically whether a test measures the intended construct. Construct validity is used to ensure that the measure is actually measure what it is intended to measure (i.e. the construct), and not other variables (Clark and Watson, 1995). By means of validity, content validity, criterion validity, convergent/divergent validity, and factorial construct validity procedures were conducted.

Content validity was investigated by experts. Using a panel of 'experts' familiar with the construct is a way in which this type of

validity can be assessed. The experts can examine the items and decide what that specific item is intended to measure. Content validity is the extent to which the measurement method covers the entire range of relevant behaviours, thoughts, and feelings that define the construct being measured (Streiner and Norman, 2003).

Criterion validity is the extent to which people's scores are correlated with other variables or criteria that reflect the same construct (Phelan and Wren, 2005). The criterion validity of the Turkish WHYMPI was determined by item analysis based on differences between averages of upper-lower group item scores.

Convergent/divergent validity was investigated by correlation between Turkish WHYMPI and BDI. Pearson's correlation coefficient was used to correlate the scores with each other (Phelan and Wren, 2005). The BDI is useful to compare correlations with other instruments measuring the same construct (Kerns et al., 1985). Besides, this measure makes it possible to compare results across patients with cancer.

Exploratory factor analysis was used to test the factorial construct validity of the Turkish WHYMPI. The item scores were subjected to an exploratory factor analysis using the principal component analysis and varimax rotation with Kaiser Normalisation to test its construct validity. Factor extraction was restricted to five factors for Section 1, three factors for Section 2, and four factor for Section 3 to test construct validity. Before conducting the factor analysis, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test were conducted to evaluate whether the sample was large enough to perform a satisfactory factor analysis. A KMO value >0.5 indicates that the sample size is adequate for factor analysis (Kara et al., 2006). In the second stage of this analysis, an exploratory factor analysis was conducted to identify a variable factor structure. An exploratory factor analysis, using principal component extraction method with Varimax rotation, was conducted on all participants to determine the factor structure of the 52-items of the Turkish WHYMPI. Item with factor loadings ≥0.40 (including values that round to 0.40) and those that did not load on more than one factor were retained.

Ethics considerations

Permission to translate and use the WHYMPI into Turkish was granted by developer, Robert D. Kerns. Permission to conduct this study was received from the authors' institutional ethical committe. The informed consent was obtained from the Director of the Hospital, the head of the daily chemotherapy unit and from all study participants. The patients with cancer were informed about the purpose of the study and what should be expected of them. Participants were assured of rights of refusal to participate in or to withdraw from the study at any stage without any negative consequences. The anonymity and confidentiality of participants was guaranteed.

Results

Patients' characteristics

In this study, 520 patients with cancer were interviewed. The characteristics of the study population are presented in Table 1. The patients with cancer in the sample averaged 52.05 years of age (SD 10.06, range 19–64) and included most patients who were female (53.3%), married (89.0%), housewife (38.9%), retired (38.9%), and had completed primary school (49.0%). The majority had breast (24.3%) or lung cancer (21.3%), duration of the illness was 19.93 months (SD 31.63 months).

Table 1
The demographic and medical characteristics of the patients with cancer (n = 520).

	Mean ± SD	Range (19–64)
Age (year)	52.05 ± 10.06	19–64
Duration of the illness (month)	19.93 ± 31.63	1–192
	n	%
Gender		
Female	277	53.3
Male	243	46.7
Marital status		
Married	463	89.0
Single	57	11.0
Occupational status		
Housewife	202	38.9
Retired	202	38.9
Self-employed	39	7.5
Public servant	33	6.3
Worker	33	6.3
Unemployed	9	1.7
Student	2	0.4
Education		
Illiterate	35	6.7
Literate	9	1.7
Primary	255	49.0
Secondary	48	9.3
High	99	19.0
University	74	14.3
Type of cancer		
Breast	126	24.2
Lung	111	21.3
Colon	93	17.9
Ovarian	44	8.5
Lymphoma	25	4.8
Stomach	17	3.3
Rectum	10	1.9
Other cancers	94	18.1
Duration of the illness		
0–6 month	255	49.0
7–12 month	75	14.5
≥13 month	190	36.5

Mean scores and internal consistency of the Turkish WHYMPI

The mean, standard deviation and internal consistency of the Turkish WHYMPI for patients with cancer are shown in Table 2. The mean score ± SD of the Section 1 was 2.52 (SD 0.82, range = 0–6) and scores of the five subscales were as follows: pain interference 2.69 ± 1.59, support and self control 4.83 ± 0.79, pain severity 1.42 ± 1.52, pain perception 0.42 ± 0.77 and negative mood 1.56 ± 1.41. Section 2 was 2.77 (SD 0.69, range = 0–6) and scores of the three subscales were as follows: punishing responses 0.45 ± 0.94, solicitous responses 5.41 ± 0.95 and distracting responses 1.99 ± 1.53. Section 3 was 1.63 (SD 1.05, range = 0–6) and scores of the three subscales were as follows: household chores 1.72 ± 1.58, outdoor work 0.71 ± 1.25, activities away from home 1.60 ± 1.24 and social activities 2.76 ± 2.04.

The internal consistency of the Turkish WHYMPI as measured by the Cronbach's alpha coefficient has been found between 0.60–0.92 for patients with cancer indicating a satisfactory reliability. Cronbach's alpha coefficients of the inventory were found 0.85 for pain experience (Section 1), 0.60 for responses by significant other (Section 2), and 0.83 for daily activities (Section 3), and Cronbach's alpha values of subscales were between 0.60–0.92 except one item (except support and self control subscale). All of the correlations between inventory items were significantly higher.

Table 2
Mean, standard deviation (SD), and internal consistency (Cronbach's α coefficient) of the Turkish WHYMPI for patients with cancer (n = 520).

Inventory	Total items	Range of scores	Patients with cancer (Turkish version of the WHYMPI)		
			Mean	SD	α
Pain experience	20	0—6	2.52	0.82	0.85
Pain interference	6	0—6	2.69	1.59	0.87
Support and self control	5	0—6	4.83	0.79	0.29
Pain severity	3	0—6	1.42	1.52	0.76
Pain perception	3	0—6	0.42	0.77	0.76
Negative mood	3	0—6	1.56	1.41	0.63
Responses by significant other	14	0—6	2.77	0.69	0.60
Punishing responses	4	0—6	0.45	0.94	0.70
Solicitous responses	5	0—6	5.41	0.95	0.69
Distracting responses	5	0—6	1.99	1.53	0.72
Daily activity	18	0—6	1.63	1.05	0.83
Household chores	4	0—6	1.72	1.58	0.88
Outdoor work	4	0—6	0.71	1.25	0.78
Activities away from home	8	0—6	1.60	1.24	0.79
Social activities	2	0—6	2.76	2.04	0.92

Test-retest reliability

According to the internal consistency test, Cronbach's alpha coefficients of the inventory were found 0.82 for pain experience (Section 1), 0.66 for responses by significant other (Section 2), and 0.81 for daily activities (Section 3), and Cronbach's alpha values of subscales were between 0.60—0.95 except one item (except support and self control subscale). There was no difference between test and retest values of the Turkish WHYMPI.

Construct validity of the Turkish WHYMPI

Content validity
According to content validity results for Turkish WHYMPI by seven experts, the Kendall's coefficient of concordance is nonsignificant across the sample (Kendall's W = 0.188, p = 0.064). The insignificance detected at p > 0.05 level as a result of Kendal analysis of WHYMPI indicates that there is no statistically significant difference between expert opinions for interpreting and understanding of inventory items (Shultz and Whitney, 2005).

Criterion validity
The criterion validity of the Turkish WHYMPI was determined by item analysis based on differences between averages of upper-lower group item scores. When the mean scores of items of the upper and lower groups of the inventory were examined, the differences between groups were statistically significant (t = 43.196, p = 0.000).

Convergent/divergent validity
The subscale correlations between the Turkish WHYMPI and BDI ranged from $r_p = 0.363$ (p < 0.01) for Section 1 and BDI; $r_p = -0.060$ (p = 0.170) for Section 2 and BDI; $r_p = -0.286$ (p < 0.01) for Section 3 and BDI. By means of divergent validity, Section 2 and Section 3 scores were negatively correlated with BDI, whereas a positive correlation with the Section 1 and BDI scores showed convergent validity. The correlations between section I and BDI, and Section III and BDI were statistically significant.

Factorial construct validity
Exploratory factor analysis was carried out using principal component analysis with varimax rotation and Kaiser Normalisation to test its construct validity. The KMO was 0.74, indicating that the sample was large enough to perform a satisfactory factor analysis and that the sample size was sufficient for psychometric testing of a 52-item scale.

Construct validity was provided by factor analysis. Table 3, Table 4 and Table 5 lists the factor loadings for the Turkish version of the 52-item WHYMPI when the data from all 520 patients with cancer were analysed. The result of the factors were extracted in Section 1: pain interference (Factor 1), support and self control (Factor 2), pain severity (Factor 3), pain perception (Factor 4) and negative mood (Factor 5) (Table 3). The result of the factors were extracted in Section 2: punishing responses (Factor 1), solicitous responses (Factor 2) and distracting responses (Factor 3) (Table 4). The result of the factors were extracted in Section 3: household chores (Factor 1), outdoor work (Factor 2), activities away from home (Factor 3) and social activities (Factor 4) (Table 5). However, some of the items were loaded on other factors in our samples. The major difference was in the section one, pain perception factor. One of the differences was that items 11 and 16 in the pain perception factor of the original factor structure appeared in the support and self control factor in our results. Some of the items in Sections 2 and 3 appeared in the other factors, but generally the factors were almost similar with the original ones. Factor loadings were significant, with standardised loadings ranging from 0.40 to 0.92. Results indicated that respondents did not have difficulty answering the questions in the Turkish version of the WHYMPI.

Discussion

This is the first study to evaluate the Turkish version of the WHYMPI in patients with cancer in Turkey. Simple and brief validated tools that measure pain should be useful in the clinical setting, but the validity of such tools needs to be confirmed. In the present study, the validity and reliability of the Turkish WHYMPI measurements were tested in a sample of patients with cancer.

It is now known that the pain especially cancer-pain is a multifactorial phenomenon that results in complexity interactions between physiological, cognitive, social and other factors (Yalcın et al., 2004). The WHYMPI was developed in order to fill a widely recognised void in the assessment of clinical pain. The tool is an integral part of the Multiaxial Assessment of Pain and enables individuals with pain to be classified according to psychosocial and behavioural factors rather than factors related to their physical injury alone. The WHYMPI stands out for being easy to administer, corresponding closely with a cognitive-behavioural perspective in

Table 3
Five factors with factor loading in Section 1 of the Turkish WHYMPI for patients with cancer (n = 520).

Items	Patients with cancer					Item-factor correlation (α)
Pain interference	Factor 1					
(3) Affects ability to work	0.87					0.83
(4) Affects the amount of satisfaction from social activities	0.85					0.83
(2) Interference with daily activities	0.75					0.84
(8) Affects ability to participate in social activities	0.68					0.83
(17) Affects ability to do household chores	0.63					0.83
(15) Degree of spouse in relation to pain problem	0.45					0.85
Support and self control		Factor 2				
(5) Supportiveness of spouse in relation to pain problem		0.84				0.85
(10) Amount of spouse worry regarding pain problem		0.69				0.84
(6) Overall mood (high to low) during the past week		0.66				0.86
(11) Amount of control over life during the past week		0.65				0.86
(16) Ability to deal with problems during the past week		0.58				0.86
Pain severity			Factor 3			
(12) Among of suffering experienced because of pain			0.72			0.83
(7) Severity of pain during the past week			0.71			0.84
(19) Affects friendships with other than family members			0.63			0.84
Pain perception				Factor 4		
(13) Affects marital and family relationships				0.74		0.85
(1) Level of pain at the present moment				0.67		0.84
(14) Affects the amount of satisfaction from work				0.62		0.84
Negative mood					Factor 5	
(18) Degree of irritability during the past week					0.83	0.85
(20) Amount of tension or anxiety during the past week					0.78	0.85
(9) Affects the amount of satisfaction from family members					0.61	0.85

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 4
Three factors with factor loading in Section 2 of the Turkish WHYMPI for patients with cancer (n = 520).

Items	Patients with cancer			Item-factor correlation (α)
Punishing responses	Factor 1			
(7) Expresses irritation at me	0.80			0.61
(10) Expresses anger at me	0.75			0.61
(1) Ignores me	0.64			0.61
(4) Expresses irritation at me	0.62			0.61
Solicious responses		Factor 2		
(5) Takes over my chores		0.76		0.59
(8) Gets me to rest		0.67		0.59
(13) Gets me something		0.66		0.58
(11) Gives me pain medication		0.63		0.62
(2) Asks me how he/she can help		0.42		0.59
Distracting responses			Factor 3	
(9) Involves me in activities			0.86	0.48
(12) Encourages met o work an a hobby			0.84	0.48
(14) Turns on the TV			0.67	0.55
(6) Talks to met o take my mind off the pain			0.53	0.54
(3) Reads to me			0.40	0.59

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

terms of theory and being psychometrically robust (Laliberte et al., 2008). The WHYMPI is a patient-centred instrument and could be completed in a clinic, at home and other locations. It allows to patients to monitor their cancer pain condition easily and therefore could improve patients' adherence to medication-non-compliance is a well-known problem in treatment of cancer pain. Furthermore, using the WHYMPI could improve communication between patients and health professionals, which could improve patients' satisfaction and therapeutic outcomes (Kerns et al., 1985). This study confirmed that the Turkish WHYMPI is effective and practical instrument for assessment of pain for patients with cancer. Further use of the WHYMPI could produce for reduction or treatment of cancer pain. Overall, our data provide evidence for the validity and reliability of the WHYMPI as a comprehensive, multidimensional and self-report inventory for that purpose.

In this study, the 52-item WHYMPI, consisting of five subscales was translated into Turkish using a back-translation technique. The Turkish version of the WHYMPI was created through the standard procedure reported before, and it was demonstrated that detailed efforts were needed in this process. The second step toward demonstrating equivalence, the evaluation of psychometric testing. For the cross-cultural validation of Turkish WHYMPI, several statistical approaches were undertaken.

In our study, in the first section of the WHYMPI we found better life control (80.5%), better pain perception (93%), worse pain interference (44.8%), worse pain severity (23.6%), and worse negative mood (25.3%) scores. In the second section, we found better solicitous responses (90.1%), and better distracting responses (33.1%), but few patients had worse punishing responses (7.5%) scores. In the third section, approximately one third of

Table 5
Four factors with factor loading in Section 3 of the Turkish WHYMPI for patients with cancer (n = 520).

Items	Patients with cancer				Item-factor correlation (α)
Household chores	Factor 1				
(17) Do laundry	0.88				0.83
(1) Wash dishes	0.86				0.83
(13) Prepare a meal	0.83				0.82
(9) Help with house cleaning	0.74				0.82
Outdoor work		Factor 2			
(2) Mow the lawn		0.92			0.83
(6) Work in the garden		0.90			0.83
(14) Wash the car		0.48			0.83
(10) Work on the car		0.45			0.83
Activities away from home			Factor 3		
(11) Take a ride in the car			0.74		0.82
(16) Go to the park or beach			0.67		0.82
(3) Go out to eat			0.64		0.83
(4) Play cards or other games			0.62		0.83
(7) Go to a movie			0.61		0.83
(5) Go grocery shopping			0.56		0.82
(15) Take a trip			0.54		0.82
(18) Work on house repaire			0.43		0.83
Social activities				Factor 4	
(12) Visit relatives				0.93	0.82
(8) Visit relatives				0.90	0.82

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

patients (27.1%) had better performance of common activities scores.

Lai et al. (2009) examined the psychometric testing of Multidimensional Pain Inventory-Screening Chinese version (MPI-sC) in terminal cancer patients, they found the highest proportions were affected by pain in terms of Life Control (72.6%) and Pain Interference (48.1%), relatively few patients (14.2%) had problems directly linked to pain severity (intensity). Zaza et al. (2000) examined the generalizability of the non-malignant pain patient profiles based on the Multidimensional Pain Inventory (MPI) to patients with cancer-related pain. They found the lowest pain severity, interference, negative mood, and punishing response scores in patients with cancer. These findings were similar with our findings.

The internal reliability, test-retest reliability, and construct validity indicate that the Turkish WHYPI is of moderate psychometric quality. The internal consistency of each scale was estimated by Cronbach's alpha coefficient. Internal consistency reliability for the three section of the WHYMPI was measured by Cronbach's alpha and this suggests that the use of the WHYMPI subscales is feasible. The internal consistency for the American version was ranging from 0.70 to 0.90 (Kerns et al., 1985). The reliability coefficients obtained were high (range from 0.60 to 0.92) in this study (except one factor) among the patients with cancer and this would indicate a high degree of reliability for this tool in this study (Table 2). Although the last factor had lower internal consistency (Cronbach's alpha coefficient was found 0.29 for support and self control), but this factor displayed normal factor loading of the questions included in the scale. The Cronbach's alpha coefficients of the WHYMPI achieved acceptable standards for reliability. The homogeneity of the WHYMPI was seen to be at an adequate level in terms of item correlations.

For test-retest reliability, according to the internal consistency test, there was no difference between test and retest values of the Turkish WHYMPI. Cronbach's alpha coefficient was 0.82 for pain experience (Section 1), 0.66 for responses by significant other (Section 2), 0.81 for daily activities (Section 3), Cronbach's alpha values of subscales were between 0.60–0.95, and this would indicate a high degree of reliability for this tool in this study. According to the original WHYMPI, the stability (test-retest)

coefficients were in the 0.62–0.91 range, indicating that a substantial proportion of the reliable variance in the scales was stable over time (Kerns et al., 1985).

According to content validity results for Turkish WHYMPI by seven experts, the Kendall's coefficient of concordance is nonsignificant across the sample (W = 0.188, p = 0.064). Content validity result is excellent, which reveals that all items are measuring the same construct as the overall scale.

According to criterion validity results of the Turkish WHYMPI, the differences between groups were found statistically significant (t = 43.196, p = 0.000).

The Turkish WHYMPI and BDI were used for evaluating the convergent and divergent validity of the scale, and the correlations between the scores were assessed. In our study, scores of the BDI showed significant positive correlation with the Section 1 of the Turkish WHYMPI as expected. In another saying, when perceived pain intensity increased, also depression increased. The scores of the BDI showed significant negative correlations with the Section 3 of the Turkish WHYMPI, when patients' performance of common activities increased, depression decreased.

The diagnosis of cancer induces stresses that are caused by the patient's perception of cancer, its manifestation, and treatment. In addition, all patients with cancer, fear becoming disabled and dependent as well as having altered appearance and body function (Martinez et al., 2014). Pain, a sensory and emotional experience, is influenced by physiological, sensory, affective, cognitive, sociocultural and behavioural factors. The affective component includes anxiety. Anxiety evokes similar responses on the physiological system as pain, and therefore may be a potentiator of pain. Pain perception increases when anxiety is high and patients are attentive to the pain (Syrjala et al., 2014). Anxiety is traditionally believed to be especially relevant to acute stress, while the depressive affect is considered almost exclusively in relation to chronic stress (Smeltzer et al., 2010). The results of the present study indicate that depression is also a factor influencing inappropriate pain. By using BDI with WHYMPI, we have demonstrated a concordance between these symptoms, suggesting that attention to both types of response is needed. The management of emotional distress may prove valuable in improving pain control and

satisfaction with treatment in patients with cancer. The present study indicates that depression influences the perception of pain in patients with cancer. However, neglecting the importance of patients' own perception and conceptualizations of their disease and pain may impede successful treatment for pain. To address the problem of inadequate cancer pain management, clinicians must not only inquire about and measure pain intensity, but should also assess and monitor factors associated with pain such as psychological distress.

The 'construct validity' of the Turkish WHYMPI was evaluated with the principle component method with varimax rotation, the factor analysis indicated five factors for Section 1, three factors for Section 2 and four factors for Section 3, factor analysis yielded factor loadings above 0.40 and factor loadings of the items in the scale ranged from 0.40 to 0.92. Kerns et al. (1985) found that factor loading of the items ranged from 0.43 to 0.87. These results indicated that were similar to the findings from the original study (Kerns et al., 1985).

Looking specifically at the items in the Turkish scale compared with the original scale, cultural characteristics may have been an influencing factor. This also questions the KMO procedure. This indicated that the sample was large enough to perform a satisfactory factor analysis, but further validation of the original scale clearly showed that factor solutions were associated with sample size.

The results indicate some differences in the factor structures of the WHYMPI between Turkish and American samples. There are a lot of differences between Turkish and American culture. Culture is associated with learned ways of doing things, beliefs, moral values, customs, and habits (Schein, 1990). Moreover patients' perception of their disease varies greatly in different cultures. Attitudes and adjustment toward health and illness, perceptions of the causes of disease, the role of the family and patients' needs and coping styles are all culture-related variables. Culture also influences interpretations of cancer initiation and progression which, in turn, affect adjustment.

Cancer patients' attitudes and adjustment toward their illness may therefore be quite different in Turkey. For the Turkish people, being afflicted with a serious illness is often predestined and perceived to be caused by sin. They also believes that suffering is part of life and that pain may minimize suffering in afterlife. In different cultures, patients are expected to express their feelings, fears and anger in response to a diagnosis of serious illness and to develop active coping mechanism. In Turkey, expression of feelings is unusual behaviour. Families mostly make decisions for the patient. In Turkish culture, all the family members support each other when a family member falls ill and needs support. The social influences can play a role in patients engagement in activity with pain present and their willingness to have pain without trying to avoid or control it.

In Turkish culture, patients also believed that doctors have enough education to treat their diseases and whatever they prescribe should be precisely followed. Contrary, some patients are more likely to hold certain beliefs about cancer pain management that may impede their pain control, such as fears of addiction. Perception of illness may be quite different in Turkey. Denial as a defence mechanism has been frequently discussion in relation to people's general functioning and adjustment to cancer. Denial acts as a modulator of emotional reactions to the stress of life-threatening illness and may ease the patient's adjustment during treatment. This, however, could be a reflection of a culturally unique concept of health and pain as perceived by Turkish patients with cancer. In other words considering that people with different cultural back-ground may have different perceptions of health, pain and its determinants. The findings of this study indicated that these determinants were perceived different by both Turkish and American patients with cancer.

A factor analysis was considered to be a good tool in cross-cultural comparison because these statistics revealed the conceptual difference of the pain in patients with cancer in the Turkish WHYMPI. Despite the fact that this inventory originally was developed in USA and the sample in this study was from a culturally diverse population, the inventory was translated successfully and it was well accepted by patients with cancer. These findings indicate that there were cross-culturally common and culture-specific WHYMPI items.

Once a valid and reliable scale is ready for use, it can be used to measure outcomes in a study. With the Turkish scale now, the study can proceed to further validation of the scale and use in research outcome. The results of this study provide evidence that the WHYMPI is a valid instrument for measuring the pain in individuals with cancer. Our study confirmed that the Turkish version of the WHYMPI was reliable for assessment of clinical pain in patients with cancer. In summary, this study provides validation data for the WHYMPI and supports its use as a practical brief tool to assess pain in patients with cancer in the Turkish culture.

Conclusions

The Turkish version of the WHYMPI has shown statistically acceptable levels of reliability and validity. Based on psychometric properties, the Turkish WHYMPI showed evidence to support that it is culturally appropriate tool for patients with cancer. Turkish researchers and health care providers can use the WHYMPI to assess pain in patients with cancer. These are relevant characteristics for the possible use of this simple, self-administered questionnaire in the assessment of patients with cancer needing additional medical management.

In conclusion, 52-item WHYMPI derived from the factor analysis appeared to have sufficient validity and reliability evidence for the Turkish sample of patients with cancer. We believe that this instrument will become valuable in future cross culture research on patients with cancer. Future researchers may recommend a large enough sample size, examine the validity for longitudinal data from clinical samples, comprise people from different regions in Turkey and diverse populations of the world and adapt the 52-item WHYMPI in assessment of clinical pain with other diseases, such as fibromyalgia, chest pain, etc.

Relevance to clinical practice

In research and practice, valid measurement instruments are needed to assess pain in patients with cancer. The WHYMPI is simple to administer, and Turkish researchers and health care providers can use the WHYMPI to assess pain in patients with cancer. The WHYMPI is simple to administer and nurses by using this equipment in routine appointments will be able to assess behavioural and psychophysiological evaluation of cancer pain and pain management.

Conflict of interest statement

The author(s) declare that they have no conflict of interests.

Acknowledgements

References

Andreu, Y., Gardon, M., Dura, E., Ferrando, M., Pascual, J., Turk, D.C., et al., 2006. An examination of the psychomeric structure of the multidimensional pain inventory in temporomandibular disorder patients: a confirmatory factor analysis. Head & Face Medicine 2 (48), 1—9.

Beck, A.T., Steer, R.A., Garbin, M.G., 1988. Psychometric properties of the beck depression inventory: twenty-five years of evaluation. Clinical Psychology Review 8 (1), 77—100.

Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., Erbaugh, J., 1961. An inventory for measuring depression. Archives of General Psychiatry 4, 561—571.

Bergstrom, G., Jensen, B.I., Bodin, L., Linton, J.S., Nygren, L.A., Carlsson, G.S., 1998. Reliability and factor stracture of the multidimensional pain inventory-Swedish language version (MPI-S). Pain 75, 101—110.

Cherny, N.I., 2000. The management cancer pain. CA: A Cancer for Clinicians 50, 70—116.

Clark, L.A., Watson, D., 1995. Construct validity: basic issues in objective scale development. Psychological Assessment 7, 309—319.

de C Williams, A.C., Davies, H.T., Chadury, Y., 2000. Simple pain rating scales hide complex idiosyncratic meanings. Pain 85 (3), 457—463.

Dedeli, O., Karadeniz, G., 2009. An integrated psychosocial-spiritual model for cancer pain management. Pain 21 (2), 45—53.

Ferrari, R., Novara, C., Sanavio, E., Zerbini, F., 2000. Internal structure and validity of the multidimensional pain inventory, Italian language version. Pain Medicine 1 (2), 123—130.

Flor, H., Rudy, T.E., Birbaumer, N., Striet, B., Schugens, M.M., 1990. The applicability of the West Haven-Yale multidimensional pain inventory in German-speaking Countries: data on reliability and validity of the MPID. Der Schmerz 4, 82—87.

Gehdoo, R.P., 2006. Cancer pain management. Indian Journal of Anaesthesia 50 (5), 375—390.

Georgoudis, G., Watson, P.J., Oldham, J.A., 2000. The development and validation of a Greek version of the short-form McGill Pain Questionnaire. European Journal of Pain 4 (3), 275—281.

Hisli, N., 1988. A study on the validity of Beck Depression Inventory [Beck Depresyon Envanteri'nin geçerliği üzerine bir çalışma]. Journal of Psychology [Psikoloji Dergisi] 6, 118—122.

Hjermstad, M.J., Fainsinger, R., Kaasa, S., 2009. Assessment and classification of cancer pain. Current Opinion in Supportive and Palliative Care 3, 24—30.

Kara, M., van der Bijl, J., Shortridge-Baggett, L.M., Astı, T., Ergüney, S., 2006. Adaptation of the diabetes management self-efficacy scale for patients with type 2 diabetes mellitus: scale development. International Journal of Nursing Studies 43, 611—621.

Kerns, D.R., Turk, C.D., Rudy, E.T., 1985. The West Haven Yale multidimensional pain inventory (WHYMPI). Pain 23, 345—356.

Kimberlin, L.C., Winterstein, G.A., 2008. Validity and reliability of measurement instruments used in research. American Society of Health—System Pharmacists 65 (1), 2276—2284.

Lai, Y.H., Guo, S.L., Keefe, F.J., Tsai, L.Y., Shun, S.C., Liao, Y.C., et al., 2009. Multidimensional Pain Inventory-Screening Chinese version (MPI-sC): psychometric testing in terminal cancer patients in Taiwan. Support Care Cancer 17 (12), 1445—1453.

Laliberte, S., Lamoureux, J., Sullivan, M.J.L., Miller, J.M., Charron, J., Bouthillier, D., 2008. French translation of multidimensional pain inventory: L'inventaire multidiensionnel deLa douleur. Pain Research & Management 13 (6), 497—505.

Lobiondo-Wood, G., Haber, J., 2002. Reliability and Validity, Nursing Research Methods, Critical Appraisal, and Utilization. Elsevier, USA.

Lousberg, R., Breukelen, J.P., Groenman, N.H., Schidt, A.J.M., Arntz, A., Winter, F.A.M., 1999. Pyschometric properties of the multidimensional pain inventory, Dutch language version (MPI-DLV). Behaviour Research and Therapy 37, 167—182.

Martinez, K.A., Snyder, C.F., Malin, J.L., Dy, S.M., 2014. Is race/ethnicity related to the presence or severity of pain in colorectal and lung cancer? Journal of Pain and Symptom Management. http://dx.doi.org/10.1016/j.jpainsymman.2014.02.005.

McGuire, D.B., 2004. Occurrence of cancer pain. Journal of the National Cancer Institute Monographs 32, 51—56.

Phelan, C., Wren, J., 2005. Reliability and validity - Exploring reliability in academic assessment. Available at: www.uni.edu/chfasoa/reliabilityandvalidity.htm (accessed 01.03.14.).

Potter, V.T., Wiseman, C.E., Dunn, S.M., Boyle, F.M., 2003. Patient barriers to optimal cancer pain control. Psycho-Oncology 12, 153—160.

Schein, E., 1990. Organizational culture. American Psychologist 45 (2), 109—119.

Shultz, K.S., Whitney, D.J., 2005. Measurement Theory in Action, Case Studies and Exercises. Sage Publications Inc., California.

Smeltzer, S.C., Bare, B.G., Hinkle, J.L., Cheever, K.H., 2010. Brunner & Suddarth's Textbook of Medical-surgical Nursing, twelft ed. Lippincott Williams & Wilkins, Philadelphia.

Streiner, D.L., Norman, G.R., 2003. Health Measurement Scales: a Practical Guide to Their Development and Use. Oxford University Press, Oxford.

Syrjala, K.L., Jensen, M.P., Mendoza, M.E., Yi, J.C., Fisher, H., et al., 2014. Psychological and behavioral approaches to cancer pain management. Journal of Clinical Oncology 1, 1703—1711.

Tavsancıl, E., 2005. Measurement of Attitudes and SPSS Data Analysis, second ed. Nobel Publication & Distribution, Ankara.

Tegin, B., 1987. Cognitive processes in depression: an investigation based on Beck's model ([Depresyonda bilişsel süreçler: Beck modeline göre bir inceleme]). Journal of Psychology [Psikoloji Dergisi] 6, 116—123.

Turk, D.C., Sist, T.C., Okifuji, A., Miner, M.F., Florio, G., Harrison, P., et al., 1998. Adaptation to metastatic cancer pain, regional/local cancer pain and non-cancer pain: role of psychological and behavioral factors. Pain 74 (2—3), 247—256.

White, H.D., 2003. Author cocitation analysis and Pearson's r. Journal of the American Society for Information Science and Technology 54 (13), 1250—1259.

World Health Organization, 2012. World Health Statistics 2012. Available at: http://www.who.int/gho/publications/world_health_statistics/2012/en/ (accessed 15.11.12.).

Yalcın, B., Cay Senler, F., Büyükcelik, A., Utkan, G., Tek, I., Doruk, H., et al., 2004. The opinions of the cancer patients about pain management: a questionnaire study. Turkish Journal of Cancer 34 (3), 114—117.

Yarbro, C.H., Wujcik, D., Gobel, B.H., 2011. Cancer Nursing Principles and Practice, seventh ed. Jones and Bartlett Publishers, Canada.

Yıldırım, Y.K., Uyar, M., 2006. Barriers to effective cancer pain management. Pain 18 (3), 12—19.

Zaza, C., Reynob, L., Moulin, D.E., 2000. The Multidimensional Pain Inventory profiles in patients with chronic cancer-related pain: an examination of generalizability. Pain 87, 75—82.