

ORIGINAL RESEARCH

PAIN MANGEMENT

A pilot study of reliability and validity of Turkish version of West Haven-Yale Multidimensional Pain Inventory in patients with low back pain

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Abstract

Background: West Haven-Yale Multidimensional Pain Inventory (WHYMPI), used in the evaluation of patients with chronic pain including behavioral and cognitive assessment, is a multidimensional pain scale consisting of three main sections and 12 subscales. The validity of this inventory has been supported by various study results of confirmatory and exploratory factor analytic procedures. The aim of our present study was to investigate the validity and reliability of the Turkish form of the West Haven-Yale Multidimensional Pain Inventory (WHYMPI-T).

Methodology: 41 patients, with a minimum 3 mon history for chronic non-specific low back pain, without previous surgical history, neurological and rheumatic diseases, and without communication problem; completed Brief Pain Inventory (BPI), McGill Pain Questionnaire (MPQ), Beck Depression Inventory (BDI) and the Short Form-36 (SF-36) scales. The measurements were repeated in fifth days.

Results: Significant difference between WHYMPI-T lower and upper group averages was found. Internal consistency analysis of the scale, Cronbach's α coefficient ranged from 0.93 to 0.99 for B and C sections. All the items of A, B and C sections were found compatible with each other in the item analyses and scale test-retest results were congruent with each other. Between WHYMPI-T subscales and BPI, MPQ, BDI, SF-36 scales, a positive correlation was observed.

Conclusion: The results of our study confirm that WHYMPI-T is a valid and reliable instrument which can be used for the evaluation of chronic non-specific low back pain.

Key words: West Haven-Yale Multidimensional Pain Inventory; WHYMPI; WHYMPI-T; Low back pain; Validity; Reliability

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1. Introduction

Back pain, is defined as muscle tension or stiffness with or without sciatica between the inferior gluteal fold and the costal edge. 74-89% of patients with back

pain recovered after 3 to 6 months but chronic pain persists in 9-28% of the patients.¹

Chronic low back pain is one of the most common pain syndrome and in 85% of individuals this pain is

nonspecific. However, loss of functionality, lack of labor, reduction in quality of life, psychiatric problems and economic problems are associated with it.² Spinal movement, mechanical loading and biological factors are important in the etiology of chronic low back pain. Psychological factors also play an important role. For this reason comprehensive assessment of pain with a multidisciplinary and psychosocial model-based approach is essential for the success of the treatment.^{3,4}

Physical examination and tests are important for pain assessment. Verbal expression of the patient and usage of standard scale data are used.⁵ The contents of pain scale that is used in our country are generally about intensity and duration of pain. The number of scales with psychological, emotional and social aspects are very limited. West Haven-Yale Multidimensional Pain Inventory (WHYMPI) is one of the most commonly used multi-dimensional scale for chronic pain in terms of physiologic, psychologic and emotion aspects.⁶ The impact of pain on daily life, the individual's degree of participation in the activities and the individual's surroundings expression of pain are evaluated in the scale which has been translated into various languages and it is used to assess a wide range of pathologies.

Aim of this study is to adapt WHYMPI to Turkish language and to evaluate the validity and reliability of the Turkish version in patients with chronic low back pain.

2. Methodology

The study plan and participants

41 volunteers with non-specific low back pain, between November 2014 - August 2015, in our Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation and Department of Orthopedics and Traumatology, were included into the study.

Ethical approval was obtained from Institutional Research Ethics Committee. The study was executed according to the Helsinki Declaration. Patients were informed about the aim of the study, period of the study and the procedures to be applied. 'Written Voluntary Disclosure and Consent Form' was signed by the all of the patients.

Inclusion criteria for the study were; patients between 18-70 yrs old without severe spinal anomalies and without nerve root compression, a minimum of 3 months for chronic non-specific low back pain without

medical treatment and patients who can speak and understand Turkish. Patients with history of lumber surgery, rheumatologic disease, neurological disease and cognitive problems were excluded from the study. Demographic and social characteristics of all participants (age, height, weight, gender, occupation, educational level) were evaluated. Information about the disease of the patient (complaints, diagnosis, time of diagnosis, treatment, chronic disease presence) were evaluated. The story of pain (pain intensity (visual analogue scale (VAS)), duration, frequency, aggravating and relieving factors) were evaluated. Exercise habits, smoking and alcohol usage of the patients were determined. Posture analysis, limb length measurements and manual muscle testing were done for the physical evaluation. Range of motion was measured as described by Kendall McCreary, shortness tests and special tests (Schober test, Walk test, Slump test, hand finger- ground distance measurement, lateral flexion measurements) were used.

Measurements

WHYMPI was developed by Kerns, Turk and Rudy in 1985. It is a multidimensional scale with psychometric and cognitive. It also evaluates in a point of view of behavioral for patients with chronic pain. It is divided into 3 parts and contains 52 item. The first part assesses the severity of pain. It is the most comprehensive section focused on the impact of pain on various aspects of life. The second part evaluates; "patient's closest person's responses" that are perceived by the patient. The third section evaluates the patient's activity and frequency of activity.⁶ Distribution according to the subtitle and scoring of the items in WHYMPI are shown in Table 1.

Brief Pain Inventory, McGill Pain Questionnaire (MPQ), Beck Depression Inventory (BDI), Oswestry Disability Index (ODI), Short Form-36 scale were used for reliability analysis of WHYMPI-T.⁷⁻¹¹

Brief Pain Inventory used for pain intensity, pain localization, treatment for pain and to inquire about the effect of pain on daily activities.⁷ *McGill Pain Questionnaire*: Used for location of pain, the sensation caused in the individual, time, and livable level for pain intensity.⁸ *Beck Depression Inventory* was used to measure cognitive and motivational symptoms that are seen in emotional depression.⁹ *ODI* is often used to measures the severity of the pain, personal care, lifting,

Table 1: The Subheadings and scoring of WHYMPI parts

Part Name	Questions	Scoring
Part A		
Interference	2, 3, 4, 8, 9, 13, 14, 17, 19	$(2+3+4+8+9+13+14+17+19)/9$
Support	5, 10, 15	$(5+10+15)/3$
Pain Severity	1, 7, 12	$(1+7+12)/3$
Self-control	11, 16	$(11+16)/2$
Negative mood	6, 18, 20	$((6\text{-Item } 6)+18+20)/3$
Part B		
Punishing responses	1, 4, 7, 10	$(1+4+7+10)/4$
Solicitous responses	2, 5, 8, 11, 13, 14	$(2+5+8+11+13+14)/6$
Distracting responses	3, 6, 9, 12	$(3+6+9+12)/4$
Part C		
Household chores	1, 5, 9, 13, 17	$(1+5+9+13+17)/5$
Outdoor work	2, 6, 10, 14, 18	$(2+6+10+14+18)/5$
Activities away from home	3, 7, 11, 15	$(3+7+11+15)/4$
Social activities	4, 8, 12, 16	$(4+8+12+16)/4$

walking, sitting, standing, social life, sleep, travel and the degree of pain. Increased total points shows increased level of disability. The total score obtained from the patient is converted into percentiles system that shows the disability percentage.¹⁰ Disability level of patients participating in the study were determined by this scale. *Short Form-36*: was used to measure the quality of life of patients.

Protocol

Scale adaptation to Turkish language was done after obtaining permission from the author on e-mail. The original scale was translated into Turkish by three different scholars who are fluent in English. Two scholars worked in the field of health and healthcare, and the third one did not belong to healthcare. These three translations were compared and edited into a single form. The form was translated into English by a person independent of the study whose native language is English and who can speak Turkish fluently. When both adaptations are compatible with each other Turkish version of West Haven-Yale Multidimensional Pain Inventory (WHYMPI-T) was tested intelligibility on 5 patients fulfilling the criteria of the study, and the study was initiated.

Patients who fulfilled the inclusion criteria were assessed twice in four days period with specified

scales. Patients did not receive medical treatment and / or physiotherapy and rehabilitation in this period.

Statistical Analysis

Statistical Package for Social Science (SPSS) 22.0 was used in the analysis of data obtained from research. Identifying characteristics of the patients were expressed with mean value and standard deviation.

Criterion validity of the method was used for WHYMPI-T validity analysis. Responses from the patients were scored in the inventory, then sorting was done from higher to the smaller values. 27% of the highest points was set as 'top group' and the lowest 27% of the points was set as Sub-Group after rating distribution. Criterion validity was done by comparing the upper and lower group mean values with t test.

Internal consistency, item analysis and constancy over time methods were used for reliability analysis of WHYMPI-T. Cronbach's alpha coefficient was used for internal consistency analysis. Intra Class Coefficient (ICC) value and Cronbach's alpha coefficient are frequently used method in the reliability analysis. If ICC value is greater than 0.70 this indicates that the scale is reliable. Paired t tests were used for comparison. Item analysis was done by Pearson correlation analysis for WHYMPI-T and it was evaluated for correlation of each item with each other.

Invariance analysis by time for WHYMPI-T was done with Test-retest and parallel forms which were reviewed by Pearson and Spearman correlation analysis.

Statistical significance was considered as $p < 0.05$.

3. Results

27 women (54%) and 23 men (46%) with chronic low back pain were evaluated in this study. 4 patients with history of previous back surgery were excluded from the study. 3 patients who used analgesic drugs and 2 patients without follow up were excluded from the study. 23 women and 18 men a total of 41 patients (mean age 40.06 ± 14.61 yrs) completed the study. The specifications of the patients are shown in Table 2.

The distribution of people who the patients feel close as a result of WHYMPI-T form; 41.5% partner, 26.8% child, 19.5% family, 7.3% friend and 4.9% housemate. Total scores of WHYMPI-T scale A, B and C sections and sub scale sections with test-retest results are shown in Table 3.

WHYMPI-T Criteria Validation

The scores obtained from inventory was divided into upper and lower groups for WHYMPI-T criteria validation. We have detected statistically significant difference between the two groups. ($p=0.00$) (Table 4).

WHYMPI-T reliability

Internal consistency, correlation and analysis of substances according to the time invariance methods were used for WHYMPI-T reliability.

Internal consistency

The total score of all case responses for A, B and C section of WHYMPI-T were used for Internal consistency of WHYMPI-T. The Cronbach α coefficients for A, B and C section, were found

respectively as follows 0.97, 0.93 and 0.99. Cronbach's α coefficient of the sub-scale in section A is found between 0.71 to 0.95, It is found between 0.37-0.72 for sub-scale in section B and It is found between 0.72-0.87 for sub-scale in section C. (Table 5).

Table 2. The demographic and social characteristics of participants.

Parameter	Mean \pm SD	
Age (year)	40.06 \pm 14.61	
Height (cm)	170.51 \pm 09.09	
BMI (kg/m ²)	26.86 \pm 05.80	
Pain Severity (VAS 0-10)	5.73 \pm 1.71	
Pain times (min)	305.36 \pm 448.20	
	n	%
Sex		
Female/Male	23 / 18	56.09 / 43.91
BMI		
Normal	16	39.0
Overweight	16	39.0
Obese	9	21.9
The level of education		
Primary school and below	11	26.8
High school	10	24.4
University	20	48.8
Marital status		
Married / Single / Divorced	24 / 17 / 0	58.5 / 41.5 / 0
Cigarette smoking		
Yes / No	14 / 27	34.1 / 65.9
Alcohol		
Yes / No	12 / 29	29.3 / 70.7
Exercise		
Regularly	7	17.1
Irregularly	5	12.2
Not	29	70.7

Table 3. WHYMPI-T test-retest results

WHYMPI-T subscales	Test (Mean \pm SD)	Retest (Mean \pm SD)	p
Part A			
Interference	2.4 \pm 1.1	2.13 \pm 1.12	p > 0.05
Support	4.8 \pm 1.51	4.81 \pm 1.46	
Pain severity	3.2 \pm 1.35	3.04 \pm 1.23	
Self-control	4.17 \pm 1.22	4.22 \pm 1.19	
Negative mood	1.01 \pm 0.23	1 \pm 0.24	

Part B				
Punishing responses		2.1 ± 0.97	2.18 ± 0.98	p > 0.05
Sollicitous responses		3.65 ± 1.06	3.64 ± 1.14	
Distracting responses		3.60 ± 1.14	3.56 ± 1.23	
Part C				
Household chores		4.02 ± 1.50	4.04 ± 1.5	p > 0.05
Outdoor work		1.65 ± 0.8	1.61 ± 0.74	
Activities away from home		3.17 ± 1.17	3.16 ± 1.19	
Social activities		3.14 ± 0.99	3.17 ± 0.98	
General activities		2.96 ± 0.59	2.96 ± 0.59	

Table 4. WHYMPI-T criteria validity

Groups	n	Mean ± SD	t	p
Top Group	11	47.39 ± 2.64	-13.07	0.00
Subgroup	11	35.54 ± 3.92		

Table 5: WHYMPI-T internal consistency analysis

WHYMPI-T	Test	Retest	Cronbach α	ICC	p
	Mean ± SD	Mean ± SD			
Part A	15.21 ± 2.64	15.21 ± 2.76	0.97	0.94	
Interference	13.8 ± 2.26	12.35 ± 2.86	0.88	0.78	
Support	11.85 ± 2.72	12.18 ± 2.92	0.78	0.63	
Pain severity	12.51 ± 1.97	12.39 ± 3.01	0.84	0.72	
Self-control	11.72 ± 3.26	11.72 ± 2.71	0.71	0.55	
Negative mood	14.05 ± 7.37	13.69 ± 7.74	0.95	0.91	
Part B	9.40 ± 1.93	9.35 ± 2.21	0.93	0.87	
Punishing responses	5.99 ± 1.33	6.18 ± 1.07	0.69	0.53	0.000
Sollicitous responses	6.10 ± 1.28	6.39 ± 1.31	0.38	0.23	
Distracting responses	6.27 ± 1.19	5.9 ± 1.18	0.72	0.57	
Part C	11.98 ± 2.35	11.97 ± 2.43	0.99	0.97	
Household chores	9.13 ± 2.29	18.92 ± 2.38	0.80	0.67	
Outdoor work	8.55 ± 2.22	18.73 ± 2.37	0.87	0.77	
Activities away from home	9.24 ± 2.48	19.28 ± 2.66	0.86	0.75	
Social activities	8.31 ± 2.29	20.23 ± 3.11	0.73	0.57	

ICC: Intra class Correlation Coefficient

Item analysis

Each substance of WHYMPI-T was found to be correlated with each other as a result of item analysis (Table 6, 7 and 8).

Table 6: WHYMPI-T Part A item correlation analysis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1																			
2	.626**	1																		
3	.256	.121	1																	
4	.653**	.610**	.169	1																
5	-.109	-.054	-.131	-.092	1															
6	-.035	-.269	.058	-.348*	-.009	1														
7	.729**	.668**	.034	.573**	-.089	-.252	1													
8	.642**	.836**	.168	.702**	-.094	-.217	.643**	1												
9	.639**	.676**	.170	.642**	-.231	-.232	.548**	.774**	1											
10	-.053	.023	.070	-.015	.774**	.025	-.061	-.113	-.152	1										
11	-.197	-.223	.034	-.191	.112	.230	-.265	-.213	-.190	-.047	1									
12	.827**	.641**	.169	.686**	-.089	-.137	.820**	.676**	.658**	-.025	-.253	1								
13	.612**	.558**	-.001	.553**	-.319*	-.236	.551**	.731**	.674**	.405**	-.294	.640**	1							
14	.126	-.036	.706**	.159	-.207	.209	.018	.063	.096	.096	-.122	.131	-.155	1						
15	-.096	-.071	.008	.007	.863**	-.042	-.085	-.115	-.186	.904**	-.025	-.050	-.348*	.004	1					
16	-.171	-.172	.000	-.229	.204	.463**	-.273	-.201	-.215	.101	.639**	-.226	-.367*	.022	.096	1				
17	.569**	.770**	-.005	.548**	-.124	-.345*	.686**	.782**	.667**	-.264	-.197	.543**	.697**	-.137	.248	-.237	1			
18	.155	.069	.070	.343*	-.349*	.440**	.257	.131	.221	-.243	-.200	.388*	.328*	.124	.233	.370*	.037	1		
19	.400**	.666**	.131	.645**	-.067	-.289	.462**	.762**	.690**	.021	-.202	.520**	.620**	-.013	.032	-.195	.675**	.143	1	
20	.334*	.204	.333*	.463**	-.081	-.384*	.387*	.219	.269	.177	-.335*	.474**	.177	.343*	.118	.359*	.105	.716**	.264	1

* $p < 0,05$; ** $p < 0,01$

Table 7: WHYMPI-T Part B item correlation analysis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1													
2	-.287	1												
3	-.254	.692**	1											
4	-.035	-.142	-.344*	1										
5	.039	.451**	.359*	-.087	1									
6	.047	.355*	.369*	-.075	.361*	1								
7	.116	-.295	-.259	.451**	-.229	.008	1							
8	-.357*	.804**	.640**	.016	.416**	.310*	-.183	1						
9	-.030	.320*	.365*	.157	.265	.391*	-.032	.278	1					
10	.099	-.296	-.452**	.563**	-.190	-.118	.422**	-.219	.051	1				
11	.159	.034	.113	.028	.255	.126	.275	-.036	.055	.088	1			
12	-.095	.171	.338*	-.211	.302	.505**	.074	.173	.386*	-.093	.364*	1		
13	-.284	.623**	.429**	-.148	.460**	.111	-.194	.536**	.225	-.106	.094	.355*	1	
14	.028	.263	.134	.130	.478**	.266	-.072	.327*	.239	-.100	.404**	.286	.350*	1

* $p < 0,05$ ** $p < 0,01$

Table 8: WHYMPI-T Part C item correlation analysis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1																	
2	. ^c	. ^c																
3	.456**	. ^c	1															
4	-.098	. ^c	.293	1														
5	.237	. ^c	.108	.085	1													
6	-.082	. ^c	.139	.270	-.028	1												
7	-.278	. ^c	.536**	.404**	.202	. ^c	1											
8	-.175	. ^c	.410**	.340 ^c	.015	. ^c	.366 ^c	1										
9	.555**	. ^c	. ^c	-.107	.419**	. ^c	-.216	-.050	1									
10	. ^c	. ^c	.229	.607**	.167	.321 ^c	.370 ^c	.204	-.262	1								
11	-.274	. ^c	.449**	.392 ^c	-.054	.314 ^c	.334 ^c	.506**	. ^c	.509**	1							
12	.107	. ^c	-.184	-.066	.044	. ^c	-.164	.271	.034	-.029	.226	1						
13	.670**	. ^c	. ^c	. ^c	.039	. ^c	.430**	-.296	.576**	. ^c	-.291	.042	1					
14	. ^c	. ^c	.099	.283	.149	.031	.283	.060	-.219	.498**	.362 ^c	. ^c	-.231	1				
15	-.108	. ^c	.363 ^c	.142	.175	.122	.108	.265	-.177	.302	.413**	.393 ^c	. ^c	.189	1			
16	-.030	. ^c	.264	.322 ^c	.394 ^c	.133	.257	.315 ^c	.089	.419**	.543**	.200	-.123	.268	.505**	1		
17	.813**	. ^c	. ^c	-.209	.439**	. ^c	-.173	-.086	.583**	. ^c	-.275	.107	.613**	. ^c	-.107	-.019	1	
18	-.265	. ^c	.138	.537**	.144	.316 ^c	.344 ^c	.277	-.085	.712**	.364 ^c	. ^c	. ^c	.290	.322 ^c	.433**	. ^c	1

* P < 0.05 ** p < 0.01

Invariance

Test-retest and parallel scale analysis were used for invariance of WHYMPI-T. A positive correlation between WHYMPI-T's A, B and C sections scores were found as a result of test-retest scores (Table 9).

Table 9: The test-retest analysis scores of A, B and C parts

WHYMPI-T	Part A	Part B	Part C
Part A	r	0.944	
	p	0.000	
Part B	r		0.880
	p		0.000
Part C	r		0.974
	p		0.000

r = Correlation coefficient

Pain Intensity subscale and section evaluating pain on activity of BPI were used for analysis of time invariance with parallel form method. Also part of pain the qualifications and pain intensity section of MPQ, BDÖ, ODI, physical component and mental component scores of KF-36 were used. Sections A and C of WHYMPI-T were determined to be associated with the other scales than section B of WHYMPI-T (Table 10).

4. Discussion

Chronic pain is a complex and subjective concept that the patient's own. Comprehensive chronic pain assessment based psychosocial parameters is important for treatment plan, to improving the treatment effectiveness and accurate analysis of clinical trials. Therefore, multidimensional pain scale

Table 10: The analysis results of the WHYMPI-T scale according to the parallel form method

Scales	WHYMPI-T			
		Part A	Part B	Part C
BPI- Pain Severity	r	0.621	M	M
	p	p < 0.005		
BPI- Activity effect	r	0.609	M	-0.321
	p	p < 0.005		p < 0.05
MPQ- Pain quality	r	0.438	M	-0.382
	p	p < 0.005		p < 0.05
BDI	r		M	-0.502
	p	M		p < 0.005
ODI	r	0.526	M	-0.310
	p	p < 0.005		p < 0.05
SF-36 PCS	r	-0.586	M	0.383
	p	p < 0.005		p < 0.05
SF-36 MCS	r		M	M
	p	M		M

BPI-Pain Severity: Pain Severity Subgroup of Brief Pain Inventory

BPI-Activity effect: Activity Effect Subgroup of Brief Pain Inventory

MPQ- Pain quality: Pain Quality Subgroup of MPQ

BDI: Beck Depression Inventory

SF-36 PCS: Short Form-36 physical component score

SF-36 MCS: Short Form-36 mental component score

r: Correlation coefficient

M: Meaningless

for assessing chronic pain is a great role nowadays.⁶ WHYMPI-T that is the multidimensional pain scale is a valid and reliable scale for patients with chronic low back pain as a result of the study.

Pain catastrophizing is associated with multiple pain outcomes, and is differentially associated with the adaptive coping (AC), dysfunctional (DYS), and interpersonally distressed (ID) coping classifications of the West Haven-Yale Multidimensional Pain Inventory.¹² Chronic pain is one specific health condition where couple relationships have been directly linked to physical and psychological outcomes. As a result, West Haven-Yale Multidimensional Pain Inventory provides an examination of the relationships between depressive symptoms and partner response styles and relationship satisfaction in the chronic pain.¹³

WHYMPI is a multi-dimensional scale that can be used for to evaluate patients with musculoskeletal disorders, neurological disorders, rheumatic diseases and psychological disorders. WHYMPI was used to evaluate patients with spinal cord injury in the study that was done by Soler et al.¹⁴ Lousberg et al. and Karlsson et al. used WHYMPI in the group of patients with fibromyalgia and psychological problems with cognitive and behavioral disorders.^{15,16} Calabro et al. used WHYMPI for psychopathological evaluation in obese individuals.¹⁷ In addition, WHYMPI has been used to evaluate the effectiveness of treatment methods in the literature.^{18, 19, 20}

Verra et al. and Garg et al. used WHYMPI for the patients with chronic non-specific low back pain like our study.^{21, 22} WHYMPI-T scale gave valid and reliable results in patients with low back pain as a result of our study.

Kern et al. reported the subscale scores of original WHYMPI between 0.97 and 3.74 points.⁶ The average value of the sub-scales of Swedish version WHYMPI were determined to be 1.23 to 3.73 by Bergström et al.²³ Jakobsson created the WHYMPI short version and found Cronbach α coefficients between 0.68 to 0.93 in the Swedish version of the study.²⁵ Subgroup of A and C section of the WHYMPI-T questionnaire's Cronbach α coefficient values are similar to the results Kern et al. But Our results were lower in section B (0.37-0.72). The reason for this difference may be the duration of pain in our patients. Duration of patient's pain is between 6 months-40.6 yrs in Kern et al. study group. Duration of pain is 3 months-12 yrs in our series. Another important factor about this subject is the closest person feels himself or herself. It comprises a wide range of identification like partner, friends, family, children and housemate. Wider perception of the concept of the nuclear family in Turkish culture can be the reason. Generally, our preliminary study group was consisted of married individuals and partner or lover have been reported as the closest person. A portion of the participant were single, while another part that have partners were determined to be problematic in relation to the partner when we investigated the differences of analysis results. We determined that patients with problematic in relation to the partners feel that the people closest person for him or her are underage children and their mother or father living far away. Definition of young children and

family not living together has not adequately defined in WHYMPI-T part B. Definition of 'Significant person' must be as adulthood individuals living together in the recent studies. Another limiting factor of our study is the smaller number of patients.

Bernstein et al. used discriminant and factor analysis methods to evaluate internal consistency and construct validity of WHYMPI. Weak correlation had been detected for activities away from home, social activities, anxiety responses and reactions to distractions sections. But reliability and validity analysis of WHYMPI had been found statistically significant.²⁶ We have detected significance for Cronbach's α coefficient in all subscales of WHYMPI-T outside concerns responses in the internal consistency analysis. As a result of our study WHYMPI meets the standards of validity and reliability like the results of Bernstein et al.

Parallel form is one of the most used form for scale reliability analysis. Soler et al. used numerical rating scale and the brief pain questionnaire for pain parameters, BDI, psychological global goodness index and the functional social support scale for psychological and social parameters, the functional independence measure for functionality evaluation in patients with spinal cord injury in the Spanish version of WHYMPI.¹⁴ Sub-parameters of WHYMPI and the results obtained from the parallel scale were consistent with each other as a result of the study. We have used McGill Pain Scale and the Brief Pain Inventory for evaluation of pain parameters, ODI for functionality, BDI for psychosocial assessment and SF-36 scale for the assessment of quality of life. We have found significant consistency between; WHYMPI-T part A, C and pain scales, WHYMPI-T part C and BDI. Also we have found significantly consistency between ODI and SF-36 results and WHYMPI-T part A and C scores like Soler et al.

Huprich et al. investigated the relationship between treatment success and environmental interest of patients receiving physiotherapy. They reported that the relationship between severity of pain and emotional distress in daily life as a result of Relationship Profile Test and WHYMPI scores.⁽²⁷⁾ We find a significant relationship between pain intensity measurements such as BPI, MPQ, WHYMPI-

T and BDI scores. It is consistent with the results of Huprich et al.

Nicholas et al. used WHYMPI, Roland Morris Disability Questionnaire and The Depression Anxiety Stress Scale to evaluate depressive symptoms in patients with chronic pain. They found a significant relationship between results.²⁸ The relationship between WHYMPI-T and ODI and BDI were investigated in our study. Relationship between depressive symptoms, functionality and WHYMPI-T part C was determined as a result of our study.

5. Limitations

Because this study is a pilot study, so the sample size was small. Based upon the results and observations of this study, future studies will be planned with a higher number of patients to validate or negate the result found in this study.

6. Conclusion

WHYMPI-T which is used in the assessment of chronic pain with high psychosocial and behavioral aspects was determined in accordance with the valid standards by criterion validity of the method of analysis for validity. Reliability is determined by Cronbach α coefficients that are found as a result of internal consistency reliability analysis for reliability analysis and Pearson correlation coefficient values that are found as a result of Test re-test method. We believe it would be beneficial to use WHYMPI-T to evaluate the outcome of and follow-up the patients with chronic low back pain.

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8. Competing interest

The authors declare that they have no conflict of interest.

9. Authors' contribution

EGG: Concept of study, manuscript writing, review & editing, statistical analysis

MM: Diagnosing, editing, manuscript writing, review & editing.

YOA, HO: Statistical analysis, writing, review & editing

10. References

1. Chou R, Shekelle P. Will this patient develop persistent disabling low back pain? *JAMA*. 2010;303(13):1295-1302. [PubMed] DOI: [10.1001/jama.2010.344](https://doi.org/10.1001/jama.2010.344)
2. Gürleyik ZG, Daşkapan A, Tüzün EH, Akman N. Lumbar spondilozisli hastalarda bel ağrısının psikososyal sağlık ve yaşam kalitesi üzerine etkisi: pilot çalışma. *Fizyoterapi Rehabilitasyon*. 2013;24(1):80-87. [Free Full Text]
3. Deniz S, Atim A, Purtuloğlu T, Kurt E. Results of the assessment of the council of multidisciplinary pain. *Agri*. 2013;25(3):123-8. [PubMed] DOI: [10.5505/agri.2013.77045](https://doi.org/10.5505/agri.2013.77045)
4. Hancock MJ, Maher CG, Laslett M, Hay E, Koes B. Discussion paper: what happened to the 'bio' in the biopsychosocial model of low back pain? *Eur Spine J*. 2011 Dec;20(12):2105-10. [PubMed] [Free Full Text] DOI: [10.1007/s00586-011-1886-3](https://doi.org/10.1007/s00586-011-1886-3)
5. Soysal M, Kara B, Arda MN. Assessment of physical activity in patients with chronic low back or neck pain. *Turk Neurosurg*. 2013;23(1):75-80. [PubMed] [Free Full Text] DOI: [10.5137/1019-5149.JTN.6885-12.0](https://doi.org/10.5137/1019-5149.JTN.6885-12.0)
6. Kerns RD, Turk DC, Rudy TE. The West Haven-Yale Multidimensional Pain Inventory. *Pain*. 1985;23:345-56. [PubMed] DOI: [10.1016/0304-3959\(85\)90004-1](https://doi.org/10.1016/0304-3959(85)90004-1)
7. Kuru T, Yeldan İ, Zengin A, Kostanoglu A, Tekeoglu A, Akbaba YA, et al. Erişkinlerde Ağrı Ve Farklı Ağrı Tedavilerinin Prevalansı. *Agri*. 2011;23(1), 22-27. [Free Full Text]
8. Kuguoglu S, Eti-Aslan F, Olgun N. McGill Melzack Ağrı Soru Formu (MASF) nun Türkçe'ye Uyarlanması [Turkish adaptation of the McGill Melzack Pain Questionnaire (MPQ)]. *Agri*. 2003;15(1), 47-52.
9. Tuglu C, Aktürk Z, Dağdeviren N, Türe M. The Reliability And Validity Analysis Of The Turkish Version Of Beck Depression Inventory For Primary Care. *Turkish Journal of Family Practice* 2005;9(3):117-122. [Free Full Text]
10. Johnsen LG, Hellum C, Nygaard ØP, Storheim K, Brox JI, Rossvoll L, et al. Comparison of the SF6D, the EQ5D, and the Oswestry disability index in patients with chronic low back pain and degenerative disc disease *BMC Musculoskelet Disord*. 2013;14(1):148. [Free Full Text] DOI: [10.1186/1471-2474-14-148](https://doi.org/10.1186/1471-2474-14-148)
11. Koçyiğit H, Aydemir Ö, Fişek G, et al. Kısa Form-36 (KF-36)'nin Türkçe versiyonunun güvenilirliği ve geçerliliği. *İlaç ve Tedavi Dergisi*. 1999;12:102-106.
12. Chatkoff DK, Leonard MT, Maier KJ. Pain catastrophizing differs between and within West Haven-Yale Multidimensional Pain Inventory (MPI) pain adjustment classifications: theoretical and clinical implications from preliminary data. *Clin J Pain*. 2015 Apr;31(4):349-54. [PubMed] DOI: [10.1097/AJP.0000000000000117](https://doi.org/10.1097/AJP.0000000000000117)
13. Leonard MT, Chatkoff DK, Maier KJ. Couples' Relationship Satisfaction and Its Association with Depression and Spouse Responses Within the Context of Chronic Pain Adjustment. *Pain Manag Nurs*. 2018 Aug;19(4):400-407. [PubMed] DOI: [10.1016/j.pmn.2017.10.008](https://doi.org/10.1016/j.pmn.2017.10.008)
14. Soler MD, Cruz-Almeida Y, Sauri J, Widerström-Noga EG. Psychometric evaluation of the Spanish version of the MPI-SCI. *Spinal Cord*. 2013 Jul;51(7):538-52.. [PubMed] [Free Full Text] DOI: [10.1038/sc.2013.21](https://doi.org/10.1038/sc.2013.21)
15. Lousberg R, Van Breukelen GJ, Groenman NH, Schmidt AJ, Arntz A, Winter FA. Psychometric properties of the Multidimensional Pain Inventory, Dutch language version (MPI-DLV). *Behav Res Ther*. 1999 Feb;37(2):167-82. [PubMed] DOI: [10.1016/s0005-7967\(98\)00137-5](https://doi.org/10.1016/s0005-7967(98)00137-5)
16. Karlsson B, Burell G, Kristiansson P, Björkegren K, Nyberg F, Svärdsudd K. Decline of substance P levels after stress management with cognitive behaviour therapy in women with the fibromyalgia syndrome. *Scand J Pain*. 2019 Jul 26;19(3):473-482. [PubMed] DOI: [10.1515/sjpain-2018-0324](https://doi.org/10.1515/sjpain-2018-0324)
17. Calabrò PF, Ceccarini G, Calderone A, Lippi C, Piaggi P, Ferrari F, et al. Psychopathological and psychiatric evaluation of patients affected by lipodystrophy. *Eat Weight Disord*. 2020 Aug;25(4):991-998. [PubMed] DOI: [10.1007/s40519-019-00716-6](https://doi.org/10.1007/s40519-019-00716-6)
18. Zampi DD. Efficacy of Theta Binaural Beats for the Treatment of Chronic Pain. *Altern Ther Health Med*. 2016 Jan-Feb;22(1):32-8. [PubMed]
19. Eklund A, Jensen I, Leboeuf-Yde C, Kongsted A, Jonsson M, Lövgren P, et al. The Nordic Maintenance Care Program: Does psychological profile modify the treatment effect of a preventive manual therapy intervention? A secondary analysis of a pragmatic randomized controlled trial. *PLoS One*. 2019 Oct 10;14(10):e0223349. [PubMed] [Free Full Text] DOI: [10.1371/journal.pone.0223349](https://doi.org/10.1371/journal.pone.0223349)
20. Wakolbinger R, Diers M, Hruba LA, Sturma A, Aszmann OC. Home-Based Tactile Discrimination Training Reduces Phantom Limb Pain. *Pain Pract*. 2018 Jul;18(6):709-715. [PubMed] DOI: [10.1111/papr.12657](https://doi.org/10.1111/papr.12657)
21. Verra ML, Angst F, Staal JB, Brioschi R, Lehmann S, Aeschlimann A, et al. Reliability of the Multidimensional Pain Inventory and stability of the MPI classification system in chronic back pain. *BMC Musculoskelet Disord*. 2012 Aug 24;13:155. [PubMed] [Free Full Text] DOI: [10.1186/1471-2474-13-155](https://doi.org/10.1186/1471-2474-13-155)
22. Garg A, Pathak H, Churyukanov MV, Uppin RB, Slobodin TM. Low back pain: critical assessment of various scales. *Eur Spine J*. 2020 Mar;29(3):503-518. [PubMed] DOI: [10.1007/s00586-019-06279-5](https://doi.org/10.1007/s00586-019-06279-5)
23. Bergström KG, Jensen IB, Linton SJ, Nygren ÅL. A psychometric evaluation of the Swedish version of the

- Multidimensional Pain Inventory (MPI-S): a gender differentiated evaluation. *Eur J Pain*. 1999 Jun;3(3):261-273. [PubMed] DOI: 10.1053/eujp.1999.0128
24. Flor H, Rudy TE, Birbaumer N, Streit B, Schugens MM. Zur Anwendbarkeit des West Haven-Yale Multidimensional Pain Inventory im deutschen Sprachraum : Daten zur Reliabilität und Validität des MPI-D [The applicability of the West Haven-Yale multidimensional pain inventory in German-speaking countries. Data on the reliability and validity of the MPI-D.]. *Schmerz*. 1990 Jun;4(2):82-7. [PubMed] DOI: 10.1007/BF02527839
25. Jakobsson U. Psychometric testing of the brief screening version of Multidimensional Pain Inventory (Swedish version). *Scand J Caring Sci*. 2009 Mar;23(1):171-9. [PubMed] DOI: 10.1111/j.1471-6712.2008.00602.x
26. Bernstein IH, Jaremko ME, Hinkley BS. On the utility of the West Haven-Yale Multidimensional Pain Inventory. *Spine (Phila Pa 1976)*. 1995 Apr 15;20(8):956-63.. [PubMed] DOI: 10.1097/00007632-199504150-00014
27. Huprich SK, Hoban P, Boys A, Rosen A. Healthy and maladaptive dependency and its relationship to pain management and perceptions in physical therapy patients. *J Clin Psychol Med Settings*. 2013 Dec;20(4):508-14. [PubMed] DOI: 10.1007/s10880-013-9372-1
28. Nicholas MK, Coulston CM, Asghari A, Malhi GS. Depressive symptoms in patients with chronic pain. *Med J Aust*. 2009 Apr 6;190(S7):S66-70. [PubMed]