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Validity, reliability, and comparison of the WOMAC osteoarthritis index and Lequesne algofunctional index in Turkish patients with hip or knee osteoarthritis

Sibel Basaran · Rengin Guzel · Gulsah Seydaoglu · Fusun Guler-Uysal

Abstract To assess validity and reliability of the Western Ontario and McMaster Universities (WOMAC) osteoarthritis (OA) index and Lequesne algofunctional index in Turkish patients with hip or knee OA and to compare the results of the instruments for these two particular sites of involvement. Two disease-specific instruments: WOMAC LK 3.1 and Lequesne indices were administered to 117 outpatients with OA (44 hip and 73 knee) living in Turkey. These indices were administered twice 7–10 days apart to ensure the test–retest reliability. All patients were asked to reply a generic health-related quality-of-life instrument (Short Form-36, SF-36) and a structured interview assessing demographic and other characteristics. Internal consistency and reliability was evaluated by Cronbach's alpha and intra-class correlation coefficients (ICC). Construct validity was tested by correlating the WOMAC or Lequesne with each other, and also with SF-36 and visual analog scale (VAS). The Cronbach's alphas of the WOMAC and Lequesne subscales were ranged 0.78–0.95 and 0.51–0.85 for hip and 0.78–0.94 and 0.61–0.71 for knee OA, respectively. Test–retest reliability of the WOMAC and Lequesne subscales yielded ICCs of 0.77–0.94 and 0.51–0.85 for hip and 0.80–0.98 and 0.61–0.71 for knee OA, respectively. WOMAC and Lequesne showed moderate-good correlations between comparable subscales of SF-36 (physical functioning and bodily pain) and weak-moderate correlations between VAS. All subscales and total WOMAC had better internal consistency and more satisfactory concurrent validity compared with Lequesne. Our results indicated that WOMAC is a more reliable index for use in Turkish patients with hip or knee OA than Lequesne.

Keywords Hip osteoarthritis · Knee osteoarthritis · Lequesne · Turkish · Validation · WOMAC

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Introduction

Osteoarthritis (OA) is the most common form of arthritis and its prevalence increases with age. Knee and hip osteoarthritis are common causes of lower extremity pain and disability in the general population. Patients with lower extremity OA exhibit deterioration in functions concerning mobility, transfer, and activities of daily living (ADL). Pain and disability have a significant impact on health-related quality of life of the patients [1–4].

It has been generally accepted that there is a disparity between symptoms and radiological abnormalities in osteoarthritis. Poor correlation between radiography and symptoms necessitates therapeutic decisions depending on pain and physical disability suffered by patients [5]. Assessment of pain and physical function is not only

important for evaluating the course of disease, but also for determining the effects of treatment. Therefore, there is a need for valid and responsive outcome measures to quantify the impact of OA on patients and to assess the efficacy of treatments for OA [2, 6].

There are a variety of instruments that measure the different dimensions of health status in patients with OA. The Western Ontario and McMaster Universities (WOMAC) osteoarthritis index and Lequesne algofunctional index for hip and knee are among the most widely used disease-specific instruments for the assessment of patients with OA. WOMAC is a multidimensional, self-administered health status instrument whereas Lequesne is an interviewer-administered instrument for patients with osteoarthritis of both hip and knee [7–10].

Psychometric properties of health status questionnaires should be evaluated to ensure that the versions of these questionnaires that have been translated and adapted for use in another language are equivalent to the original questionnaire. This is also necessary to enable comparison between assessments made in different populations [3, 11]. Validation of WOMAC index in Turkish patients with knee OA has been studied recently [12]. However there is, so far, no data concerning WOMAC index in hip OA and the validity and reliability of Lequesne index in Turkish patients. The aim of this study is to evaluate the reliability and validity of WOMAC and Lequesne indices in Turkish patients with hip or knee OA and to compare the results of the instruments for these two particular sites of involvement.

Subjects and methods

Patients and data collection

A total of 134 patients with OA (50 hip and 84 knee) living in Cukurova region, Turkey were enrolled consecutively at the outpatient clinic of Cukurova University Physical Medicine and Rehabilitation Department over a period of about 9 months (between June 2004 and February 2005). The study had approval from the local ethics committee and patients provided informed consent.

All patients met the clinical and radiological criteria of the American College of Rheumatology for hip or knee OA. The criteria for inclusion were primary hip or knee OA, age over 40 years, and competency to complete the questionnaires. Exclusion criteria were presence of other rheumatic diseases responsible for secondary OA, symptoms and signs of acute synovitis, any physical therapy program or intra-articular injections within the previous 6 months. Patients who had traumatic injuries of the lower limb, advanced or uncontrolled cardiac, or peripheral vascular diseases were also excluded from the study.

Of the 134 patients who met the inclusion criteria 17 patients (six from hip and 11 from knee OA patients) were not included in statistical analyses because of not attending the second visit for readministration of the questionnaires.

All patients were questioned about demographic data, co-morbid conditions, duration of symptoms, target joint (the most painful or symptomatic joint), and pain severity at rest using visual analog scale (VAS). The presence of co-morbidities was assessed according to the patient's self reports with special emphasis questioning for the following conditions: hypertension, cardiac diseases, chronic respiratory diseases, diabetes mellitus, neurological problem, gastrointestinal diseases, kidney disease, and visual impairments. The total co-morbidity score was the sum of the co-morbid conditions and the score ranged from 0 to 8.

Radiographs used in this study were obtained within 6 months of the date of the assessments and graded on the basis of the Kellgren and Lawrence radiological scoring [13]. Laboratory analyses including complete blood count, erythrocyte sedimentation rate, C-reactive protein, and routine biochemical tests were performed. The use of simple analgesics and non-steroidal anti-inflammatory drugs were also questioned and patients were advised not to change the medications until the second visit.

Measures

Two disease-specific questionnaires (WOMAC LK 3.1 version and Lequesne algofunctional index of severity for the hip or knee) and one generic questionnaire [Short Form-36 (SF-36)] was administered to the patients with OA at baseline. WOMAC and Lequesne algofunctional indices were readministered after 7–10 days.

The WOMAC osteoarthritis index is a three-dimensional, disease specific, self-administered health status measure. It evaluates clinically important, patient-relevant symptoms in the areas of pain, stiffness, and physical function in patients with osteoarthritis of the hip and/or knee. The index consists of 24 questions in three subscales (five pain, two stiffness, 17 physical function). It is available in Likert, visual analog scale and numeric rating scale formats. Original authorized Turkish translation of the WOMAC LK 3.1 was used in our study with the permission of the copyright owner (Prof. Nicholas Bellamy). In Likert version, there are five response levels for each item representing different degrees of intensity that were scored from 0 to 4 (0 = none, 1 = mild, 2 = moderate, 3 = severe, and 4 = extreme). The scale lengths of the subscales are as follows: pain = 20, stiffness = 8, and physical function = 68. Higher scores indicate worse health status [10, 14, 15]. In order to normalize the LK index on 0–10 scales, as recommended in the user guide, the following correction factors are used where S = sum of raw scores of items in dimension: pain score range:

0–20, normalization$=(S\times0.50)$; stiffness score range: 0–8, normalization$=(S\times1.25)$; and physical function score range: 0–68, normalization$=(S\times0.147)$. Once subscale values have been normalized, they are summed to provide a single value (total score) in which the three component subscales were equally weighted [14].

Lequesne algofunctional index of severity is a disease and joint-specific questionnaire. It has been developed as an interview format and consists of three scales with a total of ten items. The first scale contains five items of pain or discomfort, the second maximum distance walked (one item), and the third function or activities of daily living (ADL; four items). The score for pain and ADL scales range from 0 (no pain or functional limitation) to 8 (extreme pain or functional limitation). The "maximum distance walked" section is graded from 0 = unlimited to 6 = less than 100 m. The score is upgraded by one point "if the patient uses one walking stick or crutch' or by two points 'if the patient uses two walking sticks or crutches." Lequesne index directly aggregates symptoms and function which results in a single global index score ranging from 0 to 24. Higher scores indicate worse health status [8, 9, 16]. For the purpose of this study, validity and reliability were assessed for the global index as well as the three scales separately. Lequesne index was translated from the English version following standard guideline recommendations [17].

The translated indices were pre-tested in order to avoid misunderstandings. Both indices were clear and well understood. So that, we did not make any cross-cultural modifications for both WOMAC and Lequesne indices.

SF-36 is a generic, 36-item, self-administered instrument assessing general health status in eight scales (physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health). The physical function scale consists of ten items asking about involvement in different activities such as running, lifting heavy objects, participating in sports, lifting and carrying groceries, climbing stairs, bending, kneeling, walking, bathing, and dressing. The pain scale consists of two items asking patient to rate the severity of pain and extent of interference with normal activities because of pain [18]. Two psychometrically based summary measures: the physical component summary scale (PCS) and mental component summary scale (MCS) scores have been developed recently [19]. PCS and MCS make it possible to reduce the number of statistical comparisons needed and provide greater precision. Psychometric properties of SF-36 have been studied and SF-36 was shown to be valid and reliable in Turkish patients [20]. In this study, SF-36 is scored using SF Health Outcomes^{TM} Scoring Software (QualityMetric Incorporates). The score ranges between 0 and 100 and higher scores represent better health status.

Statistical analysis

Cronbach's alpha coefficient was used to test the internal consistency of the WOMAC and Lequesne. A Cronbach's alpha value of 0.70 is generally considered to be sufficient. No agreement exists about the acceptable value of the coefficient alpha, but values <0.60 are not reasonable. Test–retest reliability coefficient was also calculated. Intra-class correlation coefficients (ICC) with 95% confidence intervals (CI) were calculated, an ICC ≥0.70 is also considered as acceptable. To compare the construct validity correlations between WOMAC and Lequesne indices with similar dimensions of SF-36 and VAS were tested by Pearson's correlation test. Pearson's correlation coefficients were interpreted as either excellent relationship $r\geq0.91$; good $0.90\leq r\geq0.71$; fair $0.70\leq r\geq0.51$; weak $0.50\leq r\geq0.31$; little or none $r\leq0.3$. Statistical package "SPSS version 12.0 for Windows" was used for analyses. The appropriate t tests and chi-square tests were performed to assess differences between groups. A p value of 0.05 was taken as the level of significance.

Results

The study group consisted of 117 patients (44 hip OA and 73 knee OA) with a mean age of 61.5±9.7 (range 40–78 years). Baseline characteristics of the hip and knee OA patients and the descriptive data for the distribution of socio-demographic and clinical features together with WOMAC, Lequesne and SF-36 scores of the hip and knee OA patients were given in Table 1. Ninety percent ($n=66$) of knee OA patients and 82% ($n=36$) of hip OA patients were female. Twenty-four of the hip OA patients and 32 of the knee OA patients designated their right hip or knee to be the target joint. Body mass index (BMI) of 56% of knee OA and 38.6% of hip OA patients were ≥30 kg/m^2. Seventeen percent of the patients were living alone, while 83% of them were living with their family.

When we compare socio-demographic data and baseline characteristics of hip and knee OA patients, only age and duration of stiffness were significantly higher in hip OA patients. PCS score of SF-36 and total score of Lequesne were also significantly worse in hip OA patients (Table 1).

Patient characteristics such as age, BMI, education, duration of disease and stiffness, co-morbid conditions, VAS, and radiological grade were analyzed for correlations with WOMAC and Lequesne scores. VAS correlated significantly with all WOMAC and Lequesne subscale scores and total scores of both hip ($r=0.46$ for WOMAC and $r=0.52$ for Lequesne total score) and knee ($r=0.46$ for WOMAC and $r=0.49$ for Lequesne total score) OA patients. No correlations were detected between radiological grade

Table 1 Socio-demographic data, baseline characteristics, and health status measures of hip and knee OA patients

	Hip OA (n=44) Mean±SD	Knee OA (n=73) Mean±SD
Age	64.7±9.3	59.6±9.6*
BMI	29.0±4.9	30.5±9.6
Education (years)	7.5±4.5	7.1±4.6
Duration of disease (years)	4.9±5.2	5.2±4.1
Duration of stiffness (min)	11.8±9.3	8.0±7.9*
Co-morbid conditions	3.6±1.6	3.6±1.6
VAS	55.1±14.7	54.9±17.5
Radiological grade (n, %)		
Grade II	20 (45.5)	25 (34.2)
Grade III	20 (45.5)	33 (45.2)
Grade IV	4 (9.1)	15 (20.5)
WOMAC pain	4.6±1.5	4.6±1.7
WOMAC stiffness	4.3±1.9	4.3±2.1
WOMAC function	5.2±1.5	4.9±1.6
WOMAC total	14.1±4.4	13.8±4.7
Lequesne total	12.2±3.4	10.7±3.7*
SF-36 PF	35.5±19.4	40.8±20.9
SF-36 BP	36.1±17.8	38.3±19.1
SF-36 PCS	31.3±6.9	34.9±7.9*

*$p<0.05$

BMI body mass index, *VAS* visual analog scale, *SF-36* Short Form-36, *WOMAC* Western Ontario and McMaster Universities osteoarthritis index, *PF* physical functioning, *BP* bodily pain, *PCS* physical component summary scale

and the two scales in both hip and knee OA patients (Table 2).

The results of the reliability and validity were shown in Tables 3 and 4 for the WOMAC and Lequesne indices.

The WOMAC subscales demonstrated a high ICC statistic (0.77–0.94 for hip and 0.80–0.98 for knee) with a quite narrow confidence interval. Cronbach's alpha was found between 0.78 and 0.95 for hip and 0.78 and 0.94 for knee

Table 2 Correlations between socio-demographic and baseline characteristics with WOMAC and Lequesne indices

	WOMAC				Lequesne			
	Pain	Stiffness	Function	Total	Pain	Distance	Function	Total
Age	0.11	0.19	0.01	0.14	0.11	0.10	0.02	0.15
	0.01	0.15	0.08	0.08	0.01	0.23	0.18	0.09
BMI	0.11	0.19	0.08	0.06	0.13	0.05	0.05	0.05
	0.28	0.19	**0.37**	0.29	0.21	0.18	**0.42**	**0.36**
Education	−0.21	−0.20	−0.24	−0.21	−0.16	−0.14	−0.08	−0.04
	−0.33	−0.18	**−0.34**	−0.30	−0.23	−0.11	**−0.37**	**−0.31**
Duration of disease	0.02	0.02	0.18	0.10	0.13	0.16	0.20	0.25
	0.31	0.17	**0.32**	0.27	0.27	0.16	0.24	0.27
Duration of stiffness	0.06	**0.32**	0.04	0.10	**0.34**	0.01	0.17	0.08
	0.38	**0.48**	**0.42**	**0.53**	**0.54**	0.20	0.17	**0.44**
Co-morbid conditions	0.20	0.06	0.11	0.08	**0.31**	0.27	0.06	0.32
	0.05	0.12	0.08	0.09	0.10	0.15	0.14	0.16
VAS	**0.49**	**0.35**	**0.53**	**0.46**	**0.35**	**0.39**	**0.32**	**0.52**
	0.44	**0.35**	**0.48**	**0.46**	**0.39**	**0.31**	**0.43**	**0.49**
Radiological grade	0.16	0.08	0.20	0.17	0.11	0.07	0.13	0.15
	0.29	0.10	0.21	0.22	0.07	0.07	0.24	0.11

First row—hip, second row—knee; ($r>0.3$ are shown in bold characters)

WOMAC Western Ontario and McMaster Universities osteoarthritis index, *VAS* visual analog scale

Table 3 Internal consistency and reliability of WOMAC and Lequesne indices of hip and knee OA patients

	Score (test) Mean±SD	Score (retest) Mean±SD	Item-scale correlation[a]	ICC (95% CI)	Cronbach's alpha
WOMAC hip					
Pain	4.6±1.5	4.5±1.3	0.39–0.76	0.81 (0.70–0.88)	0.80
Stiffness	4.3±1.9	4.3±1.9	0.79	0.77 (0.59–0.89)	0.78
Function	5.2±1.5	5.2±1.4	0.53–0.76	0.94 (0.92–0.97)	0.95
Total	14.1±4.4	14.0±4.1	0.55–0.76	0.94 (0.93–0.96)	0.95
WOMAC knee					
Pain	4.6±1.7	4.6±1.6	0.51–0.65	0.98 (0.68–0.85)	0.78
Stiffness	4.3±2.1	3.9±2.1	0.67	0.80 (0.68–0.87)	0.81
Function	4.9±1.6	5.1±1.6	0.58–0.72	0.93 (0.91–0.96)	0.94
Total	13.8±4.7	13.5±4.8	0.55–0.71	0.95 (0.93–0.97)	0.95
Lequesne Hip					
Pain	5.4±1.4	5.4±1.4	0.15–0.56	0.51 (0.23–0.71)	0.51
Distance	2.9±1.9	2.9±1.9	–	–	–
Function	3.9±1.3	3.9±1.2	0.62–0.73	0.85 (0.76–0.91)	0.85
Total	12.2±3.4	12.3±3.2	0.12–0.56	0.58 (0.37–0.75)	0.58
Lequesne Knee					
Pain	4.7±1.7	4.8±1.5	0.33–0.60	0.61 (0.45–0.73)	0.61
Distance	1.9±1.6	1.9±1.5	–	–	–
Function	4.2±1.4	4.3±1.3	0.39–0.55	0.71 (0.58–0.80)	0.71
Total	10.7±3.7	10.9±3.5	0.25–0.59	0.71 (0.60–0.80)	0.71

[a] Correlations are computed with the item of interest deleted

ICC intra-class correlation coefficient, *WOMAC*: Western Ontario and McMaster Universities osteoarthritis index

groups. Correlation between item and total scale was found between 0.39 and 0.79 and 0.51 and 0.72 for hip and knee OA, respectively. The Lequesne subscales demonstrated a moderate ICC statistic (0.51–0.85 for hip and 0.61–0.71 for knee) with a wide confidence interval. Cronbach's alpha was found between 0.51 and 0.85 for hip and 0.61 and 0.71 for knee groups. Correlation between item and total scale was found between 0.15 and 0.73 and 0.33 and 0.60 for hip and knee OA, respectively (Table 3).

Subscales of WOMAC showed moderate-good correlations between comparable subscales of SF-36 (physical functioning and bodily pain) and weak-moderate correlations between VAS. Subscales of Lequesne showed moderate correlations between SF-36 physical functioning and bodily pain subscales and also weak-moderate correlations between VAS. Moderate-good correlations were found between total scores of both WOMAC and Lequesne and SF-36 (Table 4).

The results of the correlation between WOMAC and Lequesne were shown in Table 5. Correlation between WOMAC and Lequesne was found weak-moderate in all subcales except Lequesne function subscale and WOMAC physical function subscale in hip OA (0.77). Moderate correlations were found between total scales of the two indices (0.69 for hip and 0.65 for knee).

Discussion

In this study, we evaluated the reliability and validity of WOMAC and Lequesne indices in Turkish patients with hip or knee OA and additionally we compared the results of the instruments for these two particular sites of involvement. Our results showed that all subscales and total score of WOMAC had better internal consistency and more satisfactory concurrent validity compared with Lequesne.

Metric properties of German version of the WOMAC and Lequesne indices were evaluated and compared by Stucki et al. [21] in patients with hip or knee OA. The Cronbach's alpha values of WOMAC and Lequesne indices were similar to our values which were 0.81–0.96 for WOMAC and 0.55–0.86 for Lequesne in their study. Item-scale correlations of WOMAC were also similar to our results, but ICC values were lower than ours. When we compare the results for Lequesne, item-scale correlations and ICC values of Lequesne were higher than ours. The Cronbach's alpha values of Lequesne pain were low in both hip and knee OA in our study. Similar findings concerning Lequesne pain domain were detected (0.55 and 0.63, respectively) in the study by Stucki et al. These results can be interpreted as pain or symptom domain of Lequesne may not be a reliable measure of pain in patients with hip or

Table 4 Construct validity of the WOMAC and Lequesne indices of hip and knee OA patients

	SF-36										VAS
	PF	PR	BP	GH	Vitality	SF	ER	MH	PCS	MCS	
WOMAC											
Pain	−0.72	−0.22	−0.59	−0.46	−0.52	−0.47	−0.27	−0.36	−0.57	−0.33	0.49
	−0.57	−0.21	−0.60	−0.30	−0.35	−0.50	−0.28	−0.27	−0.48	−0.32	0.44
Stiffness	−0.55	−0.01	−0.46	−0.25	−0.45	−0.37	−0.22	-0.12	−0.39	−0.21	0.35
	−0.37	−0.01	−0.40	−0.17	−0.25	−0.32	−0.01	−0.23	−0.31	−0.19	0.35
Function	−0.68	−0.19	−0.63	−0.41	−0.46	−0.41	−0.25	−0.30	−0.57	−0.27	0.53
	−0.76	−0.29	−0.66	−0.33	−0.41	−0.56	−0.23	−0.37	−0.63	−0.31	0.48
Total	−0.73	−0.19	−0.64	−0.43	−0.51	−0.45	−0.27	−0.31	−0.59	−0.29	0.46
	−0.73	−0.27	−0.67	−0.33	−0.41	−0.57	−0.25	−0.36	−0.61	−0.32	0.46
Lequesne											
Pain	−0.39	−0.02	−0.32	−0.04	−0.02	−0.23	−0.16	−0.05	−0.32	−0.04	0.35
	−0.58	−0.27	−0.61	−0.35	−0.40	−0.61	−0.37	−0.32	−0.50	−0.40	0.39
Distance	−0.50	−0.34	−0.32	−0.33	−0.31	−0.41	−0.14	−0.24	−0.40	−0.18	0.39
	−0.47	−0.30	−0.39	−0.25	−0.46	−0.36	−0.12	−0.14	−0.48	−0.17	0.31
Function	−0.56	−0.12	−0.50	−0.26	−0.19	−0.31	−0.09	−0.21	−0.48	−0.13	0.32
	−0.67	−0.32	−0.55	−0.28	−0.54	−0.42	−0.26	−0.34	−0.56	−0.29	0.43
Total	−0.66	−0.16	−0.52	−0.34	−0.32	−0.50	−0.23	−0.28	−0.51	−0.24	0.52
	−0.74	−0.41	−0.69	−0.44	−0.60	−0.63	−0.32	−0.37	−0.71	−0.38	0.49

First row—hip, second row—knee

WOMAC Western Ontario and McMaster Universities osteoarthritis index, *PF* physical functioning, *PR* physical role, *BP* bodily pain, *GH* general health, *VT* vitality, *SF* social functioning, *ER* emotional role, *MH* mental health, *PCS* physical component summary scale, *MCS* mental component summary scale, *VAS* visual analog scale

knee OA. The possible explanation for the low internal consistency may be the inconsistent grading of Lequesne pain questions. The pain or symptom section and thus the composite Lequesne index are not unidimensional measures of an underlying construct. They found only the ADL or function domain of Lequesne index to be internally consistent for both hip and knee OA (0.93 and 0.71, respectively) in accordance with our results. They compared WOMAC subscales with Lequesne subscales and found moderate-high correlations, whereas it was weak-moderate in our study. Our correlation values between WOMAC and Lequesne for hip OA was better than knee OA, as it was also the case in the study by Stucki et al. [21].

For construct validity they used radiological severity and range of motion values, whereas we used SF-36 and VAS for comparison. Moderate correlations were found between the WOMAC and Lequesne with radiological grade and range of motion in the mentioned study. We also graded the radiographs of our patients and found no correlations between subscales and total score of both indices and radiological grade.

In the reliability and validity study of Korean WOMAC and Lequesne, the Cronbach's alpha values for subscales of WOMAC and Lequesne were found to be 0.81–0.96 and 0.71–0.85, respectively, in patients with knee OA [6]. These values are similar to our Cronbach's alpha values for

Table 5 Correlation between WOMAC and Lequesne scales

		WOMAC hip				WOMAC knee			
		Pain	Stiffness	Function	Total	Pain	Stiffness	Function	Total
		Lequesne hip				Lequesne knee			
	Pain	0.44	0.33	0.30	0.38	0.51	0.46	0.62	0.60
	Distance	0.43	0.37	0.36	0.42	0.42	0.19	0.38	0.37
	Function	0.68	0.43	0.77	0.70	0.45	0.38	0.62	0.51
	Total	0.72	0.51	0.66	0.69	0.60	0.46	0.72	0.65

WOMAC Western Ontario and McMaster Universities osteoarthritis index

WOMAC and higher than our results for Lequesne scales. Item-scale correlations of WOMAC (0.67–0.84) were higher and ICC values (0.79–0.89) were slightly lower than ours. When we compare the results for Lequesne, item-scale correlations (0.31–0.80) and ICC values (0.76–0.80) of pain and function domains of Lequesne were higher than our results. Correlation values between WOMAC and Lequesne were weak-moderate (except walk distance) as in our study. They found walk distance item to be the least comprehensible item. Therefore no correlations between distance domain and WOMAC were detected in the study by Bae et al. [6]. Patient and physician global assessments and VAS values were used for construct validity. Moderate correlations were found between WOMAC and VAS and weak correlations were found between Lequesne and VAS in their study. We found weak-moderate correlations for both WOMAC and Lequesne scales.

Responsiveness of WOMAC pain and function sections were also assessed and compared with Lequesne by Theiler et al. [22]. WOMAC scales and the WOMAC global index were found to be more responsive than the comparable Lequesne sections in patients with OA of the lower extremities [22].

Faucher et al. [5] assessed reliability and validity of the WOMAC and Lequesne in French population. Test–retest reliability of the two indices was found to be good; however, they found that both indices were not valid to assess functional disability caused by knee OA in French population. Same authors investigated the psychometric properties of each item of the Lequesne index and modified the index by item reduction in another study [23]. Item analysis revealed that fifth question of pain domain assessing "pain or discomfort when getting up from sitting position without help of arms" had the weakest reliability and they modified the index by deleting this question. Test–retest reliability and validity of the modified Lequesne index was found to be sufficient in French population with knee OA [23].

There are nearly fifty alternate language translations of WOMAC index [14]. Validity, reliability, and cross-cultural adaptations of WOMAC index has been studied in different populations [2–4, 6, 11, 21, 24, 25]. Validation of WOMAC index in Turkish patients with knee OA has been studied recently [12]. However, there is no data concerning the use of WOMAC in Turkish hip OA patients. Likewise, the validity and reliability of Lequesne index has not been studied in Turkish patients up to now. We assessed the metric properties of both WOMAC and Lequesne indices and compared the results in patients with hip or knee OA. The results of our study indicated that all subscales and total score of WOMAC had better internal consistency and more satisfactory concurrent validity than Lequesne. When we compare the results of the two studies for knee OA, our results confirm the findings of the study done by Tuzun et al. [12]. The Cronbach's alpha values for pain, stiffness, and function domains were 0.75, 0.71, and 0.94, respectively, which were similar to our results. Construct validity was assessed also by using SF-36 in their study. The correlation values for WOMAC pain, function, and total were slightly lower than ours (−0.63 for WOMAC total and physical functioning, −0.55 for WOMAC total and bodily pain). Tuzun et al. [12] have given correlation values between subscales of WOMAC and Lequesne index by using only the Lequesne total scores and the correlation values were similar to our results (0.70 between WOMAC total and Lequesne total).

Conclusion

In this study, Turkish version of the WOMAC demonstrated acceptable reliability and validity in Turkish patients with hip or knee osteoarthritis, whereas Lequesne pain and total index were found to be internally inconsistent. WOMAC is a more reliable index for use in Turkish patients with hip or knee OA than Lequesne.

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