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Research Article

## CROSS CULTURAL ADAPTION, VALIDITY AND RELIABILITY OF URDU VERSIONS OF WOMAC INDEX FOR KNEE OSTEOARTHRITIS INDEX

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**Abstract:**

**Objective:** The aim of this study was to translate and cross culturally adapt Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) from source language, English to target language, Urdu. Moreover, to establish its internal consistency, test-retest reliability and validity among knee osteoarthritis patients.

**Methods:** WOMAC was first translated from English to Urdu as per international standardized guidelines. The synthesized version of WOMAC Urdu was initially tested in 12 patients. Final established WOMAC Urdu was administered to 120 knee osteoarthritis patients two times with a 48-hour gap between. IBM Statistics Software SPSS 20.0 was used to analyze scores.

**Results:** Results showed an excellent internal consistency Cronbach's Alpha ranging from 0.816 to 0.920 for subscales of pain, stiffness and physical function. Intraclass coefficient was ranging from 0.769 to 0.945, Spearman Correlation 0.841 to 0.844 with significant correlation 0.027. There was no ceiling or floor effect with 100% kappa agreement. An excellent content validity was exhibited by significant difference of score with changing severity of knee osteoarthritis.

**Conclusion:** The findings conclude that WOMAC Urdu cross culturally adapted and found to be valid and reliable outcome measure for knee osteoarthritis in Urdu speaking patients.

**Keywords:** WOMAC Urdu, Knee Osteoarthritis, Cross Cultural Adaptation, Health Status, Reliability

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## INTRODUCTION:

The literal meanings of Urdu are 'mixture' due to the reason that it includes words and grammar from many cultures and civilizations. Urdu language is heavily influenced by Persian, Arabic and Turkish languages. It is the national language of Pakistan.[1] It is recognized by Indian Constitution as well and is spoken and understood in large part of India.[2, 3]

The most common type of arthritis is osteoarthritis which is leading cause of disability and pain worldwide. Knee is among the most commonly affected joints, although osteoarthritis can affect any synovial joint. Prevalence of osteoarthritis has been reported as high as 20% in general population middle aged or above.[4-7]

There are variety of methods used by physicians, surgeons and physiotherapists to establish diagnosis and prognosis of knee osteoarthritis. These methods include physical examination and outcomes which are subjective such as health related quality of life or objective such as 6-minute walk test.[8-11]

Western Ontario and McMaster Universities Arthritis Index is internationally used to evaluate knee and hip osteoarthritis. This questionnaire consists of 3 subdomains i.e. pain, stiffness and physical function. It has been translated in over 65 languages and has been linguistically validated. [12, 13]

English is less spoken and understood in most parts of Pakistan. In order to better measure disease statuses and outcomes, there is huge need to translate outcome measuring tools into Urdu. The objective of current study was WOMAC translation into Urdu, measurement of test retest reliability, internal consistency, content validity, criterion/ construct validity, agreement percentage, floor effect and ceiling effect.

## METHODS:

The cross-cultural adaptation was based on Beaton's guidelines. The process was comprised of three phases; cross cultural adaptation, validity and reliability of WOMAC. The study protocol was consisted to two phases, in phase first, English version of WOMAC was translated from source language, English, to target language, Urdu; through standardized guidelines by Beaton et al. with few modifications. It was translated and adapted culturally according to living standards in Pakistan. The target use of this translation was self-rating about knee functional status. The first phase was completed with help of Urdu experts with an outstanding level in English language as well.

Online translation portal was also used to assist translation. Skipping two steps of Beaton's guidelines 11 experts; 3 orthopedists, 2 English professors, 2 rheumatologists, 2 Urdu professors and 2 cultural experts were volunteered to review Urdu version developed at first phase. The panel discussed and concluded that items containing double barreling in Urdu meanings such as Twisting, bending be replaced by daily activities involving these activities. Furthermore, the activities like 'toile use' were modified and specified such as standing from commode or ground toilet. Domestic activities were also exemplified from activities of daily living. This was end of stage IV, questionnaire developed at this stage was applied to 12 patients having diagnosed knee osteoarthritis. Majority patients understood questions and responses were correct, so no further modification was made. On average it took 13 minutes to complete WOMAC Urdu and was tested over paper and mobile phone. There was no significant difference. The scoring scale was translated but scoring remained unchanged i.e. 0 to none and 4 to extreme. Possible score ranges were 20, 8 and 68 for pain subscale, stiffness and subscale of physical function. Total of WOMAC Urdu was calculated by summing up all three subscales and converting it to percentage as per guidelines. Higher the score, greater the reflection of pain, stiffness and dysfunction.[14-16]

In second phase validity and clinometric properties were established for translated Urdu version of WOMAC in patients with diagnosis of primary osteoarthritis. Therefore, inclusion criteria were based on American College of Rheumatology (ACR), age 40 to 70 years, diagnosis confirmed by radiographs and patients' ability to read and understand the self-reporting Urdu measure. The patients having advance inflammatory or rheumatic diseases, low backache and history of long-term use of steroids were excluded.[17]

A total of 120 patients meeting eligibility criteria and willing to return at 3<sup>rd</sup> day again, were screened from orthopedic outpatient department and asked to complete WOMAC Urdu version. The clinicians were requested to adjust minimal dose of medicine for two days, so that conditions may not change and also with two-day gap recall bias can be minimized.

Interim correlation was performed for item analysis of three subscales of WOMAC. Items flagged as irrelevant to particular subscale were considered for removal. It was based on consistent values of interim correlation less than 0.3 or more than 0.7. Internal consistency of subscales of knee symptoms, pain and degree of stiffness was measured and removal was

considered if Cronbach's Alpha value found to be less than 0.7. Test re-test based on ICC, agreement percentage as absolute and variation of 1 point between two measurements, ceiling and floor effects in subscales based on percentage, content validity based on degree of disease severity by One way ANOVA and criterion validity based on numeric rating pain scale was done based on Spearman correlation using IBM-SPSS software (v. 20.0).

### RESULTS:

The results showed that mean WOAMC ranged from 16.00 to 16.13, 5.60 to 5.73, 57.07 to 57.73 for pain, stiffness and physical function, respectively, at test and retest occasions. There was no ceiling and floor effect (100%) in all subscale. Furthermore, at testing occasion Cronbach's Alpha found to be 0.954 (95% CI 0.877 to 0.938) for pain, 0.971 (95% CI 0.920 to 0.960) for stiffness and 0.792 (95% CI 0.783 to 0.756)

for physical function. Since all subscales had CA value greater than 0.7, no subscale or item was removed. Intraclass Coefficient for WOMAC Urdu found to be 0.913 for pain subscale, 0.943 for stiffness and for physical function it was 0.769. These values confirm an excellent test retest reliability for WOMAC Urdu version. Table 1-3

Item analysis showed that there was 91.6%, 97.2%, 67.6% and 96.3% inter-item correlation for pain, stiffness and physical function subscales and total score of WOMAC Urdu, respectively, all of which were <0.3 and no item >0.7 so no removal considered. Absolute agreement between 1<sup>st</sup> and 2<sup>nd</sup> final visit ranged from 78.6% to 96.7%. Agreement for individual questions was more consistent in pain and stiffness, while it was different in physical function subscale.

Table 1 Internal Consistency

Internal Consistency				
	Testing Phase		Retesting Phase	
	Cronbach's Alpha	Mean $\pm$ SD	Cronbach's Alpha	Mean $\pm$ SD
Pain	0.833	16.00 $\pm$ 1.420	0.816	16.13 $\pm$ 1.550
Stiffness	0.920	5.60 $\pm$ 0.883	0.873	5.73 $\pm$ 1.128
Physical Function	0.884	57.07 $\pm$ 3.227	0.899	57.73 $\pm$ 4.140

Table 2 Intraclass Coefficient-Test retest

Intraclass Coefficient-Test retest				
	Cronbach's Alpha	Intraclass Coefficient	Lower	Upper
Pain	0.954	0.913	0.877	0.938
Stiffness	0.971	0.943	0.920	0.960
Physical Function	0.792	0.769	0.783	0.756
WOMAC Total	0.972	0.945	0.923	0.962

Table 3 Symmetric Measures

Symmetric Measures	NPRS-WOMAC		
	Test	Retest	P Value
Pearson's R	0.830	0.794	0.025
Spearman Correlation	0.844	0.841	0.027
Kappa Agreement	100%	100%	0.000

Table 4 Comparison of Means based on Kellgren Lawrence Grades

	P Value	Mean Difference
Pain, Testing Phase	0.000	8.03571
Stiffness Testing Phase	0.003	6.02679
Physical Function Testing Phase	0.000	3.75679
Pain Retesting Phase	0.000	9.46429
Stiffness Retesting Phase	0.000	9.59821
Physical Function Retesting Phase	0.000	6.64571
WOMAC Total Testing Phase	0.000	5.93911
WOMAC Total Retesting Phase	0.000	8.56857

Regarding content validity, it was hypothesized that with increasing severity level of osteoarthritis based on Kellgren Lawrence grades and radiographs, the score on WOMAC subscales will increase. Although, only two categories of Kellgren Lawrence were used, performing independent sample t test, there was seen a significant difference in WOMAC Urdu Scores confirming the hypothesis. The mean differences with respective p values are shown in Table 4. The WOMAC Urdu and Numeric Rating Pain Scale were well correlated regarding disease progression and similarity of outcomes, indicating good construct validity. Table 3

#### DISCUSSION:

In this study, WOMAC was cross culturally adapted in Urdu Language along with its validity and reliability. WOMAC is famous for its validity and reliability in patients with knee osteoarthritis and has been translated into many languages other than English mainly in Germany, Iran, Korea, Tunisia and Turkey.[18, 19] There found acceptable values of internal consistency and Cronbach's alpha values ranged from 0.87 to 0.93. Previously reported values are 0.81 to 0.96 for Korean, 0.81 to 0.95 for Turkish, 0.81-0.96 for German version of WOMAC. Furthermore, all three subscales of WOMAC Urdu showed outstanding concurrent validity, 0.76 to 0.94 which is also comparable to previous reported values as 0.79 to 0.89 for Korean, 0.80 to 0.98 for Turkish, 0.46 to 0.96 for German, 0.80 to 0.94 for Persian and 0.84 to 0.92 for Arabic versions.[20-23] Thai researchers have reduced WOMAC items while translating, however ICC dropped to 0.52 to 0.79.[24]

The fluctuation in values of test retest reliability may also be due to varying gap between two self-evaluating readings. Current study retested scale with a short gap of two days and patients had comparative less severe stage of osteoarthritis. Test retest may directly be affected by duration of gap between assessments and severity of disease. In current study reasons of short

gap between tests were chances of unviability of participants if gap be increased and also the analgesics may improve overall condition of osteoarthritis.

The strengths of current study include reasonable sample size, detailed statistical analysis and large panel consensus on Urdu translations. Limitation include lack of responsiveness measurements and absence of healthy participants without osteoarthritis. However, WOMAC index has been extensively used in experimental studies and has been reported to show comparable or greater responsiveness to change as compared to other tests. This may vary depending upon intervention type and its subscales. Previously reported reliability of scale varies in subscales in which physical function subscale has been found most consistent followed by pain and stiffness.[25]

#### CONCLUSION:

The findings conclude that WOMAC Urdu cross culturally adapted and found to be valid and reliable outcome measure for knee osteoarthritis in Urdu speaking patients.

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