



Translation and Validation of the Reduced Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) From English to Yoruba

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SUMMARY

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) developed in English language for assessment of knee osteoarthritis (KOA) may be misinterpreted among Yoruba-speaking patients. This study translated the reduced WOMAC into Yoruba and validated the translated copy with the original one. Sixty radiographically-confirmed knee osteoarthritic subjects in the south-west of Nigeria participated in this study. The original English version of the WOMAC was translated into Yoruba language (used as Yoruba version) by two linguists from the Department of Linguistic and African Languages, Obafemi Awolowo University, Ile-Ife, Nigeria. The Yoruba version was retranslated into English by the English Department of the same university to ensure accuracy. The original and retranslated questionnaires were administered to each subject at 3 days interval. After two weeks the retranslated questionnaire was administered to each subject. The data were analysed using descriptive and inferential statistics.

The results of validation showed that there were positive significant relationships between the scores for the original WOMAC and retranslated WOMAC in all the domains (pain; $r=0.996$, $p<0.001$, stiffness; $r=0.971$, $p<0.001$, difficulty $r=0.980$, $p<0.001$). The test retest reliability also showed a positive significant relationship (pain; $r=0.996$, $p<0.001$, stiffness; $r=0.990$, $p<0.001$, difficulty $r=0.992$, $p<0.001$) between the scores for the retranslated WOMAC at first administration and the scores when re-administered after 2 weeks in all the domains.

It can be concluded from the study that the Yoruba version of the reduced Western Ontario and McMaster Universities (WOMAC) Osteoarthritis Index is reliable and valid as an outcome measure for assessing patients with knee osteoarthritis.

KEY WORDS: WOMAC, knee osteoarthritis, pain, stiffness and difficulty

INTRODUCTION

Globally, osteoarthritis (OA), which can be associated with aging, has a significant impact on disability and morbidity in the elderly. It is a major public health problem (Fransen et al, 2011) with a report of symptomatic knee OA incidence of 10% in men and 13% in women aged 60 years or older (Zhang et al, 2010). Research has shown that osteoarthritis of the knee is the second reason for

consultation in rheumatology in sub-Saharan Africa and the first location of osteoarthritis in the lower limbs (Ouedraogo, 2014). Ogunlade et al (2005) and Akinpelu et al (2005), in different studies, reported that knee osteoarthritis (KOA) is commonly seen in Nigerian hospitals. Akinpelu et al (2009) reported that one out of every five adults older than 40 years in a Nigerian rural community (Igbo-Ora) had symptomatic knee osteoarthritis

with a female preponderance and a female to male ratio of 2.1 : 1, that is 2.1 female to 1 male. It is the leading cause of disability affecting 60-70% of the population older than 60 years. Obesity, work related injuries and injuries due to sports are also some of causes of osteoarthritis (Nguyen et al, 2011).

Osteoarthritis is a degenerative joint disease in which the cartilage covering the ends of bones in the joint breaks down and the bones begin to rub against each other (Arthritis Foundation, 2006). Its major symptoms are pain, poor flexibility and decreased joint range of motion (Onigbinde et al, 2009). Osteoarthritis is the most common form of arthritis with exacerbation of acute inflammation. It affects both male and female but the joint distribution pattern differs according to gender. The prevalence, incidence and severity of osteoarthritis are different in women than in men with women more likely than men to suffer from osteoarthritis and women experience more severe arthritis in the knee. Although presentation of osteoarthritis does not differ between men and women, symptom severity does (O'Connor, 2007).

Most subjects with osteoarthritis usually experience functional limitations in activities of daily living due to joint pain, stiffness, locking, hamstring tightness, regional muscle atrophy and lax ligament (Netter and Freyberg, 1990). The high predilection for the knee joint is largely due to the weight bearing nature of the joint. It is easily susceptible to wear and tear under pressure especially if already in a pathologically deformed state (Moore, 1992).

Outcome measures for clinician researchers in osteoarthritis include:

- Arthritis Impact Measurement Scales – a disease-specific measure of physical, social, and emotional well-being designed as a measure of outcome in arthritis (Meenan et al, 1999).
- Oxford knee score – used to assess function and pain after total knee replacement (TKR) surgery (arthroplasty) (Murray et al, 2007).

The functional status of patients with knee OA can be assessed either by a battery of tests quantifying physical activity restrictions, such as the 6-minute walk test, the stair climbing test, and the lifting and carrying weight test, or by questionnaires evaluating disability in daily living activities. This last method is relevant and appreciated for its simplicity. Moreover, it allows for assessing the patient's opinion of functional disability. It is increasingly recognized that a key outcome measure for any health-care intervention

for OA, as for many other conditions, is a change in health-related quality of life (HRQoL) (Liang et al, 1990).

The most widely used condition-specific instruments for the assessment of OA knee and hip is the Western Ontario and McMaster Universities (WOMAC) Osteoarthritis Index (Hawker et al, 1995) which is recommended by the Outcome Measure in Rheumatoid Arthritis Clinical Trial (OMERACT) (Boers et al, 1998). The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is used to assess pain, stiffness, and physical function in patients with hip and/or knee osteoarthritis (OA) (Bellamy 2002). WOMAC is a propriety set of standardized questionnaires used by health professionals to evaluate the condition of patients with osteoarthritis of the knee and hip. It was developed by Western Ontario and McMaster Universities in 1982. WOMAC is available in alternate language forms including: Arabic (Guermazi et al, 2004), Chinese (Xie et al, 2008), Dutch (Roorda et al, 2004), Finnish (Soininen et al, 2008), French-Canadian (Faucher et al, 2002), German (Stucki et al, 1996), Hebrew (Wigler et al, 1999), Italian (Salaffi et al, 2003), Korean (Bae et al, 2001), Moroccan (Falk et al, 2008), Spanish (Escobar et al, 2002), Swedish (Roos et al, 1999), Thai (Kuptniratsaikul and Rattanachaiyanont, 2007) and Turkish (Tunzun et al, 2005).

A few years ago, some redundancies were found in the WOMAC scale and thence it was tapered to give rise to a new version called the reduced WOMAC, which is equally reliable, valid and responsive as the original version (Whitehouse and Lingard, 2003). Though numerous studies are being carried out for linguistic and cross-culture validation of different outcome measures, there have been no previous reports about translation of the reduced WOMAC into Yoruba language. Yoruba is one of the most popularly spoken Nigerian languages and it is the major language of the south-west of Nigeria. The Yoruba are one of the largest ethno-linguistic groups in sub-Saharan Africa. They constitute about 21 percent of the population of modern day Nigeria (Brooks, 2003). For good clinical application of WOMAC within this region, there is a need to have a Yoruba version of WOMAC. Considering the low literacy level in the country, there is the likelihood of misinterpreting WOMAC which was originally in English if it is used for patients who do not understand English. It is therefore necessary to provide Nigerian language (Yoruba) versions of the index. The aim of this study therefore was to translate from English to Yoruba and

determine the reliability and validity of the Yoruba version of the WOMAC questionnaire.

METHODOLOGY

Subjects for the study were radiographically-confirmed knee osteoarthritis patients receiving treatment at the Physiotherapy Department of Obafemi Awolowo University Teaching Hospitals Complex, Ile Ife; Ladoko Akintola University of Technology Teaching Hospital, Osogbo and University College Hospital, Ibadan in the south-west of Nigeria. The major inclusive criterion was for the participants to be fluent in both Yoruba and English.

Sampling Determination

The sample size formula for descriptive study was used:

$$N = \frac{4(Z_{crit})^2 p(1-p)}{D^2} \text{ according to Eng (2003)}$$

- N = sample size of a single study group
- Z crit = 1.960 at 95% confidential interval
- P = a pre-study estimate of proportion to be measured which may be assumed to be 0.80
- D = total width of expected confidential interval which is 0.20.

The equation yielded 61. Therefore 60 patients were recruited for the study. The purposive sampling technique was used to recruit 60 knee osteoarthritis patients who understand and speak Yoruba and English.

Inclusion Criteria

Subjects with symptomatic knee osteoarthritis with radiological confirmation and who were fluent in both Yoruba and English were included in the study.

Exclusion Criteria

Subjects with neurological disorders were excluded and non-Yoruba speaking subjects were excluded.

Research Design: A cross sectional research design was adopted.

Instrumentation

The main tools used for this study were the reduced WOMAC questionnaire and the translated version of the WOMAC questionnaire. WOMAC consist of 3 sections (A, B, C) which ask specific questions about hip and knee pain.

Section A asked about the pain felt in the hip/ knee during 48 hours while walking, going up and down stairs, at night, on sitting and during standing up. Section B investigated the severity of stiffness of the hip/knee during sitting during the last 48 hours and section C assessed the extent of difficulty experienced following physical activities like descending stairs, ascending stairs, rising from sitting and standing. The questionnaire is scored on the 5 Likert scale.

Procedure

Ethical approval was obtained from the ethical review committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. Also, written informed consents were signed by the participants. The guidelines for processing the translation of self-report measures as recommended by Beaton et al (2000) were followed.

Prior to data collection, the original English version of WOMAC was given to two linguists from the Department of Linguistics of Obafemi Awolowo University, Ile Ife, Nigeria, who are proficient in both English and Yoruba and whose mother tongue is Yoruba, for translation into Yoruba. The translated version was used as the Yoruba version. This Yoruba version was then taken to the Department of English Language of the same university for re-translation into English, to ensure accuracy.

Each subject was administered the English or Yoruba version of the WOMAC questionnaire, which was collected immediately. After two weeks, the questionnaires were re-administered to each subject for reliability and validity.

Data Analysis

Data were analysed using SPSS 16 from Chicago Illinois. The results were summarized using descriptive and inferential statistics. Spearman Rho was used to examine the relationship between the original WOMAC score and the Yoruba version score. Also Spearman Rho correlation was used to evaluate the test retest reliability of the Yoruba version of WOMAC. An alpha level of 0.05 was set as level of significance.

RESULT

The total number of respondents in the survey was 60. The majority of the participants were female (75.4%) compared to the male (24.6%). More than two-thirds of the total population (68.9%) were married, while 31.1% were widows and 32.7% were not educated (see table 1).

The physical characteristics of the respondents are presented in table 2. The mean age of the respondents was 64.10 ± 9.56 years and the mean duration of knee osteoarthritis was 3.80 ± 1.85 years with mean difficulty of 28.23 ± 8.61 .

Table 1. Socio-demographic data of respondents

Variables	Frequency	%
Sex		
Male	15	24.6
Female	45	75.4
Marital status		
Married	41	68.9
Widowed	19	31.1
Educational level		
None	19	32.7
Primary	7	11.5
Secondary	12	19.7
Tertiary	22	36.1

Table 2. Physical characteristics of respondents N=60

Variables	Minimum	Maximum	Mean SD
Age(years)	40.00	80.00	64.10 ± 9.56
DOA(years)	1.00	5.00	3.80 ± 1.85
PnTot1	2.00	18.00	8.07 ± 3.50
StfTot1	0.00	8.00	4.22 ± 1.63
DiffTot1	13.00	52.00	28.23 ± 8.61

Keys: DOA- Duration of osteoarthritis; PnTot1- Pain total for original WOMAC score; StfTot1- Stiffness total for original WOMAC score; DiffTot1- Difficulty total for original WOMAC score

Comparison between the male and female original WOMAC scores is shown in table 3. Pain total for male respondents was significantly higher than that of female respondents ($t=3.627$, $p < 0.001$) and males had significant more difficulty in carrying out physical activities than females ($t=2.223$, $p < 0.05$).

Table3. Independent t-Test Comparing the mean Original WOMAC Score of Male and Female Respondent

Variables	Male n=15 Mean \pm SD	Female n=45 Mean \pm SD	t value	p value
PnTot	10.53 ± 2.95	7.24 ± 3.30	3.627	0.001
StfTot	4.53 ± 1.85	4.11 ± 1.56	0.796	0.435
DiffTot	3.07 ± 10.39	26.62 ± 7.38	2.223	0.039

Keys: PnTot- Total pain for WOMAC score; StfTot- Total stiffness for WOMAC score; DiffTot- Total difficulty for WOMAC score

There was a positive relationship ($r=0.996$, $p < 0.001$)

between total pain of the original WOMAC score and the translated copy, there was also a positive relationship ($r=0.971$, $p < 0.001$) between total stiffness of the original WOMAC score and the translated copy. In addition, there

was a positive relationship ($r=0.980$, $p < 0.001$) between the scores of the original WOMAC score and the translated copy for total difficulty in physical activity. This is shown in table 4.

Table 4. Summary of Pearson Moment Correlation Showing Relationship Between the Original WOMAC Score and the Translated WOMAC Score. n=60

Variables	PnTot1	StfTot1	DiffTot1	PnTot2	StfTot2	DiffTot2
PnTot1	1					
StfTot1	0.417	1				
DiffTot1	0.729**	0.541**	1			
PnTot2	0.996**	0.431**	0.717**	1		
StfTot2	0.404**	0.971**	0.507**	0.415**	1	
DiffTot2	0.716**	0.541**	0.980**	0.717**	0.492**	1

Keys: **Correlation is significant at the 0.01 level (2 tailed); PnTot1- Pain total for original WOMAC score; StfTot1- Stiffness total for original WOMAC score; DiffTot1- Difficulty total for original WOMAC score; PnTot2- Pain total for first translated WOMAC score; StfTot2- Stiffness total for first translated WOMAC score; DiffTot2- Difficulty total for first translated WOMAC score

Test Retest Reliability of Translated Copy of WOMAC

Presented in table 5 is the relationship between the first scores and the two weeks scores of the translated WOMAC. There was a positive significant relationship ($r=0.996$, $p < 0.001$) between the first score for pain intensity of translated WOMAC and the two weeks' score. Also a positive significant relationship ($r=0.990$, $p < 0.001$) was found between the first score for stiffness and the two weeks' score of the translated WOMAC as well as between the first score and the two weeks' score ($r=0.992$, $p < 0.001$) for total difficulty in physical activity of the translated WOMAC.

Table 5. Summary of Pearson Moment Correlation to show relationship between first score of translated WOMAC and two weeks score of translated WOMAC score

Variables	PnTot2	StfTot2	DiffTot2	PnTot3	StfTot3	DiffTot3
PnTot2	1					
StfTot2	0.415**	1				
DiffTot2	0.717**	0.494**	1			
PnTot3	0.996**	0.415**	0.724**	1		
StfTot3	0.433**	0.990**	0.517**	0.434**	1	
DiffTot3	0.714**	0.515**	0.992**	0.724**	0.538**	1

Keys: **Correlation is significant at the 0.01 level (2 tailed); PnTot2- Pain total for first translated WOMAC score; StfTot2- Stiffness total for first translated WOMAC score; DiffTot2- Difficulty total for first translated WOMAC score; PnTot3- Pain total for two weeks score of translated WOMAC; StfTot3- Stiffness total for two weeks score of translated WOMAC; DiffTot3- Difficulty total for two weeks score of translated WOMAC

DISCUSSION

It has become increasingly imperative to use outcome measuring tools to assess as well as monitor efficacy and progress in treatment plans designed for different categories of patients. The reduced Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is one of the outcome measures utilized as a screening tool for patients with knee osteoarthritis.

The total number of participants in the study was 60, and there were 15 male and 45 female participants. This shows that the prevalence of osteoarthritis may be higher in females than in males. According to Akinpelu et al (2009), one out of every five adults older than 40 years in a Nigerian rural community (Igbo-Ora) had symptomatic knee osteoarthritis with a female preponderance and a female to male ratio of 2.1:1. This was in agreement with the findings of the present study. The results of this study also showed that pain total for men was significantly higher than pain total for female ($t=3.627$, $p < 0.001$). This showed that men tended to have more severe knee pain than women. This finding was in contrast to the finding of Shalome et al (2011), whose results clearly showed that women have greater pain, more pain sensitivity, and reduced function compared to men.

The results of this study show that there is a positive significant relationship ($r=0.996$, $p < 0.001$) between the first score and the two weeks score of translated WOMAC for pain. Similarly a positive significant relationship ($r=0.990$, $p < 0.001$) exists between the first score and the two weeks score of translated WOMAC for stiffness. Also, there is a positive significant relationship ($r=0.992$, $p < 0.001$) between the first score and the two weeks score of translated WOMAC for physical activity. These findings support a previous report by Jyotsna et al (2010), who developed the Hindu version of WOMAC that is valid and reliable. On the reliability and validity of the Yoruba language, Olaogun et al (2003) found that the Yoruba version for the Verbal Pain Rating Scale was reliable and valid. Similarly, Adedoyin et al (2006) found the Yoruba version of the modified Borg Exhaustion Scale to be reliable and valid for assessing degree of dyspnoea in asthmatic patients. The result of this study also indicated that the Yoruba version of WOMAC is reliable and valid for use in Yoruba-speaking communities.

CONCLUSION

This study concluded that the Yoruba version of the reduced Western Ontario and McMaster Universities (WOMAC)

Osteoarthritis Index is reliable and valid as an outcome measure for assessing patients with knee osteoarthritis.

RECOMMENDATION

It is recommended that WOMAC be translated to other Nigeria languages and be validated for effective utilization of the tool in different geopolitical regions of the nation.

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