RESEARCH PAPER

Chinese translation and validation of the Oxford Knee Scale for patients with knee osteoarthritis

Roy T.H. Cheung, PT, PhD [a],*, Shirley P.C. Ngai, PT, PhD [a], Kevin K.W. Ho, MD [b]

[a] Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hong Kong, China
[b] Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong, Hong Kong, China

Abstract *Background:* Oxford Knee Scale (OKS) is a commonly used instrument to assess the symptoms and functional status in people with knee osteoarthritis. However, a Chinese version of this scale is not yet available.
Objective: The objective of this study was to translate the OKS into Chinese and validate the Chinese version of OKS.
Methods: The Chinese OKS was translated from the original English version following the recommendations of the International Society for Pharmacoeconomics and Outcomes Research. One hundred Chinese reading patients with knee osteoarthritis were recruited from local hospitals and physiotherapy clinics. Psychometric properties were evaluated in terms of test—retest reliability and internal consistency. Convergent validity was examined by Spearman rank correlation coefficient tests by comparing its score with the validated Chinese version of the Western Ontario and McMaster Universities Osteoarthritis Index and Health Outcome Survey Short Form-36.
Results: Chinese OKS demonstrated excellent reliability (intraclass correlation coefficient = 0.88). Cronbach α of individual questions was > 0.7. Strong correlation was found between the Chinese OKS and the Western Ontario and McMaster Universities Osteoarthritis Index ($\rho > 0.553$, $p < 0.001$). Fairly strong negative correlation was also found between Chinese OKS and Health Outcome Survey Short Form-36 ($\rho = -0.273$ to -0.666, $p < 0.05$).
Conclusion: The Chinese translated version of OKS is a reliable and valid instrument for clinical evaluation in Chinese reading patients with knee osteoarthritis.

* Corresponding author. Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Gait & Motion Analysis Lab, ST004, G/F, Block S, Hung Hom, Hong Kong, China.
E-mail address: Roy.Cheung@polyu.edu.hk (R.T.H. Cheung).

Introduction

Knee osteoarthritis is a major healthcare concern. The overall lifetime risk of symptomatic knee osteoarthritis is an astounding 50% [1]. According to the statistics from the World Health Organization [2], the current Chinese population is > 1.4 billion. It has been suggested that up to 10.3% of people in China suffer from symptomatic knee osteoarthritis [3]. Therefore, it is estimated that there are currently > 100 million patients with knee osteoarthritis in China. It is foreseeable that the number of Chinese reading patients with knee osteoarthritis will increase with the aging population, thereby increasing the already significant economic burden.

For the purpose of evidence-based practice, reliable and accurate clinical tools are required to document the progress and evaluate treatment response for clinical decision-making. The Oxford Knee Scale (OKS) was introduced to assess the symptoms and functional status in patients with knee osteoarthritis [4]. OKS has 12 items addressing the extent of knee pain and the level of functional impairments related to daily activities over the previous 4 weeks. This scale has been used worldwide for evaluating patients before and after total knee arthroplasty and has been translated in other languages [5—10].

To date, there is no validated Chinese version of this outcome measurement. Hence, the purpose of this study was to test the reliability, internal consistency, and convergent validity of the Chinese translation of OKS.

Methods

Participants

A total of 100 patients (35 men and 65 women) with a diagnosis of knee osteoarthritis were recruited from the orthopedic outpatient department and physiotherapy clinics of local hospitals in Hong Kong, China. The diagnosis was confirmed by radiographic findings by an orthopedic surgeon and they were able to read and comprehend Chinese. We excluded patients if they had corticosteroid injection or serotonin treatment within the previous 8 weeks, or another site of osteoarthritis other than the tibiofemoral joint. We also excluded patients who were illiterate. The demographical data (age, height, weight, and body mass index) and information about knee osteoarthritis (distribution of affected leg and duration of knee osteoarthritis) of the patients are presented in Table 1. The study protocol was reviewed and approved by the ethical committees of the involved university and hospitals. All the patients provided their written informed consent before being tested.

Development of the Chinese questionnaire

The translation process followed the procedures recommended by the International Society for Pharmacoeconomics and Outcomes Research [11] and other crosscultural adaptation and translation studies [12]. In brief, two Chinese translations of the original English version of OKS were performed by two independent English—Chinese

Table 1 Demographics of participants

Demographics		Values (SD)
Age (y)		65.6 (8.9)
Height (m)		1.59 (0.09)
Weight (kg)		69.1 (16.6)
Body mass index (kg/m^2)		27.2 (4.2)
Involved knee	Left	21
	Right	10
	Both	69
Duration of knee osteoarthritis (y)		7.9 (1.0)

SD = standard deviation.

translators. A panel comprising a translator and two bilingual authors compared the two translations and formulated a consensus version. Backward translation of the consensus version questionnaire to English version was performed by two independent translators who were blinded to the original questionnaire and not involved in the previous translation work. The backward translated questionnaire was reviewed for equivalence to the original questionnaire by an expert panel, which consisted of two experienced physiotherapists and two research fellows in the area of musculoskeletal physical therapy and orthopedics. The questionnaire was finalized after a pilot test for crosscultural adaptation, which involved 20 patients with knee osteoarthritis.

Statistical analysis

Test—retest reliability of the Chinese OKS was determined by comparing the scores obtained from two subsequent treatment sessions (within 7 days apart) by the intraclass correlation coefficient. Internal consistency of the questionnaire was examined by the Cronbach α. Based on previous validation studies [12,13], convergent validity was assessed by comparing the scores with the validated Chinese versions of the Western Ontario and McMaster Universities (WOMAC) Osteoarthritis Index [14] and Health Outcome Survey Short Form-36 (SF-36) [15] by the Spearman's rank correlation coefficients (ρ). The correlation value was considered to be very strong if it was between 0.9 and 1.0, strong if it was between 0.7 and 0.9, moderate if it was within 0.5—0.7, and weak if it was < 0.5 [16].

Results

Crosscultural adaptation and psychometric properties

We did not receive any critique about the Chinese OKS in the pilot test involving 20 patients with knee osteoarthritis. All the participants expressed that they understood the wordings used in the instrument. Therefore, the questionnaire was used in the subsequent validation study without any further adaptation. Thirty individuals were asked to fill in the Chinese OKS twice on subsequent two clinical visits (within 7 days apart). The test—retest reliability was excellent (intraclass correlation coefficient = 0.88,