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Cross-cultural adaptation, validity and rehability of the QUIPA tool: Turkish version

N.G. Tore[1], D. Oskay[1], H. Satıs[2], S. Haznedaroglu[2]

[1]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Gazi University, Ankara, Turkey; [2]Division of Rheumatology, Department of Internal Medicine, Faculty of Medicine, Gazi University, Ankara, Turkey

SUMMARY

The Quality Indicators for Physiotherapy Management of Hip and Knee Osteoarthritis (QUIPA) is the only patient-reported outcome measure to assess the quality indicators of physiotherapy management of hip/knee osteoarthritis (OA). It consists of 3 subscales and a total of 18 questions. The purpose of this research was to translate and adapt the QUIPA into the Turkish language using a cross-cultural approach as well as test its validity and reliability for Turkish-speaking patients with hip/knee OA.

Ninety-two patients with hip/knee OA were enrolled in the research. The cross-cultural adaptation of the QUIPA was performed according to guidelines defined by Beaton et al. Participants completed the QUIPA tool twice at an interval of 7 days. Test-retest reliability and internal consistency were determined by interpreting the intraclass correlation coefficient (ICC) and Cronbach's alpha coefficient, respectively. Construct validity was tested via exploratory factor analysis.

For the first, second, and third subscales and total score of QUIPA, ICC was found to be 0.895, 0.947, 0.665, and 0.925, respectively. Cronbach's alpha coefficient was 0.682, 0.797, 0.593, and 0.812. The Exploratory Factor Analysis demonstrated that the QUIPA tool is based on 3 factors. These results indicate that the Turkish version of the QUIPA has excellent test-retest reliability and good internal consistency.

Therefore, the Turkish version of the QUIPA seems to be a valid and reliable tool to assess the quality indicators of physiotherapy management of hip/knee OA in Turkish-speaking patients. It is intended to be used in clinical settings and research works.

Key words: *Physiotherapy; quality indicators; hip; knee; osteoarthritis.*

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INTRODUCTION

Osteoarthritis (OA), known as chronic joint pain, is one of the most common health conditions. OA is one of the leading causes of disability and joint pain worldwide, with a prevalence of approximately 11% for the hip and 24% for the knee in the adult population (1). Common symptoms of OA, such as pain and physical inactivity can lead to chronic conditions such as depression, cancers, and cardiovascular problems and consequently even cause premature death (2). OA patients also experience emotional distress, social isolation, decreased productivity, poor sleep, fatigue, fear of movement and, as a result, poor quality of life (QoL) (3). OA also reduces work efficiency and productivity due to its symptoms, causing early retirement and resulting in significant health and social costs (4). For these reasons, OA poses a huge burden on individuals, the healthcare system, and the economy (2). The cost of treating a patient with knee OA, according to a study conducted in Turkey was determined to be $ 378.97 (5). Furthermore, the burden of OA is expected to increase due to obesity and the aging of the population (6).

According to the American Collage of Rheumatology (ACR) guidelines, one of the most recommended conservative treatments for patients with hip and knee OA is physical therapy (7). Moreover, this approach has shown to be effective in improving physical function and reducing pain (8, 9). Over the past 20 years, numerous

Corresponding author:
Nurten Gizem Tore
Dipartimento di Fisioterapia e Riabilitazione, Facoltà di Scienze della Salute, Università Gazi, Ankara, Turchia
E-mail: gizemtore@hotmail.com

studies have been published supporting the beneficial effects of physical therapy in the treatment of knee and hip OA (10-12). The management of OA with physiotherapy is considered the cornerstone of conservative treatment for this chronic disease (12). Therefore, physiotherapists play an important role in providing non-pharmacological treatment for OA. A systematic review of patients' perceived healthcare needs for OA reported that patients perceived physiotherapists to be important to assist them in managing their health conditions and giving exercise prescriptions (13).

Quality indicators (QIs) are measurable tools for evaluating the quality of care (14). QIs in physiotherapy can be used to assess how physiotherapists adhere to clinical guideline recommendations and are accepted tools for evaluating OA care (15, 16). QIs reflect the minimum acceptable practice standards and are generally developed by consensus techniques (17). Patient-reported QIs are a good way to evaluate the quality of OA care. The participation of patients in quality assessment is helpful in promoting patient-centered care as well as improving the quality and relevance of treatment (18). There are studies in the literature evaluating the QIs in surgical, pharmacological, and conservative treatments in OA (15). However, some of these QIs were not specific to physiotherapy care, because including questions on surgical or pharmacological treatments. Although some others were specific to physiotherapy, they were not in the form of patient-based outcome measures. In addition, these QIs were created according to the older clinical guidelines recommended in 2011 (19).

Teo et al. recognized this gap in the literature and developed a patient-based questionnaire, which is called Quality Indicators for Physiotherapy Management of Hip and Knee Osteoarthritis (QUIPA), evaluating the QIs of physiotherapy management of hip/knee OA and published their study in 2020 (6). It is crucial to establish the reliability of QI tools so that the results fully reflect the practice of physiotherapy and/or mediate the improvement of physiotherapy services (20). Yet, there is no Turkish version of this questionnaire. Therefore, the purpose of this study is to test the construct validity and reliability of the Turkish version of the QUIPA tool.

MATERIALS AND METHODS

At the beginning, permission was obtained from the developers of the questionnaire to create the Turkish version of the questionnaire. Then, the approval for this study was received by a local ethics committee of a university. This study was conducted at the Rheumatology department between April and August 2021.

Ninety-two patients aged 18-65 years with a diagnosis of knee/hip OA according to the ACR clinical classification criteria who came to the hospital for their routine control were included in the research. They all had been previously treated with physiotherapy and had an adequate command of the Turkish language to understand the questionnaire. Participants who had undergone knee/hip replacement surgery and had inflammatory arthritis were excluded from the study. All patients participating in the study were asked to read and sign the written informed consent form. The procedures used in this study are in line with the principles of the Declaration of Helsinki.

The cross-cultural adaptation and translation process of the QUIPA tool was conducted in 5 stages in accordance with Beaton's guideline which is presented in Table I (21). Demographic characteristics of participants were recorded. All patients filled in the Turkish version of the QUIPA tool twice at a 7-day interval in the hospital.

The QUIPA tool consists of 18 questions and has 3 subscales. The first subscale of the questionnaire is about *Assessment and Management Planning* and consists of six questions about OA assessment, screening for depression, depression referral, comorbidities, treatment planning, and review. The second subscale is about *Core Recommended Treatments* and consists of eight questions about OA and related pain, exercise preferences, specific exercise program prescription, exercise adherence, educa-

Table I - The stages of Beaton's guidelines.

Stages	Assignments
1	The QUIPA tool was translated from English to Turkish by 2 native Turkish speakers, one of whom was informed about the research and the other was not.
2	Translations of the 2 translators were synthesized into a single version
3	The synthesized Turkish translation was independently translated back into English by 2 professional bilingual translators who were blind to the original version of the QUIPA tool.
4	A committee of 4 translators, 1 methodologist, and 1 Turkish linguist compared the English translations with the original QUIPA tool to assess language and cultural compatibility. A pre-final version of the QUIPA tool was created.
5	The intelligibility of the pre-final version was tested in a group of 50 patients with hip/knee OA and healthy subjects. The QUIPA tool was finalized, as all individuals stated that they understood all the questions.

QUIPA, Quality Indicators for Physiotherapy Management of Hip and Knee Osteoarthritis; OA, Osteoarthritis.

tion about different treatment options for OA, and education about the benefits of weight loss, and weight loss strategies. In this subscale, if 'no' is marked for the item related to the specific exercise program prescription (question #10), the question about exercise adherence (question #12) is automatically removed by the scorer, since it is not applicable. Besides, if a response other than 'yes' is marked for the question about the benefits of weight loss (question #13a), the question addressing weight loss strategies (question #13b) is also omitted, since it is not applicable. The last subscale is about *Adjunctive therapies* and consists of four questions about footwear, walking aids, work-related advice, appliances, and aids (6).

Statistical analysis

Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 22.0. The SPSS program was used to test whether the data fit the normal distribution or not. Data conforming to normal distribution were expressed as mean ± standard deviations. Internal consistency and test-retest analysis were carried out to test the reliability of the QUIPA tool. The internal consistency indicates the extent to which the questions in a questionnaire correlate with each other and is also associated with the overall score of a questionnaire (22). Cronbach's alpha coefficient was used to determine the internal consistency of the questionnaire. Cronbach's alpha coefficient can range from 0.0 to 1.0. In the literature, Cronbach's alpha coefficient of 0.6 to 0.69 is considered acceptable, 0.7 or higher is required to consider a questionnaire adequately reliable, yet, a minimum value of 0.8 is required for 'good' internal consistency (23). The intraclass correlation coefficient (ICC) (95% confidence interval) was utilized for determining the test-retest reliability of QUIPA tool. ICC values >0.90 indicate excellent reliability, 0.75-0.90 stand for good reliability, 0.5-0.75 correspond to moderate reliability and <0.5 means poor reliability (24). Furthermore, the exploratory factor analysis was carried out to determine the construct validity of the QUIPA. Kaiser-Meyer-Olkin (KMO) and Bartlett sphericity tests were utilized to determine whether the data were appropriate for the principal components analysis. Varimax rotation technique was used to determine the factors.

RESULTS

In this study 90.2% (n=83) of the patients were female and 9.8% (n=9) were male. The mean age of the participants was 56.61±7.27. The mean duration of disease was 6.63±4.38. Of all the patients, 80.4% (n=74) were diagnosed with knee OA and 19.6% (n=18) were diagnosed with hip OA (Table II).

All patients diagnosed with knee OA had

Table II - Demographic characteristics of patients.

	n=92
Gender (n) (%)	
Female	83 (90.2%)
Male	9 (9.8%)
Age, years (X±SD)	56.61±7.27
Disease duration, years (X±SD)	6.63±4.38
Diagnose (n) (%)	
Hip OA	18 (19.6%)
Knee OA	74 (80.4%)

N, number; SD, standard deviation; OA, osteoarthritis.

knee pain complaints. Moreover, 82.4% of the patients were over 50 years old. Morning stiffness was present in 66.2% of the patients and crepitus in 90.5% of the patients. Bony tenderness and bony enlargement were present in 40.5% and 56.8% of the patients, respectively. Furthermore, there was no palpable warmth in 62.2% of the patients. All patients with a diagnosis of hip OA had hip pain. In addition, their internal hip rotation was less than 15 degrees and hip flexion was less than 115 degrees.

All of the 92 patients filled in the QUIPA two times. The total score of QUIPA was 66.94±35.82 for the first interview and 67.60±32.48 for the second interview. The internal consistency analysis was performed to investigate the reliability of the QUIPA. Cronbach's alpha coefficient was 0.682 for the *Assessment and Management Planning subscale*, 0.797 for the *Core Recommended Treatments* sub-

Table III - Cronbach's alpha coefficient when a single item is deleted and Cronbach's alpha coefficients of subscales.

QUIPA	Cronbach's alpha coefficients if item deleted
1st question	0.803
2nd question	0.804
3rd question	0.802
4th question	0.793
5th question	0.802
6th question	0.820
7th question	0.801
8th question	0.792
9th question	0.790
10th question	0.795
11th question	0.799
12th question	0.803
13th (a) question	0.815
13th (b) question	0.803
14th question	0.801
15th question	0.821
16th question	0.812
17th question	0.798
1st Subscale, (Q1-Q6)	0.682
2nd Subscale, (Q7-Q13)	0.797
3rd Subscale, (Q14-Q17)	0.593
Total	*0.812*

Table IV - Test-retest reliability analysis of the QUIPA.

QUIPA	ICC	95% CI (Lower-upper bound)
1st question	0.814	0.731-0.873
2nd question	0.686	0.560-0.780
3rd question	0.782	0.688-0.850
4th question	0.655	0.521-0.758
5th question	0.727	0.614-0.811
6th question	0.616	0.471-0.728
7th question	0.768	0.669-0.841
8th question	0.631	0.490-0.739
9th question	0.723	0.609-0.808
10th question	0.785	0.692-0.853
11th question	0.879	0.812-0.923
12th question	0.772	0.674-0.843
13th (a) question	0.842	0.770-0.892
13th (b) question	0.752	0.615-0.845
14th question	0.543	0.381-0.672
15th question	0.498	0.327-0.637
16th question	0.514	0.347-0.650
17th question	0.866	0.804-0.909
1st Subscale, (Q1-Q6)	0.895	0.845-0.929
2nd Subscale, (Q7-Q13)	0.947	0.921-0.965
3rd Subscale, (Q14-Q17)	0.665	0.534-0.765
Total	*0.925*	*0.888-0.950*

ICC: Intraclass correlation coefficient, CI: Confidence interval.

Table V - KMO and Bartlett Tests.

	KMO Test	Bartlett Test	
		Chi-Square	p
QUIPA	0.796	704.614	<0.001

QUIPA, Quality Indicators for Physiotherapy Management of Hip and Knee Osteoarthritis.

scale, 0.593 for the *Adjunctive therapies* subscale, and 0.812 for the QUIPA total score. The Cronbach's alpha coefficient was considered good for the second subscale, and moderate for the first and third subscales. Cronbach's alpha coefficient for the total score of the questionnaire indicates that QUIPA has good internal consistency. The Cronbach's alpha coefficients of the subscales after exclusion of a single item and total coefficient of the QUIPA are shown in Table III. As a result of the test-retest reliability analysis, ICC was found to be 0.895 for the *Assessment and Management Planning* subscale, 0.947 for the *Core Recommended Treatments* subscale, 0.665 for the *Adjunctive therapies* subscale, and 0.925 for the QUIPA total score. The ICC for total score of questionnaire demonstrates that QUIPA has excellent test-retest reliability. Based on the 95% CI of the ICC for each item, all sections, and the total scale are presented in Table IV. The values of KMO and Bartlett tests demonstrated that the sample size was adequate for a factor analysis (Table V). Results of the factor analysis showed that QUIPA has 3 dimensions by the scree plot which is presented in Figure 1. With regard to the total variance analysis, the three-factor of QUIPA constitutes 54.66% of the total variance (Table VI).

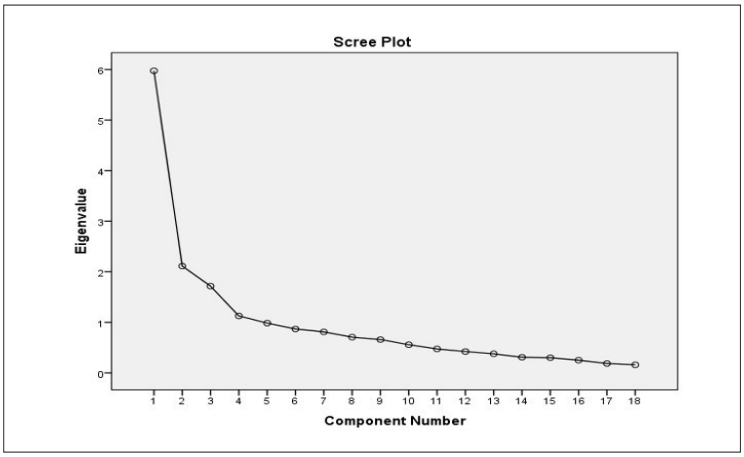

Figure 1 - Scree plot graph of the QUIPA tool**.**

Table VI - Total variance analysis of QUIPA**.**

Component	Initial eigenvalues			Extraction sums of squared loading		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	5.975	33.193	33.193	5.975	33.193	33.193
2	2.113	11.741	44.934	2.113	11.741	44.934
3	1.716	9.533	54.466	1.716	9.533	54.466
4	1.126	6.256	60.722			
5	0.984	5.468	66.190			
6	0.869	4.826	71.017			
7	0.811	4.506	75.523			
8	0.707	3.929	79.452			
9	0.660	3.666	83.118			
10	0.558	3.099	86.217			
11	0.474	2.633	88.850			
12	0.423	2.347	91.198			
13	0.378	2.099	93.297			
14	0.309	1.717	95.013			
15	0.300	1.669	96.683			
16	0.251	1.395	98.077			
17	0.186	1.033	99.110			
18	0.160	0.890	100.000			

QUIPA, Quality Indicators for Physiotherapy Management of Hip and Knee Osteoarthritis

DISCUSSION

The aim of this study was to translate and to perform a cross-cultural adaptation of the QUIPA tool in Turkish and to test its reliability. The translation and cross-cultural adaptation process of QUIPA was successfully performed. In view of the statistical results, it was determined that QUIPA is a reliable assessment tool for patients with knee/hip OA in the Turkish population. As far as we know, translation and cross-cultural adaptation of the QUIPA in any other language has not been carried out yet. There is only one article in the literature against which we can compare the findings obtained from our study. Previous studies showed that OA is more common in women and especially in individuals over 50 years of age (25-27). When the demographic characteristics of the patients participating in this study were evaluated, the fact that most of the

patients were female and the average age was 56.61±7.27 are compatible with the literature. However, it should be taken into account that although advanced age is accepted as a risk factor for the development of OA, according to the ACR diagnostic criteria, individuals can be diagnosed with OA even if they are not over 50, if they meet the criteria in other items at the specified rate. Therefore, individuals under the age of 50 were also included in this study. The internal consistency of the QUIPA was determined using Cronbach's alpha coefficient. It was found to be 0.682 for the *Assessment and Management Planning* subscale, 0.797 for the *Core Recommended Treatments* subscale, 0.593 for the *Adjunctive therapies* subscale, and 0.812 for the QUIPA total score. However, in the study conducted by Teo et al., Cronbach's alpha value was not analyzed to test the reliability of the questionnaire (6). Therefore, there is no data in the literature with which to compare this finding. In addition, when the Cronbach's alpha coefficient of the QUIPA was assessed after exclusion of single items, most questions contributed to the Cronbach's alpha coefficient of the questionnaire. Cronbach's alpha coefficient obtained from this research indicates that the responses to the items are consistent and the Turkish version of the QUIPA has good internal consistency.

Test-retest reliability of QUIPA was assessed using the ICC analysis. ICC (95% CI) was 0.895 (0.845-0.929) for the *Assessment and Management Planning* subscale, 0.947 (0.921-0.965) for the *Core Recommended Treatments* subscale, 0.665 (0.534-0.765) for the *Adjunctive therapies* subscale and 0.925 (0.888-0.950) for the QUIPA total score. In the study conducted by Teo et al., ICC was 0.70 (0.54-0.81) for the *Assessment and Management Planning* subscale, 0.84 (0.75-0.90) for the *Core Recommended Treatments* subscale, 0.70 (0.39-0.87) for the *Adjunctive therapies* subscale and 0.80 (0.69-0.88) for the QUIPA total score (6). ICC results ranged from moderate to excellent in this study and from good to excellent in the study carried out by Teo et al. The ICC for the total score of the questionnaire indicates that the Turkish version of QUIPA has excellent test-retest reliability. Moreover, these findings express the time-dependent invariance of the Turkish version of the QUIPA. The results of the KMO and Bartlett tests indicated that the sample size was adequate and suitable for the factor analysis. In our study, the factor analysis reveals that QUIPA has 3 subscales. This finding was similar to the study of Teo et al. and it demonstrated that the Turkish version of the QUIPA is a valid instrument (6).

The convergent validity of a questionnaire is generally evaluated together with its construct validity and reliability. In the studies on the convergent validity of a questionnaire, it is necessary to compare the findings of other relevant questionnaires, which are generally proven to be valid and accepted as the gold standard in the literature (28). However, there is no questionnaire defined as a gold standard in order to evaluate the QIs for hip and knee OA. Therefore, the convergent validity of QUIPA could not be evaluated in this study. The strength of this research was to follow up on the standard translation and cultural adaptation process defined by Beaton et al. (21). Besides, the sample size should be based upon the rule of 5 to 7 patients per question (29). QUIPA contains 18 questions and a sufficient number of patients was reached by including 92 patients in this study. Furthermore, one of the important contributions of this study to the literature is a new patient-rated questionnaire which evaluates the QIs of physiotherapy management of hip/knee OA in Turkish-speaking patients.

CONCLUSIONS

Translation and cultural adaptation of questionnaires are extremely important to standardize the interpretation of results derived from patients in different countries (30). As a consequence of this study, the translation and cultural adaptation of QUIPA into Turkish was successfully performed. In addition, it was determined

that the Turkish version of QUIPA is a reliable and valid tool. Therefore, from now onward, it can be used while evaluating the QIs of physiotherapy management of hip/knee OA in Turkish-speaking patients.

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