Thai Version of the Kujala Patellofemoral Questionnaire in Knee Pain Patients: Cross-Cultural Validation and Test-Retest Reliability

Sutida Sakunkaruna MSc*,
Yosawin Sakunkaruna MSc*, Prasert Sakulsriprasert PhD*

** Faculty of Physical Therapy, Mahidol University, Nakhon Pathom, Thailand*

Objective: *To conduct a cross-cultural adaptation and determine the test-retest reliability of the Thai version of the Kujala Patellofemoral questionnaire (KPQ).*

Material and Method: *The present study comprised two phases: cross-cultural adaptation and test-retest reliability. The KPQ was first translated and cross-culturally adapted from English to Thai. The content validity test was conducted, and the final version of the Thai version of Kujala Patellofemoral Questionnaire was developed. Forty knee pain patients were enrolled in this study to determine test-retest reliability of the final version of this questionnaire. All 40 subjects were patients from the Physical Therapy Center, Faculty of Physical Therapy, Mahidol University with a diagnosis of anterior knee pain by physical therapists. They were asked to complete the questionnaires; the 1st session after registration and 2nd session 30 minutes after finishing the first administration. For statistical analysis, the intraclass correlation coefficient ($ICC_{(2,1)}$) method was used to determine test-retest reliability.*

Results: *All 40 subjects (36 women, 4 men; with age range 18-56 years) were assessed twice with 30-minute time interval. Thirteen questions indicated strong reliability, ranging from $ICC_{2,1}$ 0.8 to 1.0 and the total score was $ICC_{2,1}$ 0.98.*

Conclusion: *The Thai version of the Kujala Patellofemoral Questionnaire was cross-culturally adapted, validated, and presented with excellent test-retest reliability. Regarding clinical implication, this questionnaire is now available for Thai physical therapists in evaluating Thai knee pain patients.*

Keywords: *Patella, Patellofemoral pain syndrome, Questionnaires, Reliability*

J Med Assoc Thai 2015; 98 (Suppl. 5): S81-S85
Full text. e-Journal: *http://www.jmatonline.com*

Patellofemoral pain syndrome (PFPS) is commonly seen in knee pain patients; its pain is mostly described in the area of the patella and anteriorly around the knee joint[1,2]. Aleman, 1928, demonstrated that approximately 10-40% of PFPS patients were female, athletes and soldiers[3,4]. Thus, the etiology of PFPS has not been clearly explained yet. Most patients with excessive weight bearing, prolonged walking, running, squatting and walking up-down stairs were found with the symptom of anterior knee pain. The dysfunction of the knee joint and muscle has been observed with patella misalignment, deficiency of hip extensor muscle and tightness of the tensor fascia latea[2-5].

Several questionnaires have been developed to assess the functional ability of LE in knee pain patients such as WOMAC, Lysholm scale, Noyes scale and Larson scale[20]. However, the Kujala Patellofemoral Questionnaire was found to be one of the validated instruments to evaluate LE function especially in anterior knee pain and PFPS patients. Kujala et al in 1993[5] developed the self-administered Kujala Patellofemoral Questionnaire or "Anterior knee pain scale" (AKPS). The questionnaire was used to assess pain and functional ability of LE movements in knee patients. It comprises 13 questions with 3-5 choices of answer in each question; different scores are obtained in each answer. When the total scores are summarized, the score "100" represents the greatest ability of knee function and the score "0" represents the greatest difficulty to perform knee function. Previous studies[3,4,11] have shown good validity and reliability of this questionnaire in determining the knee function of knee patients.

To cross-culturally adaptation the Kujala Patellofemoral Questionnaire, various languages were chosen to determine the cross-cultural adaptations and

Correspondence to:
Sakunkaruna S, Faculty of Physical Therapy, Mahidol University, 999 Phutthamonthonsai 4 Road, Salaya, Nakhon Pathom 73170, Thailand.
Phone: +66-2-4415450, Fax: +66-2-4415454
E-mail: sutida.min@mahidol.ac.th

their reliability including Persian, Turkish, Chinese, German, Swedish, Portuguese and Danish[3,4,10-13]. In fact, appropriate use of the questionnaire in any specific population requires the process of reliability study[19], and therefore, the purposes of this study were to cross-culturally adapt the questionnaire in Thai and determine its reliability. The cross-cultural adaptation of the Thai Kujala Patellofemoral Questionnaire was examined by test-retest reliability.

Material and Method

Cross cultural adaptation of Kujala Patellofemoral Questionnaire to Thai

Six steps were used for the cross cultural adaptation of the Kujala Patellofemoral Questionnaire to Thai (Fig. 1). The first step involved obtaining the approval from both the original study's author, "Urho M Kujala", and the publisher, Arthroscopy of North America. Then the initial forward translation, employed three Thai native speakers to translate the questionnaire to three individual Thai versions. Next, the authors of this research analyzed and synthesized the three Thai version questionnaires finalizing the first draft of the Thai Kujala Patellofemoral Questionnaire. After that, the backward translation version was performed by a native English speaker who can read and understand Thai, and then, the committee of this study created the second synthesized Thai version of the Kujala Patellofemoral Questionnaire. Finally, the content validation study of the second Thai version of the questionnaire was conducted, according to the few comments and the results of a number of miscomprehended questions from the content validity study[18]. The questionnaire was modified and enhanced for context to produce the final Thai version of the Kujala Patellofemoral Questionnaire to assess its reliability.

Test-retest reliability

Forty knee pain patients were enrolled in this study to perform the test-retest reliability of the final version of this questionnaire. All 40 subjects were patients from the Physical Therapy Center, Faculty of Physical Therapy, Mahidol University, with a diagnosis of anterior knee pain by physical therapists. Subjects were reported as knee pain patients with pain and limited knee function. The questionnaire included some general details: age, sex, affected side and duration of knee pain symptom (Table 1). All subjects were able to read and understand Thai. They were asked to complete the questionnaires; the first session after registration and

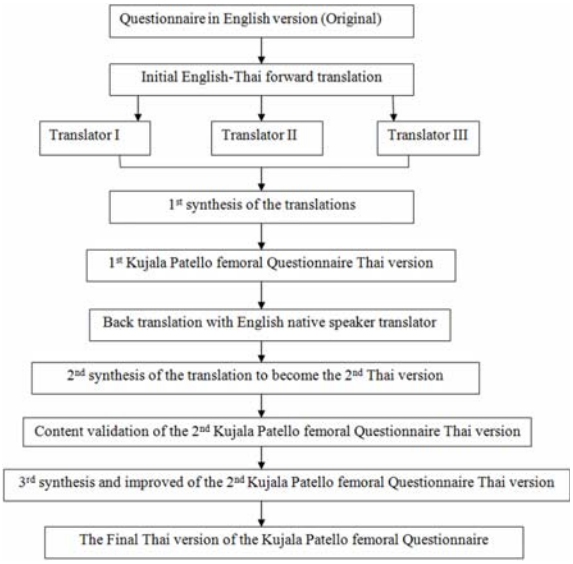

Fig. 1 Diagram representing the process of cross cultural adaptation the Kujala Patellofemoral Questionnaire to Thai.

Table 1. Demographic and clinical characteristics of subjects

Demographic data	n	range
Age (year)	40	18-56
Sex		
Male	4	
Female	36	
Side of involved knee		
Right	18	
Left	20	
Both	2	
Duration of symptoms (months)		1-12

second session thirty minutes after finishing the first administration[12]. Subjects received the appropriate physical therapy treatments from their physical therapists.

All participants were asked to sign an informed consent form approved by the Mahidol University-Institutional Review Board (MU-IRB COA No. 2013/063.1706).

Instrumentation

The Kujala Patellofemoral Questionnaire scale consisted of 13 questions with 3-5 choices. The questions included knee functional ability; limping, weight bearing, walking, stairs, squatting, running, jumping, prolonged sitting, pain swelling, painful

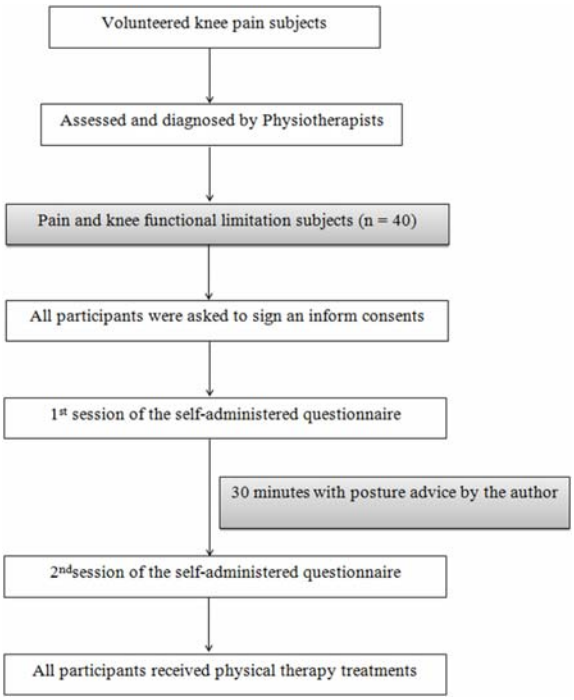

Fig. 2 Diagram representing the method for the test-retest reliability study of the Thai version of the Kujala Patellofemoral Questionnaire.

patellar movement, muscle atrophy and flexion deficiency[4,5]. Each answer had different scores. To calculate the total score, all items were summarized. The score '0' represented the greatest limitation of knee function, whereas the score '100' indicated the ability to perform most knee functions. The final Thai version of the Kujala Patellofemoral Questionnaire would be available and can be downloaded at website: www.pt.mahidol.ac.th

Study population

Forty subjects, anterior knee pain patients, were involved in this study. The inclusion criteria were patients with a diagnosis of anterior knee pain by physical therapists, who were able to read and understand Thai. Subjects who had cognitive impairments and neurological conditions were excluded.

Statistical analysis

The sample size of subjects were calculated from the study of Kuru et al[4] which determined the validity of the Turkish Kujala Scale Questionnaire in patients with PFPS. Test-retest reliability was used to determine the Thai version of the Kujala questionnaire, on two occasions with a 30-minute time interval and intraclass correlation coefficient (ICC) 95% CI. The correlation value was determined as the value of difference consideration; between 0.9 and 1.00 indicated very strong reliability, within 0.7 and 0.9 strong, between 0.5-0.7 moderate and below 0.5 was considered as weak reliability[14,15].

Results

Cross cultural adaptation of the Kujala Patellofemoral Questionnaire to Thai

The Kujala Patellofemoral Questionnaire was completed in cross-cultural adaptation process according to the aforementioned procedure, and the test-retest reliability was then studied.

Test-retest reliability

Thirteen questions presented strong reliability ranging from 0.8-1.0. In addition, the total score was shown as 0.98, indicating very strong test-retest reliability of the Thai version of the Kujala Patellofemoral Questionnaire.

Discussion

Cross-cultural adaptation of the Kujala Patellofemoral Questionnaire to Thai version was validated. Similarly, Persian et al and Watson et al reported that 2 of 13 questions presented the most miscomprehended and were related to technical terms such as "atrophy" and "patellar subluxation". In fact, these technical terms were described and clearly explained in the Thai Kujala Patellofemoral Questionnaire.

An outcome measurement of the test-retest reliability study was the value of an intraclass correlation coefficient (ICC) of which an exceptional value was considered as greater than 0.7[16]. The reliability of the Thai Kujala Patellofemoral Questionnaire presented an excellent level (ICC = 0.98, 95% CI = 0.8-1.0) of reliability in this study. Similarly, the Persian Kujala Questionnaire was ICC = 0.96, Chinese = 0.96, Turkish = 0.96 and Dutch = 0.81[9,10,12,13]. The different factors from each study including pathologies of the participants, time intervals of the two occasions to complete the questionnaire and demographic data produced differing results.

In the present study, the authors chose 30 minutes for time interval according to the subjects' symptoms and conditions, as the subjects comprised outpatients coming to the Physical Therapy Center, Nakhonpathom, Thailand for treatment. From the literature review, the recommendation of the time interval

for test-retest reliability study was 20-30 minutes or 1-2 days[12]. In fact, the 30-minute time interval was convenient for the outpatient subjects. To avoid memorization of the answers, the author advised the subjects regarding general health education such as proper posture for standing and sitting while the subjects were waiting for the second administration.

The study had several limitations. First, the range of participants' ages was 18 to 56 years, by which patients over 40 years could be considered as presenting knee osteoarthritic condition[17]. Second, the onset of knee pain of each subject differed (from 1 month to 12 months). Lastly, the 30-minute time interval might be the limitation from the subjects convenient as aforementioned. Therefore, the result from this study showed excellent test-retest reliability of the Thai Kujala Patellofemoral Questionnaire, which could be a valid and reliable instrument to assess patients with knee osteoarthritis.

Conclusion

The original Kujala Patellofemoral Questionnaire was cross-culturally adapted to Thai version. The Thai version was validated and then investigated for test-retest reliability showing excellent reliability. The Thai version of Kujala Patellofemoral Questionnaire can be one of the useful physical therapy instruments to assess Thai knee pain patients.

What is already known on this topic?

The Kujala Patellofemoral Questionnaire is a validated instrument to use in knee pain patients. Similar to the study of Sakunkaruna et al[18], cross-cultural adaptation of the Kujala Patellofemoral Questionnaire to Thai was valid and reliable.

What this study adds?

The present study produced an excellent test-retest reliability of the Thai version of the Kujala Patellofemoral Questionnaire, which can be used to assess Thai knee pain patients.

Acknowledgement

The authors wish to thank the Faculty of Physical Therapy, Mahidol University for supporting this research. The authors would also like to thank Prof. Kujala Urho for the permission to adapt the questionnaire cross-culturally to Thai.

Potential conflicts of interest

None.

References

1. Crossley KM, Bennell KL, Cowan SM, Green S. Analysis of outcome measures for persons with patellofemoral pain: which are reliable and valid? Arch Phys Med Rehabil 2004; 85: 815-22.
2. Laprade JA, Culham EG. A self-administered pain severity scale for patellofemoral pain syndrome. Clin Rehabil 2002; 16: 780-8.
3. Negahban H, Pouretezad M, Yazdi MJ, Sohani SM, Mazaheri M, Salavati M, et al. Persian translation and validation of the Kujala Patellofemoral Scale in patients with patellofemoral pain syndrome. Disabil Rehabil 2012; 34: 2259-63.
4. Kuru T, Dereli EE, Yaliman A. Validity of the Turkish version of the Kujala patellofemoral score in patellofemoral pain syndrome. Acta Orthop Traumatol Turc 2010; 44: 152-6.
5. Kujala UM, Jaakkola LH, Koskinen SK, Taimela S, Hurme M, Nelimarkka O. Scoring of patellofemoral disorders. Arthroscopy 1993; 9: 159-63.
6. Singer B, Singer K. Anterior Knee Pain Scale. Aust J Physiother 2009; 55: 140.
7. Fulkerson JP, Shea KP. Disorders of patellofemoral alignment. J Bone Joint Surg Am 1990; 72: 1424-9.
8. McConnell J. The physical therapist's approach to patellofemoral disorders. Clin Sports Med 2002; 21: 363-87.
9. Kumar A, Jones S, Bickerstaff DR, Smith TW. Functional evaluation of the modified Elmslie-Trillat procedure for patello-femoral dysfunction. Knee 2001; 8: 287-92.
10. Mostamand J, Bader DL, Hudson Z. The effect of patellar taping on joint reaction forces during squatting in subjects with Patellofemoral Pain Syndrome (PFPS). J Bodyw Mov Ther 2010; 14: 375-81.
11. Cheung RT, Ngai SP, Lam PL, Chiu JK, Fung EY. Chinese translation and validation of the Kujala scale for patients with patellofemoral pain. Disabil Rehabil 2012; 34: 510-3.
12. da Silva Aquino V, Falcon SFM, Neves LMT, Rodrigues RC, Sendin FA. Translation and cross-cultural adaptation of the scoring of patellofemoral disorders into Portuguese: preliminary study. Acta Orthop Bras 2011; 19: 273-9.
13. Sakulsriprasert P, Vachalathiti R, Vongsirinavarat M, Kantasorn J. Cross-cultural adaptation of modified Oswestry Low Back Pain Disability Questionnaire to Thai and its reliability. J Med Assoc Thai 2006; 89: 1694-701.
14. Kievit AJ, Breugem SJ, Sierevelt IN, Heesterbeek

PJ, van de Groes SA, Kremers KC, et al. Dutch translation of the Kujala Anterior Knee Pain Scale and validation in patients after knee arthroplasty. Knee Surg Sports Traumatol Arthrosc 2013; 21: 2647-53.
15. Bennell K, Bartam S, Crossley KM, Green S. Outcome measures in patellofemoral pain syndrome: test retest reliability and inter-relationships. Phys Ther Sport 2000; 1: 32-41.
16. Hinkle D, Wiersma W, Jars S. Applied statistics for the behavioral sciences. Boston: Houghton-Mifflin; 1988.
17. Fayers PM, Machin D. Quality of life: assessment, analysis and interpretation. Chichester: John Wiley & Sons; 2000.
18. Heidari B. Knee osteoarthritis prevalence, risk factors, pathogenesis and features: Part I. Caspian J Intern Med 2011; 2: 205-12.
19. Sakunkaruna S, Sakunkaruna Y, Sakulsriprasert S. Content validity of the Kujala Patellofemoral questionnaire: Thai version. The 2nd International Physical Therapy Conference (IPTC) and The 2nd Physical Therapy Mahidol University Research Symposium (PTMURS). Bangkok: Mahidol University; 2014: 228-39.
20. Garratt AM, Brealey S, Gillespie WJ. Patient-assessed health instruments for the knee: a structured review. Rheumatology (Oxford) 2004; 43: 1414-23.

การทดสอบหาค่าความน่าเชื่อถือของการวัด-วัดซ้ำของแบบสอบถาม Kujala patellofemoral score ฉบับภาษาไทย

สุธิดา สกุลกรุณา, ยศวิน สกุลกรุณา, ประเสริฐ สกุลศรีประเสริฐ

วัตถุประสงค์: *เพื่อหาค่าความน่าเชื่อถือของการวัด-วัดซ้ำของแบบสอบถาม Kujala patellofemoral score ฉบับภาษาไทย*

วัสดุและวิธีการ: *แบบสอบถาม Kujala patellofemoral score ฉบับภาษาไทย ผ่านกระบวนการปรับข้ามวัฒนธรรมและผ่านการทดสอบความตรงของเนื้อหา จนเป็นแบบสอบถามฉบับสมบูรณ์การศึกษานี้มีผู้เข้าร่วมวิจัยเป็นผู้มีอาการปวดเข่าที่เข้ารับการรักษาที่ศูนย์กายภาพบำบัด มหาวิทยาลัยมหิดล จำนวน 40 คน ตอบแบบสอบถาม Kujala patellofemoral score ฉบับภาษาไทย 2 ครั้ง เป็นระยะเวลาห่างกัน 30 นาที การหาค่าความน่าเชื่อถือของการวัด-วัดซ้ำใช้สถิติ the intraclass correlation coefficient ($ICC_{(2,1)}$)*

ผลการศึกษา: *ผู้เข้าร่วมจำนวน 40 คน (หญิง 36 คน, ชาย 4 คน) การศึกษานี้เป็นการทำแบบประเมิน 2 ครั้ง ในช่วงระยะเวลาห่างกัน 30 นาที รวม 13 คำถาม ได้ผลค่าความน่าเชื่อถือที่ระหว่าง 0.8-1.0 และค่าความน่าเชื่อถือจากคะแนนรวมคือ 0.98*

สรุป: *แบบสอบถาม Kujala patellofemoral score ฉบับภาษาไทยมีความสมบูรณ์ตรงในเนื้อหาและมีความน่าเชื่อถือ ในระดับดีมากสามารถนำมาใช้ประโยชน์สำหรับการตรวจประเมินทางกายภาพบำบัดในผู้ป่วยไทยที่มีอาการปวดเข่า*