



Cross-cultural Adaptation and Validation of the International Knee Documentation Committee Subjective Knee Form in Filipino*

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ABSTRACT

Objectives. The primary objectives of this study were to perform cross-cultural adaptation and to determine the validity and reliability of the Filipino IKDC Subjective Knee Form.

Methodology. The IKDC subjective knee form was translated and cross-culturally adapted to Filipino. The process consisted of a forward translation, backward translation, review of versions by an expert committee, modification of the Draft Filipino version, and pre-testing of the Initial Filipino version. The clinimetric properties of the final Filipino IKDC subjective form, namely face and content validity, construct validity, internal consistency and test-retest reliability were measured from 101 respondents. Face and Content validity were explored with questionnaires, internal consistency was assessed with Cronbach Alpha, test-retest reliability was measured with interclass correlation coefficients, and construct validity was analyzed by comparing scores between respondents with injured knees with respondents with healthy knees.

Results. The Filipino version of the IKDC subjective form has internally good clinimetric properties. Content validity showed that all items of the Filipino Version of the IKDC subjective form were perceived to be highly relevant by experts. Face validity showed that the participants graded the questionnaire items as easy to understand and relevant to their condition. Internal consistency, test-retest reliability and were interpreted as excellent and acceptable, with an ICC value of 0.99 and Cronbach's Alpha of 0.702, respectively.

Conclusion. The Filipino IKDC subjective knee form has good face validity, content validity and is a reliable patient reported outcome measure for knee function.

Keywords. Filipino, IKDC, translation, validation, PROM

INTRODUCTION

The International Knee Documentation Committee Subjective Knee Form has been validated, developed, and documented in literature as a valid patient-reported outcome measure (PROM) to evaluate ligamentous and meniscal knee injuries.¹⁻⁴ It studies the domains of pain, activities of daily living, and sports and/or recreation.² In the past decade, there have been many studies validating translated IKDC subjective forms from various countries. Each of their respective authors cross-culturally adapted and performed validity and reliability testing on their respective translated IKDC subjective form.⁵⁻¹⁵

According to Beaton et al., cross-cultural adaptations and translation of established PROMs made for use in the English language should be done in certain scenarios.¹⁶ Specifically, for the Philippines, due to the change in language, culture, and country of use, a translation and cross-cultural adaptation is warranted for the IKDC subjective. A cross-cultural adaptation and translation ensure that the translated version of the scale is linguistically and culturally accepted; this,

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however, does not correspond to the validity and reliability of the translated PROM.¹⁶⁻¹⁹ The primary objective of this study was to perform cross-cultural adaptation and to determine the clinimetric properties of the Filipino International Knee Documentation Committee Subjective Knee Form. Face and content validity, construct validity, internal consistency, and test-retest reliability were determined.

METHODOLOGY

Study design

This was a translation and validation study that examined the clinimetric properties of the created Filipino Version of the IKDC subjective knee form. The study was conducted prospectively at the Philippine Orthopedic Center from January 2020 to November 2022. The American Orthopedic Society for Sports Medicine permitted usage of the IKDC without license or agreement for the purpose of research.

Translation and cross-cultural adaptation phase

As described in the paper of Beaton et al., five general steps were followed to create the culturally adapted Filipino Version of the IKDC subjective form.¹⁶ In the forward translation phase, two bilingual Filipinos drafted separate Filipino IKDC subjective forms, which were consolidated to create the initial Filipino IKDC subjective form. A separate professor from the Department of Filipino and Philippine Literature, University of The Philippines, Diliman, then performed a back translation of the initial Filipino IKDC subjective form. The initial Filipino IKDC subjective form and the back-translated initial Filipino IKDC subjective form were reviewed by an expert committee consisting of three consultants from the Sports Section of the Philippine Orthopedic Center, the Assistant Chairperson and a Professor from The Department of Filipino and Philippine Literature, University of The Philippines, Diliman, and a Methodologist. The expert committee reviewed the previous drafts to create the Final Draft of the Filipino IKDC subjective form.

Pre-testing and modification phase

Fifteen patients with ligamentous knee injuries from the Philippine Orthopedic Center and three Rehabilitation Medicine Consultants from the Philippine Orthopedic Center took part in the pre-testing of the Draft of the Filipino IKDC subjective knee form. Each of these respondents was asked to interpret each item's difficulty and comprehensibility. The data collected from the pre-testing was reviewed and consolidated by a methodologist. The expert committee reviewed this data and modified the Filipino IKDC subjective knee form before utilization in the validation phase of the study.

Validation and reliability testing phase: patients and procedures

Twenty-four patients diagnosed with ligamentous knee injuries were recruited for face validity testing. Participants

were asked to rate items of the Filipino IKDC subjective form in terms of *difficulty to understand* and *relevance to their condition*. To tackle content validity, 10 Orthopedic surgeons from the Philippine Orthopedic Center reviewed the Filipino IKDC subjective form. Each expert rated item relevance, comprehensiveness, and comprehensibility. A 4-point Likert scale was used to rate item relevance, while comment sections were available for comprehensiveness and comprehensibility.

A total of 67 respondents participated in the construct validity and reliability testing phase of the study. Forty-nine respondents had ligamentous knee injuries diagnosed by the Sports Section of The Philippine Orthopedic Center and 18 were healthy respondents. These 49 respondents were not part of the previous phases of this study. All respondents answered the Filipino IKDC subjective knee form and then answered the same form again five to seven days later.

A minimum of 14 patients, seven with injured and seven with healthy knees, were required to explore the discriminative validity based on a level of significance of 5% and a power of 80% with an absolute effect size of 1.3.²⁰ To adequately explore test-retest reliability, a minimum of 41 patients were required with a level of significance of 5% and a power of 90% with an interclass correlation coefficient (ICC) of 0.87.^{5,21} Lastly, a minimum of 53 patients were required to explore internal consistency based on a level of significance of 5% and a precision of 0.05 with Cronbach alpha of 0.89.^{7,8,22}

Statistical analysis

Descriptive statistics were used to summarize the general and clinical characteristics of the participants. Frequency and proportion were used for categorical variables (nominal/ordinal), mean and standard deviation for normally distributed interval/ratio variables, and median and range for non-normally distributed interval/ratio variables. The ICC was used to determine the test-retest reliability of the IKDC subjective knee form. To assess the questionnaire's internal consistency, Cronbach's Alpha was utilized. Mann-Whitney U test and Chi-square test were used to determine the difference in mean, median, and frequency between injured and healthy participants, respectively. All valid data was included in the analysis. Missing variables were neither replaced nor estimated. The Null hypothesis was rejected at 0.05 α -level of significance. R version 4.2.2 was used for data analysis.

RESULTS

Translation and cross-cultural adaptation, pre-testing

Cultural adaptation suggestions from the expert committee were incorporated for items 1, 5, 7, and 8 of the Filipino IKDC. In the physical activities included in the second choice, Skiing and Tennis were changed to "pagbubuhat ng sako" and "pagbibisikleta" which translate to carrying a sack and riding a bicycle respectively.

During the pre-testing and initial face and content validity testing, specifically for items 2 and 3 of the IKDC, participants had a hard time quantifying their subjective knee pain on a scale of 1–10. Thus, under the Likert scale in the choice section of these items, phrases were added to aid the participant to quantify each aspect the of knee symptoms the item was asking them to grade. Although item 4 seemed straightforward in its English form, in the pretesting phase, participants had difficult time differentiating between the initial choices “Wala/Kaunti/Katamtaman/Napakatigas/Labis-labis” The choices were changed to “walang paninigas o pamamaga, may kaunting nararamdamang paninigas o pamamaga, may paninigas o pamamaga ng tuhod, sobrang maga o sobrang tigas ang tuhod, hindi maigalaw and tuhod dahil sa pamamaga o paninigas.”

Content validity

Four items of the Filipino IKDC were rated highly relevant by all experts, while the remaining items were rated highly relevant to quite relevant. None of the experts had any comments on Comprehensibility. For Comprehensiveness, comments on the items were regarding translation. The experts who participated in this study phase gave suggestions to improve the comprehensibility of each item.

Face validity

For item difficulty, the majority of the items were deemed easy to understand. The majority of the items were also deemed important to the respondent’s knee condition.

Test-retest reliability and internal consistency

The Filipino IKDC subjective knee form had excellent reliability with a computed interclass correlation coefficient (ICC) of 0.998. With a computed Cronbach’s alpha of 0.7026, the IKDC Filipino subjective knee form had acceptable internal consistency.

Survey proper and construct validity

There were 67 respondents for the survey, 49 (73.13%) with injured knees and 18 (26.9%) with normal knees. The two groups were similar in terms of age and sex (Table 1). The IKDC subjective knee form score was able to discriminate

between the two groups, with median scores of 51.72 for the injured group and 100 for the normal group ($p < 0.001$).

DISCUSSION

The Filipino version of the IKDC subjective form has internally good clinimetric properties. Content validity showed that all items of the Filipino Version of the IKDC subjective form were perceived to be highly relevant by experts. Face validity showed that the participants graded the questionnaire items as easy to understand and relevant to their condition. Internal consistency and test-retest reliability were interpreted as excellent and acceptable, respectively.

Translation, cross-cultural adaptation and pre-testing

The authors of the paper worked closely with the expert committee in creating the Final Version of the IKDC Filipino Subjective Knee form. This allowed comments and suggestions from all phases of the study to be reviewed and consolidated into each subsequent version. Prior to administering the final IKDC subjective in Filipino in the reliability testing phase, items were shortened or rephrased to make each item simpler to understand.

The original phrase from the second choice of the United States, English IKDC subjective knee form for items 1,5,7 and 8 is “Strenuous activities like heavy physical work, skiing or tennis.” The expert committee as well as respondents from the pre-testing phase of this study shared the sentiments that tennis and skiing are unfamiliar sports to the demographic of respondents, that the Filipino IKDC subjective knee form is supposed to cater to. Instead of substituting tennis and skiing with other sports, the created item choice “Nakakapagod na aktibidad gaya ng mabibigat na trabaho, tulad ng pagbubuhat ng sako o pagbibisikleta” which tried to focus activities deemed as heavy physical work and strenuous.

Face and content validity

Most participants from the face validity phase found the items comprehensible and relevant to their condition. The items rated as “difficult to understand” were the lengthier items of the IKDC which required more time to read.

Table 1. Profile of respondents and hypothesis testing validity with survey proper

	Total (n=67)	Injured Knee (n=49)	Normal Knee (n=18)	p
	Frequency (%); Median (IQR)			
Age, years	30 (27-31)	29 (26-31)	31 (30-31)	0.064§
Sex				0.270†
Male	46 (68.66)	36 (73.47)	10 (55.56)	
Female	21 (31.34)	13 (26.53)	8 (44.44)	
Injured knee [n=49]				-
Left	27 (55.10)	27 (55.10)	-	
Right	22 (44.90)	22 (44.90)	-	
IKDC subjective knee form score [n=116]	67.816 (47.989-94.253)	51.724 (37.931-69.540)	100 (97.70-100)	<0.001§

Statistical tests used: § - Mann-Whitney U test; † - Chi-square test

The orthopedic surgeons who participated in the content validation phase graded all the items of the Filipino Version of the IKDC subjective form as highly relevant for evaluating ligamentous knee injuries. The majority of the comments focused on the correct phrasing of the questions and responses. The types of comments made by the experts were grouped into two main categories: appropriate wording to describe knee symptoms and syntax. One respondent commented using “pagkalas ng tuhod” instead of “pagbigay ng tuhod.” The expert committee discussed how to phrase the term “pagbigay ng tuhod” (originally “giving way in your knee” in English) and agreed that it was an appropriate translation. The other comments on the syntax were reviewed by the Assistant Chairperson of The Department of Filipino and Philippine Literature, University of The Philippines, Diliman.

The changes incorporated into the Final Filipino IKDC subjective form prior to reliability and construct validity testing are enumerated below. For item 6, the choices were changed from “oo” and “hindi” to “mayroon” and “wala”. The questions for items 1, 5, and 7 were simplified to “Ano ang pinakakaya mong gawin na hindi sumasakit ang tuhod,” “... nang hindi namamaga ang tuhod,” and “... nang hindi bumibigay ang tuhod,” respectively. For question 10, the phrase “paano mo titignan” was changed to “paano mo mamarkahan.”

Reliability and construct validity

Internal Consistency of the Filipino IKDC subjective form was acceptable with a computed Cronbach’s alpha of 0.7026. The study by Crawford et al., investigating the internal consistency of the Original IKDC reports a Cronbach’s alpha of 0.77.²³ More recent studies that performed cross-cultural adaptations and validity studies report values ranging from 0.89 to 0.97.⁵⁻¹⁵ These include studies from China, the Netherlands, Brazil, Thailand, Italy, South Korea, Indonesia, Greece, and Turkey.

The test-retest reliability of the Filipino IKDC subjective knee form was found to be excellent with an ICC of 0.99. This value is comparable with the Brazilian and Indonesian IKDC versions having an ICC of 0.99, the Dutch IKDC’s ICC of 0.96, and the Original IKDC’s ICC of 0.95.^{6,11,22}

A study by Anderson et al., collected normative data for the IKDC form for around 5000 knees in the United States of America; 28% of respondents had injured knees while the remainder did not have knee problems.²⁴ This study reported that respondents with a current unilateral knee problem, current treatment, or history of knee surgery had lower scores than respondents without a history of knee problems. This proves the construct validity of the IKDC subjective knee form since it can differentiate between patients with healthy knees and patients with injured knees.²⁴

Data from this current study is similar to the data collected by Anderson et al., in 2006.²⁴ In this current study, patients with knee injuries also had lower scores than patients with healthy knees. The Filipino IKDC subjective knee form score

was able to discriminate between the two groups, with median scores of 51.72 for the injured knees group and 100 for normal knee patients ($p < 0.001$).

RECOMMENDATIONS AND LIMITATIONS

Although the scores between healthy and injured knees were significantly different, it only *suggests* that the Filipino IKDC has good construct validity because there is no normative data available. According to Mokking et al., to explore the construct validity of a PROM, hypothesis testing regarding “internal relationships, relationships to scores of other instruments, or differences between relevant groups” should be carried out.²⁵

Most IKDC translation and validation studies noted the lack of a “gold standard” questionnaire to measure knee function.¹⁻⁴ They translated and validated knee PROMs in their native languages to evaluate the corresponding IKDC being validated.⁵⁻¹⁵ A major limitation of this study is that the knee-related PROMs used in foreign studies do not have Filipino versions.

The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36), although not a knee-specific PROM, was also used to measure the construct validity of the IKDC subjective knee form.⁵⁻¹⁵ The Filipino Version of the SF-36, while not accessible to the author at this time, could be licensed and used in the future to further investigate the Filipino IKDC subjective knee form.

Aside from determining the clinimetric properties of the Filipino IKDC as presented above, according to Mokking et al., responsiveness should also be measured.^{19,25} Responsiveness is defined as the ability to “detect change over time in the construct to be measured.”^{19,25} To measure the responsiveness of the Filipino IKDC subjective knee form, it should also be administered to patients before and after ACL reconstruction surgery.

CONCLUSION

The Filipino IKDC subjective knee form developed in this study has good face validity, good content validity and is a reliable PROM to evaluate knee pain and function of Filipino patients with ACL injuries. Further research in responsiveness and construct validity can be done.

STATEMENT OF AUTHORSHIP

All authors certified fulfillment of ICMJE authorship criteria.

AUTHORS DISCLOSURE

The authors declared no conflict of interest.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available upon request from the corresponding author.

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REFERENCES

- Meta F, Lizzio VA, Jildeh TR, Makhni EC. Which patient reported outcomes to collect after anterior cruciate ligament reconstruction. *Ann Jt.* 2017;2:21. DOI: 10.21037/aoj.2017.05.10
- Van Meer B, Meuffels D, Reijman M. A comparison of the standardized rating forms for evaluation of anterior cruciate ligament injured or reconstructed patients. *Chadwick C Prodrornos. The anterior cruciate ligament reconstruction and basic science.* Philadelphia: Elsevier, 2018. DOI: 10.1016/B978-0-323-38962-4.00120-X
- Ahmad SS, Meyer JC, Krism0er AM, et al. Outcome measures in clinical ACL studies: an analysis of highly cited level I trials. *Knee Surg Sports Traumatol Arthrosc.* 2017;25(5):1517-27. PMID: 27743080 DOI: 10.1007/s00167-016-4334-4
- Collins NJ, Misra D, Felson DT, Crossley KM, Roos EM. Measures of knee function: International Knee Documentation Committee (IKDC) Subjective Knee Evaluation Form, Knee Injury and Osteoarthritis Outcome Score (KOOS), Knee Injury and Osteoarthritis Outcome Score Physical Function Short Form (KOOS-PS), Knee Outcome Survey Activities of Daily Living Scale (KOS-ADL), Lysholm Knee Scoring Scale, Oxford Knee Score (OKS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Activity Rating Scale (ARS), and Tegner Activity Score (TAS). *Arthritis Care Res (Hoboken).* 2011;63 Suppl 11(0 11):S208-28. PMID: 22588746 PMID: PMC4336550 DOI: 10.1002/acr.20632
- Fu SN, Chan YH. Translation and validation of Chinese version of International Knee Documentation Committee Subjective Knee Form. *Disabil Rehabil.* 2011;33(13-14):1186-9. PMID: 20969433 DOI: 10.3109/09638288.2010.524274
- Çelik D, Coşkunsu D, KiliÇoğlu Ö, Ergönül O, Irrgang JJ. Translation and cross-cultural adaptation of the international knee documentation committee subjective knee form into Turkish. *J Orthop Sports Phys Ther.* 2014;44(11):899-909. PMID: 25323139 DOI: 10.2519/jospt.2014.4865
- Koumantakis GA, Tsoligkas K, Papoutsidakis A, Ververidis A, Drosos GI. Cross-cultural adaptation and validation of the International Knee Documentation Committee Subjective Knee Form in Greek. *J Orthop Traumatol.* 2016;17(2):123-9. PMID: 26093603 PMID: PMC4882291 DOI: 10.1007/s10195-015-0362-y
- Haverkamp D, Sierevelt IN, Breugem SJ, Lohuis K, Blankevoort L, van Dijk CN. Translation and validation of the Dutch version of the International Knee Documentation Committee Subjective Knee Form. *Am J Sports Med.* 2006;34(10):1680-4. PMID: 16816150 DOI: 10.1177/0363546506288854
- Kim JG, Ha JK, Lee JY, Seo SS, Cho CH, Lee MC. Translation and validation of the Korean version of the international knee documentation committee subjective knee form. *Knee Surg Relat Res.* 2013;25(3):106-11. PMID: 24032098 PMID: PMC3767895 DOI: 10.5792/ksrr.2013.25.3.106
- Kümmel D, Preiss S, Harder LP, Leunig M, Impellizzeri FM. Measurement properties of the German version of the IKDC subjective knee form (IKDC-SKF). *J Patient Rep Outcomes.* 2018;2:31. PMID: 30294711 PMID: PMC6092732 DOI: 10.1186/s41687-018-0058-1
- Metsavaht L, Leporace G, Riberto M, Sposito MMM, Batista LA. Translation and cross-cultural adaptation of the Brazilian version of the International Knee Documentation Committee Subjective Knee Form: validity and reproducibility. *Am J Sports Med.* 2010;38(9):1894-9. PMID: 20472755 DOI: 10.1177/0363546510365314
- Padua R, Bondi R, Ceccarelli E, et al. Italian version of the International Knee Documentation Committee Subjective Knee Form: cross-cultural adaptation and validation. *Arthroscopy.* 2004;20(8):819-23. PMID: 15483542 DOI: 10.1016/j.arthro.2004.06.011
- Lertwanich P, Prohruetkit T, Keyurapan E, Lamsam C, Kulthanan T. Validity and reliability of Thai version of the International Knee Documentation Committee Subjective Knee Form. *J Med Assoc Thai.* 2008;91(8):1218-25. PMID: 18788694
- Todor A, Vermesan D, Haragus H, Patrascu Jenel Jr M, Timar B, Cosma DI. Cross-cultural adaptation and validation of the Romanian International Knee Documentation Committee-subjective knee form. *PeerJ.* 2020;8:e8448. PMID: 32117610 PMID: PMC7003694 DOI: 10.7717/peerj.8448
- Deviandri R, van der Veen HC, Lubis AMT, Postma MJ, van den Akker-Scheek I. Translation, cross-cultural adaptation, validity, and reliability of the Indonesian version of the IKDC Subjective Knee Form. *Orthop J Sports Med.* 2021;9(9):23259671211038372. PMID: 34604432 PMID: PMC8485307 DOI: 10.1177/23259671211038372
- Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine.* 2000;25(24):3186-91. PMID: 11124735 DOI: 10.1097/00007632-200012150-00014
- Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health social and behavioral research: a primer. *Front Public Health.* 2018;6:149. PMID: 29942800 PMID: PMC6004510 DOI: 10.3389/fpubh.2018.00149
- Epstein J, Santo RM, Guillemin F. A review of guidelines for cross-cultural adaptation of questionnaires could not bring out a consensus. *J Clin Epidemiol.* 2015;68(4):435-41. PMID: 25698408 DOI: 10.1016/j.jclinepi.2014.11.021
- Mokkink LB, Terwee CB, Knol DL, et al. The COSMIN checklist for evaluating the methodological quality of studies on measurement properties: a clarification of its content. *BMC Med Res Methodol.* 2010;10:22. PMID: 20298572 PMID: PMC2848183 DOI: 10.1186/1471-2288-10-22
- Machin D, Campbell MJ, Tan SB, Tan SH. *Sample sizes for clinical, laboratory and epidemiology studies*, 4th ed, John Wiley & Sons, Inc.; 2018.
- Bujang MA, Baharum N. A simplified guide to determination of sample size requirements for estimating the value of intraclass correlation coefficient: a review. *Arch Orofacial Sci.* 2017;12(1):1-11.
- Bonett DG. Sample size requirements for testing and estimating coefficient alpha. *J Educ Beh Stat.* 2002;27(4):335-40. DOI: 10.3102/10769986027004335
- Crawford K, Briggs KK, Rodkey WG, Steadman JR. Reliability, validity, and responsiveness of the IKDC score for meniscus injuries of the knee. *Arthroscopy.* 2007;23(8):839-44. PMID: 17681205 DOI: 10.1016/j.arthro.2007.02.005
- Anderson AF, Irrgang JJ, Kocher MS, et al; International Knee Documentation Committee. The international knee documentation committee subjective knee evaluation form: normative data. *Am J Sports Med.* 2006;34(1):128-35. PMID: 16219941 DOI: 10.1177/0363546505280214
- Mokkink LB, Terwee CB, Patrick DL, et al. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *J Clin Epidemiol.* 2010;63(7):737-45. PMID: 20494804 DOI: 10.1016/j.jclinepi.2010.02.006

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