ORIGINAL ARTICLE

An Indonesian Version of Validity and Reliability Test of Knee Outcome Survey - Activities of Daily Living Scale in Knee Osteoarthritis

Rimnauli Deasy Putryanti Sinaga[1], Tirza Z. Tamin[1], I Nyoman Murdana[1], Dewi Friska[2]

[1] Department of Physical Medicine and Rehabilitation, Faculty of Medicine Universitas Indonesia, Dr. Cipto Mangunkusumo National Central Public Hospital Jakarta, Indonesia

[2] Department of Community Medicine, Faculty of Medicine Universitas Indonesia, Dr. Cipto Mangunkusumo National Central Public Hospital Jakarta, Indonesia

ABSTRACT

Introduction: Knee osteoarthritis (OA) symptoms greatly limit daily activities and cause functional disability, also limit participation and reduce quality of life. It is necessary to evaluate patients' perspectives on clinical outcomes regarding the quality and success of knee OA management. The Knee Outcome Survey – Activities of Daily Living Scale (KOS-ADLS) is an instrument to assess these perspectives. This study tests the validity and reliability of a KOS-ADLS translation.

Methods: This study is a cross-sectional study involving 65 subjects and was conducted at the Musculoskeletal Division, Department of Physical Medicine and Rehabilitation, Cipto Mangunkusumo Hospital from 01/10/2020 to 31/08/2021. The results of the Indonesia translation of KOS-ADLS (KOS-ADLS-Ina) were tested for validity using Pearson correlation with $p<0.05$ and $r>0.3$ and the reliability was tested with internal consistency of α-Cronbach and Intraclass Correlation Coefficient ≥ 0.7.

Results: The correlation value for the total items was 0.461–0.792. As for the internal consistency, the α-Cronbach set at 0.911 and ICC was 0.969 (0.950–0.981). KOS-ADLS-Ina proves that both Pearson's correlation and internal consistency have values above the minimal intended value with a significance of $p<0.05$.

Conclusion: KOS-ADLS-Ina proves to be a valid and reliable functional capacity instrument to be used in Indonesian population.

Keywords: Knee Outcome Survey – Activities of Daily Living Scale, knee osteoarthritis, Indonesia, validity, reliability.

ABSTRAK

Pendahuluan: Gejala osteoarthritis (OA) lutut membataskan aktivitas sehari-hari dan menimbulkan disabilitas fungsional yang akan membatasjab partisipasi dan menurunkan kualitas hidup. Evaluasi luaran klinis dari sudut pandang pasien dirasakan perlu terkait kualitas dan keberhasilan tatalaksana OA lutut. Knee Outcome Survey Activity Daily Living Scale (KOS-ADLS) merupakan instrumen untuk menilai status fungsional pasien OA lutut yang mengevaluasi gejala-gejala dan keterbatasan fungsional spesifik selama aktivitas hidup sehari-hari. Penelitian ini bertujuan untuk menguji kesahihan dan keandalan instrument KOS-ADLS yang diadaptasi dan diterjemahkan ke budaya dan bahasa Indonesia (KOS-ADLS-Ina).

Metode: Penelitian potong lintang denga 65 pasien ini dilaksanakan di poliklinik Departemen Rehabilitasi Medik divisi Muskuloskeletal RSCM dari 01/10/2020 sampai 31/08/2021. Data diuji kesahihan menggunakan korelasi Pearson dengan $p<0.05$ dan $r>0.3$ dan keandalan dengan uji konsistensi internal dengan nilai α-cronbach dan Intraclass Correlation Coefficient ≥ 0.7.

Hasil: Hasil penelitian menunjukkan nilai korelasi KOS-ADLS-Ina untuk keseluruhan item ialah 0.461–0.792. Nilai α-cronbach KOS-ADLS-Ina adalah 0.911 dan nilai ICC yaitu 0.969 (0,950–0,981). Berdasarkan hasil analisis statistik, instrumen KOS-ADLS-Ina memiliki nilai korelasi dan konsistensi internal diatas nilai minimal yang berarti sahih dan andal dengan tingkat signifikansi $p<0.05$.

Kesimpulan: Kesimpulannya, KOS-ADLS-Ina memiliki kesahihan dan keandalan yang baik untuk digunakan sebagai alat ukur keterbatasan fungsional pada OA lutut di Indonesia.

Correspondent Detail:

Rimnauli Deasy Putryanti Sinaga

Department of Physical Medicine and Rehabilitation, Faculty of Medicine Universitas Indonesia,
Dr. Cipto Mangunkusumo National Central Public Hospital Jakarta, Indonesia
Email: rdps1986@gmail.com

INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease characterized by articular cartilage degeneration, subchondral bone changes, osteophyte formation, ligament weakening, muscular weakness at the quadriceps, and joint inflammation.[1,2] Structural and morphological musculoskeletal changes in knee with OA can cause pain, swollen joints, reduced range of motion, and joint instability.[2] The World Health Organization estimates 9.6% and 18% of above 60-year-old males and females have OA symptoms. OA is one of the top 10 causes of disability in developing countries. Approximately 80% of OA patients experience limited range of motion and 25% lose the ability to carry out daily activities, while one-third experience disability.[3,4] The 2018 Baseline Health Research by the Indonesian Ministry of Health revealed that the prevalence of joint disease at the age of ≥75 year was 18.6%.5 In 2018, 1744 outpatients from the Medical Rehabilitation polyclinic at Cipto Mangunkusumo General Hospital, which were

37% of the total patient population, had been diagnosed with OA symptoms.

Knee osteoarthritis (OA) symptoms greatly limit daily activities and cause functional disability, and also limit participation and reduce the quality of life. Current medical biopsychosocial developments increase physicians' responsibilities not only in treating physical health, but also in increasing the quality of life in comprehensive rehabilitative management.[6–8]

Patients' perspectives on clinical outcomes are necessary to be evaluated to determine the quality and success of knee OA treatment. Thus, instruments applied for clinical use must also include patients' direct reports of pain and function.[9] Jia et al.[10] revealed that there is no direct correlation between clinical examination and radiological findings of knee OA and the symptoms experienced by the patient. Furthermore, Lespasio et al.[9] promote the need to evaluate patients' subjectivity of symptoms.

Patient-Reported Outcome Measure (PROM) is commonly used as an instrument to evaluate symptoms, functional status, and changes in treatment while avoiding operator bias.11 Knee Outcome Survey - Activities of Daily Living Scale (KOS-ADLS) is a knee PROM that is widely used to evaluate functional status in several knee joint disorders, including OA.[12,13] It is widely used and validated, reliable, as well as responsive.[10] This instrument focuses on the evaluation of symptoms and limited functions in conducting daily activities. KOS-ADLS is usually indicated for conditions caused by knee joint diseases, including ligament or meniscus injuries, knee OA, and patellofemoral pain. KOS-ADLS may also be used for all age ranges. It comprises 14 questions with a recall period of 1–2 days, so neither the patient nor the clinician needs extended time to fill and interpret the scores of this questionnaire. It is also responsive to changes during treatment, and effective as evaluation of knee OA patients undergoing physical therapy or orthopedic procedures.[14] Compared to Western Ontario and McMaster Universities Osteoarthritis Index, Williams et al.[11] found KOS-ADLS to be more suitable as a knee function PROM for knee OA.

Currently, KOS-ADLS has been translated into several languages. However, this valuable instrument has not been translated into a valid and reliable Indonesian language version. Therefore, this study attempts to provide one such translation as an instrument to evaluate the functional limits of knee OA patients.

METHODS

This is a cross-sectional study to evaluate the validity and reliability of the Indonesian translation of KOS-ADLS (KOS-ADLS-Ina). Samples were obtained sequentially from the Medical Rehabilitation polyclinic of Dr. Cipto Mangunkusumo National Central Public Hospital from 01/10/2020 to 31/08/2021. Samples were knee OA patients obtained through consecutive and total sampling during this period. Eligible patients were requested to fill out a questionnaire under supervision. Table 1 lists the inclusion and exclusion criteria for knee OA patients at the polyclinic.

Table 1. Inclusion and Exclusion Criteria for Knee OA Patients.

Inclusion Criteria	Exclusion Criteria
Male or Female	History of surgery or injury to the lower extremities (hip, knee, and ankle)
Diagnosed with primary or secondary, unilateral or bilateral knee osteoarthritis by a medical rehabilitation specialist and a rheumatologist according to clinical and radiological criteria.	Congenital defect of the lower extremities
18 years-old and above	Autoimmune disorders like rheumatoid arthritis involving the lower extremities
Literate in Indonesian language	Knee joint infection that limits mobility
Good comprehension of instructions	Lower extremity pain not involving the knee (hip or ankle joint)
Capable of moving independently with or without walking aids	Lower back pain limiting mobility
Mo-CA INA≥ 26	Vascular disease limiting mobility
Geriatric Depression Scale<5	Neuromuscular disease reducing mobility
Consent to participation	Having treated with injections for knee OA
	Drug consumption that lowers psychophysical ability

*Mo-CA INA = Indonesian Version of Montreal Cognitive Assessment

Two translations were provided by two translators. One is a certified English interpreter proficient in Indonesian language who had been given context and conceptual information about KOS-ADLS. The other is an Indonesian native speaker and certified English interpreter that was not briefed on the questionnaire nor possessed medical or clinical backgrounds. These translations were synthesised by the interpreters through consensus discussions, resulting in one translated manuscript. This synthesised translation was then back translated by another interpreter that had no knowledge of the original KOS-ADLS. Experts evaluated the back translation by comparing it to the original. Then, cognitive debriefing was conducted up to the pre-final version to identify difficulties in filling out the questionnaire using 10 respondents representing the target population. The revaluation using the cognitive briefing results was then followed by final grammatical editing. This produced the final KOS-ADLS-Ina. The translations were conducted according to the International Society for Pharmacoeconomics and Outcomes Research guidelines.

The validity of the construct was evaluated by examining the correlation between each question and the total score using Pearson's

correlation. Meanwhile, reliability was assessed using Cronbach's alpha and test-retest reliability, by calculating the Intraclass Correlation Coefficient (ICC). The acceptable ICC threshold was >0.7 with results above >0.8 to be considered excellent.[15]

Ethical clearance was provided by the Ethics Committee of the Faculty of Medicine, Universitas Indonesia – Cipto Mangunkusumo Hospital. Approval was given on 10 August 2020 under the protocol number 20-08-0814.

RESULTS

Each stage of translation was archived for comparison. Table 2 shows the changes made in the process of providing the back translation along with remarks on each item. Cognitive debriefing did not yield any more significant changes to the final version of KOD-ADLS-Ina.

Table 2. Process of Translating KOD-ADLS into Indonesian Language and Its Back Translation

No.	Original	Forward Translation I	Forward Translation II	Reconciliation	Backward Translation
1	Symptoms:	Gejala-gejala:	Gejala:	Gejala:	Symptom:
2	To what degree does each of the following symptoms affect your level of activity? (check one answer on each line)	Seberapa besar pengaruh gejala-gejala berikut pada tingkat aktivitas anda? (centang satu jawaban pada setiap baris)	Seberapa jauh setiap gejala berikut memengaruhi tingkat kegiatan anda? (beri tanda centang pada satu jawaban di setiap baris)	Seberapa besar setiap gejala berikut memengaruhi tingkat aktivitas Anda? (beri tanda centang pada satu jawaban di setiap baris)	To what extent does each symptom influence your level of activity? (check only one answer in one line)
3	Pain	Rasa nyeri	Sakit	Nyeri	Pain
4	Stiffness	Kaku	Kaku	Kaku	Stiffness
5	Swelling	Bengkak	Bengkak	Bengkak	Swelling
6	Giving way, buckling, or shifting of the knee	Lutut tidak dapat menopang badan, atau lutut bergeser	Lutut berubah, menekuk, bergeser	Lutut tidak dapat menopang badan, menekuk, atau lutut bergeser	Knees cannot support the body, bend, or the knees shift
7	Weakness	Lemah	Lemah	Lemah	Weak
8	Limping	Pincang	Pincang	Pincang	Limping
9	I do not have the symptom	Saya tidak mengalami gejala ini	Tidak ada gejala	Saya tidak mengalami gejala ini	I do not have the symptom
10	I have the symptom, but it does not affect my activity	Saya mengalami gejala ini tetapi hal itu tidak memengaruhi aktivitas saya	Ada gejala namun tidak memengaruhi kegiatan	Saya mengalami gejala ini namun tidak memengaruhi aktivitas saya	I have the symptom, but it does not affect my activities

Table 2. Process of Translating KOD-ADLS into Indonesian Language and Its Back Translation

No.	Original	Forward Translation I	Forward Translation II	Reconciliation	Backward Translation
11	The symptom affects my activity slightly	Gejala itu sedikit memengaruhi aktivitas saya	Gejalanya sedikit memengaruhi kegiatan	Gejala ini sedikit memengaruhi aktivitas saya	The symptom slightly affects my activities
12	The symptom affects my activity moderately	Gejala itu cukup memengaruhi aktivitas saya	Gejalanya cukup memengaruhi kegiatan	Gejala ini cukup memengaruhi aktivitas saya	The symptom affects my activities moderately
13	The symptom affects my activity severely	Gejala itu sangat memengaruhi aktivitas saya	Gejalanya sangat memengaruhi kegiatan	Gejala ini sangat memengaruhi aktivitas saya	This symptom greatly affects my activities
14	The symptom prevents me from all daily activity	Gejala itu menghalangi saya melakukan semua aktivitas sehari-hari	Gejalanya menghambat seluruh kegiatan harian	Gejala ini menghambat saya melakukan semua aktivitas sehari-hari	This symptom prevents me from doing all my daily activities
15	Functional Limitations with Activities of Daily Living:	Keterbatasan fungsional dalam aktivitas kehidupan sehari-hari	Keterbatasan fungsional dalam aktivitas kehidupan sehari-hari	Keterbatasan Fungsional Dalam Aktivitas Kehidupan Sehari-Hari:	Functional limitations with activities of daily life
16	How does your knee affect your ability to: (check one answer on each line)	Bagaimana pengaruh lutut pada kemampuan untuk: (centang satu jawaban pada setiap baris)	Bagaimana pengaruh lutut pada kemampuan untuk: (centang satu jawaban pada setiap baris)	Bagaimana pengaruh lutut anda pada kemampuan untuk: (beri tanda centang pada satu jawaban di setiap baris)	What is the effect of your knees on your ability to: (check only one answer in one line)
17	Walk	Berjalan	Berjalan	Berjalan	Walking
18	Go up stairs	Naik tangga	Menaiki tangga	Naik tangga	Going up stairs
19	Go downstairs	Turun tangga	Menuruni tangga	Turun tangga	Going downstairs
20	Stand	Berdiri	Berdiri	Berdiri	Standing
21	Kneel on front of your knee	Berlutut menggunakan bagian depan lutut	Berlutut dengan bagian depan lutut	Berlutut menggunakan lutut bagian depan	Kneeling using the front of the knees
22	Squat	Jongkok	Jongkok	Jongkok	Squatting
23	Sit with your knee bent	Duduk dengan lutut ditekuk	Duduk dengan lutut tertekuk	Duduk dengan lutut ditekuk	Sitting with knees bent
24	Rise from a chair	Berdiri dari posisi duduk di kursi	Bangkit dari kursi	Berdiri dari posisi duduk di kursi	Standing up from sitting on a chair
25	Activity is not difficult	Aktivitas ini tidak sulit	Kegiatan yang tidak sulit	Aktivitas ini tidak sulit	This activity is not difficult
26	Activity is minimally difficult	Aktivitas ini sedikit sulit	Kegiatan yang sedikit sulit	Aktivitas ini sedikit sulit	This activity is slightly difficult

Table 2. Process of Translating KOD-ADLS into Indonesian Language and Its Back Translation

No.	Original	Forward Translation I	Forward Translation II	Reconciliation	Backward Translation
27	Activity is somewhat difficult	Aktivitas ini agak sulit	Kegiatan yang agak sulit	Aktivitas ini agak sulit	This activity is somewhat difficult
28	Activity is fairly difficult	Aktivitas ini cukup sulit	Kegiatan yang lumayan sulit	Aktivitas ini cukup sulit	This activity is moderately difficult
29	Activity is very difficult	Aktivitas ini sangat sulit	Kegiatan yang sangat sulit	Aktivitas ini sangat sulit	This activity is very difficult
30	I am unable to do the activity	Saya tidak mampu melakukan aktivitas ini	Saya tidak mampu melakukannya	Saya tidak mampu melakukan aktivitas ini	I cannot do this activity

There were 65 patients as the subjects of this study. 9 subjects were male and 56 were female. The age range of the subjects was 43–77 years with an average of 59.75 years. The subjects' BMIs ranged from 19.22–37.98 kg/m2, mostly Class I Obesity according to Asia-Pacific standards. Educational backgrounds varied, although most were high school graduates (23 subjects) without further education. Occupational demographics showed that 38 subjects were housewives. 41 subjects experienced bilateral knee OA, and 41 subjects were also experiencing grade III OA.

The correlation coefficient for each KOD-ADLS-Ina item with a total score ranged from 0.461 to 0.792. This validates the questionnaire as all items were scored above the cut-off of 0.3. Meanwhile, Cronbach's Alpha for KOS-ADLS-Ina was 0.911. Therefore, it can be concluded that KOS-ADLS-Ina was both valid and reliable.

DISCUSSION

An interesting observation is the difficulty in understanding the phrase "kneeling using the front of the knees" found during cognitive debriefing because another attempt at translation into Chinese also encountered a similar difficulty. This difficulty was remedied in the final version of KOD-ADLS-Ina using "lutut bagian depan" instead of "bagian depan lutut.".[10]

The translation for "giving way, buckling, or shifting of the knee" is different from the original. Its translation was back translated into "knees cannot support the body, bend, or the knees shift." The semantics and concepts are still quite similar despite the differences. The problem arises from the translation of the term "buckling" that is too technical. Some translation attempts into Greek, French, and Chinese also found similar results.[10,16,17] These translations were forwarded to Prof. James Irrgang as the questionnaire's original author who found these changes to be acceptable.

In the validity test, it was found that the item "Walking" translated from KOS-ADLS-Ina had the highest correlation coefficient, similar to the attempt of translation into Arabic.[18] The items' correlation strength ranging from moderate to strong coincided with the range found in the original KOS-ADLS study.[19] The KOS-ADLS-

Ina Cronbach's alpha obtained during this study was excellent, ranging from 0.899–0.929. The test-retest reliability of KOS-ADLS-Ina was excellent as well, with ICC ranging from 0.951–0.961. This high value may be attributed to the short test-retest period compared to other translation attempts such as into Persian with a period of 8 days.[20]

The readability of KOS-ADLS-Ina was also assessed using the Fry graph for grade 8. KOS-ADLS-Ina can be used for subjects with 8th grade reading skills. It is currently impossible to compare readability to the original questionnaire as no measurement has ever been conducted. The excellent readability of KOS-ADLS-Ina coincides with the cognitive debriefing results. Representatives were obtained from 10 junior high school graduates and all of them were able to fill out the form well. The form itself took 3 to 8 minutes to complete and there were no difficulties in understanding the questions even by geriatric patients. The interpretation of the questionnaire could be completed in less than 5 minutes. The ease of filling and interpreting KOS-ADLS-Ina offers considerable advantages in the clinical setting.14 However, it is worth noting that it does not explore the questionnaire's ability to accurately measure therapeutic response as it does not issue the questionnaire serially.

CONCLUSION

KOS-ADLS-Ina is statistically proven to be a valid and reliable tool for evaluating knee OA patients.

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