Translation, Validity, and Reliability of the Indonesian Version of the Anterior Cruciate Ligament–Return to Sport After Injury Scale

Romy Deviandri,*†‡§ MD, Hugo C. van der Veen,† MD, PhD, Andri M.T. Lubis,‖ MD, PhD, Maarten J. Postma,¶#**†† PhD, and Inge van den Akker-Scheek,† PhD
Investigation performed at the Department of Orthopedics, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands

Background: The Anterior Cruciate Ligament–Return to Sport After Injury (ACL-RSI) scale measures athletes' emotion, confidence, and risk appraisal when returning to sports after an anterior cruciate ligament (ACL) injury and/or ACL reconstruction (ACLR).

Purpose: To translate the ACL-RSI into the Indonesian language and to assess its validity and reliability in Indonesian-speaking patients after ACLR.

Study Design: Cohort study (diagnosis); Level of evidence, 2.

Methods: After a forward-and-backward translation procedure, the validity and reliability of the Indonesian version of the ACL-RSI (I-ACL-RSI) were investigated. Patients who had undergone ACLR at a single hospital were asked to complete 4 questionnaires: I-ACL-RSI, Injury–Psychological Readiness to Return to Sport, Tampa Scale of Kinesiophobia, and International Knee Documentation Committee. After a 2-week interval, patients were asked to complete the I-ACL-RSI a second time. Following the COSMIN reporting guidelines (Consensus-Based Standards for the Selection of Health Measurement Instruments), we determined construct validity using hypothesis testing, as well as test-retest reliability, internal consistency, floor and ceiling effects, and measurement error.

Results: Of 200 eligible patients, 102 (51%) were included in the analysis. All predefined hypotheses on correlations between the I-ACL-RSI and the other questionnaires were confirmed, indicating good construct validity. An intraclass correlation coefficient of 0.90 (2-way random, type agreement) was found for the first and second I-ACL-RSI scores, indicating good test-retest reliability. A Cronbach α of 0.95 indicated good internal consistency, and no floor or ceiling effects were found. The standard error of measurement was 3.9, with the minimal detectable change calculated as 10.9 points at the individual level and 1.1 points at the group level.

Conclusion: Based on the study findings, the I-ACL-RSI can be considered a valid and reliable questionnaire for Indonesian-speaking patients after ACL injury and/or ACLR.

Keywords: ACL injuries; ACL-RSI; questionnaire; PROM; Indonesian translation

The number of anterior cruciate ligament reconstruction (ACLR) surgical procedures has increased gradually over the past decade. An estimated 400,000 to 500,000 ACLRs are performed each year in the United States, based on implant usage.[31] This number is expected to rise throughout the world as a result of increased participation of adolescents and young adults in athletic activities. In Indonesia, the number of ACLRs rose by 42% in 2019 as compared with 2018 (1575 implants in 2018 vs 2236 in 2019).[6]

The ultimate goal of an ACLR is to return to sport (RTS) at the preinjury level.[9,20] Many factors affect sports resumption. Besides physical aspects, psychological factors play an essential role in RTS after ACLR.[22] In 2008, Webster et al[30] developed and analyzed the validity of the Anterior Cruciate Ligament–Return to Sport After Injury (ACL-RSI) scale, which measures athletes' emotion, confidence, and risk appraisal when returning to sports after anterior cruciate ligament (ACL) injury and/or ACLR. ACL-RSI scores recorded during rehabilitation are strongly associated with RTS.[23] The ACL-RSI is widely used and has been translated into many languages.

The aim of this study was to translate the English version of the ACL-RSI to Indonesian and evaluate the validity

and reliability of this questionnaire in patients after ACL injury. We hypothesized that the Indonesian version of the ACL-RSI (I-ACL-RSI) would be valid and reliable for use in Indonesian patients with ACL injuries.

METHODS

Patients provided informed consent before participating in this study. The study was approved by the local institutional review board. Between June and September 2021, a total of 200 eligible patients were invited by email to participate in this study. All were Indonesian patients who underwent a primary ACLR between January 2019 and December 2020 at a hospital in Indonesia. Patients who were unable to understand the Indonesian language were excluded.

The ACL-RSI comprises 12 items, organized into 3 subgroups of psychological factors: emotions, confidence in performance, and risk appraisal. An overall score is calculated by summing the scores for the individual items and then transforming the score to a scale from 0 to 100, with 100 indicating the absence of symptoms and higher levels of psychological readiness. We used an adapted version of the ACL-RSI according to Webster et al,[30] where the visual analog scale is replaced by an 11-point numeric rating scale, with boxes ticked from 0 to 100.

Translation Procedure

The developer of the original ACL-RSI was informed and gave her consent to an Indonesian translation of the ACL-RSI (Webster, personal communication, 2021). The translation of the English version into Indonesian was performed using a forward-and-backward translation procedure.[1,11] First, 2 independent Indonesian individuals with sufficient knowledge of English did a literal translation of the ACL-RSI into Indonesian (T1 and T2). Next, a synthesized version (T1+2) was composed by the annotation of the 2 initial translations, and a back-translation into English (BT1 and BT2) was performed by 2 independent professional translators. The back-translation was reviewed by a native English speaker to check for inconsistencies with the original English version. An expert committee consisting of 3 sports medicine orthopaedic surgeons, 1 methodological expert, and 1 translator reviewed this Indonesian translation (T1+2). The Indonesian translation (T1+2) was summarized by the expert committee after considering the review of the forward-and-backward translation procedure; then, 1 of the authors (R.D.) edited the questionnaire into its prefinal version. This prefinal I-ACL-RSI was then pretested in 10 patients with ACL injury as a pilot study to ascertain feasibility and to identify any potential issues before making the questionnaire ready for use on a large scale. Next, the researcher (R.D.) documented any obstacles that patients faced while filling out the questionnaire. Last, the documentation was discussed by the expert committee and used to summarize the questionnaire into the final version of the I-ACL-RSI.

Testing Procedure

All study patients were sent 2 sets of questionnaires separately by email. The first assessment included the I-ACL-RSI and 3 other questionnaires: the Injury–Psychological Readiness to Return to Sport (I-PRRS) scale, Tampa Scale of Kinesiophobia (TSK), and International Knee Documentation Committee (IKDC) score. Patients also provided demographic characteristics and completed the Tegner Activity Scale to measure their preinjury levels of work and sports activities. Two weeks later, patients were asked to complete the I-ACL-RSI again (second assessment). Patients were instructed to fill out each set of questionnaires immediately and send them back.

To determine whether confidence regarding sports resumption remained stable in between completion of the assessments, the beginning of the second assessment questionnaire included the question "Has your confidence regarding sports resumption changed since filling out the initial questionnaire?" The 3 possible responses were (1) *No change*, (2) *Yes, the problem changed for the better*, and (3) *Yes, the problem changed for the worse*. Only patients indicating no change in their confidence regarding sports resumption were included in the test-retest analysis. Data from patients who returned both questionnaires on the same day or >1 month apart were excluded from analyses, as were the data of patients whose level of activity was <5 according to the Tegner scale.

*Address correspondence to Romy Deviandri, MD, Faculty of Medicine, Universitas Riau, Diponegoro Street No. 1, Pekanbaru, Indonesia 28133 (email: r.deviandri@rug.nl; romydeviandri@lecturer.unri.ac.id).

†Department of Orthopedics Surgery, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands.

‡Department of Physiology, Faculty of Medicine, Universitas Riau, Pekanbaru, Indonesia.

§Division of Orthopedics–Sports Injury, Arifin Achmad Hospital, Pekanbaru, Indonesia.

‖Department of Orthopedics, Faculty of Medicine, Universitas Indonesia/Cipto Mangunkusumo Hospital, Jakarta, Indonesia.

¶Department of Health Sciences, University of Groningen, University Medical Center Groningen, the Netherlands.

#Department of Economics, Econometrics and Finance, Faculty of Economics and Business, University of Groningen, Groningen, the Netherlands.

**Department of Pharmacology and Therapy, Universitas Airlangga, Surabaya, Indonesia.

††Center of Excellence in Higher Education for Pharmaceutical Care Innovation, Universitas Padjadjaran, Bandung, Indonesia.

Measurement Instruments: I-PRRS, TSK, and IKDC

The I-PRRS questionnaire assesses an athlete's psychological readiness to resume sports participation after injury, scoring 6 items on a 100-point scale.[10] The score ranges from 0 to 60, with 60 indicating the highest confidence to RTS. We translated the I-PRRS into Indonesian following international guidelines.[1]

The TSK measures fear of reinjury attributed to movement and physical activity. It consists of 17 items scored on a 4-point Likert scale regarding the subjective experience of the injury and physical activity. The score ranges from 17 to 68, where 68 indicates a high level of fear.[17] We translated the TSK into Indonesian following international guidelines.[1]

The IKDC is designed to measure symptoms, function, and sports activity in patients with various knee conditions; it includes 18 questions. The form is scored by summing the scores for the individual items and then transforming the score to a scale ranging from 0 to 100, with 100 indicating absence of symptoms and higher levels of functioning.[15] The valid and reliable Indonesian version of the IKDC was used.[6]

Validity Testing

The construct validity of the I-ACL-RSI was assessed by determining its association with questionnaires measuring a comparable or related construct (ie, the I-PRRS, TSK, and IKDC). Per the COSMIN reporting guidelines (Consensus-Based Standards for the Selection of Health Measurement Instruments),[21] predefined hypotheses were formulated about the correlation between the I-ACL-RSI and the I-PRRS, TSK, and IKDC. It was expected that patients with better subjective knee function would be more likely to perceive themselves as psychologically prepared to RTS. We hypothesized that the I-ACL-RSI would positively correlate with the I-PRRS, TSK, and IKDC. Slagers et al[25] reported Spearman rho (r) values of 0.79 and –0.46 between the Dutch-language ACL-RSI and the I-PRRS and TSK. On the basis of that study, we hypothesized the following correlations: $r \geq 0.6$ between the I-ACL-RSI and the I-PRRS and $r \geq -0.3$ between the I-ACL-RSI and the TSK. The correlation between the Japanese version of the ACL-RSI and the IKDC was 0.4.[14] Based on this finding, a correlation ≥ 0.3 between the I-ACL-RSI and IKDC was hypothesized.

The ACL-RSI was developed to measure psychological aspects rather than physical functioning, as were the I-PRRS and TSK. By contrast, the IKDC was designed to measure physical functioning rather than psychological aspects. Therefore, lower correlations were expected between the I-ACL-RSI and IKDC than (1) between the I-ACL-RSI and I-PRRS and (2) between the I-ACL-RSI and TSK. Construct validity can be considered good when at least 75% of the hypotheses are confirmed.[27] Construct validity of the I-ACL-RSI was also determined by evaluating its structural validity when investigating its factor structure.

Floor and Ceiling Effects

The occurrence of floor and ceiling effects was assessed. If >15% of respondents reach the lowest or highest possible score, these effects are considered to exist.[27]

Reliability Testing

Under the COSMIN guidelines,[21] reliability was determined in terms of test-retest reliability, internal consistency, and measurement error. Test-retest reliability is about the extent to which patients' scores are consistent for reciprocated measurements; internal consistency involves the extent to which items of a questionnaire are related; and measurement error concerns a measure of systematic error of a patient's score that is not induced by actual changes in the measured construct. In addition, we analyzed absolute agreement, which depicts the magnitude of agreement in reciprocal measurements.

Statistical Analysis

Patient characteristics and questionnaire results were reported as mean and standard deviation (SD) or frequency and percentage. The Spearman rho values for construct validity were interpreted high ($r > 0.6$), moderate ($0.6 < r < 0.3$), or low ($r < 0.3$).[13] To analyze structural validity, exploratory factor analysis was performed on all I-ACL-RSI items using principal component analyses with varimax rotation.[18] Cronbach α was estimated to analyze internal consistency,[5] with values between 0.70 and 0.95 indicating good internal consistency.[27] The test-retest reliability of the I-ACL-RSI was assessed using the intraclass correlation coefficient (ICC),[21] and values were interpreted as poor (<0.5), moderate (0.5-0.75), good (0.75-0.9), or excellent (>0.90).[16] Minimal detectable change (MDC) and standard error of measurement (SEM) were analyzed to assess measurement error. MDC at the individual level (MDC_{ind}) was estimated using the formula $1.96 \times SEM \times \ddot{O}2$, and group-level MDC ($MDC_{grp}$) was estimated by dividing MDC_{ind} by $\ddot{O}n$.[27] SEM was determined by multiplying the pooled SD by $\ddot{O}(1 - r)$, where r is the ICC (2-way random, type agreement).[7]

Absolute agreement between the first and second assessments of the I-ACL-RSI was analyzed using Bland-Altman plots[2]: when 0 was in the 95% confidence interval (95% CI) of the mean difference between assessments, no systematic bias was present. The 95% limits of agreement were estimated with the following formula: mean difference $\pm 1.96 \times SD_{diff}$, where SD_{diff} is the SD of the mean difference between the first and second assessments of the I-ACL-RSI.[2] All statistical analyses were performed using SPSS Statistics Version 26.0 (IBM), and the level of significance was set at 5%.

RESULTS

Translation

The ACL-RSI was successfully translated into Indonesian following guidelines.[1,11] No difficulties with completing the

TABLE 1
Demographic Patient Characteristics (N = 102)

Characteristic	Mean ± SD or No. (%)
Age, y	29.4 ± 6.3
Sex	
Male	80 (78.4)
Female	22 (21.6)
Affected side	
Right	64 (62.7)
Left	35 (34.3)
Both	3 (3)
Level of sport	
Professional	3 (3)
Recreational	99 (97)
Activity type at injury	
Activities of daily living	6 (6)
Sport	85 (83)
Traffic-related accident	9 (9)
Work	2 (2)
Tegner level preinjury	7.1 ± 1.8
Time between surgery and study participation, mo	13.2 ± 4.6

TABLE 2
Outcome Scores[a]

Measure	Mean ± SD
I-ACL-RSI	
Assessment 1	63.5 ± 27.3
Assessment 2	67.7 ± 23.6
I-PRRS	40.7 ± 11.2
TSK	40.3 ± 11.4
IKDC	53.9 ± 13.8

[a]I-ACL-RSI, Indonesian version of Anterior Cruciate Ligament–Return to Sport After Injury; IKDC, International Knee Documentation Committee; I-PRRS, Injury–Psychological Readiness to Return to Sport; TSK, Tampa Scale of Kinesiophobia.

translated scale were found when the questionnaire was pretested.

Patient Characteristics

Of the 200 invited patients, 102 (51%) responded to the invitation. All patients (100%) filled out and returned 2 complete sets of questionnaires. No patients reported better or worse confidence regarding sports resumption when filling out the second questionnaire; thus, all 102 participants were included in the test-retest analysis. No patients were excluded because of missing data.

The patients had a mean Tegner level of 7.1 ± 1.8, and 97% participated in recreational sports. They had a mean age of 29.4 ± 6.3 years, and 78.4% were male. Demographic patient characteristics are presented in Table 1. Mean scores of the first and second assessments of the I-ACL-RSI were 63.5 ± 27.3 and 67.7 ± 23.6, respectively. All outcome scores can be found in Table 2.

TABLE 3
Association Between the I-ACL-RSI and the I-PRRS, TSK, and IKDC[a]

Correlation	r (Hypothesized)	r (Actual)
I-ACL-RSI vs		
I-PRRS	≥0.6	0.68
TSK	≥−0.3	−0.65
IKDC	≥0.3	0.45

[a]Values are presented as Spearman rho correlation coefficients. I-ACL-RSI, Indonesian version of Anterior Cruciate Ligament–Return to Sport After Injury; IKDC, International Knee Documentation Committee; I-PRRS, Injury–Psychological Readiness to Return to Sport; TSK, Tampa Scale of Kinesiophobia.

Validity

All predefined hypotheses on the magnitude of associations between the I-ACL-RSI and the I-PRRS, TSK, or IKDC were confirmed. The I-ACL-RSI showed a correlation >0.6 with the I-PRRS ($r = 0.68$) and >0.3 with the TSK ($r = 0.65$) and IKDC ($r = 0.45$) (Table 3), indicating that it was more strongly related to the I-PRRS and TSK than to the IKDC.

Factor analysis showed a 1-factor structure of the I-ACL-RSI, with an eigenvalue of 7.59 and explained variance of 63.25%, indicating that 63.25% of the variance of the scale is explained by true variance (the common factor). There were no floor or ceiling effects, as none of the patients reached the maximum or minimum scores.

Test-Retest Reliability, Internal Consistency, and Measurement Error

The ICC had a value of 0.91 ($P < .001$), and the 95% CI ranged from 0.86 to 0.94. Cronbach α was 0.95, indicating good internal consistency. MDC_{ind}, MDC_{grp}, and SEM were 10.9, 1.1, and 3.9, respectively. The Bland-Altman plot showed a mean difference between the I-ACL-RSI assessments of 2.4 (95% CI, 0.2-4.6; 95% limits of agreement, −48.6 to 43.9) (Figure 1). No systematic bias was found.

DISCUSSION

We were able to confirm that the I-ACL-RSI has good construct validity, good test-retest reliability, good internal consistency, and no floor or ceiling effects. Based on these results, the I-ACL-RSI can be considered a valid and reliable questionnaire for patients with ACL injuries.

Construct validity of the I-ACL-RSI can be considered good, with all predefined hypotheses confirmed. As hypothesized, the I-ACL-RSI showed a high correlation with the I-PRRS ($r = 0.68$) and TSK ($r = 0.65$). These findings lend evidence to the validity of the I-ACL-RSI as a measure of the psychological aspect in patients with ACL injuries. Our results align with those of research in other languages, such as Dutch[25] and Spanish.[24] As hypothesized, the I-ACL-RSI also showed a correlation >0.3 with the IKDC.
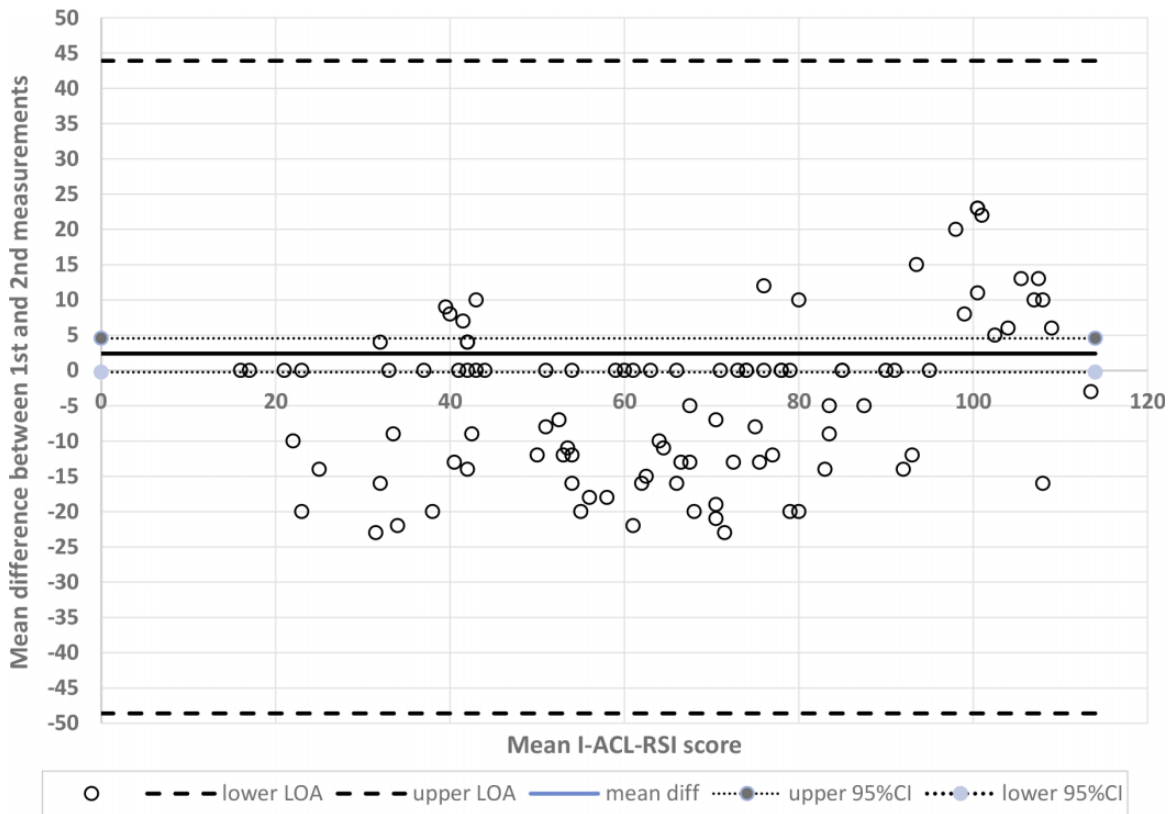
Figure 1. Bland-Altman plot of absolute agreement between the first and second assessments. Dotted lines, 95% CI; dashed lines, limits of agreement (LOAs; superior and inferior); solid line, mean difference (intermediate); open circles, data points. I-ACL-RSI, Indonesian version of the Anterior Cruciate Ligament–Return to Sport After Injury.

The same result was observed in validity studies of the Japanese,[14] Chinese,[4] French,[3] and Turkish[12] versions of the ACL-RSI.

Factor analysis showed that the I-ACL-RSI primarily evaluates 1 dimension. Therefore, the 3 subgroups of psychological factors in the I-ACL-RSI—emotions, confidence in performance, and risk appraisal—cannot be separated, and 1 total score should be used. This result is in line with the original version,[30] as well as the Dutch,[25] Swedish,[19] and Norwegian versions.[8]

No floor or ceiling effects were observed. Theoretically, a ceiling effect could have occurred, especially in patients longer after their ACL injury, but that was not the case in this study (the mean interval from surgery to participation was 13.2 ± 4.6 months). Similarly, no floor or ceiling effects were found in the Dutch,[25] Norwegian,[8] and Spanish[24] translations of the ACL-RSI.

Test-retest reliability was excellent (ICC = 0.91), just as in the Dutch (0.94),[25] Norwegian (0.94),[8] French (0.90),[3] and Turkish (0.92)[12] versions of the ACL-RSI. Internal consistency of the I-ACL-RSI was good, with a Cronbach α of 0.95. Higher values are not desirable, as this may indicate a redundancy of questionnaire items. Good internal consistency was also shown in the original version (0.92)[30] and in the Italian (0.94),[28] Dutch (0.94),[25] Swedish (0.95),[19] and Norwegian (0.95)[8] versions. The Bland-Altman plot showed

satisfactory absolute agreement, reporting only a slight difference between the mean scores of the first and second assessments of the I-ACL-RSI. No systematic bias was found.

The SEM of the I-ACL-RSI was low (SEM, 3.9; MDC_{ind}, 10.9; MDC_{grp}, 1.1) and comparable to 2 other versions: the Dutch (SEM, 5.5; MDC_{ind}, 15.3; MDC_{grp}, 1.5)[25] and Norwegian (SEM, 5.7; MDC_{ind}, 15.8; MDC_{grp}, 2).[8] Low MDC values at the group level indicate that the I-ACL-RSI can be used for group comparisons, as only low values are needed to detect change. But only values higher than the SEM can be differentiated from the measurement error; thus, to see a statistically significant change in scores on the I-ACL-RSI, the difference should be higher than the SEM. The difference between measurements should be greater than the MDC_{ind} value to distinguish from a measurement error and affirm that an important change occurred.

Besides the validity and reliability observed in this study, future research should explore the minimally important change (MIC; also known as minimal clinically important difference) as a measure of responsiveness of the I-ACL-RSI. The MIC is used to analyze whether a found difference is clinically important as perceived by the patient.[10] MIC values of the original version and the Dutch version of the ACL-RSI were calculated as 13.4 points[29] and 2.6

points,[26] respectively. Knowledge about the responsiveness and capability of the I-ACL-RSI to detect change over time is important for it to be used in longitudinal studies and in practice to follow Indonesian-speaking patients over time after their ACL injuries.

Limitations

A limitation of this study was that the response rate was about half (51%) and there were few female participants, yet the total number of participants is still acceptable. Under the COSMIN guidelines, at least 100 patients are an adequate number to study validity and 50 to study test-retest reliability.[27] Second, we did not ask whether the patients wanted to return to their sports activity after surgery. The ACL-RSI is most relevant if patients intend to resume sports, as its purpose is to measure psychological readiness to RTS. For patients who never intend to resume sports, use of the ACL-RSI is not really relevant. But considering that the patients in this study were an active population involved in sports activity before surgery, with a mean preinjury Tegner level of 7.1 ± 1.8, we assumed that they would return to their sports activities after surgery. Third, there is no information available on the validity and reliability of the Indonesian version of the I-PRRS and the TSK. However, the current study adds to the growing evidence on the translation and validity of the ACL-RSI. Indonesian clinicians and researchers are now provided with a scale to evaluate psychological readiness in RTS after ACL injury and surgery for Indonesian-speaking patients.

CONCLUSION

The I-ACL-RSI was found to be valid and reliable; therefore, it can be used to measure psychological variables in patients after ACL injury and/or ACLR in the Indonesian population. More research is needed into evaluating the MIC and responsiveness of the I-ACL-RSI.

ACKNOWLEDGMENT

REFERENCES

1. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)*. 2000;25(24):3186-3191.
2. Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet*. 1986;1(8476): 307-331.
3. Bohu Y, Klouche S, Lefevre N, Webster K, Herman S. Translation, cross-cultural adaptation and validation of the French version of the Anterior Cruciate Ligament–Return to Sport After Injury (ACL-RSI) scale. *Knee Surg Sports Traumatol Arthrosc*. 2015;23(4):1192-1196.
4. Chen T, Zhang P, Li Y, et al. Translation, cultural adaptation and validation of simplified Chinese version of the Anterior Cruciate Ligament Return to Sport After Injury (ACL-RSI) scale. *PLoS One*. 2017; 12(8):1-14.
5. Cronbach LJ, Meehl PE. Construct validity in psychological tests. *Psychol Bull*. 1955;52(4):281-302.
6. Deviandri R, van der Veen H, Lubis A, Postma MJ, van den Akker Scheek I. Translation, cross-cultural adaptation, validity and reliability of the Indonesian version of the International Knee Documentation Committee subjective knee form for patients with anterior cruciate ligament injuries. *Orthop J Sports Med*. 2021;9(9):23259671211038372.
7. de Vet HCW, Terwee CB, Knol DL, Bouter LM. When to use agreement versus reliability measures. *J Clin Epidemiol*. 2006;59(10):1033-1039.
8. Faleide AGH, Inderhaug E, Vervaat W, et al. Anterior Cruciate Ligament–Return to Sport After Injury scale: validation of the Norwegian language version. *Knee Surg Sports Traumatol Arthrosc*. 2020;28(8): 2634-2643.
9. Giesche F, Niederer D, Banzer W, Vogt L. Evidence for the effects of prehabilitation before ACL-reconstruction on return to sport-related and self-reported knee function: a systematic review. *PLoS One*. 2020;15(10):e0240192.
10. Glazer DD. Development and preliminary validation of the Injury–Psychological Readiness to Return to Sport (I-PRRS) scale. *J Athl Train*. 2009;44(2):185-189.
11. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol*. 1993;46(12):1417-1432.
12. Harput G, Tok D, Ulusoy B, et al. Translation and cross-cultural adaptation of the Anterior Cruciate Ligament–Return to Sport After Injury (ACL-RSI) scale into Turkish. *Knee Surg Sports Traumatol Arthrosc*. 2017;25(1):159-164.
13. Hinkle DE, Wiersma W, Jurs SG. *Applied Statistics for the Behavioral Sciences*. 4th ed. Houghton Mifflin; 1998.
14. Hirohata K, Aizawa J, Furuya H, et al. The Japanese version of the Anterior Cruciate Ligament–Return to Sport After Injury (ACL-RSI) scale has acceptable validity and reliability. *Knee Surg Sports Traumatol Arthrosc*. 2020;28(8):2519-2525.
15. Irrgang JJ, Anderson AF, Boland AL, et al. Development and validation of the International Knee Documentation Committee subjective knee form. *Am J Sports Med*. 2001;29(5):600-613.
16. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *J Chiropr Med*. 2016;15(2): 155-163.
17. Kori SH, Miller RP, Todd DD. Kinesiophobia: a new view of chronic pain behavior. *Pain Management*. 1990;3(1):35-43.
18. Krabbe PFM. *The Measurement of Health and Health Status: Concepts, Methods and Applications From a Multidisciplinary Perspective*. Academic Press; 2017.
19. Kvist J, Österberg A, Gauffin H, Tagesson S, Webster K, Ardern C. Translation and measurement properties of the Swedish version of ACL–Return to Sports After Injury questionnaire. *Scand J Med Sci Sport*. 2013;23(5):568-575.
20. Marx RG, Jones EC, Allen AA, et al. Reliability, validity, and responsiveness of four knee outcome scales for athletic patients. *J Bone Joint Surg Am*. 2001;83(10):1459-1469.
21. 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):737-745.
22. Nwachukwu BU, Adjei J, Rauck RC, et al. How much do psychological factors affect lack of return to play after anterior cruciate ligament reconstruction? A systematic review. *Orthop J Sport Med*. 2019;7(5): 232596711984531.
23. Sadeqi M, Klouche S, Bohu Y, Herman S, Lefevre N, Gerometta A. Progression of the psychological ACL-RSI score and return to sport after anterior cruciate ligament reconstruction: a prospective 2-year follow-up study from the French Prospective Anterior Cruciate Ligament Reconstruction Cohort Study (FAST). *Orthop J Sport Med*. 2018;6(12):2325967118812819.

24. Sala-Barat E, Álvarez-Díaz P, Alentorn-Geli E, Webster KE, Cugat R, Tomás-Sabado J. Translation, cross-cultural adaptation, validation, and measurement properties of the Spanish version of the Anterior Cruciate Ligament–Return to Sport After Injury (ACL-RSI-Sp) scale. *Knee Surg Sports Traumatol Arthrosc*. 2020;28(3):833-839.

25. Slagers AJ, Reininga IHF, van den Akker-Scheek I. The Dutch language Anterior Cruciate Ligament Return to Sport After Injury scale (ACL-RSI)—validity and reliability. *J Sports Sci*. 2017;35(4):393-401.

26. Slagers AJ, van den Akker-Scheek I, Geertzen JHB, Zwerver J, Reininga IHF. Responsiveness of the Anterior Cruciate Ligament–Return to Sports After Injury (ACL-RSI) and Injury–Psychological Readiness to Return to Sport (I-PRRS) scales. *J Sports Sci*. 2019;37(21):2499-2505.

27. Terwee CB, Bot SDM, de Boer MR, et al. Quality criteria were proposed for measurement properties of health status questionnaires. *J Clin Epidemiol*. 2007;60(1):34-42.

28. Tortoli E, Francini L, Giovannico G, Ramponi C. Translation, cross-cultural adaptation and validation of the Italian version of the Anterior Cruciate Ligament–Return to Sport After Injury (ACL-RSI) scale. *Knee Surg Sports Traumatol Arthrosc*. 2020;30(4)1180-1186.

29. Webster KE, Feller JA. Evaluation of the responsiveness of the Anterior Cruciate Ligament Return to Sport After Injury (ACL-RSI) scale. *Orthop J Sport Med*. 2021;9(8):23259671211031240.

30. Webster KE, Feller JA, Lambros C. Development and preliminary validation of a scale to measure the psychological impact of returning to sport following anterior cruciate ligament reconstruction surgery. *Phys Ther Sport*. 2008;9(1):9-15.

31. Wright RW, Bogunovic L. Revision anterior cruciate ligament reconstruction—the Multicenter Anterior Cruciate Ligament Revision Study. In: Prodromos C, ed. *The Anterior Cruciate Ligament: Reconstruction and Basic Science*. 2nd ed. Elsevier; 2018:369-370.