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Original Article

A Reliability and Validity Study of the Urdu Version of the Lysholm Knee Scoring Scale in Patients with Anterior Cruciate Ligament Injuries

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ABSTRACT

Background: The Lysholm Knee Scoring Scale is widely used to assess knee symptoms and functional limitation in patients with anterior cruciate ligament-related injuries, but its direct use in Urdu-speaking Pakistani patients may be limited by language and cultural differences. **Objective:** To translate, culturally adapt, and evaluate the reliability and validity of the Urdu version of the Lysholm Knee Scoring Scale in patients with ACL-related knee conditions. **Methods:** This cross-sectional psychometric validation study with repeated reliability assessment included 100 Urdu-speaking Pakistani patients with ACL injury or ACL-related knee conditions. The scale was translated through forward translation, synthesis, back-translation, expert committee review, and pre-final testing. Internal consistency was assessed using Cronbach's alpha, while intra-rater, inter-rater, and test–retest reliability were assessed using intraclass correlation coefficients. Structural validity was examined through exploratory factor analysis, and concurrent validity was evaluated through correlations with the Kujala Anterior Knee Pain Scale and International Knee Documentation Committee questionnaire. **Results:** Cronbach's alpha was 0.848. Intra-rater and inter-rater reliability were 0.848 and 0.996, respectively. Item-level test–retest ICCs ranged from 0.928 to 0.993, and the total score ICC was 0.992. Factor analysis supported a single-factor structure explaining 61.62% of variance. The Urdu Lysholm score showed very strong positive correlations with the Kujala scale and IKDC questionnaire. **Conclusion:** The Urdu Lysholm Knee Scoring Scale is a reliable and valid patient-reported outcome measure for Urdu-speaking Pakistani patients with ACL-related knee conditions. **Keywords:** Lysholm Knee Scoring Scale; Urdu translation; reliability; validity; anterior cruciate ligament; patient-reported outcome measure.

INTRODUCTION

Anterior cruciate ligament injury is one of the most clinically important knee ligament injuries because of its association with pain, instability, functional limitation, reduced participation in physical activity, and long-term risk of impaired knee performance. The anterior cruciate ligament contributes substantially to tibiofemoral stability by resisting anterior tibial translation and controlling rotational loads during dynamic movement; therefore, its rupture commonly affects athletes and physically active individuals, particularly during pivoting, sudden deceleration, landing, hyperextension, or rapid directional change activities (1,2). Although ACL injury may occur through direct contact mechanisms, non-contact mechanisms are frequently reported and are often linked with altered neuromuscular control, poor landing mechanics, and excessive knee abduction moments during functional tasks (2). These biomechanical and functional consequences make accurate assessment of symptoms, activity limitation, and perceived knee function essential for clinical decision-making, rehabilitation planning, follow-up evaluation, and research reporting.

Patient-reported outcome measures are widely used in knee rehabilitation because they capture the patient's perception of pain, instability, swelling, stair negotiation, squatting, limping, support use, and functional limitation in daily activity. Among knee-specific tools, the Lysholm Knee Scoring Scale is one

of the most frequently used measures for evaluating functional status after ACL injury and other tibiofemoral joint conditions. Originally developed to assess outcomes after knee ligament surgery, the Lysholm Knee Scoring Scale includes eight clinically relevant domains and produces a total score ranging from 0 to 100, with higher scores indicating fewer symptoms and better knee function (3). Its clinical utility lies in its brevity, ease of administration, and focus on symptoms that are directly relevant to ACL-related functional impairment, including limp, support, locking, instability, pain, swelling, stair climbing, and squatting (3).

Several other knee-related patient-reported outcome measures, including the International Knee Documentation Committee Subjective Knee Form, Tegner Activity Scale, Marx Activity Rating Scale, Kujala Anterior Knee Pain Scale, and Knee injury and Osteoarthritis Outcome Score, are also used to assess knee symptoms, activity level, and functional limitation in patients with ligamentous, meniscal, patellofemoral, and other knee disorders (4–8). However, the selection of an appropriate outcome measure depends not only on the clinical condition being assessed but also on the language, cultural context, literacy level, and interpretability of the target population. A questionnaire developed in one language cannot be assumed to retain the same meaning, measurement properties, or cultural relevance after direct translation into another language. For this reason, patient-reported outcome measures require systematic translation, cultural adaptation, and psychometric validation before use in a new linguistic population.

The Lysholm Knee Scoring Scale has been translated and validated in multiple languages, including Portuguese, Greek, Turkish, Dutch, Arabic, Spanish, German, and Chinese, and these studies generally support its reliability and validity across different clinical and cultural settings (9–16). Previous validation studies have reported acceptable to excellent internal consistency, test–retest reliability, construct validity, and criterion-related validity when the translated versions were compared with established knee outcome measures such as the IKDC, Kujala Anterior Knee Pain Scale, Oxford Knee Score, SF-36, and other knee-specific scales (10–16). These findings suggest that the Lysholm Knee Scoring Scale can be culturally adapted successfully, but they also reinforce that each translated version must be validated independently because item interpretation, symptom expression, and functional activity patterns may differ across populations.

In Pakistan, Urdu is widely understood and commonly used in patient communication, yet many standardized musculoskeletal outcome measures remain available primarily in English. This creates a practical barrier in clinical and research settings because patients with limited English proficiency may misunderstand questionnaire items, require assistance during completion, or provide responses that do not accurately reflect their symptoms and function. For ACL-related knee conditions, the absence of a validated Urdu version of the Lysholm Knee Scoring Scale limits the ability of clinicians and researchers to measure patient-reported knee function using a linguistically appropriate and culturally adapted tool. Establishing the reliability and validity of an Urdu version is therefore important for improving outcome assessment, strengthening local rehabilitation research, and allowing more accurate comparison of Pakistani patient data with international literature.

The present study was designed as a psychometric reliability and validity study to translate, culturally adapt, and evaluate the Urdu version of the Lysholm Knee Scoring Scale in Urdu-speaking Pakistani patients with ACL-related knee injuries. The study specifically aimed to assess internal consistency, inter-rater reliability, intra-rater/test–retest reliability, structural validity through factor analysis, and concurrent validity through correlation with the Kujala Anterior Knee Pain Scale and the International Knee Documentation Committee questionnaire. It was hypothesized that the Urdu version of the Lysholm Knee Scoring Scale would demonstrate acceptable reliability and validity for assessing symptoms and functional limitations in Urdu-speaking Pakistani patients with ACL-related knee conditions.

MATERIALS AND METHODS

This study was conducted as a cross-sectional psychometric validation study with repeated-measure reliability assessment to evaluate the Urdu version of the Lysholm Knee Scoring Scale in patients with anterior cruciate ligament-related knee conditions. The methodological focus was not to estimate disease prevalence or treatment effectiveness, but to determine whether the translated Urdu scale demonstrated acceptable measurement properties for use in clinical and research settings. The psychometric properties assessed included internal consistency, inter-rater reliability, intra-rater/test–retest reliability, structural validity, and concurrent validity against established knee-related outcome measures. The study was completed over a period of two months after synopsis approval and data were collected from community and rehabilitation settings in Faisalabad, including Allied Hospital Faisalabad, District Headquarters Hospital Faisalabad, Tehsil Headquarters Hospital Samundri, and Tehsil Headquarters Hospital Tandlianwala.

The target population comprised Urdu-speaking Pakistani patients with ACL-related knee injuries. Participants were selected using a non-probability convenience sampling technique according to predefined eligibility criteria. Patients aged 17 to 60 years with a diagnosed anterior cruciate ligament injury or history of ACL repair were eligible for inclusion, provided that no intervention was received between the repeated reliability assessments. Patients were excluded if they were unable to complete the questionnaire because of cognitive or psychological impairment, were illiterate or unable to understand Urdu, or had another serious medical, neurological, inflammatory, infectious, malignant, or musculoskeletal condition that could independently affect lower-limb function or interfere with interpretation of knee-related symptoms. A total of 100 participants were included. This sample provided more than 10 participants per item for the eight-item Lysholm Knee Scoring Scale, which was considered adequate for the exploratory factor analysis and preliminary psychometric evaluation performed in this study.

The translation and cultural adaptation of the Lysholm Knee Scoring Scale were performed through a structured multistep process. Initially, two independent bilingual translators whose mother language was Urdu translated the original English version into Urdu. One translator had a physiotherapy background, while the other was an Urdu language expert, allowing both clinical meaning and linguistic clarity to be considered during translation. The two forward translations were compared and synthesized into a single Urdu version after resolving differences in wording, conceptual meaning, and cultural suitability. This synthesized Urdu version was then back-translated into English by an English language specialist who was blinded to the original scale. The back-translated version was compared with the original English scale by an expert committee consisting of the supervisor, translators, two independent physiotherapists, and a researcher. The committee reviewed semantic, idiomatic, experiential, and conceptual equivalence and revised the Urdu version where needed to improve clarity and cultural relevance.

A pre-final Urdu version of the Lysholm Knee Scoring Scale was then tested among patients from the target population. Participants were asked to complete the questionnaire and were subsequently interviewed regarding their understanding of each item, the clarity of wording, the instructions, the response options, and the layout of the instrument. Difficult or ambiguous terms were reviewed by the expert committee, and final adjustments were made before using the Urdu version in the main study. This process was intended to ensure that the final translated version retained the clinical meaning of the original Lysholm Knee Scoring Scale while remaining understandable and culturally appropriate for Urdu-speaking Pakistani patients.

Data were collected after obtaining informed consent from each participant. Participants were informed about the purpose of the study, confidentiality of their responses, voluntary participation, and their right to withdraw at any stage without penalty. The final Urdu version of the Lysholm Knee Scoring Scale was

administered along with the Kujala Anterior Knee Pain Scale and the International Knee Documentation Committee questionnaire. The Lysholm Knee Scoring Scale was treated as the primary outcome measure for psychometric evaluation. It consists of eight items assessing limp, support, locking, instability or giving way, pain, swelling, stair climbing, and squatting, with a total score ranging from 0 to 100; higher scores indicate better knee function and fewer symptoms. The Kujala Anterior Knee Pain Scale and International Knee Documentation Committee questionnaire were used as comparator instruments for concurrent validity because they assess related constructs of knee symptoms, pain, function, and activity limitation.

Reliability assessment was performed through repeated administration of the Urdu Lysholm Knee Scoring Scale. For inter-rater reliability, two observers administered the scale to the same participants during the first assessment session, with an interval of approximately 40 to 50 minutes between assessments. For intra-rater/test–retest reliability, one observer repeated the assessment after one week. Participants who reported changes in general health status, medication use, or clinical condition that could affect activity performance between assessments were excluded from the reliability analysis. This approach was used to reduce measurement bias related to clinical change rather than true reproducibility of the instrument.

The main variables included demographic characteristics, clinical characteristics, Urdu Lysholm Knee Scoring Scale item scores and total score, Kujala Anterior Knee Pain Scale score, and International Knee Documentation Committee questionnaire score. Demographic variables included age, gender, education, lifestyle, and body mass index.

Clinical variables included diagnosis category and affected side. The primary psychometric variable was the Urdu Lysholm Knee Scoring Scale total score. Internal consistency was assessed using Cronbach's alpha coefficient. Inter-rater and intra-rater/test–retest reliability were assessed using intraclass correlation coefficients with 95% confidence intervals. Item-level agreement was additionally examined using kappa statistics where appropriate for ordinal item responses.

Structural validity was assessed through exploratory factor analysis of the eight Lysholm items. Sampling adequacy was evaluated using the Kaiser–Meyer–Olkin measure, and suitability of the correlation matrix for factor analysis was assessed using Bartlett's test of sphericity. Factor loadings, eigenvalue, and percentage of explained variance were used to interpret the factor structure of the Urdu version.

Concurrent validity was evaluated by examining the correlation of the Urdu Lysholm Knee Scoring Scale total score with the Kujala Anterior Knee Pain Scale and International Knee Documentation Committee questionnaire scores. Because these instruments assess related constructs of knee pain, symptoms, and function, strong positive correlations were interpreted as evidence supporting concurrent validity.

Correlations between the Urdu Lysholm Knee Scoring Scale and selected demographic or clinical variables, including age and body mass index, were also examined to assess whether the scale score was associated with general participant characteristics. Descriptive statistics were used to summarize participant characteristics and scale scores. Quantitative variables were reported as mean and standard deviation, while categorical variables were reported as frequency and percentage. Statistical analysis was performed using SPSS version 24, and a p-value of less than 0.05 was considered statistically significant.

Ethical approval was obtained from the Ethical Review Board of Riphah International University, Faisalabad Campus. The study was conducted in accordance with ethical principles for human participant research. Written informed consent was obtained from all participants before data collection. Confidentiality and anonymity were maintained throughout the study, and participant identity was not

disclosed in any report or publication resulting from the study. Data were recorded and analyzed in aggregate form to preserve privacy and ensure research integrity.

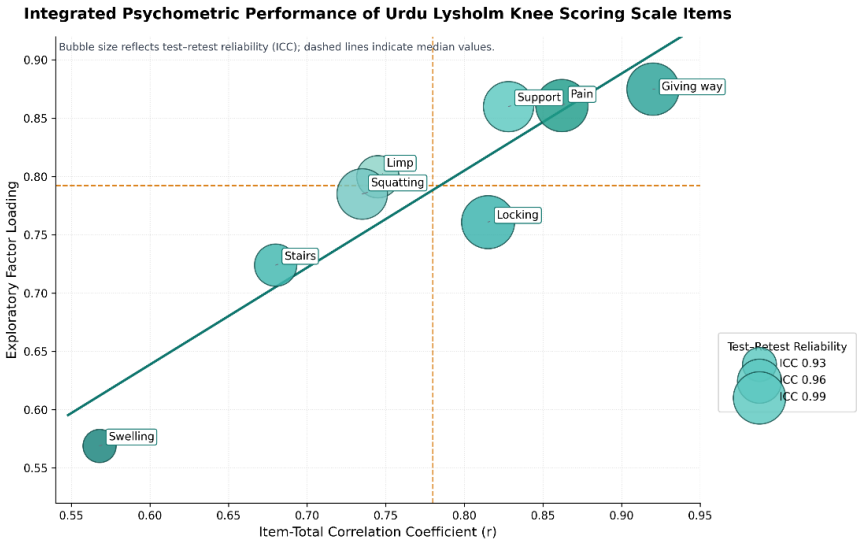

Figure 1. Integrated psychometric performance of Urdu Lysholm Knee Scoring Scale items.

The figure presents the relationship between item-total correlation and exploratory factor loading for each Urdu Lysholm Knee Scoring Scale item, with bubble size representing test–retest reliability based on intraclass correlation coefficient values. Dashed lines indicate median values for item-total correlation and factor loading.

RESULTS

The study included 100 Urdu-speaking Pakistani participants with ACL-related knee conditions. The demographic and clinical profile of the participants is summarized in Table 1. Most participants were male, with 77 males and 23 females. The mean age was 33.53 ± 12.48 years, and the mean body mass index was 25.20 ± 5.14 kg/m².

Most participants reported a sedentary lifestyle, while only 8% were categorized as physically active. The right knee was the most frequently affected side, reported in 53 participants, followed by the left knee in 36 participants and bilateral involvement in 11 participants. The mean Urdu Lysholm Knee Scoring Scale score was 60.15 ± 25.65, indicating a broad distribution of knee-related symptoms and functional limitation in the sample. The mean Kujala Anterior Knee Pain Scale score was 56.18 ± 25.12, and the mean International Knee Documentation Committee questionnaire score was 52.27 ± 25.89.

Table 1. Demographic and Clinical Characteristics of Participants (N = 100)

Variable	Value
Gender, n (%)	
Male	77 (77.0)
Female	23 (23.0)
Age, years, mean ± SD	33.53 ± 12.48
BMI, kg/m², mean ± SD	25.20 ± 5.14
Education, n (%)	
Primary	17 (17.0)
High school	32 (32.0)
College	17 (17.0)
University	23 (23.0)
Masters	11 (11.0)
Lifestyle, n (%)	
Sedentary	92 (92.0)
Active	8 (8.0)
Diagnosis category, n (%)	

Variable	Value
ACL injury	46 (46.0)
ACL repair	8 (8.0)
ACL and meniscus repair	16 (16.0)
Multiple ligament injury	15 (15.0)
Other ACL-related knee condition	15 (15.0)
Affected side, n (%)	
Right	53 (53.0)
Left	36 (36.0)
Both	11 (11.0)
Urdu Lysholm Knee Scoring Scale, mean ± SD	60.15 ± 25.65
Kujala Anterior Knee Pain Scale, mean ± SD	56.18 ± 25.12
International Knee Documentation Committee questionnaire, mean ± SD	52.27 ± 25.89

The item-level scores of the Urdu Lysholm Knee Scoring Scale at the first and second visits are presented in Table 2. The total score showed minimal change between visit 1 and visit 2, increasing only from 60.15 ± 25.65 to 60.51 ± 25.22. This small difference supports the stability of the Urdu Lysholm Knee Scoring Scale across repeated administration when no clinical intervention or meaningful change in health status occurred between assessments.

Among individual items, the highest mean score was observed for giving way sensation from the knee, with values of 15.70 ± 8.62 at visit 1 and 15.90 ± 8.57 at visit 2. Pain also showed stable values across the two visits, with mean scores of 14.05 ± 5.93 and 14.20 ± 5.89, respectively. The lowest mean scores were observed for squatting and limp, reflecting greater functional difficulty in these domains.

Table 2. Urdu Lysholm Knee Scoring Scale Item Scores at Visit 1 and Visit 2

Item	Domain	Possible Range	Visit 1, Mean ± SD	Visit 2, Mean ± SD
LKS1	Limp	0–5	2.96 ± 1.89	2.91 ± 1.90
LKS2	Support/use of cane or crutches	0–5	3.93 ± 1.92	3.92 ± 1.90
LKS3	Locking sensation in the knee	0–15	7.18 ± 5.69	7.30 ± 5.63
LKS4	Giving way sensation from the knee	0–25	15.70 ± 8.62	15.90 ± 8.57
LKS5	Pain	0–25	14.05 ± 5.93	14.20 ± 5.89
LKS6	Swelling	0–10	7.86 ± 3.08	7.82 ± 3.08
LKS7	Climbing stairs	0–10	5.74 ± 2.82	5.74 ± 2.82
LKS8	Squatting	0–5	2.73 ± 1.77	2.72 ± 1.81
Total	Urdu Lysholm Knee Scoring Scale	0–100	60.15 ± 25.65	60.51 ± 25.22

The reliability findings are summarized in Table 3. The Urdu Lysholm Knee Scoring Scale demonstrated good intra-rater reliability, with an ICC of 0.848 and a 95% confidence interval of 0.799 to 0.889.

Inter-rater reliability was excellent, with an ICC of 0.996 and a 95% confidence interval of 0.995 to 0.998. Internal consistency was also acceptable to good, with Cronbach's alpha of 0.848 for the total Urdu Lysholm Knee Scoring Scale score. These findings indicate that the translated scale produced consistent scores across repeated assessment and across raters in this ACL-related clinical sample.

Table 3. Reliability Indices of the Urdu Lysholm Knee Scoring Scale

Reliability Parameter	Statistic	95% Confidence Interval	Interpretation
Internal consistency	Cronbach's α = 0.848	Not reported	Good
Intra-rater reliability	ICC = 0.848	0.799–0.889	Good
Inter-rater reliability	ICC = 0.996	0.995–0.998	Excellent

Item-level test–retest reliability is shown in Table 4. All eight items demonstrated high reproducibility across repeated administration. Item-level ICC values ranged from 0.928 to 0.993, while the total Urdu Lysholm Knee Scoring Scale score showed an ICC of 0.992 with a 95% confidence interval of 0.988 to 0.995.

The highest item-level ICC was observed for locking sensation in the knee, whereas the lowest ICC was observed for swelling; however, even the lowest value remained within the excellent reliability range. These findings support the temporal stability of the Urdu version when applied to clinically stable participants.

Table 4. Item-Level Test–Retest Reliability of the Urdu Lysholm Knee Scoring Scale

Item	Domain	ICC	95% Confidence Interval	Interpretation
LKS1	Limp	0.954	0.936–0.972	Excellent
LKS2	Support/use of cane or crutches	0.982	0.975–0.989	Excellent
LKS3	Locking sensation in the knee	0.993	0.990–0.996	Excellent
LKS4	Giving way sensation from the knee	0.990	0.986–0.994	Excellent
LKS5	Pain	0.990	0.986–0.994	Excellent
LKS6	Swelling	0.928	0.901–0.955	Excellent
LKS7	Climbing stairs	0.954	0.936–0.972	Excellent
LKS8	Squatting	0.983	0.976–0.990	Excellent
Total score	Urdu Lysholm Knee Scoring Scale	0.992	0.988–0.995	Excellent

The item-level agreement analysis is presented in Table 5. Kappa coefficients ranged from 0.951 to 0.963 across the eight items, indicating excellent agreement for all domains of the scale. The highest agreement was observed for swelling, while the lowest agreement was observed for support/use of cane or crutches. These results further support the stability and reproducibility of individual Urdu Lysholm Knee Scoring Scale items across repeated assessment.

Table 5. Intra-Rater Agreement for Urdu Lysholm Knee Scoring Scale Items

Item	Domain	Kappa	Strength of Agreement
LKS1	Limp	0.954	Excellent
LKS2	Support/use of cane or crutches	0.951	Excellent
LKS3	Locking sensation in the knee	0.960	Excellent
LKS4	Giving way sensation from the knee	0.962	Excellent
LKS5	Pain	0.958	Excellent
LKS6	Swelling	0.963	Excellent
LKS7	Climbing stairs	0.958	Excellent
LKS8	Squatting	0.959	Excellent

The structural validity of the Urdu Lysholm Knee Scoring Scale was evaluated through exploratory factor analysis, as shown in Table 6. The Kaiser–Meyer–Olkin measure of sampling adequacy was 0.874, indicating that the sample was suitable for factor analysis. Bartlett's test of sphericity was statistically significant, with $\chi^2 = 494.573$ and $p < 0.001$, confirming that the correlation matrix was appropriate for factor extraction. The factor analysis identified a single-factor structure, with an eigenvalue of 4.93 and 61.62% of the total variance explained. Item loadings ranged from 0.569 to 0.875. The strongest loading was observed for giving way sensation from the knee, followed by pain and support/use of cane or crutches. Swelling had the lowest factor loading but remained contributory to the overall construct. These findings support the unidimensional structure of the Urdu Lysholm Knee Scoring Scale in this sample.

Table 6. Exploratory Factor Analysis of the Urdu Lysholm Knee Scoring Scale

Item	Domain	Factor Loading
LKS1	Limp	0.800
LKS2	Support/use of cane or crutches	0.860
LKS3	Locking sensation in the knee	0.761
LKS4	Giving way sensation from the knee	0.875
LKS5	Pain	0.861
LKS6	Swelling	0.569
LKS7	Climbing stairs	0.724
LKS8	Squatting	0.785
Eigenvalue		4.93
Variance explained		61.62%
Kaiser–Meyer–Olkin measure		0.874
Bartlett's test of sphericity		$\chi^2 = 494.573$, $p < 0.001$

Corrected item-total correlations are presented in Table 7. All eight Urdu Lysholm Knee Scoring Scale items showed statistically significant positive correlations with the total scale score. Correlation coefficients ranged from 0.568 to 0.920, with all p-values below 0.001.

The strongest item-total correlation was observed for giving way sensation from the knee, indicating that perceived instability was highly aligned with the overall knee function construct measured by the scale. The weakest, although still statistically significant, item-total correlation was observed for swelling. These findings indicate that each item contributed meaningfully to the total Urdu Lysholm Knee Scoring Scale score.

Table 7. Item-Total Correlations of the Urdu Lysholm Knee Scoring Scale

Item	Domain	Correlation Coefficient (r)	p-Value	Interpretation
LKS1	Limp	0.745	<0.001	Strong positive correlation
LKS2	Support/use of cane or crutches	0.828	<0.001	Strong positive correlation
LKS3	Locking sensation in the knee	0.815	<0.001	Strong positive correlation
LKS4	Giving way sensation from the knee	0.920	<0.001	Very strong positive correlation
LKS5	Pain	0.862	<0.001	Strong positive correlation
LKS6	Swelling	0.568	<0.001	Moderate positive correlation
LKS7	Climbing stairs	0.680	<0.001	Moderate positive correlation
LKS8	Squatting	0.735	<0.001	Strong positive correlation

Concurrent validity and correlations with selected clinical variables are shown in Table 8. The Urdu Lysholm Knee Scoring Scale demonstrated a very strong positive correlation with the Kujala Anterior Knee Pain Scale, with rs = 0.970 and $p < 0.001$. A very strong positive correlation was also observed between the Urdu Lysholm Knee Scoring Scale and the International Knee Documentation Committee questionnaire, with rs = 0.962 and $p < 0.001$. These findings support the concurrent validity of the Urdu Lysholm Knee Scoring Scale because higher scores on all three measures indicate better knee-related function and fewer symptoms. Age showed no statistically significant correlation with the Urdu Lysholm Knee Scoring Scale score, with rs = −0.138 and p = 0.172. Body mass index also showed no statistically significant correlation, with rs = −0.041 and p = 0.685. These results suggest that Urdu Lysholm Knee Scoring Scale scores were strongly aligned with established knee outcome measures but were not significantly associated with age or BMI in this sample.

Table 8. Correlation of Urdu Lysholm Knee Scoring Scale With Comparator Measures and Clinical Variables

Variable	Correlation Coefficient (rs)	p-Value	Interpretation
Age	−0.138	0.172	No statistically significant correlation
BMI	−0.041	0.685	No statistically significant correlation
Kujala Anterior Knee Pain Scale	0.970	<0.001	Very strong positive correlation
International Knee Documentation Committee questionnaire	0.962	<0.001	Very strong positive correlation

Overall, the Urdu Lysholm Knee Scoring Scale demonstrated good internal consistency, good intra-rater reliability, excellent inter-rater reliability, excellent item-level test–retest reliability, excellent intra-rater agreement, a clear one-factor structure, and very strong concurrent validity with the Kujala Anterior Knee Pain Scale and International Knee Documentation Committee questionnaire. These findings support the Urdu Lysholm Knee Scoring Scale as a reliable and valid patient-reported outcome measure for assessing symptoms and functional limitation in Urdu-speaking Pakistani patients with ACL-related knee conditions. However, the interpretation should remain limited to psychometric performance in the studied ACL-related sample and should not be presented as evidence of ACL injury prevalence or treatment effectiveness.

DISCUSSION

The present cross-sectional psychometric validation study evaluated the reliability and validity of the Urdu version of the Lysholm Knee Scoring Scale in Urdu-speaking Pakistani patients with ACL-related knee conditions. The findings demonstrated that the translated scale had good internal consistency, good intra-rater reliability, excellent inter-rater reliability, excellent item-level test–retest reliability, a clear one-factor structure, and very strong concurrent validity with the Kujala Anterior Knee Pain Scale and

the International Knee Documentation Committee questionnaire. These findings support the Urdu Lysholm Knee Scoring Scale as a clinically practical patient-reported outcome measure for assessing knee symptoms and functional limitation in this population. Importantly, the present study should be interpreted as a psychometric validation study rather than a prevalence, diagnostic accuracy, or treatment-effectiveness study, because its purpose was to evaluate measurement properties of the translated instrument rather than estimate the burden of ACL injury or determine response to intervention.

The need for a validated Urdu version of the Lysholm Knee Scoring Scale is clinically relevant because patient-reported outcome measures are most meaningful when patients can understand and respond to items in their own language and cultural context. The original Lysholm Knee Scoring Scale was developed to assess knee ligament surgery outcomes and remains widely used for evaluating symptoms and function in patients with ACL and other tibiofemoral joint conditions (3). However, direct use of the English version in Urdu-speaking patients may introduce comprehension bias, response error, or dependence on interviewer interpretation. The structured translation, back-translation, expert committee review, and pre-final testing process used in the current study helped preserve the conceptual meaning of the original scale while adapting its language for Urdu-speaking patients. This strengthens the clinical utility of the instrument for local rehabilitation and orthopedic settings, where Urdu is commonly used for patient communication.

Internal consistency of the Urdu Lysholm Knee Scoring Scale was good, with Cronbach's alpha of 0.848. This value indicates that the eight items measured a related underlying construct of knee-related symptoms and functional limitation without excessive item redundancy. The finding is comparable with previous validation studies of the Lysholm Knee Scoring Scale in other languages and clinical populations. The Spanish validation study reported acceptable internal consistency and supported the Lysholm score as a reliable and valid measure after ligament injury (26). Similarly, the Greek version demonstrated satisfactory internal consistency, with Cronbach's alpha of 0.779, and was considered valid for assessing soft-tissue knee disorders (22). The current alpha value is also stronger than that reported in the Jordanian Arabic validation, where Cronbach's alpha was 0.60, although differences in sample characteristics, injury stage, administration procedures, and cultural response patterns may explain variation across studies (29). Taken together, the present finding suggests that the Urdu version retains adequate item coherence and can be interpreted as a unified scale.

The Urdu Lysholm Knee Scoring Scale also demonstrated strong reproducibility. Intra-rater reliability was good, with an ICC of 0.848, while inter-rater reliability was excellent, with an ICC of 0.996. The total test–retest ICC was 0.992, and item-level ICC values ranged from 0.928 to 0.993, indicating excellent temporal stability across repeated administration in clinically stable participants. These results are consistent with earlier validation work showing strong test–retest reliability of the Lysholm Knee Scoring Scale. Briggs et al. reported acceptable reliability of the Lysholm score in patients with ACL injuries, with an ICC of 0.9, supporting its use as a patient-centered outcome measure after ACL injury (20). The Turkish validation study also confirmed good test–retest reliability and ease of use in patients with different knee complaints (23). The Dutch adaptation of the Lysholm score and Tegner Activity Scale similarly found strong test–retest reliability in patients with ACL injuries or reconstruction (24). The very high inter-rater reliability observed in the present study may reflect the structured scoring format, short interval between raters, and standardized administration; however, future studies should report rater blinding and administration independence more explicitly to further support reproducibility.

Structural validity was supported by exploratory factor analysis, which identified a single-factor solution explaining 61.62% of the total variance. The Kaiser–Meyer–Olkin value of 0.874 and significant Bartlett's test indicated that the data were suitable for factor analysis. Item factor loadings ranged from 0.569 to 0.875, showing that all eight items contributed to the underlying construct, although the strength of

contribution varied by item. Giving way, pain, and support showed particularly strong factor loadings, suggesting that instability, pain, and dependence on support are central indicators of knee function in ACL-related conditions. Swelling had the weakest loading but remained psychometrically meaningful. This pattern is clinically plausible because swelling may fluctuate with activity, injury stage, and inflammatory status, whereas instability and pain are more directly aligned with perceived functional impairment in ACL-related knee disorders.

The item-total correlation findings further supported the construct validity of the Urdu version. All items were significantly correlated with the total scale score, with coefficients ranging from 0.568 to 0.920. The strongest item-total correlation was observed for giving way, suggesting that perceived instability was the most representative item within the overall Urdu Lysholm construct. This is consistent with the clinical role of the ACL in controlling tibiofemoral translation and rotational stability. Pain and support also showed strong item-total correlations, indicating that these domains contributed substantially to overall perceived knee function. The lowest correlation was observed for swelling, although it remained statistically significant. This suggests that swelling contributes to the overall construct but may behave more variably than mechanical or functional symptoms. These findings support retention of all eight items in the Urdu version.

Concurrent validity was strongly supported by the correlations of the Urdu Lysholm Knee Scoring Scale with the Kujala Anterior Knee Pain Scale and IKDC questionnaire. The correlation with the Kujala Anterior Knee Pain Scale was very strong and positive, with rs = 0.970, while the correlation with the IKDC questionnaire was also very strong and positive, with rs = 0.962. These findings indicate that higher Urdu Lysholm scores were strongly associated with better scores on other established knee outcome measures. This direction of association is clinically coherent because all three tools assess related constructs of knee symptoms, pain, activity limitation, and functional performance. Similar convergent validity has been reported in earlier studies. Briggs et al. found that the Lysholm score correlated with the IKDC and SF-12 physical component score in ACL-injured patients (20). The Dutch validation also reported a very good correlation between the Lysholm score and IKDC, supporting convergent validity after ACL injury (24). The Turkish version demonstrated good correlation with the Kujala Anterior Knee Pain Scale, reinforcing its relationship with knee-related symptom and function measures (23). The present findings therefore align with the international psychometric literature while adding evidence for Urdu-speaking Pakistani patients.

The lack of significant correlation between Urdu Lysholm scores and age or BMI suggests that the scale primarily reflected knee-related symptoms and functional limitation rather than general demographic or anthropometric characteristics in this sample. Age showed a weak negative and non-significant correlation, while BMI also showed a negligible non-significant correlation. Although age and BMI may influence knee symptoms in broader musculoskeletal populations, the current findings indicate that these variables did not meaningfully determine Urdu Lysholm scores in the present ACL-related sample. This strengthens the interpretation that the scale was measuring the intended knee-specific construct rather than demographic characteristics.

The study has several limitations that should be considered when interpreting the findings. Participants were selected using non-probability convenience sampling from selected clinical and rehabilitation settings in Faisalabad and surrounding areas, which limits generalizability to all Urdu-speaking Pakistani patients with ACL injuries. The sample size was adequate for preliminary psychometric analysis but remains modest for more advanced validation approaches such as confirmatory factor analysis, differential item functioning, or subgroup invariance testing. Responsiveness to clinical change was not assessed, so the present study cannot determine whether the Urdu Lysholm Knee Scoring Scale is sensitive to rehabilitation progress or postoperative improvement over time. Measurement error indices such as standard error of measurement and minimal detectable change were also not reported, limiting interpretation of the smallest meaningful score difference. Although repeated reliability testing was

performed, future studies should provide more detailed reporting on rater blinding, administration order, and interval standardization. Finally, the findings apply specifically to ACL-related knee conditions and should not be generalized to all knee disorders without additional validation in broader diagnostic groups such as meniscal injury, patellofemoral pain, osteoarthritis, and postoperative knee populations.

Despite these limitations, the study provides important preliminary evidence that the Urdu Lysholm Knee Scoring Scale is a reliable and valid patient-reported outcome measure for Urdu-speaking Pakistani patients with ACL-related knee conditions. The scale demonstrated strong reproducibility, coherent internal structure, meaningful item-total correlations, and strong association with established knee outcome measures. These findings support its use in clinical assessment, rehabilitation monitoring, and local research involving ACL-related knee symptoms and functional limitation. Further multicenter studies with larger and more diverse samples should evaluate responsiveness, measurement error, minimal clinically important difference, and performance across different knee diagnoses.

CONCLUSION

The Urdu version of the Lysholm Knee Scoring Scale demonstrated good internal consistency, good intra-rater reliability, excellent inter-rater and test–retest reliability, acceptable structural validity, and very strong concurrent validity with the Kujala Anterior Knee Pain Scale and International Knee Documentation Committee questionnaire. These findings indicate that the Urdu Lysholm Knee Scoring Scale is a reliable and valid patient-reported outcome measure for assessing symptoms and functional limitation in Urdu-speaking Pakistani patients with ACL-related knee conditions. Its use may improve standardized clinical assessment and research reporting in local rehabilitation and orthopedic settings; however, further validation is recommended in larger, multicenter samples and in other knee-related diagnostic groups before broader generalization.

REFERENCES

1. Singh N. International epidemiology of anterior cruciate ligament injuries. Orthop Res Online J. 2018;1:94-6.

2. Myer GD, Ford KR, Di Stasi SL, Foss KDB, Micheli LJ, Hewett TE. High knee abduction moments are common risk factors for patellofemoral pain and anterior cruciate ligament injury in girls: is patellofemoral pain itself a predictor for subsequent ACL injury? Br J Sports Med. 2015;49(2):118-22.

3. Lysholm J, Gillquist J. Evaluation of knee ligament surgery results with special emphasis on use of a scoring scale. Am J Sports Med. 1982;10(3):150-4.

4. Irrgang JJ, Anderson AF, Boland AL, Harner CD, Kurosaka M, Neyret P, et al. Development and validation of the International Knee Documentation Committee subjective knee form. Am J Sports Med. 2001;29(5):600-13.

5. Mihata LC, Beutler AI, Boden BP. Comparing the incidence of anterior cruciate ligament injury in collegiate lacrosse, soccer, and basketball players: implications for anterior cruciate ligament mechanism and prevention. Am J Sports Med. 2006;34(6):899-904.

6. Cerulli G, Benoit D, Caraffa A, Ponteggia F. Proprioceptive training and prevention of anterior cruciate ligament injuries in soccer. J Orthop Sports Phys Ther. 2001;31(11):655-60.

7. Caraffa A, Cerulli G, Projetti M, Aisa G, Rizzo A. Prevention of anterior cruciate ligament injuries in soccer. Knee Surg Sports Traumatol Arthrosc. 1996;4(1):19-21.

8. Di Stasi S, Myer GD, Hewett TE. Neuromuscular training to target deficits associated with second anterior cruciate ligament injury. J Orthop Sports Phys Ther. 2013;43(11):777-A11.

9. Noyes FR, Barber-Westin SD. Neuromuscular retraining intervention programs: do they reduce noncontact anterior cruciate ligament injury rates in adolescent female athletes? Arthroscopy. 2014;30(2):245-55.

10. Hefti E, Müller W, Jakob R, Stäubli HU. Evaluation of knee ligament injuries with the IKDC form. Knee Surg Sports Traumatol Arthrosc. 1993;1(3-4):226-34.

11. Tegner Y, Lysholm J. Rating systems in the evaluation of knee ligament injuries. Clin Orthop Relat Res. 1985;(198):43-9.

12. Marx RG, Stump TJ, Jones EC, Wickiewicz TL, Warren RF. Development and evaluation of an activity rating scale for disorders of the knee. Am J Sports Med. 2001;29(2):213-8.

13. Kuru T, Dereli E, Yaliman A. Validity of the Turkish version of the Kujala patellofemoral score in patellofemoral pain syndrome. Acta Orthop Traumatol Turc. 2010;44(2):152-6.

14. Roos EM, Roos HP, Lohmander LS, Ekdahl C, Beynnon BD. Knee Injury and Osteoarthritis Outcome Score: development of a self-administered outcome measure. J Orthop Sports Phys Ther. 1998;28(2):88-96.

15. Waryasz GR, McDermott AY. Patellofemoral pain syndrome: a systematic review of anatomy and potential risk factors. Dyn Med. 2008;7:9.

16. Kim SK, Nguyen C, Horton BH, Avins AL, Abrams GD. Association of COA1 with patellar tendonitis: a genome-wide association analysis. Med Sci Sports Exerc. 2021.

17. Gibbs CM, Hughes JD, Popchak AJ, Chiba D, Lesniak BP, Anderst WJ, et al. Anterior cruciate ligament reconstruction with lateral extraarticular tenodesis better restores native knee kinematics in combined ACL and meniscal injury. Knee Surg Sports Traumatol Arthrosc. 2021.

18. Kocher MS, Steadman JR, Briggs KK, Sterett WI, Hawkins RJ. Reliability, validity, and responsiveness of the Lysholm knee scale for various chondral disorders of the knee. J Bone Joint Surg Am. 2004;86(6):1139-45.

19. Marx RG, Jones EC, Allen AA, Altchek DW, O'Brien SJ, Rodeo SA, et al. Reliability, validity, and responsiveness of four knee outcome scales for athletic patients. J Bone Joint Surg Am. 2001;83(10):1459-69.

20. Briggs KK, Lysholm J, Tegner Y, Rodkey WG, Kocher MS, Steadman JR. The reliability, validity, and responsiveness of the Lysholm score and Tegner activity scale for anterior cruciate ligament injuries of the knee: 25 years later. Am J Sports Med. 2009;37(5):890-7.

21. Peccin MS, Ciconelli R, Cohen M. Specific questionnaire for knee symptoms: the Lysholm Knee Scoring Scale: translation and validation into Portuguese. Acta Ortop Bras. 2006;14:268-72.

22. Panagopoulos A, Billis E, Floros GR, Stavropoulos T, Kaparounaki E, Moucho M, et al. Cross-cultural adaptation of the Greek versions of the Lysholm Knee Scoring Scale and Tegner Activity Scale. Cureus. 2020;12(7):e9372.

23. Celik D, Coşkunsu D, Kılıçoğlu Ö. Translation and cultural adaptation of the Turkish Lysholm knee scale: ease of use, validity, and reliability. Clin Orthop Relat Res. 2013;471(8):2602-10.

24. Eshuis R, Lentjes GW, Tegner Y, Wolterbeek N, Veen MR. Dutch translation and cross-cultural adaptation of the Lysholm score and Tegner activity scale for patients with anterior cruciate ligament injuries. J Orthop Sports Phys Ther. 2016;46(11):976-83.

25. Ahmed KM, Said HG, Ramadan EKA, Abd El-Radi M, El-Assal MA. Arabic translation and validation of three knee scores: Lysholm knee score, Oxford knee score, and International Knee Documentation Committee Subjective Knee Form. SICOT J. 2019;5:6.

26. Arroyo-Morales M, Martin-Alguacil J, Lozano-Lozano M, Cuesta-Vargas AI, Fernández-Fernández AJ, González JA, et al. The Lysholm score: cross-cultural validation and evaluation of psychometric properties of the Spanish version. PLoS One. 2019;14(8):e0221376.

27. Swanenburg J, Koch PP, Meier N, Wirth B. Function and activity in patients with knee arthroplasty: validity and reliability of a German version of the Lysholm Score and the Tegner Activity Scale. Swiss Med Wkly. 2014;144:w13976.

28. Wang W, Liu L, Chang X, Jia Z, Zhao J, Xu W. Cross-cultural translation of the Lysholm knee score in Chinese and its validation in patients with anterior cruciate ligament injury. BMC Musculoskelet Disord. 2016;17:436.

29. Alyamani A, Mustapha A, Aljazzazi M. Acceptance, reliability and validity of the Arabic version of Lysholm Knee Score. J R Med Serv. 2017;24(3):6-12.

30. Gokeler A, Dingenen B, Mouton C, Seil R. Clinical course and recommendations for patients after anterior cruciate ligament injury and subsequent reconstruction: a narrative review. EFORT Open Rev. 2017;2(10):410-20.

31. Cavaignac E, Coulin B, Tscholl P, Nik Mohd Fatmy N, Duthon V, Menetrey J. Is quadriceps tendon autograft a better choice than hamstring autograft for anterior cruciate ligament reconstruction? A comparative study with a mean follow-up of 3.6 years. Am J Sports Med. 2017;45(6):1326-32.

32. Jakobsson M, Gutke A, Mokkink LB, Smeets R, Lundberg M. Level of evidence for reliability, validity, and responsiveness of physical capacity tasks designed to assess functioning in patients with low back pain: a systematic review using the COSMIN standards. Phys Ther. 2019;99(4):457-77.

33. Padua DA, Marshall SW, Boling MC, Thigpen CA, Garrett WE Jr, Beutler AI. The Landing Error Scoring System is a valid and reliable clinical assessment tool of jump-landing biomechanics: the JUMP-ACL study. Am J Sports Med. 2009;37(10):1996-2002.

34. van Meer B, Meuffels D, Reijman M. A comparison of the standardized rating forms for evaluation of anterior cruciate ligament injured or reconstructed patients. 2017.

35. Kujala UM, Jaakkola LH, Koskinen SK, Taimela S, Hurme M, Nelimarkka O. Scoring of patellofemoral disorders. Arthroscopy. 1993;9(2):159-63.

36. Peccin MS, Ciconelli R, Cohen M. Questionário específico para sintomas do joelho “Lysholm Knee Scoring Scale”: tradução e validação para a língua portuguesa. Acta Ortop Bras. 2006;14:268-72.

37. Gagnier JJ, Shen Y, Huang H. Psychometric properties of patient-reported outcome measures for use in patients with anterior cruciate ligament injuries: a systematic review. JBJS Rev. 2018;6(4):e5.

38. Briggs KK, Steadman JR, Hay CJ, Hines SL. Lysholm score and Tegner activity level in individuals with normal knees. Am J Sports Med. 2009;37(5):898-901.

39. Briggs KK, Kocher MS, Rodkey WG, Steadman JR. Reliability, validity, and responsiveness of the Lysholm knee score and Tegner activity scale for patients with meniscal injury of the knee. J Bone Joint Surg Am. 2006;88(4):698-705.

40. Paxton EW, Fithian DC, Stone ML, Silva P. The reliability and validity of knee-specific and general health instruments in assessing acute patellar dislocation outcomes. Am J Sports Med. 2003;31(4):487-92.

41. Risberg M, Holm I, Steen H, Beynnon BD. Sensitivity to changes over time for the IKDC form, the Lysholm score, and the Cincinnati knee score: a prospective study of 120 ACL reconstructed patients with a 2-year follow-up. Knee Surg Sports Traumatol Arthrosc. 1999;7(3):152-9.