Translation and Validation of the "Lysholm Knee Scoring Scale" Specific Questionnaire for Knee Symptoms: Into Marathi (M-LKS)

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ABSTRACT

Objective: Knee diseases present variable consequences for an individual's function and quality of life. For the purposes of translating, validating and checking the measurement properties of the specific questionnaire for knee symptoms - the "Lysholm Knee Scoring Scale" - into the regional language Marathi of Maharashtra state in India.

Methodology: We selected, for convenience, 60 patients (49 males and 11 females, mean age = 41.4 years) with knee injuries (tibia fracture treated with interlocking nail patellar split approach, meniscal injury, anterior cruciate ligament injury).

Results: Reproducibility and ordinal consistency inter- and intra-interviewer were excellent. The nominal consistency inter-interviewers was good (Kappa = 0.72) and intra-interviewer was excellent (Kappa = 0.86). During validation process, we correlated the Lysholm questionnaire with the pain numerical scale (r=-0.6; p=0.001).

Conclusion: We concluded that the translation and cultural adaptation of the "Lysholm knee scoring scale" into our

language have proven to be reproducible and valid in patients with tibia fracture treated with interlocking nail patellar split approach, meniscal injury and anterior cruciate ligament injury.

Keywords: Questionnaires; Translations; Knee Injuries.

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INTRODUCTION

The knee is the biggest and most complex joint in the human body and is highly prone to injury.1 With outdoor physical activities being performed more frequent and more complex in modern times, the incidence of knee injuries rises as well, particularly in young people and athletes.2 Knee joint internal disturbances are uncountable, presenting variable consequences for an individual's function and quality of life. The increasing search for physical activities associated to a complex and so vulnerable anatomy of knee joint led to an increase of the number of ligament injuries on this joint, especially on anterior cruciate ligament. Joint instability is reported by patients complaining about missing steps and lack of confidence upon certain movements. Chronic anterior instability evolves with a large incidence of X-ray degenerative changes, as well as meniscal and chondral injuries. Current trend for patients intending to resume sports practice is the indication of knee ligament reconstruction. Knee surgery advancement has been assessed by means of the development of new surgical techniques, new instruments, as well as of surgeons' specialization. Previously, empirical assessments were made for checking the effectiveness of an established treatment. Many times, those assessments provided wrong conclusions regarding

the evolution and quality of the employed techniques. The complexity of knee joint and the number of criteria for evaluating its function and symptoms make measurements and quantification of employed treatments difficult. An objective examination and a questionnaire totalling 100 score points was used for assessing outcomes on knee ligament repairs. The answers to each question were "yes" (10 points) or "no" (0 point) kind. Assessment was supplemented by adding subjective criteria, such as stroke, disability, and functional evaluation. Slocum and Larson² recognized the need to assess rotational instability and comparative values pre- and postoperatively. Larson³ developed a scale of 100 score points based on subjective, objective and functional criteria. At functional aspect, it was concerned to assess an individual's conditions to walk, run, jump, and squat. Marshall et al.4 emphasized that the adequate method of assessment should allow a surgeon to determine anatomical injuries and correspondent functional damages. On this ground, they developed, in 1977, the scale "Hospital for Special Surgery Knee Score (HSSKS)"5, the first specific method used for assessing knee ligament injuries. The HSSKS includes subjective symptoms, subjective function, and objective functional tests, as well as a

clinical examination. Lysholm and Gillquist⁶ developed a scale for assessing symptoms. The Lysholm scale includes basic aspects of the Larson scale, but introducing the instability symptom and correlating it to activity. This scale was later modified by Tegner and Lysholm.7 They recognized the difficulty in achieving a score for ligament injury, and decided, in that issue, to research clinical findings, and assesses only symptoms and function. The Lysholm scale or questionnaire is constituted of eight questions, with closed answers alternatives, of which final score is expressed nominally and ordinally, with a score ranging from 95 to 100 points regarded as "excellent"; 84 to 94 points, "good", from 65 to 83 points, "fair", and "poor" when values were equal or below 64 points. The Lysholm knee score, published in 1982,6 was initially used to evaluate the functional state of the patient after anterior cruciate ligament (ACL) injury, and follow-up researches have proven its value in functional evaluation for other knee injuries, including patellofemoral pain syndrome,8 meniscal injuries,9 medical patellar plica syndrome, 10 patellar dislocation, 11 and various chondral disorders. 12 The absence of a specific instrument for assessing knee symptoms in Marathi as all our patients understand regional language called our attention to translate the "Lysholm Knee Scoring Scale", one of the most used questionnaires for assessing knee symptoms in traumatology area. Our objectives in this study were: to translate and adjust the "Lysholm Knee Scoring Scale" into our regional language Marathi, as well as to check its measurement properties (reproducibility and validity).

MATERIAL AND METHODS

Sixty patients (20% females and 80% males) have been selected from Dr R N Cooper Municipal General Hospital and HBT medical college Vile Parle Mumbai Maharashtra, presenting with knee joint pain, with diagnosis determined by Orthopaedic department in the hospital. The average age of the sample was 41.4 years old (16-58). From the 60 studied patients, 78% had a high school degree, and 22% could only understand Marathi as a language of communication. The patients selected for this study were those fulfilling the following inclusion criteria established for this research: Indian citizens from Maharashtra, with post-op tibial fracture operated with IMIL patellar split approach (43), meniscal injury (5), anterior cruciate ligament injury (12), with diagnostic complementation provided by means of imaging tests. The patients did not present medication switch or any other procedure during study period (15 days).

लंगडणे (५ पाँइट)	वेदना (२५ पाँइट)		
नाही = ५	वेदना नाहीत = २५		
सौम्य किंवा थोडया थोडया वेळाने = ३	मजबूत प्रयत्नाचा व्यायाम करताना अधुनमधून किंवा		
	सौम्य = २०		
खुप जास्त व सतत = ०	मजबूत प्रयत्न व्यायाम करताना समजून येते = १५		
आधार (५ पाँइट)	२ कि.मी. पेक्षा जास्त चालल्यावर समजून येते= १०		
आधाराची गरज नाही = ५	२ कि.मी. पेक्षा कमी चालल्यावर समजून येते = ५		
चालण्याची काठी आणि कुबडया = २	सतत = ०		
अशक्य = ०	सूज (१० पाँइट)		
नियंत्रण (१५ पाँइट)	सूज नाही = १०		
नियंत्रणाची गरज नाही अथवा नियंत्रणाची भावना = १५	मजबूत प्रयत्नाने व्यायाम करताना = ६		
भावना होते परंतु नियंत्रणाची गरज नाही = १०	नेहमीचा व्यायाम करताना = २		
अधुनमधून नियंत्रणाची गरज भासते = ६	सतत = ०		
वांरवांर = २	पाय- या चढतना (१० पाँइट)		
तपासणीच्या वेळी एकत्र नियंत्रण = ०	समस्या नाही = १०		
अस्थिरता (२५ पाँइट)	किंचीत त्रास = ६		
कोणतेही पाऊल चुकत नाही = २५	एका वेळी एक पाऊल = २		
क्वचितच, एथलीट क्रिया करताना किंवा मजबूत	अशक्य = ०		
प्रयत्नाने व्यायाम करताना = २०			
एथलीट क्रिया करताना वांरवार किंवा इतर मजबूत	बसणे (५ पाँइट)		
प्रयत्नाने व्यायाम करताना			
(सहभागी होणे अशक्य होते) = १५			
दैनिक क्रियेमध्ये कधी कधी = १०	समस्या नाही = ५		
दैनिक क्रियेमध्ये वांरवांर = ५	किंचीत त्रास = ४		
प्रत्येक पावलावर = ०	९० डिगी पेक्षा जास्त नाही = २		
	अशक्य = ०		
	एकूण स्कोर =		

Chart 1: M-LKS

Lysholm Questionnaire (Scale). Pain (25 points) Limping (5 points) No pain = 25Never = 5 Intermittent or mild during strong-effort exercises = 20 Mild or periodically = 3 Marked during strong-effort exercises = 15 Strong and continuous = 0 Marked during or after walking more than 2 Km = 10 Marked during or after walking less than 2 Km = 5 Support (5 points) Continuous = 0 No support = 5 Walking stick or crutches = 2 Swelling (10 points) Impossible = 0 No swelling = 10 Upon strong-effort exercises = 6 Restraining (15 points) Upon usual exercises = 2 No restraining or restraining feeling = 15 Continuous = 0 Has the feeling, but no restraining = 10 Occasional restraining = 6 Climbing stairs (10 points) Frequent = 2 No problem = 10 Joint restrained at examination = 0 Slightly damaged = 6 One step at a time = 2 Instability (25 points) Impossible = 0 Never miss a step = 25 Seldom, during athletic activities or other strong-effort Squatting (5 points) exercises = 20 No problem = 5 Frequently during athletic activities or other strong-effort exercises Slightly damaged = 4 (or unable to participate) = 15 Not exceeding 90 degrees = 2 Occasionally in daily activities = 10 Impossible = 0 Frequently in daily activities = 5 At each step = 0 Total score: Score table: Excellent: 95 - 100; Good: 84 - 94; Fair: 65 - 83; Poor: < 64

Chart 2: English Lysholm Questionnaire (Scale)

METHODS

Methodology employed followed the recommendations by Guillemin et al.¹³ for translation and cultural adaptation. The specific questionnaire for knee symptoms "Lysholm Knee Scoring Scale" was translated. Reproducibility of Lysholm scale was assessed by means of three interviews made with 60 patients presenting with post-operative tibia fracture treated with IMIL, meniscal injury, anterior cruciate ligament injury. The assessments were performed by two independent interviewers (interviewer 1 and 2), on the same day (inter-observer reproducibility), and within a time interval of 45 min. between both interviews. Subsequently, a new assessment, with maximum time interval of 15 days (average: 7 days) was performed by interviewer no. 1 (intra-observer reproducibility). The interviews were performed by medical professional.

The Lysholm questionnaire validity was assessed by checking its correlation with established diagnosis and other clinical parameters, all of them performed by the same interviewer, at the moment of the first interview, which are described below: Limping from 0 to 5(0= strong and continuous 5= never), support from 0 to 5(0= strong and continuous 5= never), support from 0 to 5(0= young is impossible 5= no support required), Restraining 15(0= joint restrained on examination 15= no restraining), Instability 25(0= at each step, 25= none), Pain numeric scale from zero to 25(25= no pain and 0= continuous pain), Swelling 10(0= continuous 10= none), climbing stairs 10(0= impossible 10= no problem), squatting 5(0= impossible 5= no problem).

Translation of the English original Lysholm knee score followed previously published guidelines. 13,14 The entire process consisted

of five steps: 1) Forward translation from English to Marathi by two bilingual translators independently, who are native speakers and well conversant in English. One of the translators is an orthopedic surgeon in our department (the author, PC), the other is a full-time translator (TS) with no medical background, and is not informed of our investigation; 2) Revision and modification of the questionnaire regarding language expressions and cultural differences was discussed by the two forward translators and other `` members. A primary version of M-LKS (Chart- 1) was then obtained; 3) Backward translation by two independent native English translators (AY and GY) who are well conversant in Marathi. The primary version of M-LKS was translated from Marathi to English. The two translators had medical backgrounds, with no knowledge of the original Lysholm knee score; 4) All researchers and translators convened and had discussions to solve any discrepancies, ambiguities and other language expression issues that existed in the questionnaire, and the prefinal version of M-LKS was obtained; and 5) Sixty patients with knee injuries patients were invited to complete the pre-final M-LKS for assessment, and feedbacks were collected. The researchers met once more to make final adjustments according to these feedbacks and the final version of M-LKS was obtained.

Statistical Analysis

The following statistical tests have been performed: Mann-Whitney's test, variance analysis by Kruskal-Wallis' posts, Spearman's correlation coefficient, Cronbach's alpha coefficient, Kappa's reliability coefficient. For all statistical tests, the significance level adopted was alpha <0.05 or 5%.

Table 1: Intradisciplinary coefficient values and their corresponding p values for the different questions assessed on Lysholm questionnaire.

Questions	Interinterviewer	Intrainterviewer
Limping	0.8	0.9
Support	1.0	1.0
Restraining	0.9	0.9
Instability	0.8	0.9
Pain	0.9	0.9
Swelling	0.8	0.9
Climbing	0.8	0.9
Squatting	0.9	0.9

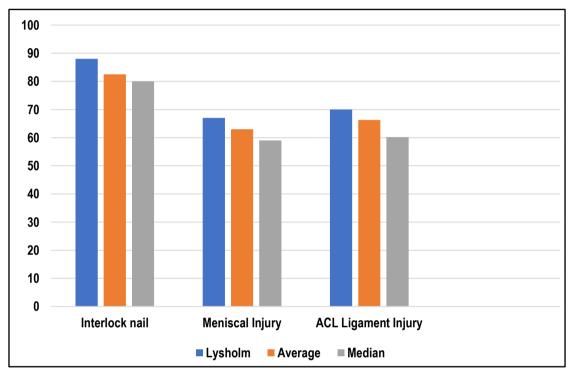


Chart 3: Average, median values obtained from Lysholm questionnaire for different clinical diagnostics

Table 2: Average, median values obtained from Lysholm questionnaire for different clinical diagnostics

Diagnosis	Lysholm	Average	Median
Interlock nail (43)	excellent (88)	82.5	80
Meniscal injury (5)	Good (67)	63	59
ACL Ligament injury (12)	Good (70)	66.3	60.2

RESULTS

Sixty patients with knee joint disease took part of the cultural equivalence evaluation phase. Only question number 3 (restraining) was regarded as difficult to understand by more than 12.5% of studied population (n=8). A new version was again administered in other 8 patients intending to check its understanding and cultural equivalence. After those modifications, the question was regarded as equivalent by more than 95% of the patients. Concerning the Lysholm questionnaire, 5 patients (6%) presented a scoring corresponding to "excellent" level, 12 patients (20%), to "good" level, 21 patients (36%) "fair", and 22 patients (38%) presented scores corresponding to "poor" level. The results achieved with the Lysholm questionnaire for the first time by interviewer 1 were used as a parameter for inter-interviewer

reproducibility analysis, once, in a second application by interviewer 1, inter-interviewer reproducibility was excellent. Thus, those results were used as reference values. When we assess the consistency of the first application of Lysholm questionnaire by one interviewer with subsequent applications by two interviewers in two different moments with the same patient, we could observe that the median was very similar between those conditions, as well as scoring variability, resulting in an excellent reproducibility level. The consistency level between both questionnaire application moments performed by the same interviewer was excellent (Kappa = 0.86), and, between two interviewers, this level was regarded as good (Kappa=0.72). Absolute values for intradisciplinary coefficient obtained for each of Lysholm's questionnaire questions, comparing inter- and intra-interviewer

reproducibility are described on Table 1. By analyzing Lysholm total scores correlations to the eight isolated questions, we found that the questions best correlating with the total were: limping, instability, pain, swelling, climbing steps, and squatting. Although questions about restraining and support presented an excellent reproducibility, they presented poor correlation to the total score, being significant for restraining question and not significant for support question. Regarding validity, we could see a higher score, which means a lower level of symptoms presented by patients with chondromalacia and meniscal injury (Table 2). The values shown between parentheses represent scores corresponding to nominal classification. By analyzing the scores, we could notice that the patients presenting fewer symptoms, which determines a higher score, were those presenting meniscal injury (Figure 2). Regarding social and mental health aspects. correlations were poor, with a statistically insignificant p value (r = 0.2 and p = 0.09; r = 0.3 and p = 0.07, respectively). For emotional aspect, correlation was also shown to be poor, although having a significant p value.

DISCUSSION

Scientific community is very concerned about developing questionnaires assessing health status, as well as validating instruments available in other languages and cultures. New instruments or those being validated must be assessed and reassessed by different researchers, in different societies and situations.15 In our study, we initially assessed the applicability of the questionnaire in a sample with good cultural level, which, in a certain manner, limits its use for this population. Due to the current importance given to this topic, a subsequent step would be the applicability of Lysholm questionnaire in different socioeconomic In our study, in order to standardize the methods for applying questionnaires, we decided to perform them as interviews, 13,16 even with those people having an average intellectual level. Evaluation instruments must be reproducible along the time, that is, they should produce equal or very similar results in two or more administrations in a same patient, considering that his/her overall clinical status is not changed. 17 All patients in our sample had a medical diagnosis of knee joint disease and were at the chronic phase of the disease. This could justify the excellent intra-interviewer consistency, once important picture changes were not seen in such a short time. We found a lower score at Lysholm questionnaire anterior cruciate ligament injury cases than for tibial IMIL patella split and meniscal injury. This could be explained by the fact that the most common symptoms of anterior cruciate ligament injury are instability and pain, which are frequent at chronic phases of these diseases. 18,19 Both symptoms account for half of the total Lysholm questionnaire score, and the higher the instability and pain, the lower the score shown by patients in our sample. A similar result was reported in a study conducted by Lysholm et al.6 with patients with acute knee injuries. The subjective classification of results obtained from Lysholm questionnaire had a high correlation with ligament lassitude among patients with anteromedial and/ or anterolateral rotational instability, which demonstrates sensitivity of Lysholm questionnaire in this aspect. On the assessment of ordinal interand intra-interviewer consistency, we had an excellent consistency among all questions, since this is an objective numeric assessment, leaving no room for variations. Furthermore,

the Lysholm questionnaire is easy to understand, was applied on individuals with good education level and presents questions and terms that are part of the daily lives of patients having knee conditions. We assessed the internal consistency of Lysholm questionnaire version to Marathi by correlation among its various questions and total scores. Questions that were most related to the total score were limping, instability, pain, swelling, climbing stairs, and squatting. Questions addressing restraining and support were poorly correlated with the total score. Such observation is important, since restraining was the question submitted to changes after the first translation into Marathi language, which may have generated a low agreement rate between this component (modified) and the others, however its reproducibility was excellent. We emphasize that restraining and support questions had a lower bias on the final results of our study. Those findings are also seen in postoperative periods and in knee ligament injuries, situations that originated the initial interest on this questionnaire.6,7

Due to the fact that the Lysholm questionnaire, in its original language, has been frequently used in many studies²⁰⁻²³ for specific assessment of knee ligament injuries, and because it was built in such a careful manner, assessing clearness and criteria for questions selection, we can believe that it presents apparent and content validity. As no structural changes occurred on the translation of Lysholm questionnaire into Marathi language, we can think that its appearance and content validity has also been maintained. When we assess diseases and correlate them to Lysholm questionnaire score, we observe a lower score for anterior cruciate ligament, probably because those diseases present a higher number of symptoms, such as pain, instability, swelling, and limping, which have stronger correlations on Lysholm questionnaire final score result when its questions were particularly analyzed.

However, regarding social aspects, mental and emotional health. correlations were poor, probably because there is no specific question for assessing non-physical/ functional status on Lysholm questionnaire. Therefore, we corroborate literature findings showing us the importance of assessing an individual from all his/her biopsychosocial aspects and the importance of, when using specific questionnaires for assessing any disease, concurrently administrating a generic questionnaire in order to obtain a more reliable profile of the overall health status of an individual. Specific assessment measurements available are clinically sensitive, as seen in our study, showing a better ability to detect specific aspects of the disease, limited to relevance domains to be assessed.6,7 The translation of Lysholm questionnaire into Marathi language and its adjustment to cultural conditions of our population, as well as the demonstration of its reproducibility and validity enabled this specific instrument to be used for assessing individuals with knee joint disease, both for research and for healthcare purposes.

CONCLUSIONS

- 1. The translation and cultural adjustment of the Marathi version of Lysholm questionnaire was proven to have measurement, reproducibility and validity properties.
- 2. The Marathi version of Lysholm questionnaire is a useful instrument for specific assessment of knee symptoms in Maharashtra patients.

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