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RESEARCH ARTICLE

VALITIDY AND RELIABILITY OF THE ARABIC VERSION OF LYSHOLM KNEE SCALEIN KNEE OSTEOARTHRITIS

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ABSTRACT

Background: Lysholm Knee Scale is a knee- is an instrument used to assess the results of rehabilitation from knee injuries, especially those requiring anterior cruciate ligament reconstruction. it measures recovery of knee joint function based on activities of daily living. **Objective** :The purpose of this study will be to test the face validity, the content validity, the feasibility, the internal consistency reliability and the test retest reliability of Arabic-language version of Lysholm knee scale to measure the PF level in knee osteoarthritic patients. **Methods:** Two expert panels (first panel consists of eight experts and second panel consist of seven experts) and 40 patients with knee OA participated in this study, 80 sheets (including retest sheets) were filled out in this study considering that bilateral knee osteoarthritic patient. Forward translation, development of preliminary initially translated version, backward translation, and development of the pre-final version and testing of pre-final version using experts then testing of the final version on patients was done. Clarity index, expert proportion of clearance, index of content validity, expert proportion of relevance, descriptive statistics, missed item index, time taken to answer the scale, Cronbach's coefficient alpha and Spearman's rank correlation coefficients were used for statistical analysis. **Results:** The study showed thatThe Arabic version of Lysholm Knee Scoring Scale has excellent face validity as scale index of clarity equaled 93.88%, and the mean of proportion of clearance (clear responses) equaled 93%, also it has excellent content validity as S-CVI equaled 89.12%, and the mean of the proportion of relevance (relevant responses) equaled 88.6%.The scale items were filled out by 99.4% in all sheets and it needed three minutes or less to be answered in about 57.7% of all and also it needed less than 5 minutes in about 82.7% sheets , cronbach's alpha equaled .853 and spearman's rank correlation coefficients between test &retest were statistically significant (item1:0.944,item 2:0.976,item 3:0,924,item 4 :0,989,item 5 :0,838,item 6: 0.951 , item 7:0.896,item 8:0,969). **Conclusion:** Arabic-language version of lysholm knee scale has face and content validity, feasibility and internal consistency and test retest reliability enough to measure the physical function in knee osteoarthritis patients.

INTRODUCTION

Osteoarthritis (OA) is a chronic degenerative and progressive condition affecting synovial joints, which mainly causes degeneration of hyaline cartilage. Although OA can affect any joint containing hyaline cartilage; its symptoms occur most often in the weight bearing joints of lower extremities and the most common large joints involved are knee joints (Osiri *et al.,* 2009). Patients with knee OA report episodes of knee instability during activities of daily living, and instability affects physical function beyond that which can be explained by contributions from other impairments such as knee pain, range of motion, and quadriceps strength (Fitzgerald *et al.,* 2004).

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Physical activity improvement is an effective means of measuring self-efficacy, satisfaction and cooperation with treatment in knee osteoarthritic patients (Rejeski *et al.,* 2008). Lysholm Knee Score is an instrument used to assess the results of rehabilitation from knee injuries, especially those requiring anterior cruciate ligament reconstruction. It measures recovery of knee joint function based on activities of daily living (Briggs *et al.,* 2009). Other English knee measures of knee function were developed such as: International Knee Documentation Committee (IKDC) Subjective Knee Evaluation Form, Knee Injury and Osteoarthritis Outcome Score (KOOS), Knee Outcome Survey Activities of Daily Living Scale (KOS-ADL), Oxford Knee Score (OKS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and Activity Rating Scale (ARS) (Collins *et al.,* 2011). The Lysholm Knee Scorewas done to translate into Arabic version for Arabic people to assess the results of rehabilitation from knee injuries. This study considered with

the measurement of validity and reliability of the Arabic version of the Lysholm Knee Score.

MATERIALS AND METHODS

Participants and design: This study was conducted in outpatient clinics of Imbaba General Hospital to investigate the validity and reliability of Arabic version of the lysholm knee scale in patients with knee osteoarthritis. This study followed studies that recommended guidelines for translating, adapting and validating psychological instruments. Two expert panels; each consists of ten experts and 40 patients with knee osteoarthritis participated in this study. Each participant signed the consent form.

Inclusion criteria for experts

- Experience not less than ten years or at least master degree.
- Major part of their work is with Arabic population.
- Fluent in Arabic and English.

Inclusion criteria for patients

All patients will be chosen according to the following criteria:

- Referred as knee OA by physician.
- Being conscious and ambulant.
- Able to read and write in Arabic.

Exclusive criteriafor patients

- Knee pain with sciatica.
- Patients with deformity of the lower limb.
- Patients under analgesic medications.
- Patients with polyneuropathy.
- Bone disease or infection.

Procedure

The following steps will be followed

Forward translation: translation of the original scale into Arabic (forward translation or one-way translation). Scale in English will be translated to Arabic to produce two forward-translated versions of the scale (A1 and A2).

Two translators will participate in forward translation,their mother language is Arabic,but they have distinct backgrounds

- One translator is knowledgeable about health terminology and the content area of the construct of the tool in the Arabic.
- The other translator is knowledgeable about the cultural and linguistic nuances of the Arabic.

Development of the preliminary initial translated Arabic version. Both versions (A1 and A2) will be compared and merged by the researchers and research committee of basic science for physical therapy, Faculty of Physical Therapy will be asked for help in resolving ambiguities and discrepancies.
Blind back-translation (blind backward translation or blind double translation) of the preliminary initial translated version of the scale:

- The preliminary initial translated version of the scale will be translated to English to produce two back-translated versions (B1 and B2).
- Two translators will participate in back translation,but they have distinct backgrounds
- One translator is knowledgeable about health terminology and the content area of the construct of the tool in the English.
- The other translator is knowledgeable about the cultural and linguistic nuances of the English.
- Comparison of the two back-translated versions of the scale (B1 and B2).

The experts compare back-translation of the scale B1 with B2, and also compare both B1 and B2 with the original Englishscale regarding instructions, items, response format, wording, sentence structure, meaning and relevance to develop the pre-final Arabic version of the scale. Pilot testing of the pre-final Arabic version of the scale for face and content validity.

- The first expert panel (eight experts) will be asked to evaluate each item of the tool for clarity (face validity) and provide suggestions to improve its clarity; dichotomous questions (clear/unclear) is used regarding instruction, items and response words.
- Then the second expert panel (seven experts) will be asked to evaluate each item of the pre-final Arabic version of the scale for content equivalence (content-related validity) using the following scale: 1 = not relevant; 2 = unable to assess relevance; 3 = relevant but needs minor alteration; 4 = very relevant and succinct and give suggestions to improve its relevance (1 and 2 considered not relevant, 3 and 4 considered relevant).
- After the pre-final version passes expert face and content validity tests, it was named the final version.
- Pilot test of the final Arabic version of the scale will be conducted on patients with knee pain. Patients will fill out data collection sheets which will be used to collect demographic data (name, age, sex).
- Feasibility (ability to use on larger sample) will be evaluated by the assessment of the frequency of missing answers per item and administration time.
- Patients will be asked to refill outthe data collection sheet again after two days.
- Statistical analysis
- SPSS computer program (version 20) was used for data analysis:
- Face validity was tested by clarity index and expert proportion of clearance.
- Content validity was tested by index of content validity (CVI) and expert proportion of relevance.
- Descriptive statistics of patients and sheets were made using mean, median, standard deviation (SD), mode, minimum (min) and maximum (max).
- Feasibility index was calculated using missed item index and time taken to fill the questionnaire.
- Internal consistency reliability was measured using Cronbach's coefficient alpha.
- Test retest reliability was measured using mean scores and Spearman's rank Correlation.

RESULTS

Item index of clarity was calculated and it was found that scale index of clarity equals 93.88%, the mean of proportion of clearance (clear responses) equaled 93%as shown in table1. Expert proportion of relevance of the final version equaled 88.6% as shown intable 2. Patients were of both genders (26 females and 14 males) also 40 patients made retest .Internal consistency calculations were made for the final version and it was found that Cronbach's alpha equals 0.932 with lower bound 0.897 and upper bound 0.958 at 95% confidence interval. Correlations between test and retest results were done. Regarding that the two-tailed value of P is 0.01, Spearman's rank correlations were calculated as shown in table (3).

reliability and the test-retest reliability of Arabic-language version of Lysholm Knee Scoring Scale for Egyptians patients with injured knee, Two expert panels (first panel consists of eight experts and second panel consist of seven experts) and 40 patients participated in this study, this study was conducted in outpatient clinics of Imbaba General Hospital. The original scale was translated forward into two Arabic versions then preliminary initial translated version was developed then it was backward translated into two English versions then pre-final version was developed then it was tested by the experts for face and content validity ,then it was tested by the patients for feasibility, internal consistency reliability and test retest reliability.

Table 1. Expert proportion of clearance of the final version

Expert number	Number of experts' agreement (clear responses)	Proportion of clearance
1	30	86%
2	35	100%
3	35	100%
4	35	100%
5	35	100%
6	35	100%
7	35	100%
8	20	57%
9	31	89%
10	31	89%
11	35	100%
12	35	100%
13	35	100%
14	35	100%
15	31	89%
Mean	32.6	93%

Table 2. Expert proportion of relevance of the final version

Expert No	Very Relevant	Proportion of very relevant	Relevant but needs minor alteration	Unable to assess Relevance	Not Relevant
1	16	46%	19	0	0
2	35	100%	0	0	0
3	35	100%	0	0	0
4	35	100%	0	0	0
5	35	100%	0	0	0
6	35	100%	0	0	0
7	35	100%	0	0	0
8	31	89%	0	0	4
9	16	46%	15	0	4
10	35	100%	0	0	0
11	35	100%	0	0	0
12	35	100%	0	0	0
13	26	74%	1	0	8
14	35	100%	0	0	0
15	26	74%	9	0	0
Mean	31	88.6%			

Table 3. Spearman's rank correlations coefficients

Item No	R value	Correlation strength	Results of test regarding association between pre- and post-test
1	0.944	Very strong	Statistically significant
2	0.976	Very strong	Statistically significant
3	0.924	Very strong	Statistically significant
4	0.989	Very strong	Statistically significant
5	0.838	Very strong	Statistically significant
6	0.951	Very strong	Statistically significant
7	0.896	Very strong	Statistically significant
8	0.969	Very strong	Statistically significant

DISCUSSION

The present study was designed to test the face validity, the content validity, the feasibility, the internal consistency

Validity of the Arabic version of Lysholm Knee Scoring Scale
The Arabic version of Lysholm Knee Scoring Scale has excellent face validity as scale index of clarity equaled 93.88%, and the mean of proportion of clearance (clear

responses) equaled 93%, also it has excellent content validity as S-CVI equaled 89.12%, and the mean of the proportion of relevance (relevant responses) equaled 88.6%. The scale items were filled out by 99.4% in all sheets and it needed three minutes or less to be answered in about 57.7% of all and also it needed less than 5 minutes in about 82.7% sheets , cronbach's alpha equaled .853 and spearman's rank correlation coefficients between test &retest were statistically significant (item1:0.944,item 2:0.976,item 3:0,924,item 4 :0,989,item 5 :0,838,item 6: 0.951 , item 7:0.896,item 8:0,969) The results of the current study came in agreement with(Polit and Beck, 2006) (6) who stated that a scale to be judged as having excellent content validity, it would be composed of items with item indexes of content validity (I-CVI) that meet the following criteria (I-CVI of 1.00with three to five experts and a minimum I-CVI of .78 for 6 to 10 experts). The recommended standards may necessitate two rounds of expert review if the initial assessment suggests the need for substantial item improvements. Feasibility of the Arabic version of Lysholm Knee Scoring Scale. The Arabic version of Lysholm Knee Scoring Scale has high feasibility because the scale items were filled out by 99.4% in all sheets and it needed three minutes or less to be answered in about 57.7% of all sheets, also it needed less than 5 minutes to be answered in about 82.7% of all sheets.

The results of the current study came in agreement with (Van, 2015) who stated that missing rate on the item level was considered acceptable if no single item had a missing rate exceeding10% and completion time was considered acceptable if 95% of sheets were completed in less than 15minutes. Internal consistency and test retest reliability of the Arabic version of Lysholm Knee Scoring Scale. The Arabic version of Lysholm Knee Scoring Scale has good internal consistency and good test retest reliability as Cronbach's alpha equaled 0.853and all Spearman's rank correlation coefficients between test and retest results were statistically significant (item 1: 0.944, item 2: 0.976, item 3: .924, item 4: .989, item 5: .838, item 6: 0.951, item 7: 0.896, item 8:0.969, total score: 0.87065). So according to α between 0.7 and 0.9 is referred as good internal consistency, also Spearman's rank correlation coefficient between 0.7and 0.9 (as in all items 1,2,3,4,5,6,7 and 8) is referred as good test retest reliability and Spearman's rank correlation coefficient between 0.6 and 0.7 (as initem 2 and 7) is referred as acceptable test retest reliability.

Also these results came in agreement with the findings obtained by (Kocher *et al.,* 2004) who conducted a study to determine the psychometric properties of the Lysholm knee scale for various chondral disorders of the knee. The overall Lysholm knee scale and six of the eight domains had acceptable test-retest reliability (ICC = 0.91) and internal consistency (Cronbach alpha = 0.65). The overall Lysholm knee scale demonstrated acceptable floor (0%) and ceiling (0.7%) effects; however, the floor effects for the domain of squatting and the ceiling effects for the domains of limp, instability, support, and locking were unacceptable (>30%). The authors concluded that the Lysholm knee scale demonstrated overall acceptable psychometric performance for outcomes assessment of various chondral disorders of the knee, although some domains demonstrated suboptimal performance (Kocher *et al.,* 2004). The results of the current study also strengthened by (Celik *et al.,* 2013) who assessed the Turkish-language, culturally adapted version of the Lysholm knee scale. The Lysholm knee scale was translated into Turkish according to Guillemin's recommendations. The study included 70 patients (mean age, 36 years; range, 17-72 years) with different knee complaints, and the scale was completed twice by each participant at 3- to 14-day intervals to assess test-retest reliability based on the interrater correlation coefficient, whereas Cronbach's alpha evaluated internal consistency. Patients completed the Turkish-language Lysholm questionnaire in approximately 3 minutes. The test-retest reliability was 0.82, with a Cronbach's alpha coefficient of 0.68, suggesting that the Turkish version of the Lysholm knee scale is quickly administered, valid, and reliable, and can be used for patients with various knee disorders (Celik, 2013). (Alyaman et al, 2017)[(11)]assessed the acceptability, reliability and validity the Arabic version the lysholm knee score as a patient reported outcome measure for Jordanian patients with anterior cruciate ligament injuries. The results showed adequate reliability (Cronbach's alpha=0.60) and good to excellent reproducibility (ICC =0.85). No floor or ceiling effects were observed and the translated score showed good face validity. The authors concluded that the translated version of lysholm score to Jordanian Arabic is an acceptable, valid and reliable tool to assess Jordanian patients with ACL injuries. Validity and reliability of translated tools were made over two or three studies not one.

The first study is designed to translate the tool to the targeted language then test the translated version for face and content validity then test the reliability, it was conducted on monolingual population. The second study was designed to test the full the psychometrics of the translated tool with bilingual participants. The third study is conducted to test the full psychometric properties of the translated tool on monolingual population, noting that the second study is not necessary to be made (Borsa, 2012). The current study is considered to be the first study in the validity and reliability studies of the Arabic language version of Lysholm Knee Scoring Scale on Egyptian patients. The final version is considered the base for the next research that will be conducted to establish the full psychometric properties of Arabic language version of Lysholm Knee Scoring Scale.

Conclusion

The results obtained from the current study can lead to concluding that arabicn version of the lysholm knee scale has face and content validity, feasibility and internal consistency and test retest reliability enough to measure the physical function in knee osteoarthritic patients.

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