Cross-cultural Adaptation and Validation of the Arabic Version of the Harrus Hip Score

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Abstract

Background: The goal of this study was to translate the Harris Hip (HHS) questionnaire into the Arabic language with cross-cultural adaptation to include and benefit Arabic speaking communities as it is the most widely used instrument for disease-specific hip joint evaluation and measurement of total hip arthroplasty outcome.

Methods: This questionnaire was translated following A clear and user-friendly guideline protocol. The Cronbach's alpha was used to assess the reliability and internal consistency of the items of HHS. Additionally, The constructive validity of HHS was evaluated against the 36-Item Short Form Survey (SF 36).

Results: A total of 100 participants were included in this study, of which 30 participants were re-evaluated for reliability testing. Cronbach's alpha of the total score of Arabic HHS is 0.528 and after the standardization, it changed to 0.742 which is within the recommended range (0.7-0.9). Lastly, The correlation between HHS and SF 36 was r=0.71 ($p<0.001$) which represents a strong correlation between Arabic HHS and SF-36.

Conclusion: Based on the results, we believe that the Arabic HHS can be used by clinicians, researchers, and patients to evaluate and report hip pathologies and total hip arthroplasty treatment efficacy.

Background

Hip pathology can cause significant disability and negatively impacts function, quality of life and working capacity.(1, 2) The prevalence of hip pathology is not uncommon, as it can affect up to 12.8% of the population aged 25 and older.(3) Osteoarthritis (OA) is one of the most common hip pathologies and is characterized mainly by joint pain and stiffness that interferes with a patient's function and quality of life.(4, 5) It is estimated that around 27 million people in the US have been diagnosed with osteoarthritis, while 25% of people over 55 years old are suffering from OA in the United Kingdom.(6–8) Moreover, hip and knee OA was ranked as the 11th highest contributing factor to global disability.(8)

In the 1960s, due to the highly disabling nature of hip pathologies, Total Hip Arthroplasty (THA) was introduced as an effective option in the management of severely damaged hip joints.(9, 10) This procedure significantly improves joint function by greatly decreasing or eliminating joint pain. The successful long-term results of THA are well documented, especially in elderly patients with hip OA(11) and the number of performed THA surgeries is increasing worldwide.(12, 13) Currently in the United States about 7 million individuals have had a THA. Most of these individuals suffered primarily from hip OA followed by hip avascular necrosis (AVN), with a higher prevalence among females compared to males.(14–16)

Many questionnaires have been employed to evaluate both the impact of a patient's hip joint disease on their function and the efficacy of its treatment.(17) Two types of scales are used to follow the patient's condition.(18) The first type is a generic health status scale which measures the patient's quality of life, such as the SF-36 questionnaire. The other type are disease-specific questionnaires such as Hip disability and Osteoarthritis Outcome Score (HOOS), Intermittent and Constant Osteoarthritis Pain (ICOAP), and Harris Hip Score (HHS).(19–23) Multiple studies have shown increased utility in reporting outcomes with disease-specific scales over generic health questionnaires for patients who have undergone THA.(18)

Many disease-specific questionnaires were created in order to evaluate specific symptoms and signs of the disease.(17) The ICOAP instrument was developed to differentiate between intermittent and constant pain among patients with hip OA.(22) The HOOS scale was used to measure the function of daily living, quality of life, and function in sport and recreation.(21) These disease-specific questionnaires have been translated from English and culturally adapted to many languages including Arabic.(24, 25) They have demonstrated validity in reflecting patient opinions about their condition.(25)(24) However, no questionnaire has shown superior measurement properties over the others.(23)

The HHS questionnaire has been translated and validated into many languages including Italian, Portuguese, and Turkish but not Arabic. The goal of this study was to translate the HHS questionnaire into Arabic with cross-cultural adaptation to include and benefit Arabic speaking communities as it is the most widely used instrument for disease specific hip joint evaluation and measurement of THA outcome.(23, 29) It has demonstrated excellent responsiveness when compared to generic health scales such as 36-Item Short Form Survey (SF 36). (29, 31) Developing an Arabic version of the HHS questionnaire available will improve cultural accessibility, patient care, clinical practice and future research.

Methods

Our study was conducted in the Orthopedic Out-Patient Clinics at King Saud University Medical City during the period from January 2020 to March 2020. Inclusion criteria were: all adults aged 18 and above, who spoke, read and wrote Arabic, and with hip pathology including arthritis, fracture, or impingement syndrome among patients seen in our orthopedic clinic.

Our study was conducted in two stages. The first stage was translation of the questionnaire to Arabic, followed by translation back to English, while the second stage included data collection for reliability and cross-cultural adaptivity.

The questionnaire was translated to Arabic language by two independent translators who were fluent in both Arabic and English and experienced in the cultural differences between communities speaking both languages.(32) The first translator (T1) had a background in medical terminology, experience in clinical orthopedics, and knowledgeable about the construct of the instrument. The second translator (T2) did not have a medical background and no previous experience with the construct of the instrument. Translation from the first translator was labeled as TL1, while that of the second translator was labeled as TL2. The translated versions (TL1 and TL2) and the original version of the HHS were compared by another two independent reviewers (R1 and R2), who are bilingual and bicultural, and no significant difference between the two translated versions (TL1 and TL2) was observed. Following consensus among both reviewers, a final Arabic translation version was adapted and labeled PI-TL. The questionnaire was then translated back from the final Arabic version (PI-TL) to English by another two independent translators (T3 and T4) who are fluent in both the English and Arabic languages and labeled (TL3 and TL4). Both translators (T3 and T4) have extensive knowledge of both cultures and have experience in translating medical literature. Finally, both reviewers (R1 and R2) compared the two back-translation versions (TL3 and TL4) to each other, then both versions (TL3 and TL4) to the original questionnaire and found no discrepancies. Following consensus between both reviewers (R1 and R2), a final Arabic version of Harris Hip Score was produced.

We then conducted a pilot study of 30 participants in order to determine if there was any difficulty in understanding the contents of the questionnaire.

The second part of the study involved patient completion of an electronic version of the Arabic HHS questionnaire at two different appointments (three weeks apart) to determine the reliability of the questionnaire. First, participants completed the Arabic version of HHS alone. Then, two weeks later participants completed the Arabic versions of HHS and SF-36 questionnaires in order to determine construct validity.

Ethical Consideration:
Approval was obtained from of the Institutional Review Board (IRB) in the Department of Family and Community Medicine in the College of Medicine, King Saud University.
Each participant approved verbally after they were informed of the study purpose and the right to withdraw at any time without any obligation toward the study team.
Also, participants' anonymity was assured by not collecting identifying data, all participants are anonymous. There were no incentives or rewards given to participants. Lastly, The IRB allowed to the authors to have the verbal approval of the participants as long as no medical treatment will be decided to the participants based on their answers of the questionnaire

Statistical analysis:

Data were analyzed using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean ± standard deviation and categorical variables were expressed as percentages. Pearson Correlation coefficient was used to assess the correlation between Harris Hip Score and SF36. The Cronbach's alpha was used to assess reliability and internal consistency of the items in the Harris Hip questionnaire. A p-value <0.05 was considered statistically significant. The correlation between the Arabic HHS and SF-36 was determined by using Pearson's correlation coefficient The following guidelines were used to interpret the correlation coefficients (r): mild correlation ($r <0.3$), moderate correlation ($0.3 < r < 0.6$), strong correlation ($r>0.6$)

Results

A total of 100 participants were included in this study, of which 30 participants were re-evaluated for reliability testing. The participants filled in all the sections of the HHS and the SF 36 questionnaires.

Based on the participant's feedback, the "duration time" was the preferred term instead of "blocks" for defining the walking distance. Otherwise, all the questions were clear and understandable.

As shown in Table I, reliability was assessed by using Cronbach's Alpha which was found to be0.528 for the current study. Following standardization (deleting Pain item) it increased to 0.742.

Cronbach's Alpha was determined following alternating removal of each item of the scale; the results are summarized in Table 2.

Test and retest values for 30 participants was 0.7 which is acceptable with no difference for all the HHS items with P-values < 0.001. (Table 3)

Finally, the correlation between HHS and SF-36 was examined using criterion validity and the results was r = 0.705 (P < 0.001). Therefore, based on the criterion validity, there is strong correlation between the Arabic HHS and SF-36 score. (Table 4).

Discussion

There are approximately 20 questionnaires currently employed to assess patient perception of hip joint diseases and their treatment, including the HHS.(17) HHS is a validated method to measure the outcome of femoral neck fracture, OA and THA.(18) This measure has demonstrated its superiority to generic health scales such as the SF36 as a more representative method for patients with total hip arthroplasty. (33) However, comparison of the HHS to other disease-specific scores did not show that any measure was significantly superior to the others. (23)

The HHS was chosen to be translated because it is one of the most widely used scores for disease-specific measure for hip joint evaluation.(23)(26) It was developed and published in 1969 by William Harris as a physician assessment tool to evaluate THA.(23) However, it has also proved to be a reliable measurement tool if completed by the patients.(29, 30) Many authors have employed this tool to evaluate patients with hip conditions such as femoral neck fracture or osteoarthritis, as well as the success of surgical interventions such as THA and have found that it is a representative measure of their condition and treatment.(19, 27, 28) HHS covers both pain and functional disability, which are also the two main factors leading to THA for patients with hip OA. As such HHS has become the most widely used measurement tool for THA outcome worldwide.(23, 29) Therefore, many scholars aim to study patients with THA by using HHS in order to compare their results to studies in the literature. HHS has the advantage of assessing the clinical improvement among patients with hip OA before and after THA, and additionally, it can predict the risk for primary THA revision.(28)

The HHS is composed of 10 items with a maximum score of 100 points, covering four major domains. Pain (1 item, 0–44 points), function (7 items 0–47 points), absence of deformity (1 item, 4 points) and range of motion (2 items, 5 points). The results are categorized as excellent, fair, or poor depending on the final score.(23)

The translators faced no difficulties in the translation nor the cultural adaptation of the items and possible responses into the Arabic language for the HHS. The forward and backwards translation of the HHS led to the development of a comprehensible Arabic HHS. This result is similar to what was reported for the Turkish, Portuguese, and Italian adaptation studies. (34–36) Moreover, the participants did not report any difficulties in answering and understanding the Arabic HHS, again similar to the other adaptation studies.(34–36)

The reliability of the Arabic HHS was evaluated by using Cronbach's alpha and test-retest reliability to assess the reliability of this scale. Cronbach's alpha of the total score of Arabic HHS is 0.528 and after the standardization, it changed to 0.742 which is within the recommended range (0.7–0.9). Also, this reliability is similar to the Cronbach's Alpha reported in the Turkish, and Italian translations, which were 0.7, 0.816 respectively. (34–36)

Test-rest value was 0.7 which is considered acceptable reliability while the Italian, and Turkish results were 0975, 0.91 respectively. We think that the Turkish study has excellent reliability since the time interval for the reliability testing was short (one week only). In the current study, the time interval was three weeks which is the recommended period (34, 35, 37)

The constructive validity of the Arabic HHS and Sf-36 was identified by finding the correlation between the two scales. The correlation was r = 0.71 (p < 0.001) which represents strong correlation between Arabic HHS and SF-36. When looking to the correlation of Harris questionnaire with the subdivision of SF-36, we found a strong correlation between the Arabic Harris questionnaire with SF-36 physical role functioning, SF-36 pain and SF-36 social functioning with PCC of 0.6, 0.628 and 0.63 respectively. Compared to the Turkish study,

they found a strong correlation of Turkish Harris with SF-36 pain subscales with PCC of 0.7 while a moderate correlation with SF36 social functioning and SF-36 physical role functioning with PCC of 0.53 and 0.46 respectively. Additionally, a moderate correlation was seen between Arabic HHS and SF-36 Physical function, SF-36 Role limitation due to emotional problems with PCC of 0.57 and 0.55 respectively. The Turkish study found a strong correlation with SF 36 physical function with PCC of 0.72 while a mild correlation was identified with SF 36 SF-36 Role limitation due to emotional problems with PCC of 0.37.

Conclusion

In this study, we translated and adapted the HHS questionnaire into Arabic with cross-cultural considerations specific to Arabic communities while maintaining its psychometric properties. Its translation reliability and validity was thoroughly tested via forward and backward translation and found statistically similar to those of other translated versions of the HHS. This disease specific questionnaire can effectively capture how the patient feels about their condition. Therefore, we believe that the Arabic HHS can be used by clinicians, researchers and patients to evaluate and report hip pathologies and THA treatment efficacy. Having this version of the HHS questionnaire available will make a great additional tool for improving care and accessibility for Arabic speaking patients as well as improve representation of this patient demographic in future research contributions.

List Of Abbreviation

Harris Hip Score (HHS)

36-Item Short Form Survey (SF-36_

Osteoarthritis (OA)

Total Hip Arthroplasty (THA)

avascular necrosis (AVN)

Hip disability and Osteoarthritis Outcome Score (HOOS)

Intermittent and Constant Osteoarthritis Pain (ICOAP)

Institutional Review Board (IRB)

Declarations

Ethics approval and consent to participate

Approval was obtained from of the Institutional Review Board (IRB) in the Department of Family and Community Medicine in the College of Medicine, King Saud University. Each participant approved verbally after they were informed of the study purpose and the right to withdraw at any time without any obligation toward the study team. The IRB allowed to the authors to have the verbal approval of the participants as long as no medical treatment will be decided to the participants based on their answers of the questionnaire

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions:

- **Ibrahim alshaygy: designing the study, Data collection, Data Analysis, writing the manuscript**
- **Musab Alageel: Designing the study protocol, Data collection, Data Analysis, writing the manuscript.**
- **Abdulaziz Aljurayyan: Designing the study protocol and review the manuscript**
- **Anthony Griffen: data interpretation and review the manuscript**
- **Orfan Arafan: Data collection and review the manuscript**
- **Abdulaziz Alsudairi: Data collection, Data analysis, writing the manuscript**
- **Mohammed Alsubaie: Designing the study protocol, Data collection, Data analysis**
- **Nada Alyousef: Designing the study protocol, Data collection, Data analysis**
- **Yasmeen Almousa: Designing the study protocol, Data collection, Data analysis**
- **Fawzi Aljasser: Data collection, review the manuscript.**

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Tables

Table1 : Measure of Reliability	
Reliability statistics	
Cronbach’s Alpha	0.528
Cronbach’s Alpha based on standardised scores	0.742

Table2 : Reliability for the items of the HHS questionnaire

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Pain	35.43	126.29	0.33	0.728
Distance walked	64.17	267.66	0.66	0.378
Activities - shoes, socks	68.61	337.68	0.53	0.492
Public transportation	71.18	366.77	-0.07	0.539
Support	62.92	304.55	0.41	0.460
Limp	63.36	298.07	0.50	0.440
Stairs	69.09	338.52	0.49	0.495
Sitting	67.94	359.48	0.04	0.537
Presence of deformity	71.70	365.69	0.00	0.512
Total degrees of Flexion	70.93	354.81	0.30	0.521
Total degrees of Abduction	71.70	365.69	0.00	0.512
Total degrees of Ext Rotation	71.70	365.69	0.00	0.512
Total degrees of Adduction	71.70	365.69	0.00	0.512

Table3 : Mean and standard deviation for the items of HHS questionnaire		
	Mean	SD
Pain	36.28	12.17
Distance walked	7.53	3.85
Activities - shoes, socks	3.09	1.34
Public transportation	0.52	0.50
Support	8.78	3.47
Limp	8.35	3.27
Stairs	2.61	1.40
Sitting	3.76	1.87
Presence of deformity	0.00	0.00
Total degrees of Flexion	0.77	0.88
Total degrees of Abduction	0.00	0.00
Total degrees of Ext Rotation	0.00	0.00
Total degrees of Adduction	0.00	0.00
Total score of HHS	71.70	19.12

Correlations between items of Harris hip score (test - retest)

		Retest													
Test		Paij	Distance walked	Activities - shoes	Public transportation	Support	Limp	Stairs	Sitting	Presence of deformity	Total degrees of Flexion	Total degrees of Abduction	Total degrees of Ext Rotation	Total degrees of Adduction	Overall
Pain	r	.572**													
	P value	0.001													
Distance walked	r		.594**												
	P value		0.001												
Activities - shoes, socks	r			.545**											
	P value			0.002											
Public transportation	r				0.202										
	P value				0.284										
Support	r					.868**									
	P value					0.000									
Limp	r						.575**								
	P value						0.001								
Stairs	r							.665**							
	P value							<0.001							
Sitting	r								0.163						
	P value								0.389						
Presence of deformity	r									1.000**					
	P value									<0.001					
Total degrees of Flexion	r										.514**				
	P value										0.004				
Total degrees of Abduction	r											1.000**			
	P value											<0.001			
Total degrees of Ext Rotation	r												1.000**		
	P value												<0.001		
Total degrees of Adduction	r													1.000**	
	P value													<0.001	
Overall															0.7
															<0.001

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed). r = Pearson Correlation coffecient 0

overall test with overall retest
r = 0.644
p value less than 0.001

Table4 : Correlation between HHS & SF36

		SF - 36									
		Physical function	Role limitation due To physical health	Role limitation dueTo emotional problems	Energy fatique	Emotional well being	Social function	Pain	General health	Health change	Overall
HHS	r	.569**	.597**	.551**	.530**	0.300	.630**	.628**	0.286	.389*	0.705**
	P value	0.001	<0.001	0.002	0.003	0.107	<0.001	<0.001	0.125	0.034	<0.001

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

r = Pearson Correlation coffecient

HHS = Harris Hip Score

overall hhs with overall sf36

r= 0.705

p value less than 0.001