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Cross-Cultural Adaptation and Validation of the Arabic Version of the Harris Hip Score

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ABSTRACT

Background: The Harris Hip Score (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 HHS 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 ($P < .001$) which represents a strong correlation between the Arabic HHS and SF-36.

Conclusions: 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.

Introduction

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 years and older [3]. Osteoarthritis (OA) is 1 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 United States have been diagnosed with OA, while 25% of people older than 55 years 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

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Table 1
Measure of reliability.

Reliability statistics	
Cronbach's alpha	0.528
Cronbach's alpha based on standardized scores	0.742

decreasing or eliminating joint pain. The successful long-term results of THA are well documented, especially in elderly patients with hip OA, and the number of performed THA surgeries is increasing worldwide [11–13]. 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, with a higher prevalence among females than 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, 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 Intermittent and Constant Osteoarthritis Pain 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 [24,25]. 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 [23,26]. It has demonstrated excellent responsiveness when compared to generic health scales such as 36-Item Short Form Survey (SF-36) [26,27]. Developing an Arabic version of the HHS questionnaire available will improve cultural accessibility, patient care, clinical practice, and future research.

Material and 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 years 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 2 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 2 independent translators who were fluent in both Arabic and English and experienced in the cultural differences between communities speaking both languages [28]. 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 2 independent reviewers (R1 and R2), who are bilingual and bicultural, and no significant difference between the 2 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 2 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 2 back-translation versions (TL3 and TL4) to each other and 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 HHS 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 2 different appointments (3 weeks apart) to determine the reliability of the questionnaire. First, participants completed the Arabic version of HHS alone. Then, 2 weeks later, participants completed the Arabic versions of HHS and the validated Arabic SF-36 questionnaires in order to determine construct validity [29].

Table 2
Reliability for the items of the HHS questionnaire.

Item	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 external rotation	71.70	365.69	0.00	0.512
Total degrees of adduction	71.70	365.69	0.00	0.512

Table 3a
Correlation between items of Harris Hip Score (test-retest).

Test	Retest						
	Pain	Distance walked	Activities- shoes, socks	Public transporations	support	Limb	stairs
Pain							
r	0.572[a]						
P value	.001						
Distance walked							
r		0.594[a]					
P value		.001					
Activities- shoes, socks							
r			0.545[a]				
P value			.002				
Public transportations							
r				0.202			
P value				.284			
Support							
r					0.868[a]		
P value					.001		
Limb							
r						0.575[a]	
P value						.001	
Stairs							
r							0.665[a]
P value							<.001

r, person correlation coefficient.
[a] Correlation is significant at the 0.01 level (2-tailed).

Table 3b
Correlation between items of Harris Hip Score (test-retest).

Test	Retest						
	Sitting	Presence of deformity	Total degree of flexion	Total degree of abduction	Total degree of external rotation	Total degree of adduction	Overall
Sitting							
r	0.163						
P value	.389						
Presence of deformity							
r		1.00[a]					
P value		<.001					
Total degree of flexion							
r			0.514[a]				
P value			.004				
Total degree of abduction							
r				1.00[a]			
P value				<.001			
Total degree of external rotation							
r					1.00[a]		
P value					<.001		
Total degree of adduction							
r						1.00[a]	
P value						<.001	
overall							
r							0.7
P value							<.001

r, person correlation coefficient.
[a] Correlation is significant at the 0.01 level (2-tailed).

Table 4
Correlation between HHS and SF-36.

Item	SF-36									
	Physical function	Role limitation due to physical health	Role limitation due to emotional problems	Energy fatigue	Emotional well-being	Social function	Pain	General health	Health change	Overall
HHS										
r	.569[a]	.597[a]	.551[a]	.530[a]	0.300	.630[a]	.628[a]	0.286	.389[b]	0.705[a]
P value	.001	<.001	.002	.003	.107	<.001	<.001	.125	.034	<.001

Overall HHS with overall SF-36. r = 0.705. *P* value less than .001.
[a] Correlation is significant at the 0.01 level (2-tailed).
[b] Correlation is significant at the 0.05 level (2-tailed).

Ethical consideration

Approval was obtained from the Institutional Review Board 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. Participants' anonymity was assured by not collecting identifying data. There were no incentives or rewards given to participants.

Statistical analysis

Data were analyzed using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY). 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 HHS and SF-36. The Cronbach's alpha was used to assess reliability and internal consistency of the items in the Harris Hip questionnaire. A *P* value <.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 ($r > 0.6$) [30].

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 1, reliability was assessed by using Cronbach's alpha, which was found to be 0.528 for the current study.

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 of all the questions are shown in Tables 3a and 3b, the overall value of test and retest was 0.7 which is acceptable with no difference for all HHS items with *P* values < .001 (Table 3b).

Finally, the correlation between HHS and SF-36 was examined using criterion validity, and the result was r = 0.528 (*P* < .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 patients' 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 SF-36 as a more representative method for patients with THA [31]. 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 1 of the most widely used scores for disease-specific measure for hip joint evaluation [23,32]. 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 [26,33]. Many authors have employed this tool to evaluate patients with hip conditions such as femoral neck fracture or OA, 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 [19,34,35]. HHS covers both pain and functional disability, which are also the 2 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 [23,26]. 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 [35].

The HHS is composed of 10 items with a maximum score of 100 points, covering 4 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 backward 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 [36–38]. Moreover, the participants did not report any difficulties in answering and understanding the Arabic HHS, again similar to the other adaptation studies [36–38].

The reliability of the Arabic HHS was evaluated by using Cronbach's alpha and test-retest reliability. Cronbach's alpha of the total score of the Arabic HHS is 0.528 which is considered moderate correlation. Other studies have higher reliability within the range (0.7-0.9). Furthermore, the Cronbach's alpha reported in the Turkish and Italian translations were 0.7 and 0.816, respectively. The

reason behind this difference is the low reliability that is seen in the pain scale, which was 0.33 [36–38].

Test-rest value was 0.7, which is considered acceptable reliability, while the Italian and Turkish results were 0.975 and 0.91, respectively. We think that the Turkish study has excellent reliability since the time interval for the reliability testing was short (1 week only). In the current study, the time interval was 3 weeks, which is the recommended period [19,36,37].

The constructive validity of the Arabic HHS and SF-36 was identified by finding the correlation between the 2 scales. The correlation was r = 0.71 ($P < .001$), 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 a PCC of 0.7 while a moderate correlation with SF-36 social functioning and SF-36 physical role functioning with a PCC of 0.53 and 0.46, respectively. Additionally, a moderate correlation was seen between the Arabic HHS and SF-36 physical function and SF-36 role limitation due to emotional problems with a PCC of 0.57 and 0.55, respectively. The Turkish study found a strong correlation with SF-36 physical function with a PCC of 0.72 while a mild correlation was identified with SF-36 role limitation due to emotional problems with a PCC of 0.37 [37].

Limitations

In the literature, constructive validity of HHS was done with generic health status scales like SF-36. Based on the literature, constructive validity of Arabic HHS is done with a generic health status scale (SF-36) only. Further studies are needed to assess the constructive validity with disease-specific scales like the HOOS.

Conclusions

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 were thoroughly tested via forward and backward translation and found to be 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.

Conflicts of interest

The authors declare there are no conflicts of interest.

For full disclosure statements refer to https://doi.org/10.1016/j.artd.2022.07.006.

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