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CROSS CULTURAL ADAPTATION, RELIABILITY AND VALIDITY OF URDU VERSION OF HIP OUTCOME SCORE

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Abstract

Purpose: *To linguistically and cross-culturally translate the Hip Outcome Score (HOS) into Urdu and evaluate its psychometric properties in patients with hip pain, thereby promoting Good Health and Well-being (SDG 3) through improved access to culturally appropriate, reliable, and valid patient-reported outcome measures for assessing hip-related health and functional outcomes.*

Materials and Methods: *The original HOS version was translated and cross-culturally adapted in accordance with international guidelines. The study comprised 300 participants with hip pain. The patients filled out a self-structured questionnaire for demographic data, as well as the HOS-Urdu, Hip Disability and Osteoarthritis Outcome Score (HOOS), Visual Analogue Scale for Pain (VASpain), and Visual Analogue Scale for Disability (VASdisability). Psychometric testing included internal consistency and test-retest reliability, content and construct validity.*

Results: *The HOS-U demonstrated satisfactory internal consistency, with Cronbach's alpha values of 0.85 for ADL and 0.86 for Sports subscales. Excellent reliability was observed across all HOS-U subscales, with Intra Class Correlation Coefficient (ICC) 0.99-0.99. No floor or ceiling effects were observed. The HOS-U ADL and Sports subscales showed strong correlations with the HOOS ADL subscales (0.77 and 0.70, respectively) and a strong correlation between the HOS-U ADL and HOOS Pain subscales (0.73). Moderate correlations were noted between HOS-U ADL and Sports subscales with HOOS Symptoms, Sports, and QOL subscales. Additionally, moderate correlations were observed between HOS-U subscales and VAS Pain (-0.43 and -0.56) as well as VAS Disability (-0.43 and 0.56).*

Conclusion: *HOS-Urdu is a reliable, valid tool for assessing hip pain and disability outcomes in Urdu speaking population.*

Introduction

Hip pain typically felt in groin, buttocks and thigh area.(1) It includes many differential diagnosis including intra articular, extra articular pathologies, mimickers like pelvic joints pathologies.(2, 3) Diagnosing hip pain in young adults without arthritis can be quite challenging. Hip pain among young adults typically involves vague symptoms, imaging studies do not show Functional consequences, and findings from the history and physical examination lack clarity. This situation often leads to difficulties in pinpointing the exact source and cause of the pain, which is crucial for effective treatment, in order to provide prompt and suitable therapies, early identification is crucial.(4, 5) Among patients experiencing hip pain without signs of osteoarthritis, the prevalence is 61% (47.3–74.4%), often linked to femoroacetabular impingement syndrome.(6) Patient-reported outcome measures are commonly used in clinical practice. According to a recent systematic review, its advantages include promoting active patient involvement, improving care quality, addressing patient priorities to improve consultation focus, facilitating standardized evaluation of results, and strengthening the bond between patients and clinicians. Many researchers stress the importance of adapting well-established and widely recognized assessment tools rather than creating new questionnaires.(7, 8) The Hip Outcome Score (HOS) is a valid and reliable tool divided into two subscales; activities-of-daily-living (ADL; 19 items) and sports (9 items), summing up a total of 28 items. It was developed by Martin, Kelly and Phillipon in 2006 in Pittsburgh, PA (USA) with the aim for measuring outcomes following hip arthroscopy, remarking that the scale is specific for functional analysis and not for mental health.(9) Hip outcome score is applicable on those individuals with the high level of functional activities such as athletes.(10) It shows greatest psychometric evidence as compared to other alternative tools such as Non-Arthritic Hip Score and Western Ontario and McMaster Universities Osteoarthritis Index.(11) The HOS questionnaire had not been previously translated into Urdu. In this study, the English version of the questionnaire was translated into Urdu, which is the language majorly spoken and understood in Pakistan. The primary objectives of the study were to translate and cross culturally adapt the HOS into Urdu and to find out the reliability and validity of the Urdu version in patients experiencing hip pain.

Materials and Methods

Translation and cultural adaptation

This study incooperated a design of cross cultural adaptation and psychometric testing following cosmin checklist.(12) Regarding translation of tool into Urdu language, the Beaton et al.(13) guidelines were utilized, according to which there are five phases.

Stage I

During the first step of tool translation, two forward translations from English to Urdu were made by two translators. Translator I was a senior physical therapist who was aware of the entire process, and translator II was an English teacher from a government school who had no medical background. Both had Urdu as their native language.

Stage II

In the second stage, two researchers and two translators combined both translations, T1 and T2, to form one common version T12 after addressing all amendments.

Stage III

In the third stage two professional translators, who were unaware of the entire procedure and had no medical experience, translated the T12 version into Urdu and created BT1 and BT2 versions.

Stage IV

In stage four, an expert committee evaluates all reports and creates a pre-final Urdu version of the questionnaire. The committee features methodologists, an assistant professor of physiotherapy, translators, and researchers. The expert group would make important judgments to

ensure comparability between the English and Urdu variants of the questionnaire.

Stage V

In stage five, the pre-final Urdu version of HOS was tested for face validity on 40 patients with hip pain by asking a respondent about the relevancy of all items to their condition, assessing difficulty in understanding any vocabulary, and assessing independence in filling out the questionnaire. After the process of reviewing all these, a final Urdu version was prepared and conducted to final psychometric testing.

Instruments

This study incorporated the Hip Outcome Score (HOS), Hip Disability and Osteoarthritis Outcome Score (HOOS), as well as Visual analogue scale for pain (VASpain) and Visual analogue scale for disability (VASdisability).

Hip Outcome Score (HOS)

HOS is a valid and reliable assessment tool separated into two subscales: activities of daily living (ADL; 19 items) and sports (9 items), for a total of 28 items. The HOS questionnaire provides five difficulty-based response alternatives, ranging from "unable to do" to "no difficulty" for each subject.(14) The ADL and sports subscale scores are adjusted to create a range of 0-100, with higher scores signifying better function. To calculate HOS subscale scores, each subscale will be scored separately, and the total score will be calculated by summing all item scores. The entire score is then divided by the highest possible score for both subscales, which is then multiplied by 100 to calculate the percentage of that subscale. (15)

Hip Disability and Osteoarthritis Outcome Score (HOOS)

HOOS is a 40-item questionnaire that assesses patient outcomes in five categories: pain, symptoms, activities of daily living, sport and recreation function, and hip-related quality of life. Each question is scored on a 5-point Likert scale from 0 to 4, and a normalized score (100 pointing to no symptoms and 0 suggesting extreme symptoms) is calculated for each subscale. The HOOS is a reliable and valid questionnaire for assessing hip pain.(16) To calculate the score of HOOS subscales, divide the mean (average of individual scores for each item in the subscale) of the observed items by 4, multiply by 100, then subtract 100 from the result to get the HOOS subscale total score.(17)

Visual analogue scale for pain (VASpain)

VASpain is a pain assessment tool that uses a 100-mm horizontal line to describe a patient's pain intensity, ranging from "no pain at all" to "worst pain imaginable". Its validity and reliability make it an ideal tool for measuring pain intensity. (18)

Visual analogue scale for disability (VASdisability)

VASdisability is a 100-mm horizontal line that represents a patient's disability degree, with points ranging from "no restriction" to "worst possible restriction." Its validity and reliability qualify it as a modest instrument for assessing disability.(19)

Psychometric testing

The psychometric testing of the questionnaire was performed by following the guidelines of COSMIN.(12)

Participants

According to psychometric testing guidelines, a sample size of 10 respondents per questionnaire item was required,(20) resulting in a minimum of 280 participants for the 28-item instrument. Data were collected from 300 individuals across various sports clubs in Rawalpindi, Islamabad. Additionally, 100 healthy participants were recruited from the same settings. The study was conducted over six months, from August 2023 to January 2024, after obtaining approval from the Ethics Review Committee of Margalla Institute of Health and Sciences (ERC Ref No: AA/194/23) and permission from the tool's developer. Written informed consent was obtained from all participants, and data collection was performed using non-probability convenience sampling.

Participants aged 18 and above, experiencing hip pain, and able to read Urdu, regardless of gender, were included in the study. Exclusion criteria comprised a history of leg or spine surgery within the past three months, neurological deficits, tumors, rheumatologic diseases, infections, low back pain, and diagnosed psychiatric disorders.

Data Collection Procedure

During the data collection procedure, participants were provided with a self-structured questionnaire to collect demographic and the HOS-Urdu version, VASpain, VASdisability, and HOOS for disease specific questions.

Data Analyses

Statistical analyses were performed using the Statistical Product and Service Solutions (SPSS) software, version 25.0. Continuous variables were presented as mean ± standard deviation, while categorical variables were expressed as frequency and percentage. A p-value of <0.05 was considered statistically significant for all analyses.

Reliability

To measure the questionnaire's reliability, the Intraclass Correlation Coefficient (ICC) (95% confidence interval) was applied for test-retest reliability and the Cronbach's Alpha for internal consistency.100 Randomly, patients were asked to fill out the HOS-Urdu twice within a 48-hour period to minimize any recall of past responses and changes in previous clinical status; treatment was not administered during this interval. It is claimed that the ICC is poor if it is less than 0.5, moderate if it is in between 0.5 and 0.75, good if it is between 0.7 and 0.9, and beyond 0.9 indicates excellent reliability(reference). High internal consistency exist between the items when Cronbach's alpha lies between 0.70 and 0.95 (20).

Content Validity

The degree to which an instrument's content accurately represents the concept it is meant to measure is known as content validity. By examining the completeness of item responses and determining if floor and ceiling effects were present, the study's content validity was assessed. It was expected that there would be no floor or ceiling effects and that less than 5% of items would be absent from the total replies of all patients. When more than 15% of respondents received the lowest or highest possible total score, this was referred to as floor and ceiling effects. (7)

Construct validity

Pearson correlation coefficient was utilized to assess association for the purpose of convergent validity of the HOS-Urdu version compared to HOOS-English, VASpain, and VASdisability , which demonstrates that associations are classified as inadequate, weak, moderate, strong, or very strong with values ranging from 0.00 to 0.09, 0.10-0.39, 0.40-0.69, 0.70-0.89, and 0.90-1.00 respectively (20). An independent t-test was utilized to determine the discriminant validity of questionnaire, which contained 100 healthy participants and 100 patients for comparison to assess discriminant validity.

RESULTS

Patient Characteristics

A total of 300 participants (240 males,60 females) with hip pain participated in the study with the mean age of (33.63±9.58). Out of 300 participants, 178 patients had hip pain duration of less than one year and the remaining 122 patients had hip pain more than of one year. The demographics of the participants are shown in Table 1.

Table 1: Demographic Characteristics of Patients.

VARIABLE	MEAN ± S.D. (N/%)	
AGE (YEARS)	33.63± 9.58	
GENDER	Male	240
	Female	60
HEIGHT (cm)	172.82±19.12	
WEIGHT (kg)	68.08±10.8	
BMI	23.56±6.25	
PAIN DURATION (YEARS)	178 (<1year) 122 (>1 year)	
VAS	Pain	4.53±2.05
	Disability	4.53±2.05
HOS	ADL	40.01±10.68
	Sports& recreational	15.26±7.56
HOOS	Stiffness	47.32±19.98
	Pain	44.84±16.51
	ADL	46.25±16.83
	Sports & Recreational	37.92±19.42
	QOL	41.88±20.64

CROSS-CULTURAL ADAPTATION

The process of translation was carried out according to the Beaton et al. guidelines and all the items were carefully forward and back translated by the translators keeping in mind the meanings of the original items remain unchanged in the translated version.(13) During face validity, the questionnaire was easily understandable and respondents filled the questionnaire without any additional questions. Hence the HOS-U version was accepted without making any changes.

RELIABILITY

INTERNAL CONSISTENCY

The Cronbach alpha value ≥ 0.70 is acceptable for new tools.(21)In present study, Cronbach alpha value was 0.85, 0.86 for HOS-U ADL and sports respectively, indicating good homogeneity of all items in the subscale.

TEST-RETEST RELIABILITY

According to previous validation studies and literature, an ICC of more than 0.70 is considered good reliability. (21)The HOS-U questionnaire was completed twice within a 48-hour interval and all subscales showed excellent reliability, with ICC value ranging from 0.99 to 0.99 (95% confidence interval). The values of mean, standard deviation and ICC for all items on HOOS are shown in Table 2.

Table 2: Mean, standard deviation and ICC (HOS).

HOS SUBSCALE	1ST MEASUREMENT MEAN±S.D	2ND MEASUREMENT MEAN±S.D	ICC VALUE	CONFIDENCE INTERVAL
HOS-ADL	38.81±6.96	38.76±6.92	0.99	95%
HOS-SPORTS	18.02±4.43	18.00±4.44	0.99	

CONTENT VALIDITY

The questionnaire was completed in approximately 5 minutes. No missing responses or multiple answers were found. The floor and ceiling analysis were performed on the total score of the HOS-U and no floor or ceiling effects were present. (22)

CONSTRUCT VALIDITY

CONVERGENT VALIDITY

The convergent validity was tested by using Pearson correlation coefficient, and correlations ≥ 0.70 are generally considered strong.(23)The correlations between HOS-U, HOOS, VAS pain and VAS disability are shown in table 3. HOS-U ADL and SPORTS subscales showed strong correlation with ADL subscales of HOOS, that are 0.77 and 0.70 respectively and had strong correlation exist between HOS-U ADL and PAIN subscale of HOOS that is 0.73. Whereas moderate correlation of HOS-U ADL and SPORTS subscales was observed with HOOS SYMPTOMS, SPORTS and QOL subscales. Similarly, HOS-U subscales showed moderate correlation with VAS pain (-0.43 and -0.56) and VAS disability (-0.43 and -0.56).

Table 3: Construct Validity (Pearson Correlation Coefficients) Between HOS Subscales, HOOS Subscales, VAS Pain And VAS Disability.

HOOS SUBSCALES	HOS-ADL	HOS-SPORTS
HOOS-PAIN	0.73	0.67
HOOS-SYMPTOMS	0.65	0.60
HOOS-ADL	0.77	0.70
HOOS-SPORTS	0.64	0.57
HOOS-QOL	0.60	0.60
VAS PAIN	-0.43	-0.56
VAS DISABILITY	-0.43	-0.56

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

Discriminant validity

Independent-t test was employed to test the discriminant validity between healthy participants and patients that showed significant difference between the total score of HOS-U Version between both groups with statistically significant $p<0.05$.

Discussion

The aim of this study was to translate and cross-culturally adapt the HOS questionnaire into Urdu language and to test the validity and reliability of this new version among the population of Pakistan. The translation and cross cultural adaptation process was performed according to predefined guidelines by Beaton et al.(13)

There were 300 participants with hip pain, with a mean age of 33.63±9.58. this was comparable to the mean ages reported in Dutch (37.6±9.9) (24), Korean (38.4)(25) and Turkish (34.8±10.6)validation studies(26), but varies from those other studies (14, 27-29). In current study, the majority were male (82%), which was consistent with Korean (25), Spanish (14) validation studies. However, other studies reported a more balanced gender distribution. (24, 26-29)

The HOS-U questionnaire was easy to complete and understandable for patients, requiring no supplementary instructions for independent completion. This resulted in a high response rate with no missing data. No floor and ceiling effects was observed, consistent with Dutch(24), Korean (25), Spanish (14)validation studies.(26-29)The absence of floor and ceiling effects indicated that the HOS-U did not contain items that captured patients at either the lower or upper ends of the scale. This ensured that the study sample was balanced regarding the severity of symptoms and/or impairments.

The reliability of HOS-U was tested with 100 patients and found to be strong. Both test-retest

reliability and internal consistency were measured. Internal consistency was excellent across all subscales, comparable to other language versions of HOS, indicating good homogeneity. Cronbach's alpha values for HOS ADL subscale(0.85) and HOS SPORTS subscale (0.86) were similar to those reported in Dutch(24),Korean(25),Spanish(14),Brazilian(27)a nd Turkish(26) and German (29) validation studies.

Test-retest reliability, measured using ICC, ranged from 0.99 to 0.99, demonstrating excellent stability over time. These results were consistent with the Turkish (26),Brazilian (27),Spanish (14),Korean (25) validation studies.

Construct validity, defined as degree to which an instrument measures the characteristics being investigated(14), was evaluated by comparing HOS-U subscales with HOOS subscales. The results showed significant correlation between corresponding domains, with the strongest correlation observed between HOS-U ADL and HOOS ADL (r=0.77), aligning with Dutch (11) and Korean (12) validation studies. Correlations between VAS pain scores and HOS-U subscales were -0.43(HOS-U ADL) and 0.56(HOS-U sports), consistent with the numeric rating scale used for the pain in Dutch validation study(24). Correlations between VAS disability and HOS-U ADL and SPORTS subscales were -0.43 and -0.56, respectively.

LIMITATIONS OF THE STUDY

The study only included patients with general hip pain and the responsiveness of the HOS-U questionnaire to clinical changes over time was not evaluated.

STRENGTHS OF THE STUDY

This study is the first to translate and cross-culturally adapt the HOS questionnaire into the Urdu language, making it accessible to a broader population in Pakistan. The translation and adaptation process strictly followed internationally accepted guidelines, ensuring both linguistic and cultural accuracy. The study employed rigorous methodological approaches, including reliability and validity testing, which enhanced the scientific credibility of the findings. The HOS-U questionnaire was shown to be easy to understand and complete, making it a practical tool for clinical and research settings.

CONCLUSION

The HOS was successfully cross-culturally adapted into Urdu language and demonstrated good reliability and validity. The HOS-U is a reliable and culturally appropriate tool for evaluating outcomes in patients with hip pain and disability, making it a valuable addition to clinical and research settings in Pakistan.

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