RESEARCH ARTICLE

Translation, cultural adaptation and psychometric analysis of Urdu version of Victorian; institute of sports assessment: Achilles questionnaire for athletes with achilles tendinopathy

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Abstract

Objective: To translate, culturally adapt and psychometrically analyse the Urdu version of the Victorian Institute of Sport Assessment-Achilles questionnaire.

Method: The cross-sectional study was conducted at the Pakistan Sports Board, Lahore, Pakistan, from June 17, 2021, to February 15, 2022, and comprised patients with Achilles tendinopathy in group A and healthy controls in group B. Beaton's guidelines for cultural adaptation and validation for self-reported measures were followed to translate and validate the Victorian Institute of Sport Assessment-Achilles questionnaire in Urdu language. Data was analysed using SPSS 23.

Results: Of the 180 subjects with mean age 28.06±5.95 years, 125(69.6%) were males. There were 130(72.2%) patients in group A and 50(27.8%) controls in group B. The overall mean score of the Victorian Institute of Sport Assessment-Achilles questionnaire was 55.99±25.43; group A 41.14±9.54 and group B 94.60±4.22. The Urdu version exhibited excellent internal consistency with Cronbach's alpha values 0.95, and excellent test-retest reliability (p<0.001). Absolute reliability was expressed by standard error of measurement 5.317 and minimal detectable change (6.38). Convergent validity demonstrated strong correlation with the physical domain (r=0.81) of the Urdu version of the World Health Organisation Quality of Life Brief Version.

Conclusion: The Victorian Institute of Sport Assessment-Achilles questionnaire could be utilised for assessing severity of Achilles tendinopathy among Urdu-speaking population for clinical as well as research purposes.

Keywords: Achilles tendinopathy, Translation, Psychometrics, Reliability and validity, VISA-A, Pakistan.

(JPMA 74: 897; 2024) **DOI: https://doi.org/10.47391/JPMA.9356**

Introduction

Tendinopathy was a term proposed in 1998 to refer to the clinical syndrome of tendon, which is identified by pain, swelling and functional impairment. Among the most common sites being affected with tendinopathy are Achilles (also known as calcaneal tendinopathy), rotator cuff and patella.[1] Achilles tendinopathy has been the most commonly reported repetitive stress injuries in the foot and ankle region as a result of disastrous healing response.[2,3] The risk of this disorder is higher among individuals participating in running (7-9% lifetime incidence among top-level runners) and jumping.[4] During the past 3 decades, 10-fold increase in incidence rate of Achilles tendinopathy among athletes has been observed due to increased level of participation in competitive and recreational athletic activities. Moreover, general population reported an incidence of 1.85/1,000 among registered patients, and 2.35 among adult population.[3] Among various sports, professional basketball reported highest incidence, followed by hockey and futsal.[5] Middle- and long-distance professional runners reported highest prevalence based upon self-reported symptoms.[6] Whereas 7.5% lifetime prevalence among high school runners have been reported.[7]

Various measurement tools are utilised to evaluate pain and extent of disability for different foot and ankle conditions, including American Orthopaedic Foot and Ankle Score (AOFAS), Foot Function Index (FFI), Foot and Ankle Ability Measure (FAAM), Ankle Osteoarthritis Score (AOS) and Foot and Ankle Outcome Score (FAOS).[8,9] To diagnose Achilles tendinopathy, the clinical examination tests currently being practised are subjective measures of patient-reported pain and stiffness in morning, palpatory measures looking for tendon thickening, crepitus, arc sign, Royal London Hospital (RLH) test, and other tendon loading measures.[10] Among various outcome measurement tools used to evaluate Achilles tendinopathy, the most commonly utilised self-reporting measure is the Victorian Institute of Sports Assessment-Achilles (VISA-A)

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Submission complete: 28-02-2023 **Review began:** 06-05-2023

Acceptance: 14-02-2024 **Review end:** 20-12-2023

questionnaire.[11] VISA-A, a user friendly 8-item self-reported outcome measure, developed in 2001, has now been the only universally accepted, highly reliable and valid assessment tool for patients suffering from Achilles tendinopathy.[12]

An emergence of patient-reported or self-reported outcome measures have been observed as an imperative means of clinical and research findings in order to evaluate patients in the past 2 decades.[13] These tools, facilitating patients to monitor and interpret changes in their health status over time, have been considered quite reasonable and reliable.[14] However, these self-reported measures may be misinterpreted due to a number of reasons, and, therefore, clinicians must be careful while using VISA-A. There is a need to construct the instrument in the local language going through standardised steps.[11] The process encompassing both translation and cultural adaptation while preparing a questionnaire to be administered in other settings is called cross-cultural adaptation. To save time and cost, cross-cultural adaptation of a gold standard measurement tool can be conducted.[15] VISA-A questionnaire has previously been translated, validated and cross-culturally adapted in several languages.[16]

The current study was planned to translate, culturally adapt and psychometrically analyse VISA-A in Urdu, which is the national language of Pakistan.

Materials and Methods

The cross-sectional study was conducted at the Pakistan Sports Board, Lahore, Pakistan, from June 17, 2021, to February 15, 2022. After approval from the ethics review committee of the University of Lahore, Lahore, Pakistan, and permission via email from the authors of VISA-A, the study was registered prospectively with the National Clinical Trial registry (ClinicalTrials.gov) under identifier NCT05125198 in accordance with international committee of medical journal editors (ICMJE) guidelines.[17]

A panel of experts was taken on board to validate the instrument after taking consent. The panel comprised professionals expert in the field of physical therapy who had a minimum of master's degree and research background matching the scope of the current study.[16] The panel had 2 sports physical therapist, 1 musculoskeletal physical therapist, 4 professional translators, 1 orthopaedic physician, and 1 research methodologist.[11]

A minimum of 2 forward and 2 backward translations were produced by translators to have comparable synthesis. Translators who were involved in forward translation were bilingual, with Urdu, the target language, as their mother tongue and had different backgrounds. One of them was aware of the concept of the instrument, while the other was completely naive with a non-medical background. For backward translations, the experts had command over English, the source language, and both were unaware of the concepts being explored. This was done to avoid information bias.[11]

The study protocol had 2 phases. In Phase I, translation was conducted following international guidelines for cross-cultural adaptation of self-reporting outcome measures.[11] For forward translation, both translators prepared their versions independently (T-1 and T-2). in the second step, both the translators revised both the versions and prepared a unified Urdu translation of the questionnaire (T-1-2). In the third step, backward translation was done by the other set of 2 translators, who were blind to the original version. The fourth step comprised an expert committee that was set up to improve semantic, empirical, idiomatic and linguistically conceptual equivalency and to obtain a final consensus Urdu and English versions of the questionnaire in order to generate a pre-final version of VISA-A-Urdu (VISA-A-U)8. In the final step of phase I, pilot testing of the pre-final version of VISA-A-U was conducted recruiting 40 athletes having been diagnosed with Achilles tendinopathy.[11] To avoid misunderstandings, the participants were provided with additional details regarding the definition and location of the Achilles tendon survey by adding the image of that region at the beginning of the survey. The final adapted version of VISA-A-U was presented before the expert committee for approval (Figure).

Phase II of the study comprised actual testing for which the sample was raised using non-probability convenience sampling technique. The sample included athletes of both genders aged 18-40 years for whom Urdu was their native language. Those with diagnosed one-sided insertional or middle portion Achilles tendinopathy, para-tendinosis, incomplete tendinous rupture with or without retro-

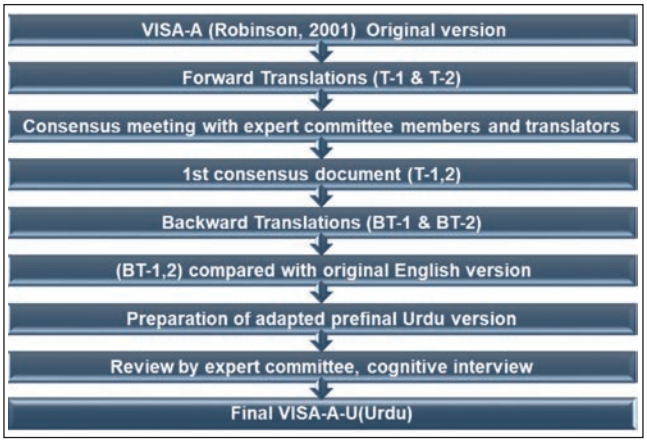

Figure: Flowchart of Translation and Cross-Culture Adaptation.[8]

calcaneal bursitis were in group A and healthy controls in group B. Those with complete tear of Achilles tendon, previous surgical history, radicular sign or symptoms, lower limb trauma and the pregnant women were excluded.[12] The sample size was calculated using the Kline criteria of recruiting a minimum of 5-10 participants per item.[18]

After furnishing informed consent, all the participants completed the self-administered VISA-A-U questionnaire as well as the Urdu version of the World Health Organization Quality of Life Brief Version (WHOQOL-BREF). This was done to determine convergent validity, which is a subtype of construct validity.[19] VISA-A-U was administered twice with an interval of 1 week to determine the test-retest reliability. The length of interval between two administrations affects the test-retest reliability, as shorter intervals might produce carryover effects because of memory, practice and mood, whereas longer interval might increase the probability of status change in a clinical condition. Time interval of 1 week was considered reasonable to avoid recall bias and clinical change.[18] The total score was computed and recorded, with lower scores indicating higher severity of Achilles tendinopathy.[11]

WHOQOL-BREF is a self-reported 26-item questionnaire comprising 4 dimensions; physical, psychological, social and environmental QOL. The Urdu version elicited good internal consistency of 0.86. Physical, psychological and environmental domains demonstrated adequate reliability (α=0.78, 0.75 and 0.73, respectively), but the social domain had low reliability (α=0.56). The WHOQOL-BREF was reproducible at a 2-week retest interval (intraclass correlation coefficient [ICC]=0.72-0.92).[20]

VISA-A consists of 8 items that measure the severity of Achilles tendinopathy in domains of pain, activities of daily living (ADLs) and sports activity. Its score ranges 0-100, with 100 being the perfect score. The original version of VISA-A questionnaire has significant psychometric properties having good test-retest reliability (r=0.93), good intra-rater reliability with 3 tests (r=0.90) and equivalently good inter-rater reliability (r=0.90) in addition to adequate stability in responses to the items when they were compared after an interval of 1 week (r=0.81).[12]

Data was analysed using SPSS 23. Mean and standard deviation were used to present quantitative variables, while frequencies and percentages were used to present qualitative data. Normality of data was tested using Kolmogorov Smirnov test which demonstrated normal distribution (p>0.05). Reliability was assessed by determining test-retest reliability across repeated measures, finding out the internal consistency and calculating minimal detectable change (MDC) for absolute reliability. To determine test-retest reliability, intraclass coefficient (ICC 2,1) was calculated with an ICC value >0.8 and 95% confidence interval (CI) indicative of high-degree correlation. Cronbach's alpha value >0.70 was considered acceptable and a sufficient measure of internal consistency.[21] For absolute reliability, the standard error of measurement (SEM) was calculated using the formula; SEM=SD x $\sqrt{}$(1-ICC).[22] Its value was utilised to determine MDC with 95% CI as expressed in the formula MDC=1.96x$\sqrt{}$2 x SEM.[23] Construct validity was assessed using principal component analysis (PCA) and expressing the inter-item correlation. The sampling adequacy was assumed prior to PCA using the Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test of sphericity. The extraction method was employed to condense the items of questionnaire into single component based on criteria of retaining factors with eigen value ≥1. Convergent validity was analysed using Pearson's correlation coefficient (r) after assuming data normality. Known group validity was determined by using independent sample t-test to evaluate the VISA-A discriminatory ability and yield an evidence of its validity. The mean scores of both groups were compared.

Content validity was determined using content validity index (CVI), and by the completeness of item responses. For this purpose, a panel of 4 professional bilingual expert members were taken on board to determine whether or not the items of the questionnaire were relevantly representing the targetted domain in a complete and sufficient manner. They were contacted initially via email and phone. Ethical consideration protocol and the consent form including the relevant information of this research and instructions, were made available to them. A set of adapted questionnaire (Urdu version) was also attached which contained an empty box to mark the score of each item according to its relevancy based on a 4-point Likert scale: 1=item is not relevant at all, 2=somehow relevant, 3=quite relevant, and 4=highly relevant. Score 3 and 4 were deemed acceptable. To calculate CVI, the relevance rating was recoded as 1 (score 3-4) and 0 (score 1-2). Item-level CVI was calculated using expert agreement on relevance scale divided by the total number of experts. The acceptable cut-off score for CVI was established at 1 based on the panel's total of 4 experts.[24,25]

Results

Of the 180 subjects with mean age 28.06±5.95 years, 125(69.6%) were males. There were 130(72.2%) patients in group A and 50(27.8%) controls in group B. Volleyball was the most common sport among the athletes 35 (19.4). The overall mean score of the VISA-A-U was 55.99±25.43; group A 41.14±9.54 and group B 94.60±4.22 (Table 1).

In PCA, sampling adequacy was assessed to be 0.952 which was higher than the minimum standardised value of 0.70, while Bartlett's measure of sphericity found data suitability for item reduction, and, hence, PCA was considered appropriate to proceed (p<0.001). Considering initial extraction of components based on eigenvalues-one criterion, one component was extracted, in which the first factor showed 84.179% variance (Table 2).

Table-1: Characteristics of the participants (n=180).

Variable	Mean±SD	n (%)
Age (years)[a]	28.06±5.95	-
Gender[b]		
Male	-	125 (69.6)
Female	-	55 (30.4)
Groups[a,b] **(VISA-A score)**	55.99±25.43	
Patients with Achilles Tendinopathy	41.14±9.54	130 (72.22)
Healthy Individuals	94.60±4.22	50 (50)
Sports Domain[b]		
Cricket	-	16 (8.9)
Football	-	26 (14.4)
Volleyball	-	35 (19.4)
Basket ball	-	20 (11.1)
Runner	-	16 (8.9)
Hockey	-	16 (8.9)
Tennis	-	5 (2.8)
Cycling	-	23 (12.8)
Badminton	-	23 (12.8)

SD: Standard deviation, A: Values presented as mean and SD, b: Absolute values and frequency in parenthesis.

Table-2: Principal component analysis of VISA-A-Urdu.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6.32	78.95	78.95	6.32	78.96	78.96
2	0.74	9.27	88.23			
3	0.28	3.49	91.72			
4	0.22	2.75	94.47			
5	0.14	1.77	96.25			
6	0.13	1.58	97.83			
7	0.11	1.32	99.15			
8	0.07	0.84	100.00			

VISA-A: Victorian Institute of Sports Assessment-Achilles.

Table-3: Internal consistency of VISA-A-Urdu.

ITEMS	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item deleted
Item 1	34.75	162.06	0.935
Item 2	35.32	162.82	0.935
Item 3	35.28	177.95	0.940
Item 4	35.78	150.81	0.934
Item 5	36.60	158.50	0.936
Item 6	35.11	161.68	0.934
Item 7	38.34	203.60	0.942
Item 8	36.80	217.11	0.941

VISA-A: Victorian Institute of Sports Assessment-Achilles.

Test-retest reliability indicated ICC value 0.95 (95% CI: 0.950.96; p<0.0001).

Internal consistency was established with Cronbach's alpha value 0.95. The alpha value dropped when items were deleted, which means that all the 8 items in the scale were contributing to the overall questionnaire score (Table 3).

Absolute reliability was determined by SEM value 5.317 and MDC value 6.38.

Using CVI, items numbered 1, 3 and 8 were rated 4 by 3 experts, and 3 by 1 expert, while all other items were rated 4 by all experts.

Convergent validity of VISA-A-U against all domains of WHOQOL-BREF showed strong correlation with physical domain (r=0.81), moderate correlation with psychological domain (r=0.49), moderate correlation with environmental domain (r=0.43) and weak correlation with social health domain (r=0.31).

Known group validity was established by the significant difference between the mean VISA-A-U of the groups (p<0.05).

Discussion

VISA-A-U yielded excellent reliability and validity in the current study. The Urdu version demonstrated excellent content validity by using CVI. CVI value of VISA-A has not been reported in literature for the original and various other adapted versions of the tool.[26]

Factor analysis provided one dimension of VISA-A-U similar to its original English version, which presented all the 8 items under one domain.[16] These results of the study are also comparable to Spanish version of VISA-A in which a one-factor solution (single domain) obtained a relative good fit.[27] VISA-A-U showed excellent known group validity (p<0.05), which was in line with the study that translated VISA-A to Persian language.[12] One study reported difference in mean VISA-A scores while comparing non-surgical patients, pre-surgical patients, and controls.[22]

Convergent validity scores in the current study were comparable to the Turkish version of VISA-A.[22] However, the original version of VISA-A, which was validated against Percy and Conochie grade of severity and Curwin and Stanish grading system, showed significant spearman's correlation coefficient (r=0.58, p<0.01) for Percy and Conochie and (r=-0.57, p<0.001) for Curwin and Stanish grading systems.[14] The French version of VISA-A showed moderate correlations against the convergent subscales of Short Form-36.[23]

VISA-A-U showed excellent internal consistency, which was comparable to a study done in Spain.[27] The test retest reliability of VISA-A-U was excellent, which confirmed earlier findings.[25,28] The original version of VISA-A had inferred good test-retest reliability (r=0.93).[16]

SEM And MDC values indicated that absolute reliability of VISA-A-U was good. The original version of VISA-A did not report SEM and MDC,[26] while the Persian version observed SEM 5.65 and MDC.[6,12,15]

The current study has limitations as it only measured content, construct and convergent validity. In terms of reliability, only internal consistency, test-retest and EM were determined. Moreover, smaller sample size of a specific population with diagnosed Achilles tendinopathy was targeted, which means limited generalisability of the translated version.

Further studies with larger and heterogeneous samples are recommended. Future research may be directed to validate VISA-A against other outcome measures of the similar construct. Moreover, to cross-culturally adapt, the data may be collected from the Urdu-speaking population worldwide.

Conclusion

VISA-A-U was found to be a reliable tool to evaluate the severity of Achilles tendinopathy. Based on comprehensibility of the contents and the supportive statistical analysis, VISA-A-U could be considered a valid and reliable outcome measure to be used among Urdu-speaking population to assess disease severity both for clinical and research purposes.

Acknowledgement: We are grateful to the administration of the University of Lahore, Pakistan, for facilitating the study.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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Author Contribution:

SJ: Data acquisition, analysis, drafting, final approval, accountable for all aspects of the work.
SA, SAA: Concept, design, Revision, final approval, accountable for all aspects of the work.
AKK, AN, SI: Data interpretation, drafting, final approval, accountable for all aspects of the work.