



RESEARCH ARTICLE

VALIDITY AND RELIABILITY OF ARABIC VERSION OF VICTORIAN INSTITUTE OF SPORT ASSESSMENT FOR PATELLAR TENDINOPATHY (VISA-P)

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ABSTRACT

Background: Patellar tendinopathy is characterized by progressive activity-related anterior knee pain and patellar tendon dysfunction. It is observed in sports involving running and jumping. The Victorian Institute of Sports Assessment–Patellar (VISA-P) is a questionnaire originally developed in English to assess the symptoms and repercussions of patellar tendinopathies on daily and physical activities. **Purpose:** To test the validity, reliability, and psychometric properties of the translated Arabic version of the VISA-P-A questionnaire in patients with patellar tendinopathy. **Method:** Thirty experts (3 panels) and 160 participants with mean age (of 18.93±3.29 years) were involved in this research. Test-retest and internal consistency analysis were used to test reliability. Intra-class correlation coefficient (95% CI) was used for test-retest analysis, while Cronbach's alpha value was used to measure internal consistency. Face, content, convergent, construct, and divergent validity was evaluated for the VISA-P-A. Factor analysis and internal construct validity were assessed, and convergent and divergent validity were tested by the correlation between VISA-P-A and SF-36. **Results:** VISA-P-A has one factorial structure and has a very strong association with SF-36. It has a high internal consistency reliability where Cronbach α was between 0.819 and 0.887 (0.853). The test-retest analysis was 0.996, ($P < 0.0001$) suggesting that test-retest findings are strongly correlated. **Conclusion:** The Arabic version of the VISA-P questionnaire is a reliable and valid tool to assess patellar tendinopathy in the Egyptian population. Factor analysis demonstrated that it had one factor and the convergent and divergent validity of the VISA-P-A has very high levels of correlation with SF-36. Therefore, it could be recommended in the physical function assessment of patellar tendinitis for Arabic-speaking people.

INTRODUCTION

Patellar tendinopathy or Jumper's knee is a common musculoskeletal condition characterized by progressively worsening activity-related anterior knee discomfort and impairment of the patellar tendon. It is highly related to sports that involve running and jumping (1), (Muaidi *et al.*, 2020). It is experienced primarily by active individuals within the age group of 14-40 years, especially basketball and volleyball athletes (2), (Hutchison *et al.*, 2019). This implies that sports involving jumping and running activities, such as soccer, volleyball, basketball, and tennis commonly develop patellar tendinopathy (3), (Nuhma *et al.* 2018). Valid and trustworthy measurements are required in medical and physical therapy practice and research to assess the efficiency of the prescribed

modalities and treatments as well as to track patients' functional abilities and impairments. The valid tool must have good criterion and construct validity as well as good face and content validity, ((4) Beaton *et al.*, 2000; (5) Mori *et al.*, 2016). The Victorian Institute of Sport Assessment Questionnaire, Patellar Tendon (VISA-P), which bears the name of the Victorian Institute of Sport in the Australian state of Victoria, is a self-reported questionnaire used to gauge the severity of patellar tendinopathy in patients with (PT). The questionnaire was created to address the lack of evidence-based guidelines for managing PT. It evaluates symptoms, function, and the capacity to engage in physical activity (PA) (6) (Dauber, *et al.* 2018). The (VISA-P) scale is the only condition-specific scale for patellar tendinopathy. (7) (Hernandez-Sanchez *et al.* 2011). Many actions must be taken in order to create questionnaires in various languages. The environment in which a survey will be used requires translation of the survey and cultural adaptation.

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To further confirm that this instrument has the original version's features, validity, and reliability, an examination of the questionnaire's psychometric qualities should be conducted. (4) (Beaton *et al.*, 2000).

The VISA-P is a useful tool for managing people with PT, according to the original study's authors, which was published in 1998. The measure has also been translated into Spanish, French, German, Dutch, Swedish, Italian, Korean, Greek, Turkish, and Brazilian Portuguese in addition to English. (6)(Dauber, *et al* 2018). The use of this questionnaire, though, was restricted in Egypt and other Arabic-speaking nations because it had not been translated into Arabic. Thus, the purpose of this study was to translate, culturally adapt, validate, and assess the validity of the VISA-P Arabic version for use with patellar tendinopathy patients in Egyptian population.

METHODS

This study was carried out in the outpatient Clinics of Cairo University hospitals and some Egypt sports clubs, to translate, culturally adapt and test the validity and reliability of the Arabic-language version of VISA-p that assess the severity of patellar tendinopathy. The research protocol was approved by the ethical committee review board of the faculty of physical therapy, Cairo university (No: P.T.REC/012/002970).The current study authors were granted permission by e-mail from the author of the original English version to translate and culturally adapt the Arabic version.

Study design: This study is a prospective observational study; it followed the recommendations of (8) (Borsa *et al.*, 2012) and (9)(Sousa *et al.*, 2011).

Participants: This study included three expert panels, each with ten members, to evaluate the face and content validity of VISA-P Arabic version. The majority of the specialists' work was working with Arabic-speaking populations; they all had at least a master's degree in physical therapy and at least ten years of experience in that field. They were also bilingual in both Arabic and English. To determine the sample size for evaluating the psychometric characteristics of the VISA-P Arabic version, twenty patients per item were chosen (9) (Sousa *et al.*, 2011).

Thus, 160 participants (101 men and 59 women) were selected and divided into 4 groups, Healthy, At risk, patellar tendinopathy, and other knee injuries groups based on the following factors: Their age ranged between 14–30 years (18.93 ± 3.28), with patellar tendinopathy referred by a physician, oriented and ambulant, and able to read and write in Arabic.

Participants who are at risk for patellar tendinopathy. Previous ligamentous and meniscal injuries of the knee. Patients who suffered from neurological diseases, congenital deformities, partial or total tendon rupture, rheumatoid arthritis, bone diseases, or infection, such as bone cancer and tuberculosis, and patients suffering from previous patellar tendon surgeries were excluded from the study. Each participant signed the consent form before participation according to the principles of the Declaration of Helsinki of 1975.

MATERIALS AND PROCEDURES

Translation and cultural adaptation: According to the most recent and complete guidelines of Borsa *et al.* (8) (Borsa *et al.*, 2012) and Sousa and Rojjanasrirat, the VISA-P translation and cross-cultural adaptation into Arabic version were completed (9) (Sousa *et al.* ,2011).VISA-P is a reliable and valid tool for evaluating patellar tendinopathy symptoms, basic functional tests, and sports participation.

Forward translation: Translation of the VISA-P into Arabic is performed by two separate native Arabic-speaking translators who worked independently to translate the English scale into two variants that were then forwarded translated (A1 and A2). The two translators had different areas of expertise: one understood the Arabic language's cultural and linguistic nuances, while the other understood the language's terms for the tool's construct and the health terminology.

Synthesis of Versions A1 and A2 into A1, 2: The researchers and research committee of basic science for physical therapy compared and combined versions A1 and A2. It was requested that some of the physical therapy faculty members assist in addressing any conflicts and uncertainties. This stage resulted in the creation of the preliminary initial translated Arabic version (A1, 2).

Blind back translation: Two back-translated versions of the scale were created from the preliminary initial translated Arabic version (A1, 2) into English (B1 and B2). The original English version of the VISA-P was kept secret from the two translators who worked independently on the back translation. The two translators came from quite different backgrounds; one was aware of English medical terminology and the tool's build, while the other was familiar with the language's cultural and linguistic nuances.

Expert Committee: The committee was made up of academics, medical experts, translators, and a linguist. The committee compared the instructions, items, response format, language, sentence structure, meaning, and relevance of the scales B1 and B2, as well as B1 and B2 with the original English scale. The committee checked over each translation (A1, A2, A1, 2, B1, and B2) as well as the written report comparing the back translations to the forward translations (A1, 2).According to those translations, the scale's preliminary initial translated Arabic version was regarded as the scale's prefinal Arabic version. After re-evaluated, expert committee added 2 demonstrative figures for question 3 and 4 to increase their degree of clearance.

Face and content validity: The prefinal Arabic version of the scale was put to the test by three expert committees for face and content validity. Using dichotomous questions (clear/unclear), the first expert panel of ten experts was asked to assess each tool item for face validity and make recommendations to increase its clarity. The clarity index has been improved to the minimum acceptable value 80%. (Borsa *et al.*, 2012) in accordance with the recommendations of the first expert panel so that it can be administered to patients. The second expert panel then reevaluated the scale's adjusted prefinal Arabic version for clarity. The third expert panel, comprised of ten experts, was then requested to assess the content equivalence (content-related validity) of each item on the modified prefinal Arabic version of the scale using the following scale: 1 = not relevant, 2 = unable to determine

relevance, 3 = relevant but requires minor adjustment, and 4 = extremely relevant and succinct with ideas to increase its significance (1 and 2 considered not relevant, 3 and 4 considered relevant). The modified prefinal version was designated the final version after passing expert face and content validation testing.

Full psychometric testing: 160 participants took part in this study to determine the initial comprehensive psychometric characteristics of the newly translated, adapted, and cross-validated Arabic version of the VISA-P. Participants completed the Arabic versions of the VISA-P and the SF-36 questionnaires, and then they completed the two surveys again one week later. Similar domains including Physical Functioning, Role Physical, Body Pain, and General Health are found on both the SF-36 and the VISA-P surveys.

Statistical analysis: Statistical analysis was conducted using SPSS for windows, version 26 (SPSS, Inc., Chicago, IL). The means and standard deviation of continuous variables are displayed, and the frequencies and percentages of the categories are shown. The reliability of the Arabic VISA-P version was evaluated using test-retest and internal consistency studies. The degree to which the items that make up the final score are all assessing the same underlying construct is determined by internal consistency. Cronbach's alpha was used to evaluate the internal consistency, and a value of over 0.80 was deemed excellent (10) (Schlosser *et al.*, 2014). Test-retest reliability of the Arabic version of VISA-P was evaluated using the two-way mixed intraclass correlation coefficient (ICC) with 95% confidence interval (95% CI) values of ≥ 0.8 that were considered as a high level of correlation (11) (Weir, 2005). Descriptive evaluations of face validity and content validity were conducted. The item content validity index (I-CVI) and scale content validity indices (S-CVI/ Ave and S-CVI/UA) were used to calculate the content validity. Factor analysis and external construct validity were used to evaluate construct validity. Using Pearson correlation coefficients, the level of agreement between the VISA-P and SF-36 scales was calculated for responses provided at baseline and one week later. Excellent, 0.81 to 1.00, very good, 0.61 to 0.80, good, 0.41 to 0.60, bad, 0.21 to 0.40, and no correlation, 0 to 0.20, are the ranges for the Pearson correlation coefficient (12) (Feise *et al.*, 2001). Prior to factor analysis, Kaiser-Meyer-Olkin, and Bartlett's tests were performed to assess the sample's appropriateness and adequacy.

RESULTS

Validity of Arabic version of VISA-P

Face validity analysis: Ten physical therapists (first panel) with a minimum of 9 years experience and a maximum of 27 years experience were selected from a general hospital to assess the face validity of the new Arabic version of the VISA-P. Seven of the experts have an MSc, and three have a Ph.D. The experts' assessments indicated that 82% of the eight items were clear. Items 1 and 5 scored 100% clear, Items 6 and 8a and 8c scored 90% clear, Items 7 and 8b scored 80% clear, Items 2 and 4 scored 70% clear, and Items 3 scored 50% clear. The Arabic version of the VISA-P questionnaire was modified based on the recommendations of the first expert panel, and it was sent to a second expert committee (second panel). According to specialists, the clarity of the Arabic version of

the VISA-P was 90% after each member of the committee submitted a written report, minor revisions were agreed upon, and the expert committee also added 2 demonstrative figures for question 3 and 4 to increase their degree of clearance, and the prefinal form was changed to accommodate these improvements. This version then became the final Arabic version of the VISA-P for validation testing.

Content validity analysis: According to the experts' opinions (third expert panel), I-ICV were as follow , Question (one) had 10 agreements represented by 100% , Question (two) had 9.75 agreements represented by 97.5% , Question (three) had 9.5 agreements represented by 95%, Question (four) had 9.75 agreements represented by 97.5%, Question (five) had 10 agreements represented by 100%, Question (six) had 10 agreements represented by 100%, Question (seven) had 10 agreements represented by 100%, Question (eight. one) had 9.75 agreements represented by 97.5%, Question (eight. two) had 9.5 agreements represented by 95%, Question (eight. three) had 10 agreements represented by 100%. , mean value is 9.825 represented by 98.25 % When calculating third and fourth option as relevant we can find that scale index of content validity/ universal agreement (SICV/UA) equal 100%. So the content validity of the Arabic version of VISA-P was excellent according to experts' opinions.

Construct validity: The sample size was suitable and adequate for factor analysis according to Kaiser–Meyer–Olkin and Bartlett tests (Table 1).

Table 1. KMO and Bartlett's test for Dimension reduction

VISA-P-A	Bartlett's Test	KMO Test	P value	df
	1748.523	0.914	0.000	28

Scree plotgraph (Figure1) showed that the optimal number of factors to be used is one factor. And this means that all the questionnaire questions refer to the same problem and no more reduction is possible in this questionnaire. And if we split the questionnaire into two factors we will find that all questions correlate well with one factor except for the first question (Table 2). While the second factor only correlates with the first, second and fifth questions only (Table 3).

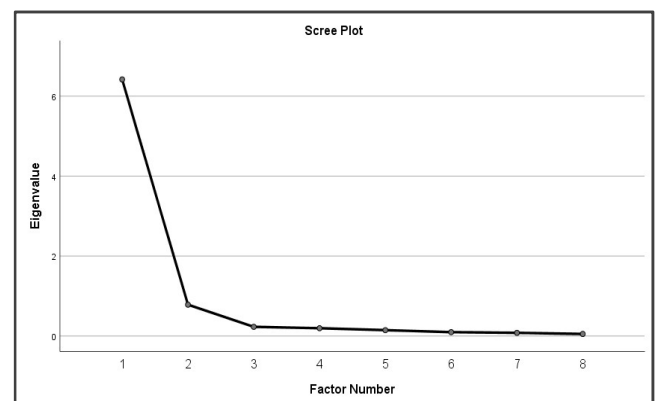


Figure 1. Scree plot to identify best number of factors to be used in factorial analysis

External construct validity between The VISA-P and SF-36 domains was performed, Pearson correlation coefficients were used to test convergent evidence by testing the correlation between the VISA-P-A and SF-36 physical function (PF),

Table (2): correlation between the factor and all questions of the VISA-P

VISA-P Question	Factor
Q1_V1	0.526
Q2_V1	0.943
Q3_V1	0.895
Q4_V1	0.897
Q5_V1	0.926
Q6_V1	0.944
Q7_V1	0.949
Q8_V1	0.907

Table 3. Correlation between the factors in case of 2 and all questions of the VISA-P

	Factor 1	Factor 2
Q1		0.967
Q2	0.854	0.413
Q3	0.864	
Q4	0.862	
Q5	0.837	0.42
Q6	0.878	
Q7	0.956	
Q8	0.958	

general health perceptions (GH) subscales, bodily pain (BP), physical role functioning (RP), and physical component summary (PCS) scores. The VISA-P-A has high correlations with the PF of SF36 with average convergence coefficient of 0.8292. Divergent evidence was also explored by examining the association between the VISA-P and SF-36 Vitality (VT), Emotional Role Functioning (RE), Social Function (SF), Mental Health component Summary (MCS) scores and the Mental Health (MH) subscales. The VISA-P-A has low correlations with the MH components of SF36 with average divergence coefficient of 0.23. The correlation between total scores of VISA-p scores and Total score of SF36 were .848** (Table 4).

Table 4. Correlation between VISA score and Total score of SF36

Correlations	VISA-P
Total_Score	0.848**

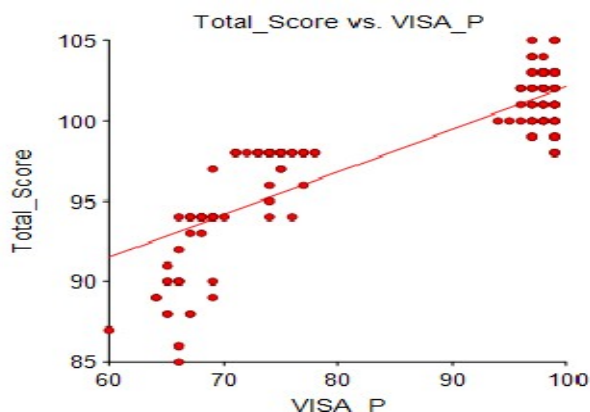


Figure 2. Correlation plots between VISA-P Score and Total score of SF36

Reliability of Arabic version of VISA-P

Internal consistency: The internal consistency for the Arabic version of the VISA-P questionnaire was measured by Cronbach alpha. The Cronbach alpha was 0.819 at first

measurement scores and 0.887 for the second measurement scores with mean of 0.855 indicating that the questionnaire has a high internal consistency (Table 5)

Table (5): Interclass correlation coefficient and Cronbach's Alpha of the results of the questionnaire

Average Measures (Cronbach's Alpha)	95% IC		F-Value	P value
	Lower Bound	Upper Bound		
0.855	0.819	0.887	6.901	0.000

Test-retest reliability: Patients were requested to complete the questionnaire once more after seven days in order to evaluate the reliability of the Arabic version of VISA-P. (second measurement). Each question's ICC values (95% CI) ranged from 0.827 to 1.000(p .0001). The entire questionnaire score's ICC value was 0.996 (p 0.0001), showing that the Arabic version of the VISA-P has strong test-retest performance.

Table 6. Scale mean and Cronbach's Alpha if Item Deleted

	Scale Mean if Item Deleted	Cronbach's Alpha if Item Deleted
Q 1	74.7875	0.859
Q 2	75.55	0.83
Q 3	75.2813	0.84
Q 4	75.9187	0.827
Q 5	76.55	0.823
Q 6	76.7563	0.815
Q 7	75.9312	0.817
Q 8	60.1125	0.954

Table 7. correlation coefficients of responses between the first and second time

Variable	Correlation coefficient	95% IC
Question 1	0.938	(0.9162, 0.9543)
Question 2	0.855	(0.8069, 0.8918)
Question 3	0.827	(0.7707, 0.8705)
Question 4	0.904	(0.8710, 0.9289)
Question 5	0.936	(0.9135, 0.9528)
Question 6	0.971	(0.9606, 0.9787)
Question 7	0.995	(0.9932, 0.9963)
Question 8	1.000	
Total Score	0.996	(0.9945, 0.9971)

Floor and ceiling effect: The response distributions for each item showed that all response categories were used for all items with no significant floor or ceiling effects. The floor effect was 0 % and the ceiling effect was 0% , So the response distributions for each item showed that all none of the patients' scores were at the maximal or minimal value, indicating no floor or ceiling effect and this suggests that the VISA-P-A is an appropriate tool for individuals with the full spectrum of severity of patellar tendinopathy.(table 8)

DISCUSSION

The current study's objectives were translating, culturally adapting, validating, and evaluating the reliability of the Arabic version of the VISA-P questionnaire. Despite being a lengthy and difficult multistep process, the translation and cultural adaption of the Arabic version of the VISA-P for patients with patellar tendinopathy was accomplished in accordance with the most recent, thorough, and published criteria (9) (Sousa *et al.* , 2011; (8) Borsa *et al.*, 2012).

Table 8. Highest and Lowest scores of the total score of VISA-P

Responses to VISA-P	Count	Percentage
60	1	0.6
99	27	16.9

For the Arabic-speaking community, the VISA-P-A may be regarded as a valid and reliable tool. The first expert panel determined that all eight of the items had an 82% clarity index, and their revisions were made to the Arabic version of the VISA-P and transmitted to the second expert panel. 90% of the Arabic version of the VISA-P was clear after the prefinal form was altered to accommodate the adjustments that were agreed upon by the second panel. The extent to which the items in the questionnaire adequately represent the concepts of interest is referred to as content validity (13) (Schmitt *et al.*, 2013).

In our study, The I-CVI was 100% for all items except items 3 (95%), items 8 part one (97.5%), and item 8 part two (95%). S-CVI/Ave of all items was 98.75%, the S-CVI/UA was 100%, and the mean expert proportion was 100%, so the content validity of the Arabic version of VISA-P-A was excellent according to experts' opinions. The sample size was adequate and sufficient for factor analysis. The VISA-P-A version, as indicated by the Scree Plot graph, has one factorial structure and this means that all the questionnaire questions refer to the same problem and no more reduction is possible in this questionnaire. The current study results were consistent with the work of (14) (Hernandez-Sanchez *et al.*, 2017) in which the findings support the 1-factor-dimensional model of the VISA-P scale and it should be considered a 1-dimensional instrument. Our results to some extent agreed with (15) (Korakakis *et al.*, 2014) who stated that VISA-P has a one-factor analysis but when excluding other knee injury groups. Our results didn't agree with (16) (Frohm *et al.*, 2004) in the Swedish version of VISA-P obtained an initial solution with 2 factors and afterward forced a third factor. The current study's authors agreed with Hernandez-Sanchez *et al.* that the VISA-P has a single factorial structure because there aren't enough questions to generate a sufficient number of factors. To examine the external construct validity, use of other validated, acknowledged the gold standard, and, if possible, context-specific surveys are often advised.

However, among the questionnaires used to assess patellar tendinopathy, there is no gold standard. In order to compare the SF-36 questionnaire with the VISA-P questionnaire, it was chosen as it is a multidimensional, widely used questionnaire for patients with patellar tendinopathy and has been translated and validated into many languages, including Arabic (17) (Schlosser, 2014). The eight domains on the VISA-P questionnaire are matched by similar subscales in the SF-36. In this study, VISA-P-A had high correlations with the PF and low correlations with the MH sections of the SF-36. The correlation coefficient with PF was 0.8292, whereas for those with MH was 0.23. The level of association between the VISA-P-A and SF36 questionnaire was 0.848. The results of the current study were in agreement with (18) (Kaux *et al.*, 2016) in the validity and reliability of the French version of VISA-P, and (19) (Hernandez-Sanchez, *et al.*, 2011) in Cross-cultural adaptation of the VISA-P score for patellar tendinopathy in the Spanish population. The VISA-P questionnaire has several advantages over the SF-36 questionnaires, including being much shorter, simpler to score, and more focused on patellar tendinopathy.

In this study, the questionnaire's Cronbach alpha was 0.819 for the first measurement scores and 0.887 for the second measurement scores, with an average of 0.853, indicating an excellent level of internal consistency. Cronbach alpha values of the VISA-P were 0.82 by Sosa, Ken Erbvín *et al.*, 0.76 by Wageck, Bruna Borges *et al.*, 0.883 by Hernandez-Sanchez *et al.*, 0.72 by Zwerver, *et al.* and 0.825 by Frohm *et al.* ((18) Sosa, Ken Erbvín *et al.*, 2021 ; (21) Wageck, Bruna Borges, *et al.*, 2013; (19) Hernandez-Sanchez *et al.*, 2011; (20) Zwerver *et al.*, 2009; (16) Frohm *et al.*, 2004). So, the Cronbach alpha values of the Arabic version of the VISA-P_A were found to be quite high similar to the other languages versions. The results of the current study revealed that the Arabic version of the VISA-P-A had a high level of internal consistency. Test-retest reliability of the Arabic version of the VISA-P_A questionnaire was measured by Intra class correlation coefficients (ICCs). The ICC value of the total questionnaire score was 0.996 ($p < 0.0001$) (7). Hernandez-Sanchez *et al.* reported the ICC value of the total questionnaire score was 0.994 (19) (Hernandez-Sanchez *et al.*, 2011), Korakakis *et al.* reported that the ICC value of the total questionnaire score was 0.818 (15) (Korakakis *et al.*, 2014), Çebblei *et al.* reported that the ICC value of the total questionnaire score was 0.99 (21) (Çebblei *et al.*, 2016), Sosa *et al.* reported that the ICC value of the total questionnaire score was 0.99 (20) (Sosa *et al.*, 2021) Brauna Borges Wageck *et al.* reported that the ICC value of the total questionnaire score was 0.91 (21) (Brauna Borges Wageck *et al.*, 2013). Test-retest results of the current study were similar to the ICC values of the previous studies. Considering the ICC values of each question and the total score of the questionnaire, it was possible to say that the Arabic version of the VISA-P-A is stable over time.

One limitation of the current study is that there was no investigation of the external longitudinal construct validity, which is measured by analyzing the change scores obtained by the questionnaires during the treatment period. Another limitation is that there was no investigation of the feasibility of the VISA-P questionnaire. Further study is needed to evaluate the feasibility and the external longitudinal construct validity and of the Arabic version of VISA-P in treatment groups.

CONCLUSION

The Arabic version of VISA-P is valid and reliable. Factor analysis demonstrated that it has one factor, and the external construct validity of the VISA-P has very high levels of correlation with SF-36. In addition, VISA-P has high test-retest and internal consistency reliability.

IMPLICATIONS FOR PHYSIOTHERAPY PRACTICE: VISA-P might be a preferred scale in the clinical assessment of patellar tendinopathy in Egyptian population since it is brief, simple to use, comprehensive, and specific for patellar tendinopathy.

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