Research Paper: Validity and Reliability of the Persian Version of "Identification of Functional Ankle Instability" Questionnaire in People With Lateral Ankle Sprain

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ABSTRACT

Purpose: The Identification of Functional Ankle Instability (IdFAI) questionnaire is a valid and reliable tool to identify ankle instability, but this questionnaire is written in English and Persian speakers have difficulties in using it. Therefore, this study aimed to translate the IdFAI questionnaire in Persian and evaluate its validity and reliability.

Methods: The present study is a non-experimental, analytical, and descriptive study. After translating the IdFAI questionnaire with a standard policy, it was given to 100 individuals with a history of at least 1 ankle sprain and 45 participants who had no history of an ankle sprain. The Cumberland Ankle Instability Tool (CAIT) was also distributed to the participants to examine the validity of IdFAI. After 1 week, a questionnaire was distributed among several participants to determine the repeatability of the test-retest of the Persian version of the questionnaire. After collecting the data, intraclass correlation, the Standard Error of Measurement (SEM), and the Cronbach alpha coefficient of the questionnaire were calculated in SPSS version 20.

Results: The correlation of the IdFAI questionnaire with the CAIT was 0.71. The Cronbach alpha coefficient of 0.88 showed an acceptable level for the reliability of the questionnaire. Also, the correlation coefficient of the test-retest was 0.95, indicating a high degree of repeatability of the Persian version of the questionnaire. The SEM was 2.35, and the factor analysis showed that the questionnaire's items could be classified into three categories, with a maximum of 72.5% variance coverage.

Conclusion: The Persian version of the IdFAI questionnaire has excellent reliability and validity in identifying Persian-speaking participants with functional ankle instability. This questionnaire can be used for people with ankle sprain injuries in future studies, clinical examinations, and evaluations.

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Highlights

- The persian version of IdFAI questionnaire has excellent reliability.

- The persian version of IdFAI questionnaire has excellent validity.

- IdFAI questionnaire can be use for iranian people with lateral ankle sprain injury.

Plain Language Summary

Evaluation of functional ankle instability is worthwhile during rehabilitation of ankle sprain to be ensured of the complete recovery and prevent the recurrent ankle sprain. IdFAI questionnaire is unique and newest tool for diagnosis. This questionnaire translated to Persian and evaluated validity and reliability. So the present study showed Persian version of IdFAI has excellent reliability and validity in identifying Persian-speaking participants with functional ankle instability.

1. Introduction

A nankle sprain is one of the most common sports injuries [1], which happens for 302000 people in the United Kingdom and at least 1 to 2 million people in the United States every year [2]. Approximately 40% to 80% of the victims suffer from functional ankle instability following a lateral ankle sprain and experience frequent ankle sprains after that [3, 4]. Functional ankle instability is associated with a defect in neuromuscular, proprioception, and posture control. If the sense of joint is impaired, it is exposed to injury, and eventually, functional instability [5]. Therefore, the evaluation of functional ankle instability is worthwhile during the rehabilitation of ankle sprain to be ensured of the complete recovery of functional ankle instability and to prevent the reoccurrence of ankle sprain. According to the research, the patients' awareness of their health and improvement should be considered one of the most critical principles in evaluating the effect of treatment. Therefore, in addition to clinical examinations, the self-report questionnaire is one of the essential methods of evaluating ankle injury; also, it is the cheapest and easiest method [6]. There are seven self-report questionnaires about problems and abnormalities of the ankle: Cumberland Ankle Instability Tool (CAIT), chronic ankle instability scale, ankle joint functional assessment tool, Ankle Instability Instrument (AII), foot and ankle outcome score, foot and ankle ability measure, and foot and ankle instability questionnaire. They are used to diagnose ankle injury and function [7]. In this regard, Simon et al. (2011) reported in their review article that none of these tools could alone predict whether someone had functional ankle instability or once experienced ankle sprain and a giving way [6]. Among seven available tools, the CAIT and AII questionnaires can predict the status of functional ankle instability. This group of researchers expanded the questionnaire and turned it into a sheet and called it the Identification of Functional Ankle Instability (IdFAI) questionnaire, which is a combination of two mentioned questionnaires that can have the best evaluation characteristics [7]. The IdFAI questionnaire is unique in the field of functional ankle instability and is the newest tool for diagnosing functional ankle instability. Donahue designed this questionnaire in 2012 by in English. It consists of 10 questions and its accuracy is 89.6%. Further analysis of this questionnaire has shown that its reliability based on test-retest is high (ICC=0.92) [7]. This questionnaire has already been translated into Chinese, Brazilian Portuguese, and Japanese in 2017. Also, it has been reported to be a simple and effective tool for evaluating ankle stability [8]. Thanks to the consistency and combination of the two main components of the CAIT and AII questionnaires, IdFAI alone can predict functional ankle instability with 95% confidence compared to the other seven questionnaires. Moreover, athletes can answer questions of the IdFAI more accurately and better [9].

Moreover, Seaman et al. (2013) reported that this questionnaire is reliable in predicting functional ankle instability status. Its sensitivity, specificity, and the relative risk are better than CAIT and AII questionnaires with 95% confidence in predicting variables [10]. However, the questionnaire was originally developed in English and accordingly used only for users who read and write English. Thus, it needs to be translated into different languages so that various nationalities can benefit from it. In

178

Kordi Ashkezari MH, et al. Persian Version Lateral Ankle Sprain Questionnaire. PTJ. 2019; 9(3):177-182.

this regard, it seems necessary to translate this questionnaire into Persian and examine its validity and reliability.

Although the CAIT questionnaire has been already validated to evaluate chronic ankle instability and is a valid and compatible tool with different cultures, the ability of the IdFAI questionnaire for the diagnosis of functional ankle instability is more than the CAIT questionnaire [7]. Therefore, this study aimed to translate the IdFAI questionnaire into Persian and to evaluate its validity and reliability.

2. Materials and Methods

This study is descriptive and analytical research. It has an ethical code and registered with the number of 1398.008.IR.UK.VETMED.REC in the Shahid Bahonar University of Kerman. Dr. Donahue designed the IdFAI questionnaire. It consists of 10 questions that evaluate 3 factors of ankle instability history (questions 5, 6, 7, and 10), information about the first ankle sprain (questions 1, 2, 3, and 4), and information about instability during daily and sports activities (questions 8 and 9) [10]. Also, each question has a specific score and ranges from 0 to 37. Higher scores indicate greater instability and lower scores lower ankle instability. The right and left legs are examined separately and if the obtained score is ≥11, the person has functional ankle instability. And if the score is ≤10, the person has no functional ankle instability [10].

At the beginning of the study, we get permission from the designer of the questionnaire, Dr. Donahue, to translate the questionnaire into Persian. We followed the international quality of life assessment project policy to translate the IdFAI questionnaire into Persian [11]. The English-to-Persian translation was done by two Persian translators who were not familiar with the IdFAI questionnaire. In the next stage, translators and researchers agreed on the final translation. Then, another translator who had extensive knowledge of the English language evaluated the quality of a direct translation with respect to clarity, common language use, and conceptual correlation. Next, a Native American translator translated the Persian version into English. Finally, the translated version into English was compared with the original version for conceptual evaluation. The pre-final version of the questionnaire was given to 20 people with ankle sprains to evaluate it in terms of the conceptual, the fluency, and fluidity of the questions.

The minimum sample size required for the present study was 145 people based on similar studies and the sample size formula. Therefore, 145 people (121 males and 24 females) who were native Persian speakers from public, academic, and athlete communities were included in the present study. A total of 100 persons had experienced ankle sprain at least once with the physician's diagnosis and 45 persons had not suffered ankle sprain and any injury in the lower limbs. Also, people with the following criteria were excluded from the study: the people with pain in lower limbs for any reason except ankle sprain, those with ankle sprain for the past 3 months, and people with neuromuscular disorders and therapeutic interventions between two sessions of filling the questionnaire. Also, the literacy level of people should include over 9 years of education and their age should be over 16 years [12]. Table 1 presents the descriptive information of the participants.

The participants were asked to complete the Persian IdFAI (IdFAI-P), and CAIT questionnaires about their own one foot and the correlation was calculated between the scores of the IdFAI and CAIT questionnaires. After 7 days, 45 participants were asked to complete the IdFAI-P questionnaire again to check its reliability. The validity and reliability of questionnaire questions were evaluated after collecting the data by calculating the intra-group

Table 1. Demographic characteristics of the participants

Variable	Mean±SD or No.
Age, y	22.76±6.07
Height, cm	176.9±9.65
Weight, kg	78.33±7.86
Body mass index, kg/m^2	24.09±1.48
Right ankle injury	88
Left ankle injury	57

PHYSICAL TREA✝MENTS

Kordi Ashkezari MH, et al. Persian Version Lateral Ankle Sprain Questionnaire. PTJ. 2019; 9(3):177-182.

179

Table 2. The validity of the total score of the IdFAI-P questionnaire and its factors

N=145	IdFAI Total Score		First Factor		Second Factor		Third Factor	
	P	r	P	r	P	r	P	r
CAIT	0.001	0.71	0.001	0.66	0.001	0.62	0.001	0.7

The correlation test, P<0.05 is significant

Table 3. The Cronbach alpha values by omitting each question and Cronbach alpha values per factor

Questionnaire Constructive Factors	Constituent Questions of Per Factor	Cronbach's Alpha Coefficient	Cronbach Alpha Value Per Factor	Total Cronbach Alpha Coefficient
The first factor	q5	0.86	0.81	0.88
	q6	0.86		
	q7	0.86		
	q10	0.86		
The second factor	q1	0.88	0.71	
	q2	0.86		
	q3	0.86		
	q4	0.88		
The third factor	q8	0.86	0.61	
	q9	0.86		

correlation coefficient, factor analysis test, and Cronbach alpha coefficient.

3. Results

The first phase of the research was the translation of the questionnaire. The final result was obtained during a session with experts after translating the questionnaire into Persian and then back translating into English. The Persian version of the IdFAI questionnaire was distributed among 145 athletes. Based on the results of Table 1, 83% of the participants were male, and 17% were female. The Mean±SD age of the samples was 22.76 ± 6.07 years and their Mean±SD education study time was 14.13±1.84 years.

There was a strong correlation between the IdFAI-P and CAIT questionnaires (r=-0.71; P>0.001). Regarding the correlation of the questionnaire factors, the results showed that the first factor, ankle instability history, has an average relationship with CAIT (r=-0.66; P>0.001). The second factor, information of the first ankle sprain, also has an average relationship with the total CAIT scores (r=-0.62; P>0.001) and the third factor, the information of instability during daily and sports activities has a strong relationship with CAIT (r=-0.7; P>0.001) (Table 3).

The Cronbach alpha and test-retest methods were used to determine the reliability of the questionnaire. The internal consistency index of this questionnaire, Cronbach's alpha coefficient, was 0.88. If any of the questions of the questionnaire were removed, the alpha coefficient would change between 0.86 and 0.88 (Table 2). The Cronbach alpha values for the first, second, and third factors were 0.81, 0.71, and 0.61, respectively. Factor analysis also showed that IdFAI-P test questions could be divided into three subgroups with a maximum of 72.5% variance coverage. The Pearson correlation was also used for test-retest reliability. The ICC correlation coefficient for all questionnaire items was 0.95 and between 0.92 and 0.97, with 95% confidence (P<0.001), indicating that the IdFAI-P questionnaire has excellent repeatability.

4. Discussion

We aimed to translate the IdFAI questionnaire into Persian and evaluate the validity and reliability of the Persian version of this questionnaire to help future studies in the diagnosis of functional ankle instability and its treatment among Persian speakers. This questionnaire was introduced by Simon et al. in 2014 as the best self-report tool for diagnosing the status of ankle joint stability [10]. This questionnaire was developed because of the controversial diagnosis of functional ankle instability

in both clinical and research methods [7, 10]. During the translation process, minor changes were applied to the questionnaire text by preserving the nature of the original version.

The results show that the Persian version of the IdFAI questionnaire has good validity and a strong correlation with CAIT (r =-0.71). The CAIT questionnaire was selected for the validity test because the designers of the original IdFAI questionnaire used the CAIT questionnaire to construct this questionnaire. Also, the Persian version of this questionnaire was available. Data analysis showed a correlation between 3 factors of the IdFAI and CAIT questionnaires. These correlations were 0.66, 0.62, and 0.7 for the first, second, and third factors, respectively.

The first factor causes ankle instability history, and the third factor causes ankle instability during the daily activities. Both factors have a similar structure with the CAIT questionnaire, which explains the average and high correlation.

The results also showed that the IdFAI-P questionnaire has excellent reliability. The Cronbach alpha coefficient between items was 0.88, which shows high reliability like the original version, whose Cronbach alpha coefficient is 0.96 [10]. Also, regarding the first, second, and third factors of the original version, the Cronbach alpha values were 0.89, 0.97, and 0.91, respectively. The Cronbach alpha value for the Brazilian Portuguese version was 0.87. These values were 0.79, 0.76, and 0.38 for the first, second, and third factors, respectively [9]. In this regard, the Japanese and Chinese versions of this questionnaire reported the Cronbach alpha values of 0.87 and 0.89, respectively [8, 13]. The present study, like other studies, has shown the high reliability of this questionnaire.

This questionnaire also has great test-retest reliability so that the correlation coefficient was 0.95. The original version of this questionnaire also has an ICC of 0.92 [10]. Therefore, the test-retest reliability coefficient of the Persian version indicates a high level of relative reliability, which is similar to the Chinese, Japanese, and Brazilian Portuguese versions. It has been reported among the different age groups of adults, where the ICC coefficients were 0.97, 0.96, 0.97 to 0.99, and 0.95, respectively [8, 9, 13, 14]. The interval between the two tests and the posttest was one week, which is an acceptable time [15, 16]. Therefore, the IdFAI-P questionnaire can be used as a reliable and repeatable tool for evaluating functional ankle instability.

Also, the value of the Standard Error of Measurement (SEM), which is the accuracy value of scores on repeated measurements, was calculated.

The formula for calculating this error is SEM = DP1. [9], DP stands for the standard deviation of the first test. The error value of the IdFAI-P questionnaire was 2.35. This error is negligible compared to the overall scores of the questionnaire, ranging from 0 to 37, and it is similar to other versions translated into other languages. In this regard, the level of this error has been reported 1.2, 1.69, and 2.2 for Brazilian Portuguese, Japanese, and original versions, respectively [8-10, 13].

The present study showed that the Persian version of the IdFAI questionnaire has excellent reliability and validity in identifying Persian-speaking participants with functional ankle instability. This questionnaire can be used in future studies, clinical examinations, and evaluations for people with ankle sprain injuries. This tool also helps identify people who have few features or criteria of functional ankle instability.

Ethical Considerations

Compliance with ethical guidelines

The Ethics Committee of the Veterinary Faculty of Shahid Bahonar University of Kerman approved the study (IR.UK.VETMED.REC.1398.008).

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Authors' contributions

All authors contributed in designing, running, and writing all parts of the research.

Conflict of interest

The authors declared no conflict of interest.

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Kordi Ashkezari MH, et al. Persian Version Lateral Ankle Sprain Questionnaire. PTJ. 2019; 9(3):177-182.

181

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182

Kordi Ashkezari MH, et al. Persian Version Lateral Ankle Sprain Questionnaire. PTJ. 2019; 9(3):177-182.