ACTA ORTHOPAEDICA et TRAUMATOLOGICA TURCICA
www.aott.org.tr

Research Article

Validity and reliability of the Turkish version of the Self-reported Foot and Ankle Score in patients with foot or ankle pain

Gökhan Yazıcı[1], Melek Volkan Yazıcı[2], Deniz Bayraktar[3], Fatmagül Varol[4], Arzu Güçlü Gündüz[1], Nilgün Bek[5]

[1]*Department of Physiotherapy and Rehabilitation, Gazi University, School of Health Sciences, Ankara, Turkey*
[2]*Department of Physiotherapy and Rehabilitation, Yüksek İhtisas University, School of Health Sciences, Ankara, Turkey*
[3]*Department of Physiotherapy and Rehabilitation, İzmir Katip Çelebi University, School of Health Sciences, İzmir, Turkey*
[4]*Department of Physiotherapy and Rehabilitation, University of Health Sciences, School of Health Sciences, İstanbul, Turkey*
[5]*Department of Physiotherapy and Rehabilitation, Hacettepe University, School of Health Sciences, Ankara, Turkey*

ARTICLE INFO

Article history:
Submitted 5 April 2019
Received in revised form
10 November 2019
Last revision received
2 April 2020
Accepted 26 April 2020

Keywords:
Foot
Ankle
Pain
Self-reported
Assessment

ORCID iDs of the authors:
G.Y. 0000-0002-9270-2290;
M.V.Y. 0000-0001-9686-0571;
D.B. 0000-0002-2852-8910;
F.V. 0000-0003-2808-9732;
A.G.G. 0000-0001-8464-1929;
N.B. 0000-0002-2243-5828.

Corresponding Author:
Gökhan Yazıcı
gokhanyazici38@hotmail.com

ABSTRACT

Objective: The aim of this study was to translate the Self-Reported Foot and Ankle Score (SEFAS) into Turkish and to determine the validity and reliability of the translated version in patients with foot or ankle pain.

Methods: A total of 98 patients (65 females, 33 males, mean age=39 years, age range 18-65 years) who presented with foot or ankle pain for at least one week were included in the study. SEFAS was translated into Turkish (SEFAS-T) and then back-translated into English by two bilingual translators to ensure the accuracy of translation. To determine the validity of the translated version, SEFAS-T, The Foot and Ankle Outcome Score (FAOS), and the Short Form 36 (SF-36) were administered at the first assessment on the same day. SEFAS-T was repeated five days later (Spearman's rho). Intra-class correlation coefficients (ICCs) were used for assessment of the test re-test reliability, while the Cronbach's alpha coefficient was used to assess the internal consistency of the questionnaire

Results: SEFAS-T showed good test-retest reliability (ICC: 0.887). Item 4 showed poor item–total correlation and inter-item correlations. When item 4 was excluded, the Cronbach's alpha value was found as 0.906. SEFAS-T total scores showed correlation with all the FAOS sub-scores ($p<0.001$) and all the SF-36 components ($p\leq0.001$) except mental health (rho: 0.149, p: 0.143). The highest correlation was found between SEFAS-T Total Score and the Sports and Recreations subscale of FAOS (rho: 0.796, $p<0.001$).

Conclusion: SEFAS-T seems to be valid and reliable as a measure for foot or ankle pain in Turkish patients.

Level of Evidence: Level II, Diagnostic study

Foot pain is defined as pain or discomfort in the toes, heels, feet arches, soles, or other adjacent parts of the foot and is experienced by 17%-42% of the adult population (1-5). Foot pain may lead to impairments in self-care and quality of life, cause disability in daily life, and increase the risk of falls (4-7).

Self-reported questionnaires are the most common method for collecting information about pain (8). They can provide reliable and valid measures of a patient's perception of pain level, impairment, disability, and quality of life (8, 9). However, the questionnaires must be translated, cross-culturally adapted, and validated to be used in different countries and within specific populations (10).

The Self-Reported Foot and Ankle Score (SEFAS) is a self-report questionnaire which was initially based on the New Zealand Total Ankle Questionnaire (11). In 2012, SEFAS was adapted by Cöster et al. to assess the perception related to foot and ankle pain in patients with osteoarthritis or inflammatory arthritis of the ankle and the outcome of surgery following total ankle replacement (12). In 2014, the validity, reliability, and responsiveness of SEFAS in forefoot, midfoot, hindfoot, and ankle disorders was assessed by Cöster et al (13). According to

Cite this article as: *Yazıcı G, Volkan Yazıcı M, Bayraktar D, Varol F, Güçlü Gündüz A, Bek N. Validity and reliability of the Turkish version of the Self-reported Foot and Ankle Score in patients with foot or ankle pain. Acta Orthop Traumatol Turc 2020; 54(4): 408-13.*

DOI: 10.5152/j.aott.2020.19185

that study, the SEFAS was found to have moderate and strong correlations when compared to the Short Form 36 (SF-36) and the Foot and Ankle Outcome Score (FAOS) scales, respectively. However, SEFAS was completed in a shorter time than FAOS and SF-36 and was found to be more attractive to patients (8). In a further study, the validity and reliability of SEFAS in patients undergoing surgery for various forefoot, hind foot, and ankle disorders was also established in 2017 by Arbab et al., and the authors showed the reliability, validity, and responsiveness of the SEFAS in German (14).

The aim of this study was to translate the SEFAS into Turkish language and to evaluate its reliability and validity in patients with foot and ankle pain.

Materials and Methods

Prior to the study, the necessary permission for translating SEFAS was obtained from Maria Cöster. The ethical approval was received from Gazi University Ethics Commission (77082166-302.08.01 Study no: 2018-91). A written informed consent form was collected from all participants.

Translation

Forward and backward translation of the SEFAS was performed according to the guidelines by Beaton et al (10). The English version of the questionnaire was translated to Turkish by two bilingual translators independently. One of the translators was a physiotherapist, and the other had no medical or clinical background. Then, a consensus was reached between translations and a single translation was formed. The questionnaire, which was translated into Turkish, was back-translated into English and compared to the original by two native English speakers who spoke Turkish well. SEFAS-T was consolidated by a team consisting of translators and researchers, and the final structure was determined. In order to determine the comprehensibility, the final version was examined by 30 healthy subjects who were literate in the Turkish language. Each subject was asked to read the translated questions and to state whether the questions were comprehensible or not. None of the subjects raised any concern regarding the comprehensibility.

HIGHLIGHTS

- Foot pain leads to impairments in self-care and quality of life and causes disability.
- The Self-Reported Foot and Ankle Score (SEFAS) assesses the perception related to foot and ankle pain.
- The Turkish version of SEFAS (SEFAS-T) showed good test-retest reliability.
- SEFAS-T total scores showed a correlation with all the FAOS sub-scores as well as SF-36 areas except mental health.
- SEFAS-T seems to be valid and reliable as a measure for foot or ankle pain in Turkish patients.

Instruments

SEFAS is a questionnaire consisting of 12 items. Each question is scored on a five-point Likert scale (0 to 4). The total score from the items is summed between 0-48 where 0 represents the most severe disability and 48 represents normal function. SEFAS has shown acceptable validity, reliability, and responsiveness in patients with various forefoot, hindfoot, and ankle disorders (13).

The SF-36 instrument is an easily understandable, self-reported instrument widely used to measure health related quality of life. The instrument consists of eight sub-scales: physical functioning, role physical, role emotional, social functioning, mental health, energy/vitality, pain, and general health perception. The SF-36 has been translated into Turkish and validated (15).

The FAOS is a 42-item questionnaire used in the evaluation of symptoms and functional limitations regarding the foot and ankle. The score contains five domains: pain, other symptoms, activities of daily living, sport and recreational activities, and foot-ankle related quality of life. Each item is scored on a five-point Likert scale from 0 to 4, where 0 represents normal function and 4 represents the worst stage. A normalized score (100 indicating normal function and 0 indicating the worst symptoms) is then calculated for each subscale. FAOS has been translated into Turkish and has shown good validity and reliability in the Turkish population for use in foot and ankle problems (16, 17).

Participants and validation procedure

The study was carried out between March 2018 and September 2018, with subjects who applied to Gazi University Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation with a complaint of any type of foot pain. Patients aged between 18-65 years, who had a foot pain for at least one week and had no cognitive impairments were included in the study. Patients who were illiterate in Turkish, had any disorder that would interfere with the study such as malignancy, hearing or visual problems were excluded from the study.

The subject characteristics including age, height, weight, gender, and cause of foot pain were recorded. SEFAS-T, SF-36 (15), and FAOS (16) were administered at the first assessment on the same day and face to face. After five days, SEFAS-T was repeated. During this five-day period, no treatment was administered to any of the participants in the study.

Statistical analysis

The SEFAS, SF-36, and FAOS subscale scores were analyzed using the Statistical Package for Social Sciences for Windows, Version 25.0 (IBM SPSS Corp.; Armonk, NY, USA).

The variables were presented as mean± standard deviation. A p value of <0.05 was considered to indicate statistical significance. The statistics regarding the reproducibility, internal consistency, and construct validity were tested by using the following methods.

Reproducibility

Reliability is an estimate of the reproducibility of a score. In this study we evaluated how well a score produced the same outcome when the questionnaire was given to the same individual on separate occasions but close to each other in time via test-retest reliability. In order to assess the reliability, the SEFAS-T was completed the second time, five days after the first for all of the participants. For determining the test-retest value following parameters were used; absolute agreement definition and two-way mixed effect model. The Intraclass Correlation Coefficient (ICC) was considered to be good at 0.70 and above (18,19).

Internal consistency

Internal consistency is the extent to which items within a dimension are homogeneous, i.e., they are correlated with each other (20). To test internal consistency, Cronbach's alpha was used. The Cronbach's alpha was considered to be good at 0.70 or higher (18).

Floor and ceiling effect

Floor and ceiling effects are considered to exist if more than 15% of the responses reach the lowest or highest possible score (21).

Construct validity

Construct validity describes the extent to which a score relates to other scores. As no gold standard exists for evaluating foot pain, FAOS and SF-36 were used for construct validity of the SEFAS by using non-parametric correlation coefficients (the Spearman's Rho). Correlation coefficients <0.4 were considered as low, 0.4-0.59 as moderate, and 0.6-0.79 as high correlation (18).

Table 1. Characteristics of the patients and test-retest results of SEFAS-T

	Mean±SD
Age (year)	39.61±15.96
Height (cm)	166.73±9.61
Weight (kg)	74.65±13.5
BMI (kg/m^2)	27.00±5.30
Baseline Test Score	31.27±8.75
Re-test Score	32.36±8.30

SD: Standard Deviation; cm: centimeter; kg: kilogram; m^2: meter squared

Results

Although there is no internationally accepted consensus regarding the minimum required sample size for validation studies, 2–20 participants per item are generally recommended (19). In this study, a prior sample size was determined as 120 patients, 10 participants per item within the SEFAS. However, due to missing data we had to exclude some patients and

Table 2. The Cronbach's alpha values of SEFAS-T

	Question	Cronbach's Alpha if Item Deleted
Item 1	How would you describe the pain you usually have from the foot/ankle in question?	0.877
Item 2	For how long have you been able to walk before severe pain arises from the foot/ankle in question?	0.879
Item 3	Have you been able to walk on uneven ground?	0.867
Item 4	Have you had to use an orthotic, shoe insert, heel lift, or special shoes?	0.906
Item 5	How much has the pain from the foot/ankle in question interfered with your usual work including housework and hobbies?	0.866
Item 6	Have you been limping when walking because of the foot/ankle in question?	0.869
Item 7	Have you been able to climb a flight of stairs?	0.873
Item 8	Have you been troubled by pain from the foot/ankle in question in bed at night?	0.877
Item 9	How much has the pain from the foot/ankle in question affected your usual recreational activities?	0.867
Item 10	Have you had swelling of your foot?	0.888
Item 11	After a meal (sat at table), how painful has it been for you to stand up from a chair because of the foot/ankle in question?	0.870
Item 12	Have you had a severe sudden pain shooting, stabbing, or spasm from the foot/ankle in question?	0.872
Total		0.885

the study was completed with 98 patients (65 female, 33 male) with foot or ankle pain. The characteristics of the patients along with test-retest results are provided in Table 1. The most reported problems were; general foot pain (n: 53), rheumatic conditions (n: 12), trauma (n: 8), sprain (n: 7), and others including flat foot, hallux valgus, and plantar fasciitis, etc. (n: 38).

Reliability

Reproducibility
The SEFAS-T showed good test-retest reliability ICC: 0.887 (Table 1).

Internal consistency
The Cronbach's alpha value was determined as 0.885. The Cronbach's alpha value was decreased for all items when they were excluded from the SEFAS-T, except item 4 (Table 2). When item 4 was excluded, the Cronbach's alpha value increased to 0.906. Item 4 showed poor item–total correlation and inter-item correlations.

Floor and ceiling effect
No floor (n: 0) and ceiling (n: 0) effects were detected for SEFAS-T.

Validity

Construct validity
SEFAS-T total scores showed a correlation with all the FAOS sub-scores as well as SF-36 areas except mental health (Table 3). SF-36 physical function and physical role subscales had a correlation of >0.40. All the subscales of FAOS had a correlation of >0.40 with SEFAS-T. The highest correlation was found between the SEFAS-T total score and the sports and recreations subscale of FAOS (rho: 0.796, p<0.001).

Discussion

There is a need for internationally acceptable, valid, and reliable self-report instruments in the assessment of foot and ankle pain in the Turkish language. In this study, the English version of the SEFAS was translated to Turkish (SEFAS-T) according to the guidelines of Beaton et al (10). The psychometric analyses revealed that the SEFAS-T was reliable and valid.

Test-retest reliability was found to be high (ICC: 0.887) for SEFAS-T. While this value was close to the original version (ICC: 0.92), the German version demonstrated higher values

Table 3. Correlation between SEFAS-T and other measurements

	SEFAS-T Total Score	SEFAS-German (Arbab et al. 2017)	SEFAS-Swedish (Cöster et al. 2014)
SF-36			
Physical Functioning	rho: 0.649, p<0.001	rho: 0.673	rho: 0.69
Role Limitation, physical	rho: 0.463, p<0.001	rho: 0.597	rho: 0.43
Role Limitation, emotional	rho: 0.383, p<0.001	rho: 0.479	rho: 0.19
Vitality	rho: 0.335, p:0.001	rho: 0.332	rho: 0.48
Mental Health	rho: 0.149, p:0.143	rho: 0.301	rho: 0.26
Social Functioning	rho: 0.337, p:0.001	rho: 0.528	rho: 0.40
Bodily Pain	rho: 0.391, p<0.001	rho: 0.673	rho: 0.71
General Health	rho: 0.364, p<0.001	rho: 0.433	rho: 0.27
FAOS			
Symptoms	rho: 0.637, p<0.001	rho: 0.625	rho: 0.64
Pain	rho: 0.668, p<0.001	rho: 0.765	rho: 0.82
Activity of Daily Living	rho: 0.700, p<0.001	rho: 0.771	rho: 0.75
Sport and Recreations	rho: 0.796, p<0.001	rho: 0.712	rho: 0.52
Quality of Life	rho: 0.606, p<0. 001	rho: 0.642	rho: 0.75
Total Score	rho: 0.761, p<0.001	rho: 0.775	NA

* p<0.05, rho: the Spearman's correlation coefficient; SEFAS-T: Turkish version of The Self-Reported Foot and Ankle Score; SF-36: Short form-36; FAOS: Foot and Ankle Outcome Score; NA: not available

(ICC: 0.970). This might be attributable to the average score differences between studies. In our study, the mean score of SEFAS at baseline was 31.27±8.75, while in the German version it was 48.4±19.7. Poor functionality might be easier to recall, and therefore the test-retest reliability might be higher in the German version. On the other hand, the population which was investigated in the German version study was composed of patients who were waiting for surgery, thus the functional status of the patients might not be altered for the relevant study.

The internal consistency of SEFAS-T was found to be strong (Cronbach's alpha: 0.885), and all the items except item 4 were found to contribute to internal consistency. Item 4 includes the following statement 'Have you had to use an orthotic (shoe insert), heel lift, or special shoes?' SEFAS was originally developed for patients who had undergone surgery, and it is expected that these devices may be offered to these patients. However, in our study we included patients with general foot or ankle pain who might not require orthotic devices or specialized shoes. Therefore, we recommend the clinicians to be cautious about item 4 when using SEFAS-T for patients who have not undergone surgery. However, we have not excluded item 4 from the SEFAS-T because it may be necessary when assessing patients who do use an orthotic device. Both the German and the original versions of SEFAS showed high internal consistency. The Cronbach's alpha was 0.881 for German version and 0.96 for the original one.

SEFAS-T was found to correlate to SF-36 and FAOS. SEFAS-T especially was found to correlate to all FAOS subscales as the previous authors described. Arbab et al. suggested to sub-scale the SEFAS as "pain", "loss of function", and "others" to determine the relationship with SF-36 subscales. While these authors showed relationship in various degrees for all subscales of SF-36 by sub-scaling the SEFAS, we could not detect strong relationships with SF-36 subscales and SEFAS total score.

Our study had certain limitations. As we included patients who had a relatively new pain, the pain status might have changed during the re-test period. Even though the pain of the patients during the five day test-retest period was verbally questioned and determined to be the same, the level of pain was not documented with a specific tool such as the Visual Analog Scale. Also, the responsiveness of the SEFAS-T could not be determined for the current study. Further studies which include a treatment modality may investigate the agreement assessment along with the responsiveness of SEFAS-T.

We conclude that the SEFAS-T is a valid and reliable instrument for evaluation of patients who have foot and ankle pain. Health professionals may find it useful to employ the SEFAS-T in the Turkish population.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Commission of Gazi University (77082166-302.08.01 Study no: 2018-91).

Informed Consent: Written informed consent form was obtained from the all participants.

Author Contributions: Concept - G.Y., F.V.; Design - M.V.Y., D.B.; Supervision - A.G.G., N.B.; Resources - G.Y., M.V.Y.; Materials - D.B.; Data Collection and/or Processing - G.Y.; Analysis and/or Interpretation - D.B.; Literature Search - M.V.Y.; Writing Manuscript - G.Y., M.V.Y., D.B.; Critical Review - N.B.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Molund M, Husebye EE, Hellesnes J, Nilsen F, Hvaal K. Proximal medial gastrocnemius recession and stretching versus stretching as treatment of chronic plantar heel pain. Foot Ankle Int 2018; 39: 1423-31. [Crossref]
2. Badlissi F, Dunn JE, Link CL, Keysor JJ, McKinlay JB, Felson DT. Foot musculoskeletal disorders, pain, and foot-related functional limitation in older persons. J Am Geriatr Soc 2005; 53: 1029-33. [Crossref]
3. Hill CL, Gill TK, Menz HB, Taylor AW. Prevalence and correlates of foot pain in a population-based study: The North West Adelaide health study. J Foot Ankle Res 2008; 1: doi: 10.1186/1757-1146-1-2. [Crossref]
4. Menz HB, Lord SR. Foot pain impairs balance and functional ability in community-dwelling older people. J Am Podiatr Med Assoc 2001; 91: 222-9. [Crossref]
5. Garrow AP, Silman AJ, Macfarlane GJ. The Cheshire Foot Pain and Disability Survey: A population survey assessing prevalence and associations. Pain 2004; 110: 378-84. [Crossref]
6. Awale A, Hagedorn TJ, Dufour AB, Menz HB, Casey VA, Hannan MT. Foot function, foot pain, and falls in older adults: The Framingham foot study. Gerontology 2017; 63: 318-24. [Crossref]
7. Chatterton BD, Muller S, Roddy E. Epidemiology of posterior heel pain in the general population: Cross-sectional findings from the clinical assessment study of the foot. Arthritis Care Res (Hoboken) 2015; 67: 996-1003. [Crossref]
8. Jensen M. The pain stethoscope: A clinician's guide to measuring pain: Springer Science & Business Media; 2012. [Crossref]
9. Jensen MP, Karoly P. Self-report scales and procedures for assessing pain in adults. 1992.
10. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine 2000; 25: 3186-91. [Crossref]
11. Hosman AH, Mason RB, Hobbs T, Rothwell AG. A New Zealand national joint registry review of 202 total ankle replacements followed for up to 6 years. Acta Orthop 2007; 78: 584-91. [Crossref]

12. Cöster M, Karlsson MK, Nilsson JA, Carlsson A. Validity, reliability, and responsiveness of a self-reported foot and ankle score (SEFAS). Acta Orthop 2012; 83: 197-203. [Crossref]
13. Coster MC, Bremander A, Rosengren BE, Magnusson H, Carlsson A, Karlsson MK. Validity, reliability, and responsiveness of the Self-reported Foot and Ankle Score (SEFAS) in forefoot, hindfoot, and ankle disorders. Acta Orthop 2014; 85: 187-94. [Crossref]
14. Arbab D, Kuhlmann K, Schnurr C, Bouillon B, Lüring C, Konig D. Reliability, validity and responsiveness of the German self-reported foot and ankle score (SEFAS) in patients with foot or ankle surgery. BMC Musculoskelet Disord 2017; 18: 409. doi: 10.1186/s12891-017-1772-1. [Crossref]
15. Koçyiğit H, Aydemir Ö, Fişek G, Ölmez N, Memiş A. The reliability and validity of the Turkish version of short form-36 (KF-36). J Med Treat 1999; 12: 102-6.
16. Karatepe AG, Günaydın R, Kaya T, Karlıbaş U, Özbek G. Validation of the Turkish version of the foot and ankle outcome score. Rheumatol Int 2009; 30: 169-73. [Crossref]
17. Roos EM, Brandsson S, Karlsson J. Validation of the foot and ankle outcome score for ankle ligament reconstruction. Foot Ankle Int 2001; 22: 788-94. [Crossref]
18. Norman GR, Streiner DL. Biostatistics: the bare essentials: PMPH-USA; 2008.
19. Anthoine E, Moret L, Regnault A, Sébille V, Hardouin JB. Sample size used to validate a scale: a review of publications on newly-developed patient reported outcomes measures. Health Qual Life Outcomes 2014; 12: 176. doi: 10.1186/s12955-014-0176-2. [Crossref]
20. Scholtes VA, Terwee CB, Poolman RW. What makes a measurement instrument valid and reliable? Injury 2011; 42: 236-40. [Crossref]
21. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol 2007; 60: 34-42. [Crossref]