ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

DOI: 10.5336/healthsci.2023-98820

Reliability of the Turkish Version of the Rowan Foot Pain Assessment Questionnaire in Patients with Chronic Foot Pain: A Cross-Cultural Adaptation Study

Rowan Ayak Ağrısı Değerlendirme Ölçeği'nin Türkçe Versiyonunun Kronik Ayak Ağrısı Olan Hastalarda Güvenirliği: Kültürler Arası Uyarlama Çalışması

Abdulhamit TAYFUR[a], Mehmet YETİŞ[b], Mehmet CANLI[a]

[a]Department of Physiotherapy and Rehabilitation, Kırşehir Ahi Evran University School of Physical Therapy and Rehabilitation, Kırşehir, Türkiye
[b]Department of Orthopedics and Traumatology, Kırşehir Ahi Evran University Faculty of Medicine, Kırşehir, Türkiye

ABSTRACT Objective: Foot and ankle pain constitute approximately 8% of the population suffering from musculoskeletal pain. Many measurement tools are available to assess foot pain and function. The Rowan Foot Pain Assessment Questionnaire (ROFPAQ) is an alternative scale that specifically evaluates multi-dimensional measures of chronic foot pain. This study aimed to develop the Turkish version of the ROFPAQ (ROFPAQ-TR) scale and to test its reliability. **Material and Methods:** A total of 198 people (47.7±10.6 years, 80 female, 118 male, 28.3±3.9 kg/m^2) with chronic foot pain between 18 and 65 years of age were included. Descriptive statistics were calculated to profile the study sample and foot pain was measured with ROFPAQ-TR. The test-retest reliability and internal consistency of the ROFPAQ-TR were evaluated with intraclass correlation coefficient (ICC) and Cronbach's alpha, respectively. For the test-retest reliability, the scale was applied to all participants again within two weeks. **Results:** Each domain of ROFPAQ-TR had a good reliability as sensory subscale (ICC=0.83), emotional subscale (ICC=0.89), and cognitive subscale (ICC=0.87). Cronbach's alpha for each domain of the ROFPAQ-TR ranged between 0.92-0.94 showing a high internal consistency. **Conclusion:** This study showed that ROFPAQ-TR is a reliable and internally consistent patient-reported outcome measure to define the severity of foot pain in Turkish population. Therefore, ROFPAQ-TR offers a psychometrically appropriate and useful evaluation of multi-dimensional measures of chronic foot problems.

Keywords: Foot; pain; patient reported outcome measure

ÖZET Amaç: Ayak ve ayak bileği ağrısı, kas-iskelet ağrısı çeken popülasyonun yaklaşık %8'ini oluşturmaktadır. Ayak ağrısını ve işlevini değerlendirmek için birçok ölçüm aracı mevcuttur. Rowan Ayak Ağrısı Değerlendirme Ölçeği [Rowan Foot Pain Assessment Questionnaire (ROFPAQ)], özellikle kronik ayak ağrısının çok boyutlu ölçümlerini değerlendiren alternatif bir ölçektir. Bu çalışmada, ROFPAQ'nun Türkçe versiyonunun (ROFPAQ-TR) geliştirilmesi ve güvenirliğinin test edilmesi amaçlanmıştır. **Gereç ve Yöntemler:** Çalışmaya 18-65 yaş arası kronik ayak ağrısı olan toplam 198 kişi (47,7±10,6 yıl, 80 kadın, 118 erkek, 28,3±3,9 kg/m^2) dâhil edildi. Çalışmaya dâhil edilen bireylerin tanımlayıcı istatistikleri hesaplandı ve ayak ağrısı ROFPAQ-TR ile ölçüldü. ROFPAQ-TR'nin test-tekrar test güvenirliği ve iç tutarlılığı sırasıyla sınıf içi korelasyon katsayısı [intraclass correlation coefficient (ICC)] ve Cronbach alfa ile değerlendirildi. Test-tekrar test güvenirliği için ölçek tüm katılımcılara iki hafta içinde tekrar uygulandı. **Bulgular:** ROFPAQ-TR'nin her bir alanı, duyusal alt ölçek (ICC=0,83), duygusal alt ölçek (ICC=0,89) ve bilişsel alt ölçek (ICC=0,87) olarak iyi bir güvenilirliğe sahipti. ROFPAQ-TR'nin her bir alanı için Cronbach alfa değeri her bir alt ölçek için yüksek bir iç tutarlılık göstererek 0,92-0,94 arasında bulundu. **Sonuç:** Bu çalışma, ROFPAQ-TR'nin Türk popülasyonunda ayak ağrısının şiddetini belirlemede güvenilir ve iç tutarlılığı olan hasta tarafından bildirilen bir sonuç ölçütü olduğunu göstermiştir. Bu nedenle ROFPAQ-TR, kronik ayak sorunlarının çok boyutlu ölçümlerinin psikometrik olarak uygun ve yararlı bir değerlendirmesini sağlar.

Anahtar Kelimeler: Ayak; ağrı; hasta tarafından bildirilen sonuç ölçütleri

The foot is one of the most complex structures in the musculoskeletal system. The foot has attracted the attention of clinicians and researchers because of its role in gait, posture and quality of life. Foot diseases and disorders occur in approximately 25% of the adult population.[1] Foot and ankle pain constitute approximately 8% of the population suffering from musculoskeletal pain.[2] Foot problems can have a neg-

Correspondence: Mehmet CANLI
Department of Physiotherapy and Rehabilitation, Kırşehir Ahi Evran University School of Physical Therapy and Rehabilitation, Kırşehir, Türkiye
E-mail: canlimehmet600@gmail.com

Peer review under responsibility of Turkiye Klinikleri Journal of Health Sciences.

Received: 12 Jul 2023 ***Received in revised form:*** 24 Aug 2023 ***Accepted:*** 28 Aug 2023 ***Available online:*** 21 Sep 2023

ative impact on function and health-related quality of life. Thus, evaluation of the presence and consequences of foot pain or injury is essential.[3]

Patient-reported questionnaires are one of the commonly used outcome measurement tools.[4] Various self-report measurement tools were developed to assess the foot pain and function such as The Foot Function Index (FFI), Foot Health Status Questionnaire, the Self-Administered Foot Evaluation Questionnaire (SAFE-Q), the American Foot and Ankle Orthopedic Society, and the Manchester Foot Pain and Disability Index.[5-9] The Rowan Foot Pain Assessment Questionnaire (ROFPAQ) is an alternative valid and reliable scale that specifically evaluates multi-dimensional measures of chronic foot pain developed by Rowan.[10] The ROFPAQ differs from other foot related questionnaires developed in the literature in terms of cognitive, affective, and sensory evaluation of foot health and foot-related quality of life. This multi-dimensional evaluation provides a holistic approach for the foot pain, hence increase the importance of using the ROFPAQ. It consists of 36 questions addressing three sub-dimensions of pain as sensory (16 questions), emotional (10 questions), and cognitive (10 questions). The original version of the ROFPAQ demonstrated appropriate concurrent validity.[10] To date, cross-cultural adaptation and test-retest reliability of the ROFPAQ have been made for Spanish and Chinese.[11,12] It was reported that the both Spanish and Chinese versions of ROFPAQ were valid and reliable tools with an acceptable use in the relevant populations.[11,12] However, it was not available for Turkish language.

The ROFPAQ is clinically easy to use and evaluates pain with its sub-dimensions. Therefore, the aim of this study was to develop the Turkish version of the ROFPAQ (ROFPAQ-TR) and to test its reliability in patients with chronic foot pain.

MATERIAL AND METHODS

One hundred and ninety-eight people participated in the study. Inclusion criteria for the study were being between 18-65 years old, being able to speak and write Turkish, and having a chronic foot pain diagnosed by an experienced physician (MY). Participants with any mental problem and/or with an additional lower extremity problem were excluded from the study. Before starting the study, all participants were informed and signed a consent form. This study was approved by the Kırşehir Ahi Evran University Faculty of Medicine Clinical Research Ethics Committee (date: May 18, 2021, no: 2021-09/96). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Demographic data such as age, sex and education level of the participants were recorded. All assessments were made during the face-to-face interviews. Foot pain was measured with ROFPAQ-TR. All assessments were completed on the same day. On the other hand, the interval between applications should be long enough to prevent significant recalls and short enough not to allow changes in the condition to be measured.[4] Therefore, ROFPAQ-TR was applied twice within two weeks for the test-retest reliability.

ROFPAQ

The ROFPAQ was developed by Rowan and is a 39-item questionnaire that assesses the sensory (16 question), emotional (10 question) and cognitive (10 question) impact of pain in patients with chronic foot pain. Three items were the indicator of comprehension and should be assessed to see if they are similar. The score of the comprehension items is not added to the sub-scales scores, but if a participant fails to score four or five on these three items, it should be considered whether the questionnaire was completed correctly. If this is the case, the professionals should check for possible mistakes and may even be beneficial to request completing the questionnaire again.[10]

The subscale questions (i.e., sensory, affective, and cognitive) are distributed evenly throughout the questionnaire instead of being grouped by domain. Each question has a Likert scale from 1 (no foot pain or foot pain does not affect patient) to 5 (extreme foot pain or foot pain significantly affects patient). All questions should be scored within their respective domain. The sub-scale scores are calculated by summing the individual item scores within them, and then dividing by the number of items within that scale. It equates to the average score for each item in the sub-

scale, and therefore the sub-scale score range is also one to five. There is no total score of the three sub-scale and a high score for each domain indicates that foot pain negatively affects the patient's life.[10]

The translation process of the questionnaire started after obtaining permission from the developers. The ROFPAQ's cross-cultural adaptation process was carried out following the Brislin's model:[13] A) Translation and back-translation: The original ROFPAQ was translated into Turkish by two researchers with advanced knowledge of English and Turkish. The consistency of the two translations with each other was reviewed and discussed to reach consensus. Later, the questionnaire was translated into English by two researchers working in the field of orthopedics and podiatrics. These two researchers have a background of working in English-speaking regions. Again, these two translations were compared and validated by a bilingual expert on the design and cross-cultural validity of the questionnaire. B) The content validity of the questionnaire was discussed by an expert committee selected based on their experience and professional knowledge. This committee consists of two orthopedic specialist, two physiotherapists and one podiatrist. This committee evaluated the items in the questionnaire in terms of relevance and repetition using the content validity index. Additionally, the Turkish translation of the ROFPAQ did not require any cultural adaptation in the content of the questions. Please see the Appendix 1 for the Turkish version of the ROFPAQ. C) Pilot study: To evaluate whether the ROFPAQ-TR was easy to understand, 20 patients with chronic foot pain were evaluated. After all the steps in the instruction were completed, the psychometric properties of the questionnaire were tested. As a result, 20 people rated the ROFPAQ-TR as an easy to understand and answer.

SAMPLE SIZE CALCULATION

Sample size calculation was based on 5 events per variable as it is one of the most common methods to estimate sample size in observational studies.[14] Each item of the ROFPAQ was considered as a variable. Therefore, sample size was 195 participants (5x39 item) in total.

STATISTICAL ANALYSIS

Descriptive statistics were calculated to profile the study sample and were reported as mean±standard deviations for continuous data and n (%) for categorical data. Test-retest reliability was analysed by using the intraclass correlation coefficient (ICC, two-way random, absolute agreement), classified as <0.5, 0.5 to 0.75, 0.75 to 0.9, and >0.90 being poor, moderate, good, and excellent, respectively.[15] Cronbach's alpha was calculated for each subscale as a measure of internal consistency and a score >0.70 was considered high internal consistency.[16] Statistical analyses were performed with the licensed IBM SPSS v22.0 software (IBM Statistical Packages for the Social Sciences, USA). A significance level of $p<0.05$ was considered statistically significant for all analyses.

RESULTS

A total of 198 patients (47.7±10.6 years, 118 males) with chronic foot pain were recruited between January and June 2022. Overall, participants were overweighted (28.3±3.9 kg/m^2). Participants demographics were shown in Table 1.

According to the committee's evaluate, the content validity index of ROFPAQ-TR reached 0.91 and showed excellent content validity. Also, 20 participants from the pilot study rated the ROFPAQ-TR as an easy to understand and answer.

Test-retest reliability for each domain of ROFPAQ-TR was good as sensory subscale [ICC=0.83,

TABLE 1: Participants' descriptive features.

Demographics (n=198)	X̄±SD/n (%)
Age, years	47.7±10.6
Body mass index, kg/m^2	28.3±3.9
Male: Female	118 (59.6%): 80 (40.4%)
Married: Single	172 (86.9%): 26 (13.1%)
Education	
Primary school	98 (49.5%)
Secondary school	40 (20.2%)
High school	18 (9.1%)
University	42 (21.2%)
Alcohol (Yes: No)	38 (19.2%): 160 (80.8%)
Smoking (Yes: No)	66 (33%): 132 (67%)

SD: Standard deviation.

APPENDIX 1: Rowan ayak ağrısı değerlendirme ölçeği.

Skorlama	
C= Bilişsel alt ölçek	
S= Duygusal alt ölçek	
A= Duyusal alt ölçek	
1. Ayak ağrımı bazen görmezden gelebiliyorum.	Madde 1 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	1 2 3 4 5
2. Yürürken ayaklarınız ne kadar ağrıyor?	Madde 2 S
Ağrı yüzünden yürüyemem/Çok fazla/Bilmiyorum/Biraz/Hiç yok	5 4 3 2 1
3. Ayağımı/ayaklarımı vurmaktan çekiniyorum.	Madde 3 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
4. Ayak ağrısı hayatımın önemli bir parçasıdır.	Madde 4 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
5. Ayağa kalktığınızda ayaklarınız ne kadar ağrıyor?	Madde 5 S
Ağrı yüzünden ayağa kalkamam/Çok fazla/Bilmiyorum/Biraz/Hiç yok	5 4 3 2 1
6. Ayak ağrım beni üzer.	Madde 6 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
7. Uyandığımda ayaklarımın acı çekmesini bekliyorum.	Madde 7 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
8. Otururken ayakların ne kadar ağrıyor?	Madde 8 S
Ağrı yüzünden oturamam/Çok fazla/Bilmiyorum/Biraz/Hiç yok	5 4 3 2 1
9. Ayak ağrım beni sinirlendirir	Madde 9 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
10. Ayak ağrım beni asla rahatsız etmez.	Kapsam: Skor 4 veya 5 olmalı
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	1 2 3 4 5
11. Ayak ağrım dayanılmaz olabilir.	Madde 11 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
12. Ne yaparsam yapayım ayaklarım her zaman ağrıyor.	Madde 12 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
13. Ayak ağrım kendime üzülmeme neden oluyor	Madde13 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
14. Ayak ağrısı hayatımı çok etkiliyor.	Madde14 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
15. Ayaklarınız ayakta durmaktan ya da yürümekten ağrıyorsa, oturduğunuzda ne olur?	Madde15 S
Hiçbir şey: Ağrılarım devam eder/Uzun bir süre sonra ağrı durur/Ayakta yada yürürken ayaklarım acımıyor/Ağrı kısa bir süre sonra durur/Ağrı aniden durur	5 4 3 2 1
16. Ayak ağrım beni sinirlendiriyor.	Madde16 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
17. Gelecekte ayak ağrımın iyice kötüleşeceğinden endişeliyim.	Madde17 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
18. Ayak ağrım beni rahatsız ediyor.	Madde18 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
19. Ayak ağrım beni yorgun hissettiriyor.	Madde19 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
20. Asla ayak ağrısı çekmem.	Kapsam: Skor 4 veya 5 olmalı
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum.	1 2 3 4 5
21. Ayak ağrısız bir hayat hayal edemiyorum.	Madde21 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
22. Ayağım/ayaklarım ağrımadan önce sadece kısa bir mesafe yürüyebiliyorum.	Madde22 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
23. Ayak ağrım ağlama isteği uyandırır.	Madde23 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
24. Ayak ağrımla ilgili kötü şeyler sevdiğim şeyleri yapmamı engeller.	Madde24 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
25. Ayaklarıma dokunmadan bile titreşimler ağrıya neden olabilir.	Madde25 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
26. Ayağımdaki ağrı bazen bağırmak istememe neden oluyor.	Madde26 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
27. Ayak ağrımı bazen unutabilirim.	Madde27 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	1 2 3 4 5
28. Ayaklarım her zaman biraz ağrı çekiyor.	Madde28 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum.	5 4 3 2 1
29. Ayak ağrımın hayatıma getirdiği kısıtlamalardan bıktım.	Madde29 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
30.Ayak ağrım beni rahatsız ediyor.	Kapsam: Skor 4 veya 5 olmalı
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
31. Ağrının ayağıma/ayaklarıma aldığım acı kadar kötü olabileceğini hiç düşünmemiştim.	Madde31 C
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
32. Ayak ağrım gelir ve gider.	Madde32 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum.	1 2 3 4 5
33. Ayak ağrım giymek istediğim ayakkabıları giymeme engel olunca beni üzüyor.	Madde33 A
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum.	5 4 3 2 1
34. Ayak ağrısı olmadan uzun süre ayakta duramam.	Madde34 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
35. Ayak ağrım gün boyunca sabittir.	Madde35 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
36. Ayak ağrım uykumu bozar.	Madde36 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
37. Geceleri yatak örtüsünün ayaklarıma dokunmasına dayanamıyorum.	Madde37 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
38.Ayak ağrımdan dolayı sıradan ayakkabı giyemiyorum.	Madde38 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1
39.Ayak ağrısı olmadan kısa bir mesafe bile yürüyemiyorum.	Madde39 S
Kesinlikle katılıyorum/Katılıyorum/Fikrim yok/Katılmıyorum/Kesinlikle katılmıyorum	5 4 3 2 1

TABLE 2: Test-retest reliability and internal consistency for the subscales of the ROFPAQ-TR.

ROFPAQ-TR	Test	Retest	ICC (95% CI)	Cronbach's α
Sensory	4.42±0.23	4.47±0.19	0.83 (0.70-0.89)	0.92
Emotional	4.50±0.24	4.50±0.26	0.89 (0.86-0.92)	0.94
Cognitive	4.38±0.25	4.40±0.24	0.87 (0.83-0.90)	0.93

ROFPAQ-TR: Turkish version of the Rowan Foot Pain Assessment Questionnaire; CI: Confidence interval.

95% confidence interval (CI) 0.70-0.89], emotional subscale (ICC=0.89, 95% CI 0.86-0.92), and cognitive subscale (ICC=0.87, 95% CI 0.83-0.90), (Table 2). Cronbach's alpha for each domain of the ROFPAQ-TR ranged between 0.92-0.94 showing a high internal consistency (Table 2). Additionally, Cronbach's alpha values were measured for all the ROFPAQ-TR items (Table 3). All the items showed a high internal consistency ranging from 0.71 to 0.99, except item 12 (α=0.58), item 17 (α=0.65) and item 32 (α=0.66).

DISCUSSION

This study, conducted with 198 Turkish adults with foot problems, investigated the content validity, reliability and internal consistency of the ROFPAQ scale in Turkish population. The content validity index showed excellent content validity for the Turkish version of the ROFPAQ (ROFPAQ-TR). The each subscale of the ROFPAQ-TR had a good reliability and a high internal consistency. The ROFPAQ-TR demonstrates evidence for its content validity and reliability to evaluate multi-dimensional aspects of the pain in people with foot problems in a Turkish population.

In the original study, Rowan analysed the test-retest reliability with Spearman coefficient values for the ROFPAQ sub-scales and reported that all subscales had a reliability more than acceptable. In the Spanish version of the ROFPAQ, test-retest reliability ranged from moderate to excellent for the domains.[10,11] Specifically, sensory subscale had a moderate reliability (ICC=0.66, 95% CI 0.45-0.79), while reliability was excellent and good for emotional (ICC=0.995, 95% CI 0.991-0.997) and cognitive subscales (ICC=0.79, 95% CI 0.65-0.87), respectively. Similarly, the Chinese version of the

TABLE 3: Internal consistency of all the ROFPAQ-TR items.

ROFPAQ-TR items	Cronbach's α
Item 1	0.87
Item 2	0.77
Item 3	0.86
Item 4	0.90
Item 5	0.99
Item 6	0.79
Item 7	0.98
Item 8	0.85
Item 9	0.72
Item 10	0.98
Item 11	0.87
Item 12	0.58
Item 13	0.87
Item 14	0.72
Item 15	0.76
Item 16	0.77
Item 17	0.65
Item 18	0.83
Item 19	0.84
Item 20	0.88
Item 21	0.78
Item 22	0.82
Item 23	0.86
Item 24	0.82
Item 25	0.74
Item 26	0.71
Item 27	0.90
Item 28	0.90
Item 29	0.99
Item 30	0.86
Item 31	0.93
Item 32	0.66
Item 33	0.88
Item 34	0.92
Item 35	0.81
Item 36	0.94
Item 37	0.78
Item 38	0.88
Item 39	0.86

ROFPAQ-TR: Turkish version of the Rowan Foot Pain Assessment Questionnaire

ROFPAQ had a moderate to excellent test-retest reliability for the domains as cognitive (ICC=0.71, 95% CI 0.64-0.78), emotional (ICC=0.93, 95% CI 0.91-0.95) and sensory (ICC=0.75, 95% CI 0.69-0.81). On the other hand, the test-retest reliability of the ROFPAQ-TR was found good for each domain as sensory (ICC=0.83), emotional (ICC=0.89), and cognitive subscales (ICC=0.87).[12] Overall, the ROFPAQ-TR had a higher reliability compare to the original ROFPAQ, and had a higher or similar reliability compare to the Spanish and Chinese versions of the ROFPAQ, except their emotional subscale. This finding was also consistent with the other foot related patient reported outcome measures. For instance, test-retest reliability of the FFI and the SAFE-Q were also moderate to good for the total and sub-scale scores as 0.69 to 0.87 and 0.72 to 0.85, respectively.[5,7] As a results, ROFPAQ-TR is a reliable tool and has one of the highest reliability values among the patient reported outcome measures for the foot problems.

In the original version of the ROFPAQ, the internal consistency was reported as high for its subscales (all >0.7).[10] In the Spanish version of the ROFPAQ, a high internal consistency was shown with the Cronbach α scores for the 3 domains about sensory (α=0.74-0.73), emotional (α=0.75-0.80), and cognitive (α=0.76-0.79) subscales.[11] The Chinese version of the ROFPAQ also had high internal consistencies as sensory (α=0.80-0.81), emotional (α=0.63-0.80), and cognitive (α=0.80-0.88) subscales.[12] In our study, Cronbach's alpha coefficients were also calculated for the ROFPAQ-TR, and found as 0.92, 0.94 and 0.93 for the sensory, emotional, and cognitive subscales, respectively. This finding was also similar with the other foot related patient reported outcome measures as high internal consistency was reported for the FFI ranging from 0.73 to 0.96 and for the Manchester Foot Pain and Disability Index (α=0.99).[5,9] Our study showed a high internal consistency for each domain of the ROFPAQ-TR, and therefore were parallel to the findings in the literature.

There are some limitations of this study. We could not test the criterion validity of the ROFPAQ-TR with the other self-reported questionnaires for the foot and ankle problems. The reason for this was that the ROFPAQ specifically evaluates the different aspect of the pain such as sensory, emotional and cognitive which were absent from the content of the other foot related self-reported questionnaires, and therefore makes it harder to compare and check the criterion validity. This was also an issue in the original study as criterion validity of the ROFPAQ was checked by using FFI scale.[10] However, correlations for the emotional and cognitive domains were problematic. Thus, it was suggested that the ROFPAQ measures different dimensions of the pain as expected. The other reason could be that the ROFPAQ is not suitable for the total score calculation. We also could not check the responsiveness of the ROFPAQ-TR such as sensitivity and specificity. The reason for this was that not having healthy control participants as sensitivity and specificity analysis requires true/false negative and true/false positive events to see how accurately the questionnaire works. Therefore, responsiveness could not be measured due to having all participants with foot pain. Lastly, the fact that the ROFPAQ consists of 39 questions requires a long time to fill it compared to the most of the other foot related questionnaires in the literature. This could adversely affect the practicality of the use of ROFPAQ. Thus, the ROFPAQ might be underused since its development. However, the multi-dimensional evaluation of the ROFPAQ is the main difference from other foot related questionnaires by providing a holistic approach for the foot pain which increase the importance of using the ROFPAQ.

CONCLUSION

In conclusion, reliable and internally consistent patient-reported results were found in Turkish-speaking patients with chronic foot pain for the Turkish version of the ROFPAQ. This study demonstrated that the ROFPAQ-TR offers a psychometrically appropriate and useful evaluation of multi-dimensional measures of chronic foot problems.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that pro-

vides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Abdulhamit Tayfur, Mehmet Yetiş;* ***Design:*** *Abdulhamit Tayfur, Mehmet Canlı;* ***Control/Supervision:*** *Abdulhamit Tayfur, Mehmet Yetiş, Mehmet Canlı;* ***Data Collection and/or Processing:*** *Abdulhamit Tayfur, Mehmet Canlı;* ***Analysis and/or Interpretation:*** *Abdulhamit Tayfur;* ***Literature Review:*** *Mehmet Canlı;* ***Writing the Article:*** *Abdulhamit Tayfur;* ***Critical Review:*** *Mehmet Yetiş;* ***References and Fundings:*** *Abdulhamit Tayfur, Mehmet Canlı.*

REFERENCES

1. Hawke F, Burns J. Understanding the nature and mechanism of foot pain. J Foot Ankle Res. 2009;2:1. [Crossref] [PubMed] [PMC]
2. Menz HB, Jordan KP, Roddy E, Croft PR. Characteristics of primary care consultations for musculoskeletal foot and ankle problems in the UK. Rheumatology (Oxford). 2010;49(7):1391-8. [Crossref] [PubMed] [PMC]
3. Riskowski JL, Hagedorn TJ, Hannan MT. Measures of foot function, foot health, and foot pain: American Academy of Orthopedic Surgeons Lower Limb Outcomes Assessment: Foot and Ankle Module (AAOS-FAM), Bristol Foot Score (BFS), Revised Foot Function Index (FFI-R), Foot Health Status Questionnaire (FHSQ), Manchester Foot Pain and Disability Index (MFPDI), Podiatric Health Questionnaire (PHQ), and Rowan Foot Pain Assessment (ROFPAQ). Arthritis Care Res (Hoboken). 2011;63 Suppl 11(0 11):S229-39. [Crossref] [PubMed] [PMC]
4. Tayfur A, Şendil A, Karakaya J, Ergun N. Cross-cultural adaptation, validity, and reliability of Turkish version of Identification of Functional Ankle Instability (IdFAI) scale. Acta Orthop Traumatol Turc. 2020;54(3):300-4. [Crossref] [PubMed] [PMC]
5. Budiman-Mak E, Conrad KJ, Roach KE. The Foot Function Index: a measure of foot pain and disability. J Clin Epidemiol. 1991;44(6):561-70. [Crossref] [PubMed]
6. Bennett PJ, Patterson C, Wearing S, Baglioni T. Development and validation of a questionnaire designed to measure foot-health status. J Am Podiatr Med Assoc. 1998;88(9):419-28. [Crossref] [PubMed]
7. Niki H, Tatsunami S, Haraguchi N, Aoki T, Okuda R, Suda Y, et al. Validity and reliability of a self-administered foot evaluation questionnaire (SAFE-Q). J Orthop Sci. 2013;18(2):298-320. [Crossref] [PubMed] [PMC]
8. SooHoo NF, Shuler M, Fleming LL; American Orthopaedic Foot and Ankle Society. Evaluation of the validity of the AOFAS Clinical Rating Systems by correlation to the SF-36. Foot Ankle Int. 2003;24(1):50-5. [Crossref] [PubMed]
9. Garrow AP, Papageorgiou AC, Silman AJ, Thomas E, Jayson MI, Macfarlane GJ. Development and validation of a questionnaire to assess disabling foot pain. Pain. 2000;85(1-2):107-13. [Crossref] [PubMed]
10. Rowan K. The development and validation of a multi-dimensional measure of chronic foot pain: the ROwan Foot Pain Assessment Questionnaire (ROFPAQ). Foot Ankle Int. 2001;22(10):795-809. [Crossref] [PubMed]
11. Navarro-Flores E, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Palomo-Lopez P, Lopez-Lopez D, Sanchez-Gomez R, et al. Cross-Cultural Adaptation and Test-Retest Reliability of the Spanish ROWAN Foot Pain Assessment Questionnaire (ROFPAQ-S). Pain Physician. 2020;23(1):E1-E6. [Crossref] [PubMed]
12. Zheng Z, Tian T, Wang G, Geng Y, Cao S, Zhang Z, et al. A cross-sectional, multicenter study examining the validation and adaptation of the Chinese ROWAN foot pain assessment questionnaire. Pain Physician. 2022;25(5):401-8. [PubMed]
13. Brislin RW. Back-translation for cross-cultural research. Journal of Cross-Cultural Psychology. 1970;1(3):185-216. [Crossref]
14. Peduzzi P, Concato J, Kemper E, Holford TR, Feinstein AR. A simulation study of the number of events per variable in logistic regression analysis. J Clin Epidemiol. 1996;49(12):1373-9. [Crossref] [PubMed]
15. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med. 2016;15(2):155-63. Erratum in: J Chiropr Med. 2017;16(4):346. [Crossref] [PubMed] [PMC]
16. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34-42. [Crossref] [PubMed]