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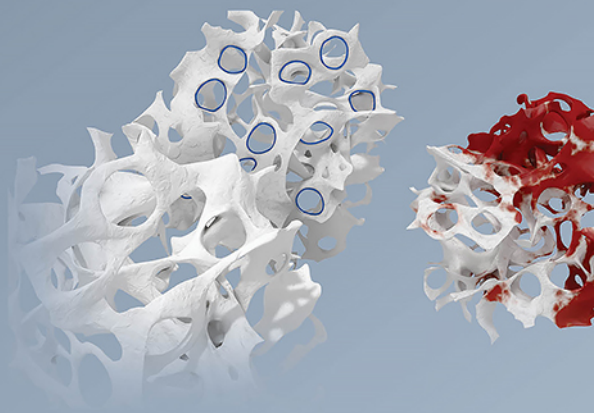

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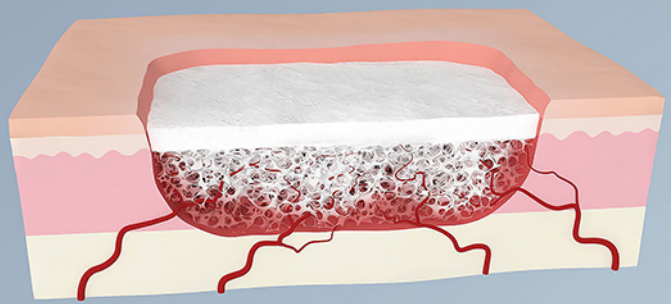

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ORIGINAL ARTICLE

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Cross-cultural adaptation, translation, and validation of the Spanish Foot and Ankle Outcome Score questionnaire

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Abstract

The Spanish Foot and Ankle Outcome Score questionnaire (FAOS-S) may be considered a health evaluation tool with 42 questions for assessing foot health disorders. To date, FAOS has been validated in different languages, but a Spanish version was lacking. Consequently, the purpose of this study was to translate and validate the Spanish version of the FAOS (FAOS es). A suitable method was developed for the translation protocol and cross-cultural validation from Swedish to Spanish. Regarding the total marks from each domain, agreement degrees and confidence were analysed using the Cronbach's α and intraclass correlation coefficient, respectively. In addition, the mean ± SD differences between pretest and posttests were calculated and completed using of the Bland and Altman distribution plots. Excellent agreement between the two versions based on Cronbach's α was demonstrated. Five domains consisting of pain, symptoms of foot disorders, activities of daily living, sports and recreation, and foot and ankle quality of life were added together to obtain the total score. Excellent retest reliability was shown for the total score. Test/retest reliability was excellent for the pain, stiffness, other foot disorder-related symptoms, and quality of life domains. There were no significant differences among any domain ($P > .05$). There were no statistically significant differences ($P = .000$) for the mean ± SD differences between pretest and posttests (56.2524 ± 19.064 [51.98–60.52] and 57.45 ± 21.02 [52.74–62.16] points, respectively). Bland and Altman plots or clinically pertinent variations were not statistically significantly different. The FAOS is considered a strong and valid questionnaire with adequate repeatability in the Spanish community.

KEYWORDS

health-related quality of life, pain measurement, questionnaire

1 | INTRODUCTION

Clinimetric tools, such as the Foot Health Status Questionnaire (FHSQ), Manchester Foot Pain and Disability Index (MFPDI), and Foot Function Index (FFI), were adapted for use in Spain and verified for measuring the quality of an individual's foot life.[1-4]

Disorders and diseases are present on foot in approximately 25% of the adult population.[5] Foot disorders are present, with very high prevalence rates between 61.3% and 79% reported in medical centre. But knowledge about the economic cost of these disorders from the point of view of public health with respect to the general population seems to be unclear nowadays.[6]

Consultations in general medicine related to the environment of musculoskeletal ankle and foot pain origins account for more than 8% of these types of consultations.[7] Accordingly, foot disorders may increase this frequency in the elderly with characteristic foot alterations, which can be combined with major elderly-related disabilities, such as the risk of falls.[8-10]

The Foot and Ankle Outcome Score (FAOS) is a self-administered clinimetric tool with 42 questions that measure ankle and foot function, such as regular activities, pain, foot health quality, and sport and recreational activities. The FAOS was developed in Sweden with appropriate and concurrent validity in other countries.[11]

Nevertheless, the same authors developed modifications between the FAOS and Knee, Injury, Osteoarthritis, and Outcome Score (KOOS) with very good agreement.[12-14]

Consequently, the FAOS reflects awareness of health foot health quality in study subjects, and it can also be used to evaluate the postinterventional differences that determine the state of foot health within the population.[12]

After taking into account the FAOS domains, five underlying factors were considered. The quality of life domain (0.989) was shown to be the most important for predicting self-reported foot disorders (47.930% out of the set of 42 responses). Pain and stiffness domains and other symptom factors were reported to be useful for predicting pain (89.435% and 42.510% of the variation, respectively).[11]

Nevertheless, cross-cultural validation, acceptability, and confidence measurements must be carried out following the guidelines in order to maintain cross-cultural measurement properties.[15] Our hypothesis was that the FAOS questionnaire would be a reliable clinimetric tool in the Spanish population.

Up to this point, the FAOS had not been validated or adapted to Spanish for use in Spain.[16-18] Accordingly, the purpose of this research was to complete the cross-cultural translation and validity of the Spanish FAOS version (FAOS es).

Key Messages

- Useful and trustworthy clinimetric tool
- This questionnaire can be administered in the total context or divided into domains, such as stiffness, pain, activities of daily living, sports and recreational activities, and ankle and foot quality of life subscales
- The quality of life domain (0.989) was shown to be the most important for predicting self-reported foot disorders (47.930% out of the set of 42 responses). Pain and stiffness domains and other symptom factors were reported to be useful for predicting pain (89.435% and 42.510% of the variation, respectively)

2 | METHODS

A cross-sectional descriptive study was conducted between September and November 2019 following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).[19] Translation and validation processes were developed using the FAOS as a clinimetric instrument.[11]

Ethical approval was obtained from the Committee of the University of Extremadura, Code 251/2019. In addition, all patients were informed of the study purpose, and their consent was obtained. Ethical standards in human experimentation based on The Declaration of Helsinki were followed.[20]

2.1 | Procedure of translation

The translation rules were applied using the recommended forward-backward method for translation of Swedish into Spanish in addition to cross-cultural adjustment and validity.[2,3,21-23] Development of the translation procedure was based on the worldwide guidelines.[21,24]

The original author of the clinimetric tool, FAOS (ER), was contacted to obtain permission to translate the original version.[11]

The translation was developed by two neutral polyglot Spanish interpreters.

The final version in Spanish was first developed by each translator individually.

The arranged, forward-translated FAOS es was back-translated to Spanish by three authors, one nurse, and two podiatrists.

The final version was compared with the primary version and checked for translation similarity and confusing statements.

The final version was agreed upon by the research team, four podiatrists, two nurses, and two physiotherapists.

An evaluation by the podiatric medical clinic to provision viability and prevent possible misunderstanding.[24]

FAOS es was arranged using a Likert scale in order to improve patient-reported outcomes.[2,25]

2.2 | Reliability test procedure and subject

Test and retest forms were completed by 79 patients (24 men, 55 women). Sociodemographic data (sex, age, body mass index [BMI], study degree, and activity) and foot disorders were self-reported by the participants. Participants were recruited from podiatric medical clinics in which university learners develop their practices. A project pilot was developed for determining people's ability to understand the FAOS es. Regarding correspondence with an interclass correlation coefficient (ICC) of 0.40 and a 95% confidence interval (CI) for a two-tailed test, an error α of 0.05, a desired analysis power of 80% (error $\beta = 20\%$), a final sample size of 79 participants (24 men, 55 women) were obtained. The sample heterogeneity was tested for this tool for numerous and diverse foot statuses.[2] The total scale and domain questions FAOS es scores about stiffness, pain, daily activities of living, and ankle and foot quality of life, and sports and recreation were acquired.[11]

2.3 | Statistical analysis

We measured the normality of the variable distribution using the Kolmogorov-Smirnov test, and results were determined as normally distributed if $P > .05$. The whole marks of dimension results measured in the research presented a non-normal distribution ($P < .05$), and for this reason, the distribution was analysed using the Wilcoxon signed-rank non-parametric paired test for the purpose of testing systematic differences between test and retest results. In order to test differences between groups, the Mann-Whitney test was used. Regarding each domain's score and total score, correlation, reliability, and internal consistency were analysed using Spearman's correlation coefficient (r_s,) ICC values, and Cronbach's α, respectively. Cronbach's α was employed to outline the internal consistency of all questions within a domain. In order to address discrepancies, a major coefficient (oscillating between 0.0 and 1.0) was contemplated for more uniform domains with an excellent possibility of considering supporting an individual variable on the clinimetric instrument. Correlations of all questions were checked at an equal degree and also whether Cronbach's α was changing. We tested correlations of all questions with the overall degree using non-parametric Spearman's rank test.

Taking into account total marks, every domain, reliability, and internal consistency using the ICC, Cronbach's α, and a 95% CI were, respectively, examined. In addition, Bland and Altman plots were calculated for estimate acceptance and heteroscedasticity.[26]

3 | RESULTS

3.1 | Translation

The adaptation of the FAOS es was enacted with only minor differences and a very high degree of agreement between the two translations. The back-translations between FAOS and FASO es were almost identical for most of the questions. The intellectual evaluation showed excellent comprehension and understanding of the FAOS es. The sociodemographic data, including age, height, BMI, and weight are shown in Table 1.

TABLE 1 Socio-demographic characteristics of the sample population

	Total group (mean ± SD range) N = 79	Men (mean ± SD range) N = 24	Women (mean ± SD range) N = 55	*P* value
Age (years)	41.430 ± 16.100 (37.824-450 366)	40.083 ± 2.828 (32.823-47.342)	42.018 ± 15.728 (37.943-46.092)	.865
Weight (kg)	69.515 ± 13.904 (66.400-72.629)	75.375 ± 13 792 (69.550-81.199)	66.958 ± 13.278 (63.368-70.547)	.015
Height (cm)	1.674430 ± 0.0956 (1.653-1.695)	1.735 ± 0.059 (1.710-1.760)	1.647 ± 0.096 (1621-1673)	.000
BMI (kg/m^2)	24.869 ± 4.980 (23753-25 984)	24.976 ± 4.234 (23.189-26.764)	24.822 ± 5.309 (23.3867-26.257)	.750

Note: In all the analyses, $P < .05$ (with a 95% confidence interval) was considered statistically significant. *P* values are from *U* Mann-Whitney test.

Abbreviations: BMI, body mass index.

TABLE 2 Results of test/retest reliability, item/total correlation, and systematic differences of the FAOS according to each domain

	Test			Retest			Correlation test/retest	Reliability test/retest	Systematic differences (test/retest)
Domain	Mean ± SD (95% CI) N = 79	Item–total correlation; *r* (*P*)[a]	Alpha if item removed	Mean ± SD (95% CI) N = 79	Item–total correlation; *r* (*P*)[a]	Alpha if item removed	*r* (*P*)[a]	ICC (95% CI)	*P* value[b]
Pain	55.90 ± 21.05 (51.19-60.62)	0.920 (<.01)	0.937	57.45 ± 21.02 (52.74-62.16)	0.898 (<.01)	0.946	0.892 (<.01)	0.966 (0.947-0.978)	.078
Stiffness and other symptoms	55.65 ± 19.40 (51.30-59.99)	0.781 (<.01)	0.946	57.59 ± 20.18 (53.07-62,11)	0.829 (<.01)	0.951	0.898 (<.01)	0.954 (0.928-0.971)	.078
Function in daily living,	65.43 ± 15.92 (61.86-68.999)	0.842 (<.01)	0.943	65.22 ± 16.34 (61.56-68.88)	0.865 (<.01)	0.951	0.787 (<.01)	0.906 (0,854-0.940)	.730
Function in sport and recreation	57.59 ± 24.12 (52.19-62.99)	0.856 (<.01)	0.943	58.22 ± 22.44 (53.19-63.25)	0.891 (<.01)	0.947	0.823 (<.01)	0.903 (0.849-0.938)	.757
Foot and ankle-related quality of life	46.67 ± 26.51 (40.73-52.61)	0.887 (<.01)	0.951	45.88 ± 25.88 (40.08-51.68)	0.900 (<.01)	0.963	0.877 (<.01)	0,9520 (0.926-0.970)	.649
Total	56.25 ± 19.06 (51 982-60 522)	N/A	0.926	56.87 ± 19.08 (52.59-61.14)	N/A	0.935	0.935 (<.01)	0.970 (0.953-0,981)	.403
	Total Cronbach α test: 0.926			Total Cronbach α retest: 0.935					

Note: P value <.05 are considered as statistically significant.

Abbreviations: CI, confidence interval; ICC, intraclass correlation coefficient; N/A, not applicable.

[a]Spearman (r_s) test.

[b]Wilcoxon signed-rank test.

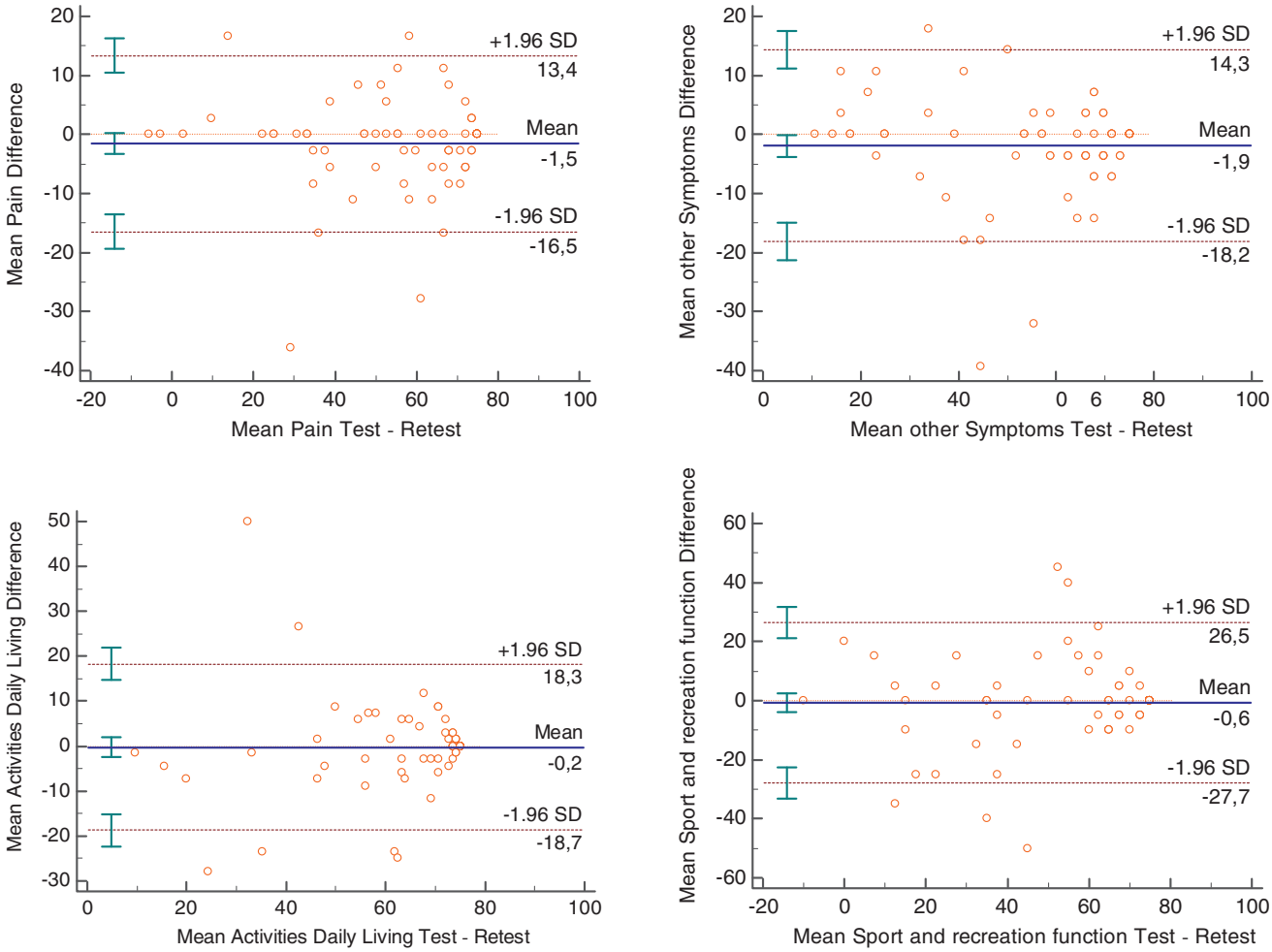

FIGURE 1 Bland–Altman plot showing the agreement between test and retest for the individual subscales and the total score. Dimensions: A, pain; B, other symptoms; C, activities daily living; D, sport and recreation function; E, foot and ankle RQL; F, total score

3.2 | Test/retest analyses

Test/retest reliability results and systematic differences of the FAOS es instrument by domains and total scores are indicated in Table 2. An adequate Cronbach' α was indicated for the five domains: (a) pain ($\alpha = 0.966$); (b) stiffness ($\alpha = 0.954$); (c) daily living ($\alpha = 0.906$); (d) sports and recreational activities ($\alpha = .903$); and (e) foot and ankle health quality in addition to total marks ($\alpha = 0.989$). Excellent test/retest reliability was shown for the total score (ICC = 0.970 [0.956–0.981]), and each of the domains such as foot and ankle health quality of life (ICC = 0.9520 [0.926–0.970]), stiffness and other symptoms (ICC = 0.954 [0.928–0.971]), and pain (ICC = [0.947–0.978]). The Spearman's correlations (r_s) between test and retest results were adequate for pain ($r = 0.892$), stiffness ($r = 0.898$), daily living activities ($r = 0.787$), sports and recreation activities ($r = 0.823$), foot- and ankle-related quality of life ($r = 0.877$) domains, and total scores ($r = 0.935$).

No systematic differences for dimension and total scores were noted ($P > .05$).

Figure 1A-F displays the Bland-Altman plots for the test/retest of each domain and total for each participant, and the difference between session means fell within the 95% CI for all of them and presented very similar results.

4 | DISCUSSION

According to the international recommended guidelines,[13,18] the FAOS es may be used as a valid questionnaire to measure the impact of alterations associated with foot disorders such as pain, stiffness, daily activities, sports, and recreational activities, and also foot and ankle health quality of life domains in the Spanish population. The original FAOS was validated in Sweden with a very high degree of reliability and sensitivity after clinical interventions.[27,28]

The Spanish FAOS-S could be used in adult and older populations regarding the most common foot conditions

as claw toes, metatarsalgia, first-ray deformity heel pain, mainly.

Before our research, Spanish cross-cultural validation and adaptation of foot health-related clinimetric tools were developed with almost identical effects.[3,4] The results of Spanish version of the FFI (FFISp) were considered as a valid and credible clinimetric instrument with an excellent Cronbach's α for assessing foot disorders.[4] Moreover, the Spanish Manchester questionnaire (MFPDI) was a strong climinetric measure with subscales for pain or foot disorders, for example, because an appropriate Rasch model (χ^2 [df] = 15.945; $P = .194$), exceptional consistency, and unidimensionality were provided.[3] Observing Table 1 we did not find differences between sex, $P = .865$). There are differences in weight and height but is normal due to the sex but the BMI is similar in both sex ($P = .750$).

Finally, we should consider possible limitations according to the research results. First, the FAOS es was developed based on podiatric medical clinic university learners' performances of the exercises although the initial FAOS was completed from an orthopaedic surgery centre.[11] Second, test/retest in this study was completed with an electronical address while the original FAOS and other Spanish validated scales were developed by face-to-face interviews with the study subjects.[3,4,11,29] As a final point, age groups, such as infant populations, were not considered in this validation, whereas other tools, such as the Oxford questionnaire (Ox-AFQ) translation was divided into ages ranging from 5 to 16 years.[30] For future consideration, the main disadvantage was the extension of the FAOS questionnaire, too long, as a difference of another pain scale as Victorian Institute of Sport Assessment (VISA)[31] or Bristol Foot Scale (BFS)[32] shorter than this tool.

5 | CONCLUSION

The FAOS es is a useful and trustworthy clinimetric tool with appropriate applications in the Spanish community. This questionnaire can be administered in the total context or divided into domains, such as stiffness, pain, activities of daily living, sports and recreational activities, and ankle and foot quality of life subscales.

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