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ORIGINAL ARTICLE

Validation of the Portuguese version of the Functional Index for Hand Osteoarthritis (FIHOA)

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ABSTRACT

Introduction: Hand osteoarthritis (HOA) is a prevalent rheumatic disease that may cause significant disability. The Functional index for HOA (FIHOA) is a validated questionnaire to evaluate loss of function in patients with HOA.

Objective: To undertake a cross-cultural adaptation and validation of FIHOA into Portuguese.

Patients and methods: First, the original French version of FIHOA had been forward-backward translated into Portuguese, according to the guidelines for cross-cultural adaptation. Secondly, patients with primary HOA were consecutively recruited in three Portuguese rheumatology outpatient clinics between May 2016 and April 2018. The final consensual Portuguese version of FIHOA was administered to 52 patients. A numerical rating scale (NRS – 0 to 100mm) for hand pain and for perceived hand dysfunction was also registered. Ten randomly selected patients were re-administered the same tools 5 to 15 days later. Internal consistency, test-retest reliability, internal construct validity and external validity related to dysfunction NRS were evaluated.

Results: Fifty-two patients were evaluated: all right-handed, 96% women, mean age of 63 (10) years and 8 (6) years of disease duration. Mean (SD) pain and dysfunction were 47 (25) and 46 (25), respectively, with 68% patients being symptomatic. Mean (SD) FIHOA was 7 (5). Cronbach's alpha for internal consistency was high and adequate (0.87) and corrected item-total correlation revealed adequate performance. For reliability, Spearman's rho coefficient was 0.88 and total intraclass correlation coefficient (ICC) between test and retest was 0.87, showing good reliability. Factor analysis revealed three factors accounting for 71% of the variance of the score, with the first one (including questions 1, 2, 3 and 10) being responsible for 47% of the variance. Spearman's rho between FIHOA and dysfunction NRS was 0.5, showing a moderate but significant correlation and moderate external validity.

Conclusion: The Portuguese version of FIHOA is a consistent, reliable, and valid instrument to measure loss of function in HOA Portuguese patients.

Keywords: Hand osteoarthritis; FIHOA; Dysfunction; Validation; Portuguese.

INTRODUCTION

Hand osteoarthritis (HOA) is a common rheumatic disease which may severely affect a high proportion of people over 50, especially women in the peri-menopause[1]. HOA overall prevalence in the Portuguese population is 8.8% (13.8% in females, and 3.2% in males), as documented in epidemiological nationwide Portuguese study EpiReumaPt[2].

HOA is frequently associated with pain, stiffness, and hard swelling of the small joints of the hand. Functional impairment and disability may be as severe as in rheumatoid arthritis[3-6], with important loss of quality of life[7,8].

Recently, large attention has been given to the assessment of function and disability as important outcome measures in clinical trials. These outcomes have also been increasingly pointed out as relevant by patients[9].

The Functional index for HOA (FIHOA) was specifically created by Dreiser *et al*[10] to quantify manual function in HOA. FIHOA is a 10-item self-reported questionnaire using a semi-quantitative four-point scale scoring, suitable to be self or physician-administered. This was the first questionnaire validated in HOA, which has been shown to be feasible, precise, reliable, and sensitive to change[11,12].

FIHOA was originally published in French and later in an English version[13]. To be used for both clinical research and clinical trials in other countries than French and English-speaking countries, the FIHOA needs to be translated and cross-culturally adapted. To date, it is validated in Dutch[14], Norwegian[15], Italian[16], Persian[17]

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and Korean[18]. Currently, there is no Portuguese validated tool to assess HOA loss of function.

The aim of this study was to cross-culturally adapt FIHOA into Portuguese and test its validity and reliability in Portuguese individuals with HOA.

PATIENTS AND METHODS

Translation and cross-cultural adaptation

In this cross-sectional study, following the cross-cultural adaptation rules for self-report questionnaires[19], French questionnaire Functional Index for Hand Osteoarthritis (FIHOA) was translated into Portuguese by a Portuguese Rheumatologist panel consensus. This version was back-translated into French by a bilingual French person with fluency in Portuguese spoken language. This version was compared to the French original to confirm that the semantic, conceptual, and experiential equivalence was met. Discrepancies and imprecisions were discussed by the Rheumatologist panel, until a consensus was reached for the final Portuguese version. Finally, the consensus version was tested in 56 adults with the clinical diagnosis of HOA, during the nationwide study *EpiReumaPt* in 2013 and, overall, no issues were reported by these individuals. The only required change was the word "receio" that was replaced by the word "relutância", in the 10th question, by panel decision, after this test.

Participants

The Portuguese version of FIHOA was applied by three rheumatologists (MC, MLM, SC) in three Rheumatology centres in Portugal. At the outpatient Rheumatology clinic, individuals with the following characteristics were consecutively included between May 2016 and April 2018: age above 18 years old; clinical diagnosis of HOA according to ACR criteria20 or with clinical thumb base OA, with or without other fingers involved, even if not fulfilling ACR criteria; fluency in Portuguese language; signature of the informed consent. Exclusion criteria were any inflammatory rheumatic disease diagnosis, such as rheumatoid arthritis, psoriatic arthritis, gout and other; un-ability to understand the questionnaire. A detailed description of the protocol is given in Supplementary Text S1. Participation was voluntary (the informed consent was read and signed before any study procedure) and ethical approval was obtained by the local ethics committee of Egas Moniz Hospital, in Lisbon, in 2015.

FIHOA details and respective scoring

The FIHOA questionnaire comprises 10 questions about daily life activities. Items are rated on a four-point scale, from 0 (possible without difficulties) to 3 (impossible). Higher values mean poorer function and the score ranges from 0 to 30. The cut-off shown to discriminate between symptomatic and non-symptomatic HOA is 5[21]. This questionnaire may be self or investigator-administered. In the present study, it was physician-administered. The rheumatologist took notes of the difficulties the patients had answering FIHOA questionnaire.

Other measures

Patients were asked to grade global hand pain (for each hand separately) suffered during the preceding 48h on a numerical rating scale (NRS) ranging from 0-100 mm. Also, their perceived hand dysfunction (for each hand separately) in the preceding week was reported on a NRS from 0 to 100 mm. The questions asked were: "Indicate the pain intensity you suffered in the right hand during the last 48 hours"; "Indicate the pain intensity you suffered in the left hand during the last 48 hours"; "Indicate the degree of difficulty in performing tasks with the right hand in the last week"; "Indicate the degree of difficulty in performing tasks with the left hand in the last week". A NRS ≥ 35 mm was considered symptomatic, based on the patient acceptable symptom state[22].

Clinical and demographic variables

Demographic and clinical data such as age, gender, hand dominance, disease duration and the presence of thumb base OA were retrieved from the online Portuguese registry *Reuma.pt*. The Portuguese database *Reuma.pt* was created in 2008 by the Portuguese Rheumatology Society (SPR) and comprehends registries for different rheumatic diseases[23], including osteoarthritis. There are thousands of patients registered, in Portugal and other countries, like United Kingdom and Brazil.

STATISTICAL ANALYSIS

Demographic and clinical data of the included patients were summarized using descriptive statistics: for the categorical data (absolute numbers and frequencies) and for the quantitative data (mean and standard deviation (SD)). Stratified data according to the level of pain NRS (<35 mm (mildly/non-symptomatic) *versus* ≥35 mm (symptomatic)) was also presented. Comparisons between the two groups based on pain NRS were performed using non-parametric tests as required, including the Mann-Whitney test and Pearson's Chi-Squared or Fisher's exact test. In the analysis, the maximum value of pain NRS was used, between right and left hand, and the same for dysfunction.

Internal consistency

To evaluate internal consistency, we calculated item-total correlations adjusted for the specific items, with Spearman rank correlation coefficient. The internal consistency reliability was assessed by calculating Cron-

bach's alpha, measuring the overall correlation between the items within the scale. For adequate performance, values >0.4 and >0.7 are recommended for item-total correlation and Cronbach's alpha, respectively[24,25].

Test-retest reliability

To evaluate test-retest validity, the three evaluation instruments (pain NRS, perceived dysfunction NRS and FIHOA) were re-administered to a fifth of the patients (n=10, randomly selected) 5 to 15 days after the first evaluation. The second assessment was led by the same Rheumatologist, either in presence or by telephone call.

To evaluate the test-retest reliability, we calculated Spearman's rho and intra-class correlation coefficient (ICC). Spearman's rho values of <0.3 were considered absent correlation, 0.3-0.5 weak, 0.5-0.7 moderate and ≥ 0.7 good or very good correlation[26]. The ICCs were calculated for each item individually and for the total score, using two-way random effects model, where both people effects and measures effects are random. An ICC ≥ 0.7 was considered sufficient at the scale level[27].

Internal construct validity

Principal component analysis was used to conduct an exploratory factor analysis on the FIHOA scores. The appropriateness of the factor analysis was checked through Bartlett's test of sphericity, and the Kaiser-Meyer-Olkin (KMO) statistic.

External validity

External validity was assessed by correlating FIHOA with the hand function NRS, using Spearman's correlation coefficient. A coefficient value of 0.1-0.3 is considered weak, 0.31-0.5 moderate and ≥ 0.5 strong[29].

The significance level of α=0.05 was considered. Statistical analyses were performed using IBM SPSS for Windows, Version 24.0 (Armonk, NY: IBM corp.).

RESULTS

Population and demographic and clinical data

Fifty-two patients were evaluated: 31 from the Rheumatology Department of Coimbra's University Hospital, in Coimbra, 12 from the Rheumatology Unit of S. Francisco Hospital, in Leiria and 9 from the Rheumatology Department of Santa Maria Hospital, in Lisbon.

Demographic and clinical data are summarized in Table I. The mean age of patients was 63 years old, 96% were women and all were right-handed.

The mean age when disease started was 56 (10.8) years old, with mean 8 (5.6) years of disease duration [19 (37%) missing values for these two parameters]. Thumb base OA (TBOA) was present in 70% patients (72% with right hand TBOA, 64% with left hand TBOA). From these, five patients had only right hand TBOA, and one had only left hand TBOA.

Clinical tools and FIHOA

Thirty-six (68%) patients were symptomatic (NRS hand pain ≥ 35 mm) and 34 (64%) had significant perceived global dysfunction (NRS dysfunction ≥ 35 mm). Mean FIHOA score was 7 (5). The mean pain in the right hand was 44 (27) and for left hand 32 (25). The mean

Table I. Demographic and clinical characteristics of the participants

Variable	Total participants (n=53)	Pain NRS <35 mm (n=17)	Pain NRS ≥ 35 mm (n=36)	p-value
Age (years), mean (SD) min-max	63 (9.8) 44-87	63 (9.7) 44-82	63 (10.0) 44-88	0.725
Female, no. (%)	51 (96)	16 (100)	34 (94)	>0.999
Hand dominance (right), no. (%)	53 (100)	17 (100)	36 (100)	-
Age at disease start, mean (SD) min-max	56 (10.8) 29-79	55 (13.9) 29-79	56 (9.5) 42-79	0.897
Disease duration (years), mean (SD) min-max	8 (5.6) 1-22	8 (4.5) 1-15	8 (6) 2-22	0.897
Thumb base arthrosis (presence), no. (%)	37 (70)	11 (64)	26 (72)	>0.999
Hand pain NRS*, mean (SD) min-max	47 (25.4) 0-100	18 (10.2) 0-30	59 (18.9) 35-100	<0.001
Hand perceived dysfunction NRS*, mean (SD) min-max	46 (24.9) 0-100	28 (15.2) 0-60	55 (24.2) 0-100	<0.001
FIHOA index (0-30), mean (SD) min-max	7 (4.9) 1-20	4 (4.0) 1-14	8 (4.8) 1-20	0.007

FIOHA - Functional index for Hand osteoarthritis; NRS – numeric rating scale; SD – standard deviation. *In the most symptomatic hand

Table II. Adjusted item-item correlation, item-total correlation and Cronbach´s alpha for each item of the Portuguese FIOHA

Items	Score Mean (SD)	Inter-item correlation Spearman's rho	Corrected item-total correlation	Scale mean if item is deleted	Cronbach's alpha if item is deleted
Item 1	0.59 (0.65)	0.07-0.63	0.57	6.41	0.86
Item 2	0.76 (0.79)	0.13-0.53	0.53	6.24	0.86
Item 3	0.96 (0.82)	0.32-0.72	0.81	6.04	0.84
Item 4	0.65 (0.71)	0.20-0.55	0.62	6.35	0.86
Item 5	0.65 (0.74)	0.06-0.65	0.50	6.35	0.87
Item 6	0.48 (0.72)	0.29-0.68	0.71	6.52	0.85
Item 7	0.98 (0.98)	0.33-0.72	0.78	6.02	0.84
Item 8	0.65 (0.71)	0.07-0.54	0.45	6.35	0.87
Item 9	0.85 (0.79)	0.06-0.54	0.48	6.15	0.87
Item 10	0.43 (0.58)	0.16-0.47	0.46	6.57	0.87

FIOHA - Functional index for Hand osteoarthritis; SD – standard deviation

perceived global dysfunction in the right hand was 44 (26) and for left hand 30 (24). Mean pain in the most symptomatic hand was 47 (25) and mean dysfunction in the most symptomatic hand was 46 (25).

Table I also shows the results of these variables stratified by the symptomatic and the mildly/non-symptomatic populations. There was no evidence of statistically significant differences between the two populations, regarding demographic parameters, age at disease start, disease duration and thumb base OA. On the other hand, hand pain, hand dysfunction and FIHOA scores were statistically significantly higher in symptomatic patients (pain NRS ≥ 35mm), when compared to the mildly/non-symptomatic individuals (pain NRS <35mm).

Difficulties with answering the Portuguese version of the FIHOA questionnaire

Several patients had some hesitation and difficulties in answering questions 3 and 9, because these questions refer to activities they weren't used to perform or didn't perform at all (cut with a pair of scissors and write for a long period of time). In those cases, the answer was considered as "missing". Otherwise, the terms used in the questions were well understood and there wasn't any difficulty with the phrasing or word significance.

Internal consistency

Table II shows the results of the internal consistency analysis. Cronbach's alpha was 0.87, which is considered high, showing strong internal coherence between items. Corrected item-total correlation revealed adequate performance (0.45-0.81). Cronbach's alpha after deleting each item showed high internal consistency (0.84-0.87). Therefore, no item was considered eligible for removal from the questionnaire.

Test-retest reliability

The comparison between the population that only answered the test (42 individuals) and the 10 individuals who participated in the retest is shown in Table III. For the pain NRS, the perceived dysfunction NRS and the FIHOA score in the test and retest population, were considered the initial evaluation (test). There was no evidence of statistically significant difference between the two populations.

Mean total FIHOA score on the test was 8 (min. 2, max. 16) and on the retest 9 (min 2, max 15), with a Spearman's rho coefficient estimate of 0.88 and significant correlation at the 0.01 significance level. The test-retest reliability of each item was assessed by ICC, that showed good or very good results ranging from 0.70 to 0.95, with only 2 items below these values (question 8 with 0.50 and question 6 with 0.64). For the total score, ICC was very good (0.87) – Table IV.

Internal construct validity

The Kaiser-Meyer-Olkin statistic was calculated to measure sampling adequacy to perform factor analysis. The result was 0.82, which indicates that factor analysis will be useful for these variables.

Bartlett's test of sphericity showed a chi square of 208.1 and $p < 0.001$, so there is evidence that the cor-

Table III. Demographic and clinical characteristics of the test population and test-retest population

Variables	Test population (n=42)	Test-retest population (n=10)	p-value
Age (years), mean (SD)	64 (10.4)	61 (7.1)	0.300
Female gender, no. (%)	40 (95)	10 (100)	0.457
Age at disease start, mean (SD)	56 (11.7)	55 (7.8)	0.600
Disease duration (years), mean (SD)	8 (5.8)	7 (5.1)	0.400
NRS (pain)* 0-100, mean (SD)	45 (26.5)	55 (19.1)	0.200
NRS (perceived global dysfunction)* 0-100, mean (SD)	44 (25.2)	59 (20.3)	0.080
FIHOA index (0-30), mean (SD)	7 (4.9)	8 (4.9)	0.700
Hand perceived dysfunction NRS*, mean (SD) min-max	46 (24.9) 0-100	28 (15.2) 0-60	55 (24.2) 0-100
FIHOA index (0-30), mean (SD) min-max	7 (4.9) 1-20	4 (4.0) 1-14	8 (4.8) 1-20

FIOHA - Functional index for Hand osteoarthritis; NRS – numeric rating scale; SD – standard deviation *In the most symptomatic hand.

Table IV. Test-retest reliability of the Portuguese FIHOA

FIHOA test-retest	Test mean (min-max)	Retest mean (min-max)	Spearman's rho	ICC#	95% CI
Item 1 – retest item 1	0.8 (0-2)	0.9 (0-2)	0.85**	0.86	0.56-0.96
Item 2 – retest item 2	0.9 (0-2)	0.9 (0-2)	0.82**	0.81	0.40-0.95
Item 3 – retest item 3	1.0 (0-3)	1.2 (0-3)	0.91**	0.91	0.68-0.98
Item 4 – retest item 4	0.7 (0-2)	0.7 (0-1)	0.76*	0.70	0.14-0.92
Item 5 – retest item 5	0.4 (0-2)	0.5 (0-2)	0.85**	0.90	0.66-0.97
Item 6 – retest item 6	0.4 (0-1)	0.6 (0-1)	0.67*	0.64	0.12-0.89
Item 7 – retest item 7	1.2 (0-3)	1.3 (0-3)	0.95**	0.95	0.82-0.99
Item 8 – retest item 8	0.6 (0-1)	0.8 (0-2)	0.51	0.50	-0.22-0.86
Item 9 – retest item 9	1.0 (0-2)	1.2 (0-2)	0.92**	0.87	0.57-0.97
Item 10 – retest item 10	0.5 (0-2)	0.7 (0-2)	0.76*	0.80	0.40-0.94
Total score-retest total score	7.5 (2-16)	8.7 (2-15)	0.88**	0.87	0.57-0.97

CI – confidence interval; FIOHA - Functional index for Hand osteoarthritis; ICC - intra-class correlation coefficient. # two-way random effects model; ** correlation is significant at the 0.01 level; * correlation is significant at the 0.05 level

relation matrix is not an identity matrix, and the data is therefore suitable for analysis.

Anti-image matrices showed good measures of sampling adequacy for all questions (between 0.72 and 0.85).

The factor analysis with Varimax rotation showed 3 components, which accounted for 71% of the overall variance. Factor 1 included questions 1, 2, 3 and 10 and explained 47% of the variance. Factor 2 included questions 4,5 and 6 and explained 13% of the variance and factor 3 included questions 7,8 and 9 and accounted for 11% variance.

Concerning factor 1, questions 1,2 and 3 refer to manual activities that require wrist strength and opposition between the thumb and second finger with strength, question 10 refers also to thumb strength but metacarpophalangeal tenderness too.

Concerning factor 2, questions 4 and 5 refer to grip strength, but question 6 refer more to finger agility.

As for factor 3, questions 7 and 8 relate to fine opposition movements (considering only the female ques-

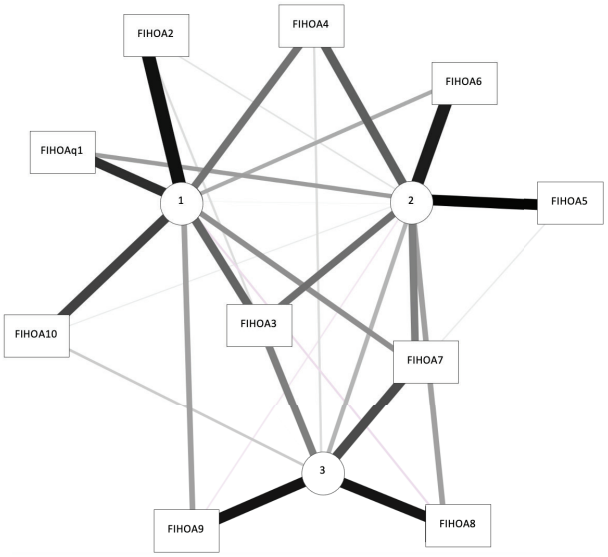

Figure 1. Networks of the loadings for the three factors obtained.
FIOHA - Functional index for Hand osteoarthritis

tion), and question 9 relates to hand resistance as a functioning unit.

There is more than 25% of the variance not explained by these 3 factors.

All questions showed good or very good positive correlation with factor 1 (from 0.53 to 0.87).

For internal construct reliability, we calculated Cronbach's alpha for the 3 components. For factor 1, Cronbach's alpha was 0.75, indicating acceptable internal consistency of the responses. Cronbach's alpha, if each item was deleted, varied between 0.66 and 0.75. For factor 2, the value was 0.70 and, if each item was deleted, varied between 0.57 and 0.69. Concerning factor 3, Cronbach's alpha was 0.75 and, if each item was deleted, varied between 0.63 and 0.69.

Figure 1 shows the graph illustration of the factors (or components) represented by circles and the FIHOA questions (the variables) by boxes. The edges (i.e., the lines) or links among variables are correlations (the loadings) between the components and the original variables. The sign and strength of the correlations are encoded in the colour intensity and width of the edges. One can observe that the factors (circles) are not correlated, being, by definition, orthogonal, or uncorrelated. The questions loading in each of the three factors are apparent from the observation of the graph. However, there are also intermediate-size loadings apparent, namely between both FIHOAq3 and FIHOAq7 and the second factor.

External validity

Spearman's rho correlation coefficient was calculated between FIHOA and maximum perceived dysfunction NRS. There was a moderate significant direct correlation (Spearman's rho=0.50, p<0.001). This is shown on Figure 2.

DISCUSSION

In the present study, we developed a Portuguese version of the French functional questionnaire for hand osteoarthritis FIHOA. The Portuguese version of FIHOA has shown good psychometric properties and is ready to be used for the assessment of hand function in Portuguese patients with HOA.

In our population there was 100% of right-hand dominance, which is in line with other authors results (100% in the Italian validation and >90% in the Persian and Korean)[16-18]. For the descriptive analysis, we divided the population in symptomatic / non or mildly symptomatic, according to the degree of hand pain. As expected, the symptomatic patients had significantly worse function when compared to the non or mildly symptomatic counterparts. However, the lack of correlation between thumb base osteoarthritis presence and pain degree was somehow unexpected, although this can be, at least in part, due to the small sample size of this population.

The Portuguese version of the FIHOA questionnaire has been shown to be easy to use. All the patients completed the questionnaire without encountering major difficulties in understanding the ten questions. Some patients had difficulty to answer questions 3 and 9. This was related to the adequacy of the questions with the daily activities of some individuals. As an example, four patients couldn't answer question 9, which refers to writing for a long period of time. Probably these patients had a low educational level.

Regarding item 7, which is gender-specific (sewing for female and using a screwdriver for male), it was not possible to test whether the two activities functioned in the same way psychometrically since our population seldom included males (n=2, 4%). Therefore, the two gender-specific questions were analysed as one. In previous validations of the FIHOA questionnaire, the populations were also female predominant (>90%), except in the Persian case[17]. The two men in this work were in the symptomatic group.

For the internal consistency analysis, Cronbach's alpha was 0.87 and, after deleting each item, 0.84-0.87, demonstrating strong internal coherence between the different questions. Other validations of FIHOA showed similar values, from 0.87 (Italian version) to 0.90 (Norwegian version)[15].

Spearman's rho for test-retest application had a high value, 0.88 and total score ICC was very good, 0.87. This confirmed the good reliability of the index, showing that patients understanding of items remained sta-

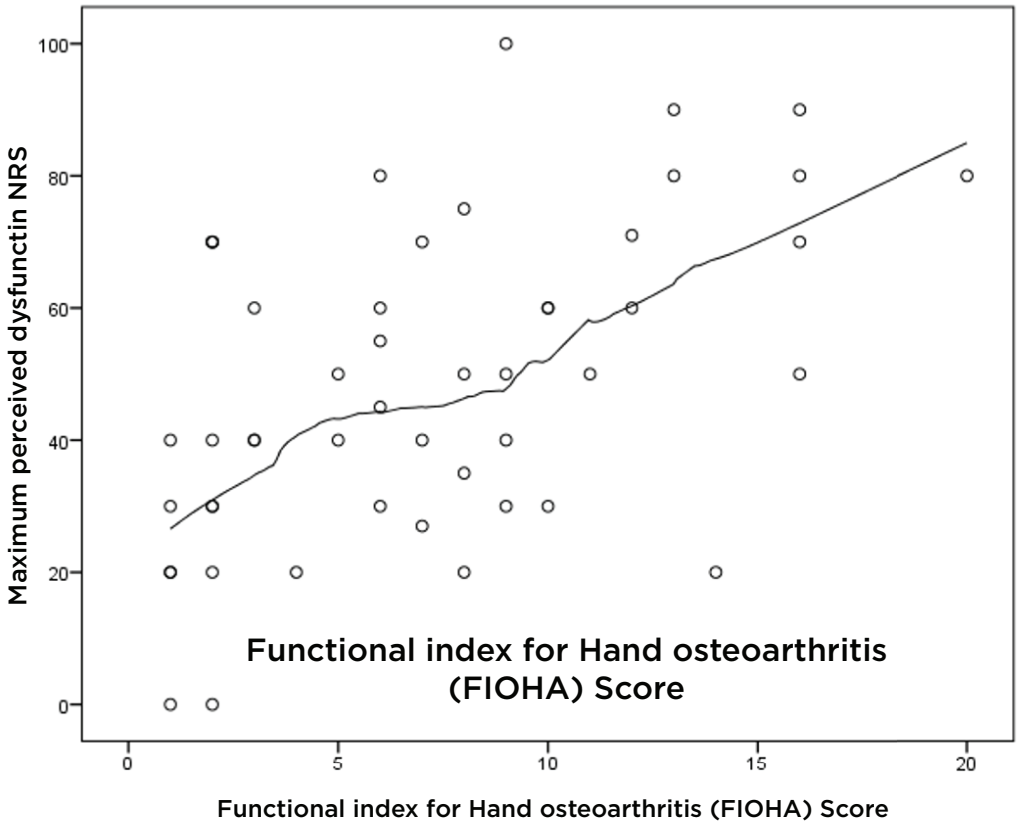

Figure 2. Scatter plot between FIHOA and maximum perceived dysfunction NRS and fitted curve (obtained by the lowess method). NRS - numerical rating scale.

ble. In other validations, Spearman's rho was between 0.87 (Korean)[18] and 0.94 (Italian)[16] and total score ICC between and 0.75 (Korean[18]) and 0.96 (Italian[16]).

Internal construct validity found three factors that explained 71% of the score variance, with factor 1 (including question 1, 2, 3 and 10) explaining almost half of the variance. We may argue that questions 7 and 9 don't apply to daily activities for every person, because there are many people that don't usually, or at all, use a scissor, sue, or write. These results may indicate that these questions may need future replacement or improved adequacy to the modern times.

In more detail, factor 1 explained almost half of the score variance and comprised three questions that refer to finger opposition difficulty and one that is less specific. The other questions grouped in two factors that explained little variance of the score and two of the ten questions had intermediate loadings in different factors, which can be explained by the multiple skills required to perform each one of the activities of the questionnaire. The different movements and tasks performed by hands may not be performed isolated from each other, so a questionnaire must consider different tasks performed, isolated or in coordination between the two hands, such as FIHOA does.

Finally, the external construct validity of the Portuguese version of FIHOA was acceptable. Indeed, despite moderate in magnitude (~0.50), the statistically significant correlation between FIHOA and the other functional measures tested reinforce the external validity of this newly developed questionnaire.

This study is not without limitations. Although the Kaiser-Meyer-Olkin statistic showed that this sample size was adequate to evaluate the internal construct validity, a relatively small number of individuals were included, all of them right-handed and with a few numbers of males. Consequently, our results may not apply to all HOA patients. Moreover, it is important to realize, that our population was predominantly symptomatic, and thus may not be representative of mild symptomatic disease. In fact, the mean pain NRS, 47 mm, was way above the value established in the literature to be considered symptomatic[22]. The same was verified for the mean perceived dysfunction, 46 mm. Also, the mean FIHOA score of 7, was high and above the cut-off value to be considered symptomatic. The selected test-retest

population had also a small sample size. However, we believe that these individuals were representative of the total population, since no significant differences were obtained regarding their demographic and clinical characteristics, when compared to the rest of the test population.

The FIHOA questionnaire itself has also important inherent weaknesses, namely not considering the possibility of different skills or dysfunction degrees between the two hands. Questions 1, 4, 5, 9 and 10 relate to activities that only require one hand. Although our whole population was right-handed, 10 patients referred more pain on the left hand and 8 referred more dysfunction in the left hand, which may not be the hand that performs some of the tasks considered in the FIHOA. Tasks referred by questions 2 and 3 may require some support from the second hand but are mainly performed by the dominant one. Indeed, only questions 6, 7 and 8 require the participation of both hands.

Strengths of this study include the recruitment of patients in three different rheumatology outpatient clinics in Portugal and the comprehensive methodology used for the cross-cultural adaptation and validation of the Portuguese version of FIHOA. The use of NRS for perceived hand function in the external validation, instead of composite multi-item measures, adds to the feasibility of this study, being less time-consuming for the patients.

In conclusion, we developed and tested the Portuguese version of FIHOA. This version proved to be consistent, reliable, and valid and can be used in Portuguese patients with HOA.

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APPENDIX

Supplementary text S1. VALIDAÇÃO DA VERSÃO PORTUGUESA DO ÍNDICE FUNCIONAL FIHOA EM DOENTES PORTUGUESES COM OSTEOARTROSE DAS MÃOS.

Critérios ACR para artrose das mãos:

Hand pain, aching or stiffness for most days of prior month AND at least three from the following criteria: 1. Hard tissue enlargement in at least 2 of 10 selected hand joints (second and third DIP, second and third PIP and TMC on both hands); 2. Bone swelling in at least two DIP; 3. Fewer than 3 swollen metacarpophalangeal (MCP) joints; 4. Deformity of at least 2 of 10 selected joints

Excluir doentes com: Artrite reumatóide, espondilartrites, gota e outras artropatias microcristalinas

Assinar o consentimento informado (certificar que o doente é português e entende as perguntas)

Centro:
Número de doente:
Nome:
Idade:
Sexo:
Mão dominante:
Duração da doença:
EVA da dor nas mãos na última semana: DIREITA ESQUERDA
EVA da incapacidade (mãos) na última semana: DIREITA ESQUERDA

INDICE FUNCIONAL PARA A ARTROSE DA MÃO (FIHOA) DE R. L. DREISER (Portuguese version)

	0	1	2	3
1. Consegue rodar uma chave numa fechadura?				
2. Consegue cortar carne com uma faca?				
3. Consegue cortar tecido ou papel com uma tesoura?				
4. Consegue levantar uma garrafa cheia com a mão?				
5. Consegue fechar completamente a mão?				
6. Consegue dar um nó?				
7. Para as mulheres – Consegue coser à mão? Para os homens – Consegue aparafusar um parafuso?				
8. Consegue abotoar a roupa?				
9. Consegue escrever durante muito tempo?				
10. Aceita, sem relutância, que lhe apertem a mão?				

0 = possível, sem dificuldade; 1 = possível, com dificuldade moderada; 2 = possível, com grande dificuldade; 3 = impossível