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ORIGINAL ARTICLE

Psychometric properties and factor structure of the Spanish version of the HC-PAIRS questionnaire

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Abstract

Objective To develop a Spanish version of the Health Care Providers' Pain and Impairment Relationship Scale (HC-PAIRS) and to test its psychometric properties.

Methods A forward and backward translation methodology was used to translate the questionnaire, which was then applied to 206 participants (174 physiotherapy students and 32 family physicians). The intraclass correlation coefficient was calculated to assess test–retest reliability. Internal consistency was evaluated using Cronbach's alpha and item analysis. Construct validity was measured using Pearson correlation coefficients between HC-PAIRS and FABQ, FABQ-Phys, FABQ-Work and the responses given by participants to three clinical case scenarios. An exploratory factor analysis was carried out following the Kaiser normalization criteria and principal axis factoring with an oblique rotation (quartimax). Sensitivity to change was assessed after a teaching module.

Results Test–retest reliability was ICC 0.50 ($p < 0.01$) and Cronbach's alpha was 0.825. The HC-PAIRS scores correlated significantly with the scores of the FABQ and also with the recommendations for work and activity given by the participants in the three clinical case scenarios. Sensitivity to change test showed an effect size of 1.5, which is considered a large change. Factor analysis suggests that the Spanish version of HC-PAIRS measures a unidimensional construct.

Conclusion The Spanish version of the HC-PAIRS has proven to be a reliable, valid and sensitive instrument to assess health care providers' attitudes and beliefs about LBP. It can be used in evaluating clinical practice and in undergraduate acquisition of skills and knowledge.

Keywords Low back pain · Attitudes and beliefs · HC-PAIRS · Reliability · Internal consistency

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Introduction

Low back pain (LBP) is one of the most common causes of medical consultation. It has a great impact on patients' quality of life, with large costs to society [1].

Patients suffering from non-specific LBP may show a wide range of disability. Some patients have a light limitation while others are severely impaired. Exhaustive research has failed to find a correlation between pain, structural damage in the spine and the level of disability in non-specific LBP [2, 3]. Among the factors that predict disability and chronicity from LBP, patients' beliefs about fear-avoidance, pain-impairment relationship and coping strategies are strongly associated with outcome from treatment [4, 5]. Accordingly, a biopsychosocial model has been proposed to explain the process through which LBP

causes disability and tends to become chronic. There is now convincing evidence that psychosocial factors, more than biomedical or biomechanical factors, are strongly linked to the transition from acute to chronic back pain disability.

The recommendations that health care providers give to their patients may have a positive or negative impact on the clinical course of LBP by modifying or reinforcing patients' attitudes and beliefs. In the absence of specific spinal pathology all the clinical practice guidelines (CPG) are unanimous in advising patients to keep active despite their pain, continue their ordinary activities and keep or return soon to work. However, there is evidence to suggest difficulties in the implementation and impact of guidelines on the practice of physiotherapists and practitioners [6–8]. One of the barriers which limit the adherence of physicians to CPG recommendations could be the beliefs and attitudes that they hold about LBP, beyond their specific knowledge of the recommended contents. The role health care providers' attitudes and beliefs about back pain may play in their practice has gained recent research attention [6, 9]. Additionally, it is possible that the beliefs and attitudes of the clinicians, at least in some cases, contribute to the development of chronic LBP disability, by reinforcing the perception of crippling disease, developing attitudes of hypervigilance or recommending restriction on ordinary activities [5, 10–12].

In order to study the influence of attitudes and beliefs of health care providers on clinical management of back pain, Rainville et al. [13] developed the Health Care providers Pain and Impairment Relationship Scale (HC-PAIRS). A high score on this scale suggests that the clinician firmly agrees with the notion that LBP justifies disability and limitation of activities. This author found differences between HC-PAIRS scores obtained by health professionals (physicians, physiotherapists, psychologists and nurses) who care for the general population and those working in a pain clinic, suggesting that there is variation in attitudes and beliefs regarding pain according to the type of training and environment in which they work. Houben et al. [14] found that the score obtained in the HC-PAIRS correlated significantly with the recommendations about work and activity. The HC-PAIRS has also been used to study the attitudes and beliefs about LBP in physiotherapy students [15, 16]. This questionnaire is a useful tool to monitor changes in conceptions and beliefs after a teaching module [17].

There is evidence which suggests that the beliefs and attitudes about LBP differ according to the cultural background in which they are explored [14–18]. The purpose of this study is to validate the Spanish version of the HC-PAIRS questionnaire and investigate its psychometric properties and factor structure in a sample of Spanish physiotherapy students and family physicians.

Materials and methods

Translation

For the cross-cultural adaptation a forward and backward translation methodology was used [19]. Two physicians involved in clinical management and research in LBP and native Spanish speakers translated the HC-PAIRS questionnaire independently. These two versions were confronted and discussed by two other medical translators who solved discrepancies if there were any, developing a unique Spanish version. Then a professional translator retranslated into English the Spanish version. The retranslated version was sent to the author of the original English version [13] who ensured that the original meaning had not been lost. This process led to a final version of the questionnaire (Fig. 1). To test the understandability of each item, the questionnaire was separately reviewed by a group of five orthopaedic surgeons and ten general practitioners to assess its semantic comprehensibility.

Subjects

One hundred and seventy-four physiotherapy students and 32 general practitioners were included in the study. All the students were in their second year of degree and had received teaching and practical modules about physiopathology and therapeutic management of LBP in several subjects, all according to evidence-based clinical guidelines. The physiotherapy students had observed LBP patients in their clinical practice modules but they had never directly treated patients independently.

The 32 physicians were family medicine specialists, working as general practitioners in several primary care centres of the Spanish national health system. The demographic characteristics are shown in Table 1. Written consent to participate in the investigation was obtained from the subjects after they had been informed about the study. The procedure for this project was approved by an institutional review board.

Procedure

The physiotherapy students completed the questionnaires at the same time in several classrooms. The 32 physicians completed the questionnaires in one of their weekly clinical sessions at their primary care centre and before a conference about LBP.

They were advised that this procedure was not an exam, and that there were no correct responses so they could feel free to express their real thoughts and beliefs when choosing the responses to the questionnaires. Two of the authors were present in each session.

Fig. 1 Spanish version of the HC-PAIRS questionnaire. Items 1, 6 and 14 are reversed. Final score is the sum of all items

<p>1- Puede aún esperarse que los pacientes con dolor lumbar crónico cumplan con todas sus actividades laborales y familiares a pesar de su dolor</p> <p>2- Un aumento en el dolor es un indicador de que los pacientes con dolor lumbar crónico deben parar lo que estén haciendo hasta que el dolor disminuya</p> <p>3- Los pacientes con dolor lumbar crónico no pueden realizar las actividades de su vida diaria cuando están con dolor</p> <p>4- Si su dolor desapareciera, los pacientes con dolor lumbar crónico volverían a ser tan activos como solían serlo</p> <p>5- Los pacientes con dolor lumbar crónico deberían tener los mismos beneficios que los discapacitados debido a su problema de dolor crónico</p> <p>6- Los pacientes con dolor lumbar crónico deben obligarse por sí mismos y por aquellos que les rodean a llevar a cabo las actividades cotidianas aunque su dolor sea grande</p> <p>7- La mayoría de gente espera demasiado de los pacientes con dolor lumbar crónico, dado su dolor</p> <p>8- Los pacientes con dolor lumbar crónico deben tener cuidado de no hacer nada que pueda empeorar su dolor</p> <p>9- Mientras tengan dolor, los pacientes con dolor lumbar crónico nunca podrán vivir tan bien como vivían antes</p> <p>10- Cuando su dolor empeora, los pacientes con dolor lumbar crónico encuentran muy difícil concentrarse en otra cosa</p> <p>11- Los pacientes con dolor lumbar crónico tienen que aceptar que son personas discapacitadas, debido a su dolor crónico</p> <p>12- No hay ninguna manera de que los pacientes con dolor lumbar crónico puedan volver a hacer las cosas que solían hacer hasta que primero encuentren una cura para su dolor</p> <p>13- Los pacientes con dolor lumbar crónico frecuentemente se encuentran pensando en su dolor y en lo que éste ha hecho con sus vidas</p> <p>14- Aunque su dolor siempre esté ahí, los pacientes con dolor lumbar crónico a menudo no se dan cuenta de él mientras se mantienen ocupados</p> <p>15 Todos los problemas de los pacientes con dolor lumbar crónico se solucionarían si su dolor desapareciera</p>
<p>1- En total desacuerdo</p> <p>2-</p> <p>3-</p> <p>4- Ni de acuerdo, ni en desacuerdo</p> <p>5-</p> <p>6-</p> <p>7- Completamente de acuerdo</p>

Four weeks later a subgroup of 171 physiotherapy students repeated the HC-PAIRS questionnaire in order to evaluate the test–retest reliability. Afterwards a subgroup of 91 physiotherapy students were randomly selected to receive a brief educational module based on the biopsychosocial model aimed to change beliefs and attitudes towards LBP. After this intervention, they completed again all the questionnaires. A greater heterogeneity was expected after the teaching module in the physiotherapy students, so these 91 participants, with the 83 students without the intervention and the 32 physicians were the subjects used to study HC-PAIRS psychometric properties.

Questionnaires

Demographic data

Age, sex, history of episodes of LBP and the presence of actual LBP were recorded for each participant prior to the other measures.

HC-PAIRS

This is a questionnaire for assessing the attitudes and beliefs of health care providers about chronic LBP. It consists of 15 statements which suggest that pain justifies impairment and disability. Each statement is followed by a seven point Likert scale on which the responder has to rate his agreement from 1 (“completely disagree”) to 7 (“completely agree”). Higher scores suggest greater adherence with the notion that back pain necessitates the avoidance of activities and justifies disability [13].

FABQ

The Fear Avoidance Beliefs questionnaire was developed to measure LBP patients’ attitudes and beliefs about fear of movement and avoidance responses in general physical activities and occupational tasks. It consists of 16 independent sentences that can be rated by the participant on a seven point Likert scale that ranges from 0 (“do not agree at all”) to 6 (“completely agree”). The questionnaire is

Table 1 Demographic characteristics and responses to psychometric instruments of the studied sample

	Physiotherapy students (<i>n</i> = 171)	Family physicians (<i>n</i> = 32)	Sig
Age mean (SD)	21.89 (4.45)	45.83 (8.89)	<0.01
Sex			
Male	75 (44 %)	14 (44 %)	>0.05
Female	96 (56 %)	18 (56 %)	
Never had back pain	26 (15 %)	9 (28 %)	>0.05
Actual back pain	27 (16 %)	3 (10 %)	>0.05
Previous back pain	140 (82 %)	23 (72 %)	
Long episode (>1 week)	42 (25 %)	11 (34 %)	>0.05
Short episode (<1 week)	98 (57 %)	10 (31 %)	>0.05
HC-PAIRS	63.89 (10.36)	63.96 (11.88)	>0.05
FABQ (total)	44.89 (15.01)	55.54 (19.88)	<0.01
FABQ-Work	18.85 (7.81)	20.96 (7.96)	>0.05
FABQ-Phys	14.32 (4.62)	16.46 (5.78)	<0.05
Response to clinical scenarios			
Perception of severity of symptoms	3.42 (0.40)	3.11 (0.56)	<0.01
Perception of severity of pathology	2.89 (0.63)	2.20 (0.76)	<0.01
Recommendations for activity	2.61 (0.69)	2.46 (0.69)	>0.05
Recommendations for work	3.31 (0.70)	2.65 (0.80)	<0.01

In each variable number of participants and percentage (%) or average and standard deviation (SD) are expressed as appropriate. The values of students are those obtained before the educational intervention

divided into two subscales: FABQ-Work comprises six sentences which assess patient' attitudes and beliefs about how occupational activities may influence his or her LBP; FABQ-Physical activity is composed of four sentences which measure attitudes and beliefs about general physical activities. For both subscales a high score indicates strong fear-avoidance beliefs [20]. This questionnaire has been validated in Spanish [21], German [22] and French [23]. Although the FABQ was originally designed for patients, it has been also used to measure beliefs and attitudes of general practitioners [10] and rheumatologists [11].

Rainville Clinical Cases questionnaire

Rainville et al. [24] constructed a questionnaire based on three clinical case scenarios to explore physicians' perception of severity of symptoms, severity of pathology and their recommendations for work and activity. All vignettes describe the symptoms, relevant physical findings, diagnostic test results and previous treatment of patients who are out of work because of their back pain. The three vignettes represent different degrees of spinal pathology, symptoms and work requirements, but none of them give evidence of either structural damage or neurological compression that would make surgery mandatory. For each vignette the participants are asked to give their opinion about the severity of symptoms and severity of the spinal pathology by selecting in each aspect a response from five

graded options that range from 1 ("very mild") to 5 ("extremely severe"). Also for each scenario the participants are asked to give a recommendation for work graded from 1 ("fulltime, full duty"), to 5 ("remain out of work"). Finally, the participants have to recommend what they think is the appropriate level of activity for each patient from choices ranging from 1 ("no activity limitations") to 5 ("limit all physical activities").

Data analysis

Comprehensibility of the translated statements of the HC-PAIRS questionnaire was assessed counting the number of demands for clarification or interpretation asked by a group of 45 students and the 32 physicians at the moment of completing the questionnaire in the first session. Comprehensibility was also tested presenting and discussing the final translated version of the questionnaire to a debate group of five orthopaedic surgeons and ten general practitioners.

The comparisons between students and physicians were done using *t* test for continuous variables and Chi squared test for categorical variables. The intra-class correlation coefficient (ICC), according to the nomenclature proposed by Shrout and Fleiss [25], was calculated to assess test-retest reliability. Internal consistency of the HC-PAIRS was evaluated using Cronbach's alpha and an item analysis was carried out for all 15 items using the whole sample of physicians and students.

Sensitivity to change was assessed by using a paired *t* test to determine whether the instrument could detect improvement in those subjects who had a change in their beliefs and attitudes measured by the FABQ questionnaire after a specific teaching module. A group of 91 physiotherapy students received a specific teaching module about the biopsychosocial approach to LBP. At the end of the intervention the participants were re-evaluated completing the HC-PAIRS and the FABQ questionnaires. A comparison was done between the pre- and post-intervention HC-PAIRS scores of those who improved at least 20 % of the score in the FABQ. Effect sizes were also calculated as the difference between pre- and post-intervention HC-PAIRS group mean scores divided by the pooled standard deviation. Values of approximately 0.2 are considered to represent small change, approximately 0.5 a moderate change, and approximately 0.8 or higher a large change in the attribute of interest [26].

Construct validity was measured in the whole sample of students and physicians using Pearson correlation coefficients between HC-PAIRS and FABQ, FABQ-Physical activity, FABQ-Work and the Rainville clinical cases questionnaire. Also in the whole sample, an exploratory factor analysis was carried out following the Kaiser normalization criteria (eigenvalues over 1) and factor loading above 0.35. The items were subjected to a principal axis factoring with an oblique rotation (quartimax). In contrast to Rainville et al. [13], oblique rotation was used because we started with the assumption that the variance of a given variable could be explained by a number of underlying common factors and that there would be some correlation among the factors being rotated [27].

The statistical analysis was performed using SPSS for Windows statistical package (v17, SPSS Inc-IBM Corporation, New York, USA). Significance was accepted at an alpha level of 0.05.

Results

The sample comprised 206 participants. Three participants (Physiotherapy students) had two or more missing values in the items of the FABQ or HC-PAIRS, and were excluded. Other two participants had only one missing value. These were not excluded and the missing value was arbitrarily filled with the middle score value of the scale (3 or 4). Therefore, the sample was established in 203 participants.

Demographic data, occurrence of back pain episodes and beliefs and attitudes of the study subjects are summarized in Table 1.

Comprehensibility

None of the participants demanded clarification of any of the items which compose the questionnaire at the time of

completing it. The medical consultation group also gave their consent to the semantic comprehensibility of the questionnaire without remarkable comments.

Reliability

Test–retest reliability was low (ICC 0.50, $p < 0.01$). The minimum score recorded was 27 given by only one participant and the maximum score was 87, given by two participants. None of the participants gave the minimum possible score (16 points) nor the maximum possible score (105 points) in the total score. The average value and standard deviation for each item are shown in Table 2. Cronbach's alpha was 0.825. Item analysis for the scale is shown in Table 3. Only item 4 raised Cronbach's alpha after deletion and its homogeneity index was very low. Item 7 also shows a low homogeneity index, although its deletion did not raise internal consistency.

Sensitivity to change

In order to test the instrument sensitivity to change, the HC-PAIRS was administered again to a subgroup of 91 students after receiving a specific teaching module aimed to change beliefs and attitudes, explaining the biopsychosocial approach to LBP. The HC-PAIRS mean score improved from 65 to 42 ($p < 0.01$) in those 66 of 91 participants who also had an improvement of 20 % in the FABQ score. Effect size of this change was 1.5, which is considered a large change.

Validity

Correlations of the scores of HC-PAIRS with FABQ-total, FABQ-Physical activity and FABQ-Work are shown in Table 4. Values of HC-PAIRS correlated more strongly with FABQ-total and FABQ-Physical activity than with FABQ-Work, although correlations were all significant.

Considering separately the physician and physiotherapy student groups, there were similar significant correlations among HC-PAIRS and FABQ questionnaires, ranging from $r = 0.441$ to $r = 0.658$.

With regard to the mean value of the responses given in all three clinical case vignettes, HC-PAIRS correlated significantly with perception of symptoms and perception of pathology. There was also correlation with the recommendations given for activity and work. A sub-analysis considering separately physicians and physiotherapy students was performed. In the physicians group there was a lack of correlation between HC-PAIRS scores and the perception of severity of symptoms and severity of pathology. However, a significant, although moderate correlation with recommendations for work and activity was found (Table 5).

Table 2 Scores for each HC-PAIRS item

	Mean	SD
Item 1 (reversed): chronic back pain patients can still be expected to fulfil work and family responsibilities despite pain	3.27	1.74
Item 2: an increase in pain is an indicator that a chronic back pain patient should stop what he is doing until the pain decreases	3.47	1.80
Item 3: chronic back pain patients cannot go about normal life activities when they are in pain	3.25	1.73
Item 4: if their pain would go away, chronic back pain patients' would be every bit as active as they used to be	4.95	1.72
Item 5: chronic back pain patients should have the same benefits as the handicapped because of their chronic pain problem	2.94	1.50
Item 6 (reversed): chronic back pain patients owe it to themselves and those around them to perform their usual activities even when their pain is bad	3.09	1.86
Item 7: most people expect too much of chronic back pain patients, given their pain	3.81	1.45
Item 8: chronic back pain patients have to be careful not to do anything that might make their pain worse	3.66	1.84
Item 9: as long as they are in pain, chronic back pain patients will never be able to live as well as they did before	3.65	1.78
Item 10: when their pain gets worse, chronic back pain patients find it very hard to concentrate on anything else	4.77	1.51
Item 11: chronic back pain patients have to accept that they are disabled persons, due to their chronic pain	2.54	1.53
Item 12: there is no way that chronic back pain patients can return to doing the things they used to do unless they first find a cure for their pain	2.62	1.55
Item 13: chronic back pain patients find themselves frequently thinking about their pain and what it has done to their life	4.36	1.53
Item 14 (reversed): even though their pain is always there, chronic back pain patients often don't notice it at all when they are keeping themselves busy	2.98	1.64
Item 15: all of chronic back pain patients' problems would be solved if their pain would go away	4.16	1.82
HC-PAIRS total	53.52	13.91

Table 3 Item analysis

	Homogeneity index	Cronbach's alpha after deleting item
Item 1 (reversed)	0.375	0.820
Item 2	0.590	0.805
Item 3	0.665	0.800
Item 4	0.088	0.838
Item 5	0.493	0.813
Item 6 (reversed)	0.541	0.809
Item 7	0.240	0.827
Item 8	0.501	0.812
Item 9	0.560	0.808
Item 10	0.389	0.819
Item 11	0.597	0.806
Item 12	0.652	0.803
Item 13	0.297	0.824
Item 14 (reversed)	0.316	0.824
Item 15	0.377	0.820

Table 4 Pearson correlations between HC-PAIRS and FABQ questionnaires

HC-PAIRS	FABQ total	FABQ-Phys	FABQ-Work
Physiotherapy students and physicians	$r = 0.672$ ($p < 0.01$)	$r = 0.667$ ($p < 0.01$)	$r = 0.557$ ($p < 0.01$)
Physiotherapy students	$r = 0.658$ ($p < 0.01$)	$r = 0.643$ ($p < 0.01$)	$r = 0.539$ ($p < 0.01$)
Physicians	$r = 0.509$ ($p < 0.01$)	$r = 0.533$ ($p < 0.01$)	$r = 0.441$ ($p = 0.019$)

Table 5 Pearson correlations between HC-PAIRS and the responses given to clinical case scenarios

HC-PAIRS	Perception of severity of symptoms	Perception of severity of pathology	Recommendations for activity	Recommendations for work
Physiotherapy students and physicians	$r = 0.426$ ($p < 0.01$)	$r = 0.237$ ($p < 0.01$)	$r = 0.586$ ($p < 0.01$)	$r = 0.246$ ($p < 0.01$)
Physiotherapy students	$r = 0.493$ ($p < 0.01$)	$r = 0.412$ ($p < 0.01$)	$r = 0.632$ ($p < 0.01$)	$r = 0.273$ ($p < 0.01$)
Physicians	$r = 0.281$ ($p = 0.119$)	$r = 0.129$ ($p = 0.489$)	$r = 0.357$ ($p = 0.049$)	$r = 0.378$ ($p = 0.036$)

Table 6 Factor loading for the HC-PAIRS

	Factor loading
Item 3	0.735
item 12	0.722
Item 11	0.672
Item 2	0.651
Item 6	0.613
Item 9	0.599
Item 8	0.545
Item 5	0.532
Item 1	0.435
Item 10	0.408
Item 15	0.402
Item 14	0.354
Item 13	0.328
Item 7	0.285
Item 4	0.096

Factor structure

Principal axis factoring extracted four factors that explained 43 % of the variance (26, 7, 5 and 5 % for each factor). Item 4 showed loading below 0.25 in all the factors and was not assigned to any factor. Other five items (2, 6, 10, 12 and 14) showed loadings over 0.25 in two factors. Because of this, it was preferred to extract only one factor. The final solution with one factor explained 27.90 % of the variance. Factor loading for each item is shown in Table 6. Noteworthy, item 4 still shows a very low loading, as well as item 7.

Discussion

There is an increasing interest in evaluating the impact of management styles on LBP care, but few instruments are available to measure beliefs and attitudes of health care providers towards LBP [28]. The purpose of this study was to translate and validate one of the most commonly used

questionnaires. This study has confirmed that the Spanish version of the HC-PAIRS is a reliable, valid and sensitive instrument to measure the beliefs and attitudes about back pain and impairment that health care providers hold, similar to the original English [13, 24], Dutch [14], and Chinese [29] versions.

In the HC-PAIRS original English version [13] an exploratory factor analysis revealed four dimensions entitled “functional expectations”, “social expectations”, “need for cure” and “projected cognitions” that altogether accounted for 56 % (29, 10,9 and 8 % respectively) of the variance of the HC-PAIRS score. However, factor 1 is clearly dominant, only two or three items compose the other three factors and, furthermore, three items load in several factors. A similar unsatisfactory result was obtained in our study: therefore, we forced the model to a one-factor solution. Houben et al. [14], in a Dutch population, found that a one-factor model fit better than a four-factor model after performing a confirmatory factor analysis. These results suggest that the HC-PAIRS measures a one-dimensional construct.

The instrument showed low test–retest reliability. However, this estimate of reliability usually shows lower values than other reliability coefficients. Test–retest reliability coefficient has no sensitivity to errors owing to specificity of the instrument that can be present in both test and retest, leading to an underestimated correlation. Furthermore, in our study test–retest was explored in students after 4 weeks and they continued receiving formation. Maybe this can explain the low test–retest reliability. The internal consistency was shown to be good (0.83), similar to the 0.78 value in the original version [13] and to the 0.83 in the Dutch version [14] but higher than the 0.72 reported for the Chinese version [15]. Rainville in the English and Houben in the Dutch versions suggested that items 10 and 13 should be deleted as their deletion raised the value of Cronbach’s alpha and these two items correlated much less with the other factors. In our study the suppression of items 10 and 13 did not raise Cronbach’s alpha values. However, we found that items 4 and 7 detracted from internal consistency and also had low loading in the exploratory factor

analysis. This variation in the Spanish version from the English and Dutch versions may be explained by the differences in the cultural background of the populations studied. Items 10 and 13 compose the dimension “projected cognitions” (poor concentration because of pain and excessive thinking about pain consequences) in the English version. In the study by Rainville the majority of surveyed health providers tended to agree on the Likert scale with the statements of items 10 and 13, irrespective to their response to other items. In our study the average responses also were trended towards agreement (item 10: 4.77 and item 13: 4.36) but revealed good correlation with the tendency given in the other items. Some studies have found differences in how back pain is faced among different cultural backgrounds by patients [30] and by health care providers [15, 16]. For example, Kovacs et al. [18] demonstrated that in Spanish LBP patients the influence of fear-avoidance beliefs is sparse in disability.

Houben [14] found a strong association between HC-PAIRS scores and scores in the Tampa Scale of Kinesiophobia (TSK) adapted for health care practitioners with the aim to validate the Dutch HC-PAIRS translation. In our study we preferred to use the FABQ to test validity as although it is in some aspects similar to TSK, the FABQ has been recommended by an expert panel for its use in clinical studies in back pain [31]. Although FABQ was originally designed to measure beliefs and attitudes in patients [20], it has also been used to measure these qualities in health care providers. Coudeyre [10] and Poiraudau [11] showed in physicians (general practitioners and rheumatologists) that a high score in FABQ was associated with a higher rate of recommendations of bed rest, sick leave and less advice to maintain maximum bearable physical activities for chronic LBP. In our study, correlations between the FABQ-W and FABQ-Phys and the HC-PAIRS were moderate, suggesting that our hypothesis were met and that convergent validity was observed. The reason why the convergence is only moderate may be that the measures of both instruments are related but do not share exactly the same construct. The difference could lie in the direction in which pain and activity are related. FABQ focuses on patients’ beliefs about how physical activities and work affected their pain, whereas HC-PAIRS focuses on the consequences that pain produces on their disability.

Further evidence for the validity of the translated version of the HC-PAIRS is given by the statistical association between scores in HC-PAIRS and recommendations for work, activity and ratings in the perception of severity of symptoms and severity of pathology, all in the expected direction. These findings are consistent with those reported by the English [24] and the Dutch [14] versions.

Our study had some limitations. Most of the sample is composed of physiotherapy students without experience in autonomous clinical practice. Although the participants received teaching and practical modules about physiopathology and therapeutic management of LBP in several academic subjects, all according to evidence-based clinical guidelines as part of their degree, they had never directly treated patients independently. The instrument measures beliefs and attitudes but not clinical knowledge. In the present study both general practitioners and physiotherapy students obtained a similar and significant correlation between HC-PAIRS and FABQ. In both groups, the HC-PAIRS also showed significant correlation with the recommendations for work, although greater in the physician group. Also a significant correlation was found for both groups with the recommendations for activity, being in this case greater for the physiotherapy students. In the study by Rainville [24], practice time and number of LBP patients seen per week had no influence in recommendations for work and activity. In our study, physiotherapy students, in spite of being a young population, showed a high prevalence of LBP episodes, higher than the prevalence found in the older family physicians. This finding is consistent with a previous work by Nyland and Grimmer [32] that also found an increased lifetime prevalence of LBP in physiotherapy students and a significantly increased risk for students once they completed first year. However, previous research has not found association between health care providers personal experience of back pain and both the level of fear-avoidance beliefs [10, 11, 33] and the HC-PAIRS score [16, 17].

Another weak point of this study is the assessment of validity by means of a correlation of HC-PAIRS with three clinical case questionnaires. The responses to clinical cases may be biased towards treatment guidelines recommendations as a result of desirability phenomena [34] and it may be that they do not reflect their true beliefs and attitudes in a real clinical work environment. Some studies, however, indicate that quality of health care can be measured in an outpatient setting by using clinical vignettes with no differences with real clinical practice [35, 36]. Research has shown that vignette-based surveys produce better measures of quality of care than medical record reviews when used to measure differential diagnosis, selection of tests, and treatment decisions [37], so vignettes appear to be a valid, comprehensive and inexpensive method that directly focuses on the process of care provided in actual clinical practice.

In conclusion, the Spanish version of the HC-PAIRS has proven to be a reliable, valid and sensitive instrument to assess health care providers’ attitudes and beliefs about LBP. HC-PAIRS can be used in evaluating clinical practice and in undergraduate acquisition of skills and knowledge.

These results indicate that the instrument is suitable for its use with Spanish-speaking providers in research of clinical and teaching settings. Nonetheless, it seems necessary to undertake new studies with a more heterogeneous sample of health care providers in order to test the fit of the model in a sample composed of clinicians of different degrees, specialization and occupation. In addition, the discrepancies found with the English and Dutch versions suggest that further studies would be needed using Item Response Theory that allows to study Differential Item Functioning to ascertain if the items operate differently in different samples [38]. This approach would help to establish which items should be modified or adapted in each country. In any case this adaptation constitutes a highly valuable instrument, bearing in mind the lack of adequate tools for measuring health care providers' beliefs and attitudes towards LBP in the Spanish language context.

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Conflict of interest None.

References

- Deyo RA, Mirza SK, Martin BI (2006) Back pain prevalence and visit rates: estimates from U.S. national surveys, 2002. *Spine* 31:2724–2727
- Carragee EJ, Alamin TF, Miller JL, Carragee JM (2005) Discographic, MRI and psychosocial determinants of low back pain disability and remission: a prospective study in subjects with benign persistent back pain. *Spine J* 5:24–35
- Chou R, Fu R, Carrino JA, Deyo RA (2009) Imaging strategies for low-back pain: systematic review and meta-analysis. *Lancet* 373:463–472
- Picavet HSI, Vlaeyen JWS, Schouten SAG (2002) Pain catastrophizing and kinesiophobia: predictors of chronic low back pain. *Am J Epidemiol* 156:1028–1034
- Pincus T, Burton AK, Vogel S, Field AP (2002) A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine* 27:E109–E120
- Bishop A, Foster NE (2005) Do physical therapists in the United Kingdom recognize psychosocial factors in patients with acute low back pain? *Spine* 30:1316–1322
- Francke AL, Smit MC, de Veer AJ, Mistiaen P (2008) Factors influencing the implementation of clinical guidelines for health care professionals: a systematic meta-review. *BMC Med Inform Decis Mak* 8:38. doi:10.1186/1472-6947-8-38
- Gonzalez-Urzelai V, Palacio-Elua L, Lopez-de-Munain J (2003) Routine primary care management of acute low back pain: adherence to clinical guidelines. *Eur Spine J* 12:589–594
- Parsons S, Harding G, Breen A, Foster N, Pincus T, Vogel S, Underwood M (2007) The influence of patients' and primary care practitioners' beliefs and expectations about chronic musculoskeletal pain on the process of care: a systematic review of qualitative studies. *Clin J Pain* 23:91–98
- Coudeyre E, Rannou F, Tubach F, Baron G, Coriat F, Brin S, Revel M, Poiraudou S (2006) General practitioners' fear-avoidance beliefs influence their management of patients with low back pain. *Pain* 124:330–337
- Poiraudou S, Rannou F, Le Henanff A, Coudeyre E, Rozenberg S, Huas D, Martineau C, Jolivet-Landreau I, Revel M, Ravaud P (2006) Outcome of subacute low back pain: influence of patients' and rheumatologists' characteristics. *Rheumatology* 45:718–723
- Vlaeyen JWS, Linton SJ (2006) Are we "fear-avoidant"? *Pain* 124:240–241
- Rainville J, Bagnall D, Phalen L (1995) Health care providers' attitudes and beliefs about functional impairments and chronic back pain. *Clin J Pain* 11:287–295
- Houben RM, Vlaeyen JWS, Peters M, Ostelo RW, Wolters PM, Stompvan den Berg SG (2004) Health care providers' attitudes and beliefs towards common low back pain: factor structure and psychometric properties of the HC-PAIRS. *Clin J Pain* 20:37–44
- Burnett A, Sze CC, Tam SM, Yeung KM, Leong M, Wang WT, Tan BK, O'Sullivan P (2009) A cross-cultural study of the back pain beliefs of female undergraduate healthcare students. *Clin J Pain* 25:20–28
- Ferreira PH, Ferreira ML, Latimer J, Maher C, Refshauge K, Sakamoto A, Garofalo R (2004) Attitudes and beliefs of Brazilian and Australian physiotherapy students towards chronic back pain: a cross cultural comparison. *Physiother Res Int* 9:13–23
- Latimer J, Maher C, Refshauge K (2004) The attitudes and beliefs of physiotherapy students to chronic back pain. *Clin J Pain* 20:45–50
- Kovacs FM, Muriel A, Abriaira V, Medina JM, Castillo-Sanchez MD, Olabe J (2005) The influence of fear avoidance beliefs on disability and quality of life is sparse in Spanish low back pain patients. *Spine* 30:676–682
- Bullinger M, Alonso J, Apolone G, Leplege A, Sullivan M, Wood-Dauphinee S, Gandek B, Wagner A, Aaronson N, Bech P, Fukuhara S, Kaasa S, Ware JE (1998) Translating health status questionnaires and evaluating their quality: the IQOLA A project approach. *International quality of life assessment. J Clin Epidemiol* 51:913–923
- Waddell G, Newton M, Henderson I, Somerville D, Main CJ (1993) A fear-avoidance beliefs questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain* 52:157–168
- Kovacs FM, Muriel A, Medina JM, Abriaira V, Castillo MD, Olabe J (2006) Psychometric characteristics of the Spanish version of the FAB questionnaire. *Spine* 31:104–110
- Pfingstein M, Kröner-Herwig B, Leibning E, Kroshage U, Hildebrandt J (2000) Validation of the German version of the Fear Avoidance Beliefs Questionnaire (FABQ). *Eur J Pain* 4:259–266
- Chaory K, Fayad F, Rannou F, Fermanian J, Revel M, Poiraudou S (2004) Validation of the French version of the Fear Avoidance Beliefs Questionnaire (FABQ). *Spine* 14:908–913
- Rainville J, Carlson N, Polatin P, Gatchel RJ, Indahl A (2000) Exploration of physicians' recommendations for activities in chronic low back pain. *Spine* 25:2210–2220
- Shrout PE, Fleiss JL (1979) Intraclass correlations: uses in assessing rater reliability. *Psychol Bull* 86:420–428
- Cohen J (1988) *Statistical power analysis for the behavioral sciences*. Erlbaum Associates, Hillsdale
- Pett MA, Lackey NR, Sullivan JJ (2003) *Making sense of factor analysis. the use of factor analysis for instrument development in health care research*. Sage Publications, Thousand Oaks
- Bishop A, Thomas E, Foster NE (2007) Health care practitioners attitudes and beliefs about low back pain: a systematic search and critical review of available measurement tools. *Pain* 132:91–101
- Chen G, Tan BK, Jia HL, O'Sullivan P, Burnett A (2011) Questionnaires to examine back pain beliefs held by health care professionals: a psychometric evaluation of simplified Chinese versions. *Spine* 36:1505–1511

30. Sanders SH, Brena SF, Spier CJ, Beltrutti D, McConnell H, Quintero O (1992) Chronic low back pain patients around the world: cross cultural similarities and differences. *Clin J Pain* 8:317–323
31. Pincus T, Santos R, Breen A, Burton AK, Underwood M (2008) A review and proposal for a core set of factors for prospective cohorts in low back pain. A consensus statement. *Arthr Rheum* 59:14–24
32. Nyland LJ, Grimmer KA (2003) Is undergraduate physiotherapy study a risk factor for low back pain? A prevalence study in physiotherapy students. *BMC Musculoskelet Disord* 4:22. doi:[10.1186/1471-2474-4-22](https://doi.org/10.1186/1471-2474-4-22)
33. Domenech J, Sánchez-Zuriaga D, Segura-Ortí E, Espejo-Tort B, Lisón JF (2011) Impact of biomedical and biopsychosocial training sessions on the attitudes, beliefs, and recommendations of health care providers about low back pain: a randomised clinical trial. *Pain* 152:2557–2563
34. Adams AS, Soumerai SB, Lomas J, Ross-Degnan D (1999) Evidence of self-report bias in assessing adherence to guidelines. *Int J Qual Health Care* 11:187–192
35. Peabody JW, Luck J, Glassman P, Dresselhaus TR, Lee M (2000) Comparison of vignettes, standardized patients, and chart abstraction: a prospective validation study of 3 methods for measuring quality. *JAMA* 283:1715–1722
36. Peabody JW, Luck J, Glassman P, Jain S, Hansen J, Spell M, Lee M (2004) Measuring the quality of physician practice by using clinical vignettes: a prospective validation study. *Ann Intern Med* 141:771–780
37. Veloski J, Tai S, Evans AS, Nash DB (2005) Clinical vignette-based surveys: a tool for assessing physician practice variation. *Am J Med Qual* 20:151–157
38. Baker FB (1985) *The basics of item response theory*. Heinemann, Portsmouth