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Fear Avoidance Beliefs Influence Duration of Sick Leave in Spanish Low Back Pain Patients

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Study Design. Follow-up study.

Objectives. To estimate the influence of fear avoidance beliefs (FAB) on 1-year low back pain (LBP)-related sick leave.

Summary of Background Data. As opposed to Anglo-Saxon and Northern European subjects, in Spanish LBP patients the influence of FAB on disability and quality of life is virtually irrelevant.

Methods. Twelve primary care and 9 hospital services from 7 different regions of Spain recruited 165 workers who visited the National Health Service for LBP. None was excluded. On their first visit and 14 days later, patients were given 2 independent Visual Analogue Scales (VAS) for LBP and leg pain, as well as the validated Spanish versions of the Fear Avoidance Beliefs (FABQ), Roland-Morris (RMQ), and SF-12 questionnaires. During the following 12-month period, the number of days on sick leave because of LBP was registered.

Results. Differences in sick leave throughout the study period were associated with baseline differences in chronicity, severity of low back (not referred) pain, disability, FAB, physical and mental quality of life, being on sick leave when entering the study, and duration of previous sick leave. Ordinal logistic regression models showed that each additional point in the total FAB baseline score increases by 2.4% the odds of being on sick leave for up to 60 days during the following year and by 7.7% the odds of being sick listed for 61 days or more. Corresponding figures for FAB-Work scores are 4.2% and 11%. No variable modifies the effect of FAB on sick leave.

Conclusion. Although in Spanish patients the influence of FAB on disability and quality of life is irrelevant, baseline FABQ score does influence LBP-related sick leave during the following year. This seems to be a direct effect of FAB, since there is no confounding by any other variable.

Key words: low back pain, sick leave, fear avoidance beliefs, determinants. **Spine 2007;32:1761–1766**

Nonspecific or common low back pain (LBP) is defined as pain between the costal margins and the inferior gluteal folds, usually accompanied by painful limitation of movement. It is often influenced by physical activities and postures, and may be associated with referred or radiated leg pain. Diagnosing common LBP implies that the pain is not related to conditions such as fractures, spondylitis, direct trauma, or neoplastic, infectious, vascular, metabolic, or endocrine-related processes.[1,2]

LBP is one of the most common reasons for sick leave in industrialized countries, leading to huge social costs.[1–5] Previous studies have found a strong association between disability and fear avoidance beliefs (FAB), as measured by the Fear Avoidance Beliefs Questionnaire (FABQ).[6–11] In Anglo-Saxon and Northern European LBP patients, FAB have shown to be a predictor and major determinant of disability,[6–9,11–18] explaining up to 32% of disability, while pain severity explains only 14%.[11]

However, the influence of FAB on LBP-related disability seems to be mediated by cultural factors that are different in Southern Europe.[19] Indeed, a previous study has shown that FAB do not predict disability in Spanish acute, subacute, and chronic LBP patients[19] and that their influence on disability and quality of life is virtually irrelevant: they explain less than 6% of disability, measured with the Roland-Morris Questionnaire, less than 5% of physical quality of life and nothing of mental quality of life, while pain severity explains up to 33% of disability.[19]

In Spanish LBP patients on sick leave, FABQ values are 45% higher than those in working patients,[10] but it is not known whether this difference precedes sick leave or is its consequence. Indeed, the influence of FAB on sick leave in Spanish patients is currently unknown. Therefore, this study was designed to estimate the effect of FAB on LBP-related sick leave in Spanish patients.

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■ Methods

The study was performed in 19 Health Care Centers from 7 different administrative regions in Spain, which represent most of the cultural variation within the country. All the centers belonged to the Spanish National Health Service and were involved in the Spanish Back Pain Research Network. Participating centers included 12 primary care centers and 7 hospital outpatient clinics in orthopedic surgery, rheumatology, and neurosurgery. The study protocol was approved by the Ethical Committees of the participating institutions, and patients gave their informed written consent to participate.

Workers who consulted their physician for LBP between December 20, 2002 and July 19, 2004, were recruited for this study. The study sample was extracted from the one in which the psychometric characteristics of the Spanish version of FAB were determined.[10] In that original study, 209 patients were included and inclusion criteria were consulting for LBP, with or without leg pain, having a potentially active work situation (*i.e.*, employed or on sick leave, but not unemployed or retired), and being able to read Spanish.

In the Spanish National Health Service, the primary care physician is responsible for granting sick leave, and in some geographic settings databases on sick leave are not accessible to the specialist. Since this study required an assessment of the number of sick leave days due to LBP during 1 year, being treated in a region where the database on sick leave was accessible to the treating physician was the only additional inclusion criterion for the current study.

Exclusion criteria were: functional illiteracy (mental status insufficient to complete the Spanish version of the Roland Morris Questionnaire [RMQ] or FABQ),[17,18] treated or untreated central nervous system impairment, direct trauma to the spine, criteria for referral to surgery (progressive motor deficit lasting 6 weeks or more, sphincter impairment of neurologic cause; disabling sciatic pain, in the absence of backache, caused by a compromised nerve root demonstrated by magnetic resonance (MRI) or computerized tomography (CT) studies; symptomatic spinal stenosis (defined as claudication unrelated to peripheral vascular disease with evidence of stenosis on MRI or CT scans), and "red flags" for potential systemic disease (oncologic disease during the previous 5 years, constitutional symptoms, unexplained weight loss, fever, chills, recent urinary tract infection, history of intravenous drug use, or immunocompromised host).[2]

Patients were seen on the day of admission to the study (day 1) and 14 days later (day 15). This timeframe was based on previous studies that have shown that period to be appropriate to assess variations in the influence of pain on disability and of pain and disability on quality of life, irrespective of patients' previous duration of pain.[20,21] On the day when the patient was recruited for the study, the following variables were recorded on a data collection form: sex, age, educational level, family situation, work status, work situation, duration of pain when entering the study, and chronicity (acute/subacute/chronic) (Tables 1 and 2). The limit between acute and subacute pain was established at 14 days[20,21] and the limit between subacute and chronic at 90 days.[22]

At visits on days 1 and 15, patients were given 2 separate Visual Analogue Scales (VAS)[23] for measuring low back and leg pain, and the validated Spanish versions of the RMQ,[24] the FABQ,[10] and the SF-12 questionnaires.[25] VAS values range from 0 (no pain) to 10 (worst pain imaginable). RMQ values range from 0 (no disability) to 24 (maximum possible disability), and FABQ scores range from 0 (no fear avoidance beliefs) to 96 (maximum fear avoidance beliefs). Within the FABQ, FAB-Phys relates to fear avoidance beliefs about physical activity (range, 0–24) and FAB-Work relates to fear avoidance beliefs about work (range, 0–42). However, for the Spanish version of FABQ, the use of the total FABQ score is recommended, since it has shown to be at least as valid and reliable as the version with those 2 subscales, and it is simpler to correct.[10] Within the SF-12 questionnaire, the physical (PCS-SF-12) and the mental (MCS-SF-12) component summaries relate to quality of life depending on physical and mental factors, respectively. Both components are normalized for the Spanish population, so its mean is 50 and its standard deviation is 10. Values of the Spanish version of PCS-SF-12 range from 2.86 (worst possible physical quality of life) to 71.67 (best possible), and those of MCS-SF-12 range from 11.61 (worst possible mental quality of life) to 71.24 (best possible).[25]

All self-assessment questionnaires were given by administrative staff, and the patients filled them out on their own and alone, without the presence of staff or accompanying persons. The completed instruments were then given to the treating physician, who stapled scales and questionnaires to the patient's data collection form and calculated the scores of the VAS scales, the RMQ, and the FAB questionnaire. Since the calculation of PC-SF-12 and MCS-SF-12 scores is complex, this was done during the analysis phase.

At 365 days after the patient's recruitment, the number of days on sick leave because of LBP during that 1-year period was gathered from the Spanish Social Security database. Since payments to workers on sick leave derive directly from data included in that database, potential mistakes are quickly detected and corrected. Therefore, that database is be considered as the "gold standard" in Spain for data on sick leave duration.

Data were entered in the database at a centralized coordination office. Data from the self-assessment questionnaires and patient's data collection form were entered within 2 weeks after the visit on day 15. In order to detect potential errors in the entering of data, all these were introduced redundantly and independently by 2 different administrative assistants. Using the same procedure, data related to sick leave were entered after being collected, 365 days after the patient's recruitment, by 2 different administrative assistants, who had no access to the scores for FABQ and the other self-assessment questionnaires.

Analysis. The scores of PCS-SF-12 and MCS-SF-12 for days 1 and 15 were calculated following the standardized methods.[25]

Improvements of LBP and leg pain were defined as the scores on the corresponding VAS on day 15 being at least one point lower than their baseline values. Improvement of disability was defined as RMQ score on day 15 being at least 2 points lower than baseline value. These limits were established according to data that suggest that they are the minimal clinically relevant changes.[26]

The duration of sick leave was categorized as "no LBP-related sick leave," "short/medium sick leave," and "long sick leave." Because of the characteristics of coverage of sick leave within the Spanish Social Security System (commented on in Discussion), 30 and 60 days were examined as cutoff points for defining "short/medium" *versus* "long" sick leave. The 60-day cutoff point was selected because with this definition the sample was balanced across the 3 categories.

In order to compare the baseline values between patients with no sick leave, "short/medium" and "long" sick leave

Table 1. Characteristics of Study Participants: Categorical Variables

Categorical Variable	All Patients [No. (%)]	Patients With No Sick Leave [No. (%)]	Patients With Short/Medium Sick Leave [No. (%)]	Patients With Long Sick Leave [No. (%)]	P*
Gender					0.210
Female	89 (53.9)	46 (51.7)	25 (28.1)	18 (20.2)	
Male	76 (46.1)	31 (40.8)	21 (27.6)	24 (31.6)	
Chronicity					0.000
Acute (1–14 days)	59 (35.8)	23 (39.0)	28 (47.5)	8 (13.6)	
Subacute (14–90 days)	37 (22.4)	18 (48.6)	9 (24.3)	10 (27.0)	
Chronic (>90 days)	69 (41.8)	36 (52.2)	9 (13.0)	24 (34.8)	
Family situation					0.756
Single	26 (15.8)	13 (50.0)	6 (23.1)	7 (26.9)	
Married	120 (72.7)	58 (48.3)	34 (28.3)	28 (23.3)	
Widowed	6 (3.6)	2 (33.3)	2 (33.3)	2 (33.3)	
Divorced	10 (6.1)	4 (40.0)	2 (20.0)	4 (40.0)	
Other	1 (0.6)	0 (0.0)	0 (0.0)	1 (100.0)	
Missing	2 (1.2)	0 (0.0)	2 (100.0)	0 (0.0)	
Academic level					0.644
Less than elementary school	29 (17.5)	13 (44.8)	8 (27.6)	8 (27.6)	
Elementary school	51 (30.9)	24 (47.1)	15 (29.4)	12 (23.5)	
High school	45 (27.3)	22 (48.9)	15 (33.3)	8 (17.8)	
University	34 (20.6)	17 (50.0)	6 (17.6)	11 (32.4)	
Missing	6 (3.6)	1 (16.7)	2 (33.3)	3 (50.0)	
Work situation					0.234
Self-employed	21 (12.7)	13 (61.9)	3 (14.3)	5 (23.8)	
Employed	129 (78.2)	57 (44.2)	41 (31.8)	31 (24.0)	
Other	5 (3.0)	4 (80.0)	1 (20.0)	0 (0.0)	
Missing	10 (6.1)	3 (30.0)	1 (10.0)	6 (60.0)	
On sick leave when entering the study					0.000
No	93 (56.4)	65 (69.9)	20 (21.5)	8 (8.6)	
Yes	67 (40.6)	9 (13.4)	26 (38.8)	32 (47.8)	
Missing	5 (3.0)	3 (60.0)	0 (0.0)	2 (40.0)	
LBP improved during the first 14 days after entering the study					0.066
No	86 (57.3)	40 (46.5)	19 (22.1)	27 (31.4)	
Yes	64 (42.7)	30 (46.9)	23 (35.9)	11 (17.2)	
Leg pain improved during the first 14 days after entering the study					0.396
No	55 (61.8)	19 (34.5)	12 (21.8)	24 (43.7)	
Yes	34 (38.2)	14 (41.2)	10 (29.4)	10 (29.4)	
Disability improved during the first 14 days after entering the study					0.008
No	100 (65.7)	45 (45.0)	22 (22.0)	33 (33.0)	
Yes	52 (34.3)	26 (50.0)	20 (38.5)	6 (11.5)	

*χ^2 test.

during the follow-up period, the χ^2 test was used for categorical variables and the Kruskal-Wallis test for continuous variables.

A multivariate ordinal logistic regression model was developed to estimate the effect of the FABQ score on sick leave. In the model, the duration of LBP-related sick leave was the dependent variable, and the "no sick leave" category was used as the reference. At the design phase, it was decided that the maximal model would include being on sick leave when entering the study (yes/no), duration of pain when entering the study (acute/subacute/chronic), severity of pain and disability, improvement of pain and disability during the first 14 days (yes/no), as well as other variables that were different across categories at baseline assessment.

A backward elimination strategy was used. A variable was considered as a confounder when its removal from the model changed by ≥10% the effect of FAB. Goodness of fit of the model was assessed through the Nagelkerke R^2 and the Likelihood ratio test.[27]

Finally, a second model was developed using the FAB-Work and FAB-Phys subscales instead of the total FAB score.

The SPSS statistical package for Windows, version 12, was used for statistical analysis (SPSS Inc., Chicago, IL).

■ Results

A total of 165 patients were recruited (86 from primary care centers and 79 from the hospital setting) and none was excluded; 89 subjects (53.9%) were women, and the median age was 45.8 years. Tables 1 and 2 show the characteristics of the study subjects. Data on continuous variables are given as median (P25, P75). No significant differences were found in any of those variables in the 165 patients included in this study and the 209 from which this sample derives (Tables 1 and 2).[19]

During the 1-year follow-up period, 77 patients did not go on sick leave, 46 were on sick leave for less than 2 months, and 42 were on sick leave for a period ranging between 2 and 12 months. Differences at baseline between patients in those subgroups were observed for the following variables: chronicity when entering the study,

Table 2. Characteristics of Study Participants: Continuous Variables

Continuous Variables (Median P25, P75)	All Patients		Patients With No Sick Leave		Patients With Short/ Medium Sick Leave		Patients With Long Sick Leave		P*
	n	Value	n	Value	n	Value	n	Value	
Age	153	45.8 (38.9, 54.2)	74	47 (40, 54)	43	46 (38, 53)	36	45 (37, 56)	0.815
Duration of sick leave when entering the study (days)	66	7.5 (0.0, 26.75)	8	4.5 (0.0, 19)	26	2.0 (0.0, 10.25)	32	22.5 (4.0, 151.5)	0.004
FAB total score†	165	62.0 (44.5, 76.5)	77	51 (35, 70)	46	65 (47, 75)	42	77 (65, 84)	0.000
FAB-Phys‡	158	21.0 (17.0, 23.2)	75	19 (15, 23)	43	21 (18, 22)	40	23 (20, 24)	0.000
FAB-Work§	156	28.5 (18.0, 35.0)	72	22 (13, 34)	44	30 (22, 34)	40	34 (27, 40)	0.000
Baseline severity of low back pain (VAS)	158	6.0 (3.4, 8.0)	76	5 (3, 8)	43	6 (4, 8)	39	8 (5, 9)	0.004
Baseline severity of leg pain (VAS)	109	5.8 (3.0, 8.0)	45	5 (3, 7)	27	6 (2, 8)	37	7 (4, 9)	0.134
Baseline disability (RMQ)	158	11.0 (7.0, 15.0)	76	9 (6, 14)	43	11 (7, 14)	39	15 (9, 19)	0.001
Physical quality of life (PCSF-12)	151	32.6 (27.7, 42.0)	74	35 (30, 46)	42	33 (27, 41)	35	29 (26, 33)	0.000
Mental quality of life (MCSF-12)	151	47.8 (35.0, 54.6)	74	50 (38, 55)	42	50 (43, 58)	35	42 (28, 51)	0.003

*Kruskall-Wallis Test.
†FAB (total score): Sum of scores of the 16 items on the scale.
‡FAB Phys: Factor 2: Fear Avoidance Beliefs, Physical Activity: Sum of the scores of items 2, 3, 4 and 5.
§FAB Work: Factor 1: Fear Avoidance Beliefs, Work: Sum of the scores of items 6, 7, 9, 10, 11, 12 and 15.
VAS indicates Visual Analogue Scale; RMQ, Roland Morris Questionnaire; PCS-SF-12, Physical Component Summary; MCS-SF-12, Mental Component Summary.

being on sick leave when entering the study, duration of sick leave before entering the study, severity of LBP (not referred pain), disability, FAB, and physical and mental quality of life. The proportion of patients who improved in terms of disability during the first 14 days was also different between patients who were not on sick leave during the 1-year follow-up period (Tables 1 and 2). Therefore, all those variables were included in the maximal regression models.

None of those variables confounded the effect of FAB on the duration of LBP-related sick leave during 1 year. As seen in Table 3, when compared with not being on sick leave because of LBP during 1 year, each additional point in the baseline FABQ score increases the odds of being on sick leave for up to 60 days by 2.4% and the odds of being sick listed for 61 to 365 days by 7.7%.

In the model in which the FABQ subscales (FAB-Work and FAB-Phys) were used instead of the total FABQ score, only the FAB-Work score held up in the model, with no variable confounding its influence on sick leave. FAB-Phys was not significant, with $P = 0.079$ (data not shown). As seen in Table 4, each additional point in the FAB-Work score increases the odds of being on sick leave for up to 60 days by 4.2% and the odds of being sick listed for 61 to 365 days by 11.0%.

■ Discussion

These results show that, in Spanish LBP patients, baseline FABQ values influence the magnitude of LBP related work loss during the following year. These results are in agreement with those from previous studies, which were conducted in other geographic and cultural settings. Indeed, FAB have shown to influence work loss in all the studies in which such an association has been analyzed.[7,9,31]

However, that influence is even more worth noting in Spanish patients since, as opposed to what has been noticed in Anglo-Saxon and Northern European countries,[6–9,11–18] the influence of FAB on disability and quality of life has previously been shown to be virtually irrelevant, both in LBP patients of working age and the elderly.[19,32] Those differences seem to be due to cultural factors,[19] so they are likely to also affect the subjects in this study. Indeed, the sample recruited for this study derives from the very population in which the virtual irrelevance of FAB on disability and quality of life was previously shown.[19]

Table 3. Regression Model Estimating the Effect of FAB on 1-Year LBP-Related Sick Leave*

Duration of Sick Leave Because of LBP (Days)	P	Odds Ratio	95% CI
1–60†	0.011	1.024	1.005–1.044
61–365†	0.000	1.077	1.048–1.107

*χ^2 of the model = 42.304; $P = 0.000$; Nagelkerke $R^2 = 0.257$
†The reference category is no LBP-related sick leave during the one-year period.

Table 4. Regression Model Estimating the Effect of FAB-Work on 1-Year LBP-Related Sick Leave*

Duration of Sick Leave Because of LBP (days)	P	Odds Ratio	95% CI
1–60†	0.022	1.042	1.006–1.079
61–365†	0.000	1.110	1.058–1.164

*χ^2 of the model = 33.319, $P = 0.000$, Nagelkerke R^2: 0.171
†The reference category is no LBP-related sick leave during the one-year period.

That suggests that FAB directly influence sick leave duration in Spanish LBP patients, as opposed to that effect being mediated by disability. Indeed, it makes sense that the more strongly LBP patients believe that work is harmful for their backs, the more reluctant they are to return to work.

There were differences between patients who were and who were not on sick leave during a 1-year period. Differences were detected in the proportion of patients who did not improve in terms of disability for the first 14 days, as well as in baseline characteristics (being on sick leave, duration of previous sick leave, chronicity of pain, severity of LBP, and disability). The design of this study does not allow for the comparison of the influence of FAB with these variables, and this should be explored in further studies. However, this study shows that none of these variables had a confounding effect on the influence of FAB on sick leave.

In the Spanish National Health Service, the primary care physician is responsible for deciding whether or not sick leave is granted, but the patient may challenge the physician's decision, so that the decision is usually taken by consensus between the patient and the physician. For Spanish primary care physicians, leg pain is more important than LBP when granting sick leave.[28] However, for Spanish LBP patients, LBP influences disability and quality of life to a greater extent than leg pain.[20,21] In this study, there were differences in LBP between patients who were and who were not going to be on sick leave during the next year, while there were none in terms of leg pain (Tables 1 and 2). Baseline severity of LBP was higher in patients who were going be on sick leave during the next year, and differences in the clinical evolution of that variable for the first 14 days since recruitment to this study almost reached statistical significance (Tables 1 and 2). Acute, subacute, and chronic patients were included in this study, and it is likely that the evolution of LBP for the first 14 days is more important in acute than in chronic patients. The sample size in the study does not allow for checking this hypothesis, which should be explored in further studies.

For the Spanish version of the FABQ, the use of the total score is recommended since it is at least as valid and reliable, and simpler to score than the use of the FAB-Work or FAB-Phys subscales.[10] Results from this study are consistent with that recommendation. The baseline score of FAB-Phys did not influence the duration of sick leave throughout the 1-year period, but the influence of the total FABQ score and the FAB-Work score was similar. In this respect, the difference in the OR associated with a 1-point increase in each scale (Table 3) should be interpreted taking into account their different range (0–42 for the FAB-Work, 0–96 for the total FABQ score).

In Spain, the minimum public coverage for workers on sick leave represents 60% of salary between days 4 and 20, and 75% from day 21 until 18 months later. After that period, they can either return to work or be classified as "permanently disabled," in which case they get a compensation for the rest of their life. The minimum coverage during the first 18 months is improved by additional insurance plans financed by companies and workers' compensation institutions. These plans start by covering 100% of the salary and decrease after a certain period. The different plans do not depend on patients' qualification, specific occupation, or salary level. They are negotiated by different trade unions and they vary slightly from one economic sector to the other. The main difference is the period after which the percentage of the salary diminishes; in the tourist sector, the worker on sick leave can receive 100% of income during the entire 18-month period; but in the vast majority, the additional coverage diminishes after a period ranging between 1 and 2 months. For that reason, these were the cutoff points that were explored. Among the 165 patients recruited for this study, only 3 were working in a sector in which the potential 18 month sick leave period was fully covered and none of them was on sick leave for more than 3 months, so it is not likely that this aspect influenced these results.

In Spanish patients, the clinical evolution during the first 14 days has shown to be a major determinant of chronification.[21] Consequently, in this study, it was hypothesized that patients' feeling of improvement for that period could influence FAB. Accordingly, the cutoff point for defining "improvement" in this study was established as the minimal clinically relevant difference,[26] and not as the optimal difference recommended for use in clinical trials, which is higher[29,30] and varies depending on chronicity, baseline severity, and other variables.[31]

The representativeness of the sample among the Spanish working population seeking health care for LBP in the Spanish National Health Service is not a major concern. The 7 Spanish regions from which patients were recruited represent the entire cultural and economic spectrum of the 17 regions in the country, participants were recruited both in the primary care and the hospital setting, and no data suggest that patients and clinical practice in the rest of the country are different.[28] In addition, all patients complying with inclusion criteria were included, none was excluded, and they represent different academic strata (Tables 1 and 2).

■ Conclusion

This study shows that, although the influence of FAB on disability and quality of life is virtually irrelevant in Spanish patients, they do influence the duration of LBP-related sick leave during 1 year. Therefore, this study provides a theoretical base for applying programs focusing on FAB reduction in Spanish workers with LBP, in order to reduce their sick leave. Further

studies are needed to assess the effectiveness and cost-effectiveness of those programs.

■ Key Points

- As opposed to what has been shown in Northern European and Anglo-Saxon patients, the influence of fear avoidance beliefs (FAB) on LBP-related disability and quality of life is virtually irrelevant in Spanish patients.
- In this study, 165 workers who visited the Spanish National Health Service for LBP were followed-up, and data on LBP-related sick leave were prospectively gathered for 1 year.
- Each additional point on the FABQ baseline score increases by 2.4% the odds of being on sick leave for up to 60 days during the following year, and by 7.7% the odds of being sick listed for 61 days or more. The influence of FAB on duration of sick leave is not confounded by other variables.
- In Spanish LBP patients, baseline FAB influence LBP-related sick leave during the following year.

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