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## Original article

# Fear-avoidance beliefs increase perception of pain and disability in Mexicans with chronic low back pain



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### ABSTRACT

**Background:** Fear-avoidance beliefs are related to the prognosis of chronicity in low back pain in subacute stages, however in chronic pain, is no clear the influence of these factors; it has been suggested that the study population can determine the magnitude of influence on disability and pain of those suffering from back pain. Currently, information does not exist in the Mexican population.

**Objective:** To analyze the relationship between fear-avoidance beliefs with pain and disability in Mexicans with chronic low back pain; analyze potentials differences between subgroups according to the time of evolution.

**Methods:** Cross-sectional study in Mexicans with chronic LBP aged between 18 and 45. Data were collected on general socio demographic characteristics, time of evolution, body mass index, pain, disability and fear-avoidance beliefs.

**Results:** 33 men and 47 women, with an average age of  $34.19 \pm 7.65$  years. Higher scores of fear-avoidance beliefs were obtained in women ( $47.2 \pm 20.99$  versus  $38.5 \pm 9.7$ ;  $p=0.05$ ) and single participants ( $p=0.04$ ). A positive correlation was found between disability ( $r=0.603$ ,  $p<0.001$ ) and pain ( $r=0.234$ ,  $p=0.03$ ) with high scores of fear-avoidance beliefs. Through generalized linear models for disability, total score of the fear avoidance beliefs questionnaire showed a standardized beta coefficient of  $0.603$ ,  $p<0.001$  ( $R^2$  of  $0.656$ ); for pain showed a standardized beta coefficient of  $0.29$ ,  $p=0.01$  ( $R^2$  of  $0.721$ ).

**Conclusion:** The present study suggests that there is a strong relationship between pain severity, FABQ scores, and functional disability in Mexicans with chronic LBP.

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## Crenças de medo e evitação aumentam a percepção de dor e incapacidade em mexicanos com lombalgia crônica

### R E S U M O

#### Palavras-chave:

Crenças de medo e evitação

Lombalgia crônica

Incapacidade

**Introdução:** As crenças de medo e evitação estão relacionadas com o prognóstico da cronicidade da lombalgia nas fases subagudas; contudo, na dor crônica, não é clara a influência desses fatores. Sugeriu-se que um estudo populacional pode determinar a magnitude da influência da lombalgia sobre a incapacidade e a dor. Atualmente não há informação a esse respeito na população mexicana.

**Objetivo:** Analisar a relação entre as crenças de medo e evitação com a dor e incapacidade em mexicanos com lombalgia crônica; analisar potenciais diferenças entre subgrupos determinados pelo tempo de evolução.

**Métodos:** Estudo transversal em mexicanos com lombalgia crônica entre 18 e 45 anos. Coletaram-se dados sobre características sociodemográficas gerais, tempo de evolução, índice de massa corporal, dor, incapacidade e crenças de medo e evitação.

**Resultados:** Foram estudados 33 homens e 47 mulheres com média de 34,19 ± 7,65 anos. Obtiveram-se escores de crenças de medo e evitação mais elevados em participantes do sexo feminino (47,2 ± 20,99 versus 38,5 ± 9,7;  $p = 0,05$ ) e solteiros ( $p = 0,04$ ). Encontrou-se uma correlação positiva entre a incapacidade ( $r = 0,603$ ,  $p < 0,001$ ) e a dor ( $r = 0,234$ ,  $p = 0,03$ ), com altas pontuações de crenças de medo e evitação. Por meio de modelos lineares generalizados para incapacidade, a pontuação total no questionário de crenças de medo e evitação mostrou um coeficiente beta padronizado de 0,603,  $p < 0,001$  ( $R^2$  de 0,656); para a dor, mostrou um coeficiente beta padronizado de 0,29,  $p = 0,01$  ( $R^2$  de 0,721).

**Conclusão:** O presente estudo sugere que há uma forte relação entre a intensidade da dor, os escores no FABQ e a incapacidade funcional em mexicanos com lombalgia crônica.

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## Introduction

Promoting gradual physical reactivation and avoiding rest are recommended in the management of low back pain (LBP).<sup>1</sup> However, these recommendations may not be carried out by individuals if they possess erroneous beliefs, attitudes of avoidance, or fear of physical activity. These people may generate catastrophic ideation about potential damage, which in turn increases incapacity and pain and interferes with clinical course and treatment adherence.<sup>2</sup>

Through the development and administration of the "Fear Avoidance Beliefs Questionnaire" (FABQ), data has been obtained that support the "Fear-Avoidance Model", previously described by Vlaeyen and Linton, which explains how the presence of fear and/or avoidance beliefs to physical activity, are related to the prognosis of chronicity in people with LBP in subacute stages (between 6 and 12 weeks of evolution); a finding initially detected in salaried workers.<sup>3,4</sup>

In the case of people with chronic LBP (symptoms lasting longer than 12 weeks) the findings are less consistent. It is for this reason that there is a current controversy surrounding the influence of these factors on the perception of pain and long-term associated disability. Additionally, it is recommendable to analyze the impact of these factors with other variables such as time of evolution, taking into account peoples' status before and after 6 months of symptom duration, and type of work, since people with a non-salaried occupation have been underrepresented in this area of research.<sup>5</sup>

On the other hand, the origins of study population could determine the magnitude of influence of fear-avoidance beliefs on disability and quality of life of those suffering from LBP; it has been observed that the influence of these factors is lower in populations from southeast Europe when compared to populations from northern Europe.<sup>6,7</sup>

In Mexico, in 2012, a study was reported that aimed to compare the personality types of 46 Mexicans with chronic LBP against asymptomatic controls using the Temperament and Character Inventory (TCI). It was found that scores on this scale supported the "Fear-Avoidance Model". However, this study included participants in subacute stages and did not analyze the association between functionality and pain. It also did not analyze the influence of the results against previously described fear and avoidance models.<sup>8</sup>

Currently, information does not exist regarding these factors in the Mexican population. This is why the research questions for this study were: Which is the relationship between fear-avoidance beliefs with pain and disability in Mexicans with chronic low back pain? and Are there differences between subgroups when they are divided according to the time of evolution and occupation?

## Material and methods

A cross-sectional study was performed in the outpatient services of the Spine Rehabilitation Services of the National Institute of Rehabilitation in Mexico City. The participants were recruited based on the following criteria: Mexicans of

either sex, aged between 18 and 45, and with a diagnosis of mechanical chronic LBP (defined as pain and discomfort for more than 12 weeks in the posterior lumbar region between the 12th ribs and inferior gluteal folds, which worsens with physical activity, effort, and postures and which improves with rest). People were excluded if they had non-mechanical lumbar pain, if they were illiterate or had a cognitive deficit that would have impeded their filling out of questionnaires, or if they had any associated comorbidities such as polyneuropathy or systemic rheumatic illnesses.

The Institutional Ethics Committee approved this study. All participants gave written informed consent before data collection began. Data were collected on general socio-demographic characteristics, such as marital status, schooling, precedence, socioeconomic level, and occupation. This last variable was stratified into paid or unpaid work, as well as into activities that are risk factors for chronic LBP. Time of evolution of the LBP and body mass index (BMI) were recorded for all participants.

For pain, the evaluation was performed using a 100 mm long visual analog scale (VAS), considering "no pain" to be at 0 mm, and 100 mm to be "unbearable pain."

*For disability:* The Roland Morris Questionnaire was used, which is a self-administered questionnaire consisting of 24 items. The total score can range from 0 (no disability) to 24 (maximum disability). This instrument is validated for use in Spanish and has been shown to be highly reliable and with adequate reproducibility.<sup>9</sup>

*Fear-avoidance beliefs:* The FABQ was applied,<sup>10</sup> which is an instrument that is also validated in Spanish and has been shown to be grammatically comprehensible and reliable. It consists of 16 items divided into two sub-scales: beliefs and fear at work (FABQ-W), and beliefs and fear to do physical activity (FABQ-PA). The items are scaled from 0 ("totally disagree") to 6 ("completely agree"). Greater scores indicate higher levels of fear and beliefs about avoiding activities. According to the original article by Waddell, the final score is arrived at by adding both sub-scales: seven of the 11 items related to work (FABQ-W), with a range of 0-42 points, and four of the five items related to physical activity (FABQ-PA). With an interval of 0-24, a high score is considered to be FABQ-PA above 14.

### Statistical analysis

The required sample size was calculated considering a correlation coefficient of less than 0.50 between the principal variables, in order to achieve a significance level of  $\alpha < 0.05$  and a statistical power of 80%. The sample size required was at least 29 people. Descriptive statistical analysis was run to summarize the data. Chi-squared tests were performed on qualitative variables, and Student *t* tests on quantitative variables; data were proven to be normal with a prior confirmation through a Kolmogorov-Smirnov test. Correlations were explored between pain and functionality with the score obtained on the FABQ, as well as with the rest of the variables through Pearson or Spearman tests, according to the case. Multiple linear regressions were performed taking pain and functionality into account. For the construction of multivariate models, variables with  $p < 0.15$  in univariate analysis

**Table 1 – Results of the administration of questionnaires and clinical data.**

n = 80	Mean ± SD
Evolution time (years)	4.43 ± 5.03
Body mass index (BMI)	27.08 ± 4.20
VAS (mm)	52.6 ± 23.16
Functionality (Roland Morris)	9.56 ± 5.20
FAB total score	42.09 ± 20.55
FAB Physical Activity	18.33 ± 7.54
FAB Work	23.43 ± 16.16

FAB, Fear Avoidance Beliefs Questionnaire; SD, standard deviation; VAS, visual analogic scale.

were included. Final models were the most parsimonious. The significance level of  $\alpha$  was 0.05. SPSS Version 17 was used for all data analysis.

### Results

80 people (33 men and 47 women), with an average age of  $34.19 \pm 7.65$  years, were included in the study. The majority of the people were determined, by the department of social services of the hospital, to be financially solvent (56.3%), although 43.8% were determined to be indebted or impoverished.

Regarding marital status, 53.8% were single, 31.3% were married, 10% were in a domestic partnership, and 5% were divorced. 68.4% of the people had an undergraduate or postgraduate university degree, 35.1% middle or high school and 5% only had an elementary school education.

Regarding occupation, only 21.3% of the sample performed activities known to be risk factors for LBP. 80% (60 people) received economic remuneration as part of their work.

The results regarding evolution time, anthropometric measurements and results of the applied questionnaires (pain, functionality and FABQ) are shown in Table 1.

A positive correlation was found between functional disability, measured on the Roland-Morris scale, with high scores on the FABQ. These correlations were found with the total score ( $r = 0.603$ ,  $p < 0.001$ ), as well as with the Physical Activity and Work subscales (FAB-PA  $r = 0.314$ ,  $p = 0.008$  and FAB-W  $r = 0.571$ ,  $p < 0.001$ ). Functionality was also found to be inversely correlated with time of evolution and schooling, higher percentages of incapacity were found at less time of evolution ( $r = -0.224$ ;  $p = 0.04$ ), and at lower levels of education ( $r = -0.28$ ;  $p = 0.01$ ). Regarding pain measured with the VAS scale, it correlated positively with the total score on the FABQ ( $r = 0.234$ ,  $p = 0.03$ ), as well as with functionality ( $r = 0.48$ ,  $p < 0.001$ ).

Scores obtained on the FABQ showed significant differences between men and women, with higher scores found in men compared to women ( $47.2 \pm 20.99$  versus  $38.5 \pm 19.7$ ;  $p = 0.05$ ). Regarding marital status, higher scores were seen in single participants when compared to other categories ( $p = 0.04$ ).

Differences were not found between groups in terms of FABQ scores when participants were divided into two groups based on time of evolution, before and after 6 months ( $p = 0.23$ ). Differences were also not found when people were divided by remunerated work or unpaid labor ( $p = 0.42$ ).

Various generalized linear models were calculated, considering the dependent variables to be the values on the Roland Morris Questionnaire functionality and the VAS scales. The model with the best adjusted coefficient of determination was sought, introducing the variables in a block forward method.

For disability evaluated with the Roland Morris Questionnaire, the best model presented a corrected  $R^2$  of 0.656. The total score of the FABQ was included in the final model, with a standardized beta coefficient of 0.603 ( $p < 0.001$ ).

In the case of pain measured on the VAS, the model with the best fit was found to have a corrected  $R^2$  of 0.721; this model only included the variable of FABQ total score, which showed a standardized beta coefficient of 0.29 ( $p = 0.01$ ).

## Discussion

Chronic LBP is a public global health problem, and despite various decades of research on the causes, there is still much unknown about the factors that influence its development and chronicity, as well as individual responses to available treatments.<sup>11</sup>

Nearly all individuals will suffer an episode of LBP at some point of their lives (80–90%), however, there is no clear correlation between pain described by people and anatomopathological alterations found, and it is only possible to reach an etiological diagnosis in 10–20% in LBP cases.<sup>12</sup>

There are many factors associated with chronic LBP, and the structural and biomechanical modifications do not completely explain all symptoms. Ample literature reports that psychosocial factors are strongly associated with pain and disability.<sup>13</sup>

Within these factors, fear and anxiety related to LBP generate a series of physiological reactions (reactive muscle hypertonia), behavioral reactions (escapism and avoidance of the painful situation), and cognitive reactions (catastrophic ideation) in an individual that can foment chronicity. This has been widely described in literature as “Fear-Avoidance Model.”<sup>3,14</sup>

In the present study, the fear and avoidance behaviors in Mexicans with chronic LBP predicted a large proportion of the degree of disability and pain without regard to the sociodemographic or occupational characteristics of our population, and previously reported as risk factors.<sup>15,16</sup>

Leeuw et al.<sup>17</sup> mentioned that within the Fear-Avoidance Model, all related factors should be considered, like pain severity and prior history of LBP, and together with hyper-vigilance/attention to pain and avoidance behaviors, it can determine the evolution of the disorder and response to treatment.

George and Stryker<sup>18</sup> report the outcomes of 313 people with LBP, for whom high scores on the FABQ and severity of pain were the two principal factors that negatively affected their function.

Coinciding with this line of research, the present study suggests that there is a strong relationship between pain severity, FABQ scores, and functional disability in Mexicans with chronic LBP.

A secondary aspect added to this study was the analysis of behaviors in populations with chronic LBP who labor

in non-remunerated occupations. This is important because the majority of studies focused on economically active populations show high scores on the FABQ associated with pain and the total of work days missed.<sup>4,19</sup>

Since we could not quantify the workdays lost for non-remunerated workers in our population, the principal variables to compare them with those who performed remunerated activities were pain and disability. No differences were observed between groups, and both were associated with fear attitudes and pain avoidance and functional disability. It is important to include variables to study unpaid workers (for example, housewives), which allowed us to measure the role pain and disability played in interrupting their daily work. These interruptions can have negative indirect economic consequences, as they can affect the functioning of their primary network and most likely would lead to a redistribution of tasks to other members of the family.

A limitation of the results presented here is that specific evaluations were not included to detect psychiatric comorbidities (anxiety and depression) that could modify the results in those who previously presented these diagnoses. The importance of these comorbidities is already known in the persistence of LBP,<sup>20</sup> however, we consider that these first reports are valuable in that they contribute to the analysis of how the fear and pain avoidance model influences in Mexicans with LBP.

There are still unresolved elements; the present study was focused on Mexicans between the ages of 18 and 45 with unspecified chronic LBP, without exploring how the fear and pain avoidance model influences in the pain prognostics for older subgroups. On the other hand, prospective cohort studies should be performed to analyze how these factors interfere in the results of treatments and treatment adherence, and to generate variables that would allow us to measure populations of unpaid workers more effectively.

As conclusion, the present study suggests that there is a strong relationship between pain severity, FABQ scores, and functional disability in Mexicans with chronic LBP. Fear-avoidance beliefs show no differences between subgroups divided according to the time of evolution and occupation.

## Conflicts of interest

The authors declare no conflicts of interest.

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