Original Article

Self-Efficacy and Fear Avoidance Beliefs in Chronic Low Back Pain Patients: Coexistence and Associated Factors

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Abstract:

A cross sectional study was conducted with the objective to assess the coexistence of self-efficacy and fear avoidance beliefs and establish the associated factors. Data collection was performed (215 individuals with lower back pain at three health services and two industries). The following instruments were used: Tampa Scale for Kinesiophobia, Beck's Depression Inventory, Piper's Fatigue Scale, Oswestry Disability Index, and the Chronic Pain Self-Efficacy Scale. Wilks' lambda test was performed, followed by MANOVA model to assess the effect of self-efficacy beliefs and fear avoidance on independent variables. Most subjects were women (65.1%), 45 years of age or younger (50.7%), with a family income between $450 and $1,350 per month (49.3%). Depression was present in 21.4%, fatigue in 29.3%, and disability in 68%. The average (standard deviation) of self-efficacy was 180.8 (60.4), and fear avoidance was 42.0 (11.5). A significant negative correlation was observed between the total score of both beliefs. The Wilks' lambda test showed that gender, income, depression, disability, and fatigue were significant and were included in the model. In the Manova analysis, low self-efficacy was associated with lower income, fatigue, depression, and level of disability ($p < .001$). High fear avoidance was associated to the male gender, lower income, depression, and level of disability ($p < .001$). The analysis of the confidence areas showed that a reduced self-efficacy and increased fear avoidance are related to an increased level of disability ($p < .001$). Specific intervention strategies must be implemented change these beliefs.

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INTRODUCTION

Low back pain is a public health problem with elevated societal costs. This problem affects approximately 20% of the population worldwide (Català et al., 2002;

Hardt, Jacobsen, Goldberg, Nickel, & Buchwald, 2008; Wong & Fielding, 2011) and approximately 30% of the population in Brazil (Dellaroza, Pimenta, & Matsuo, 2007; Sá, Baptista, Matos, & Lessa, 2009). Seventy-five percent of patients with low back pain present the same complaints after a 1-year follow-up assessment, and 30% of patients develop disabilities related to work and daily activities as well as symptoms of anxiety and depression (Lamb et al., 2007).

Patients with chronic pain frequently present dysfunctional beliefs, attitudes, and behaviors, most likely resulting from the experience of acute pain. Studies have shown that some patients with low back pain believe that physical activity aggravates the discomfort, that emotions are not related to the pain, that pain always results in disability, that they deserve special attention due to their pain, and that the only acceptable outcome for their situation is the elimination of pain (Pimenta, 1999; Pimenta, 2001; Pimenta & Cruz, 2006).

These dysfunctional beliefs concerning low back pain are erroneous conceptions that contribute to increased pain intensity and disability (Vandeenberghe, 2005). Of the beliefs described as most important to low back pain, self-efficacy and fear avoidance of pain or movement stand out.

Self-efficacy is the belief in one's ability to successfully perform specific tasks or behaviors to produce a desirable outcome. When self-efficacy is low, pain and fear avoidance behaviors increase (Salvetti & Pimenta, 2007).

The fear avoidance belief model suggests that patients fear movement because of the resulting pain, fear of aggravating their condition, or fear of causing a new problem. This fear can lead to two coping responses: confrontation or avoidance (de Jong et al., 2005). Confrontation is an adaptive response that allows an individual to perform the movement, which reduces fear as well as increases activity and functioning. Avoidance is a maladaptive response that leads the individual to avoid movement, which decreases activity and functioning as well as contributes to the persistence of pain (Woby, Urmston, & Watson, 2007).

The values, attitudes, beliefs, expectations, and judgments of the patient concerning their pain, capacity to cope, and therapeutic options influence the experience of pain and the treatment outcomes. In other words, cognitive factors can exacerbate pain and suffering, contributes to disability, and influence responses to therapy (Pimenta & Cruz, 2006).

A cross-sectional study of Brazilian patients with chronic low back pain found that self-efficacy beliefs and the fear avoidance of pain were independently associated with disability. Patients with low self-efficacy were two times more likely to have a risk of disability, and high fear avoidance of pain increased the risk of disability by 41% compared with patients who were low in fear. In addition, these beliefs are considered essential in the study of chronic pain; furthermore, correlations exists among other beliefs related to emotion, solicitude, medical cures, and physical damage (Salvetti, Pimenta, Braga & Correa, 2013).

Previous studies have identified factors associated with self-efficacy and fear avoidance beliefs (Costa, Maher, McAuley, Hancock, & Smeets, 2011; Denison, Asenlöf, Sandborgh, & Lindberg, 2007; Woby et al., 2007); however, none have analyzed the factors associated with both beliefs simultaneously. Understanding these factors is essential to propose interventions that seek to improve the physical and psychological functioning of individuals with low back pain. Thus, the present study seeks to fill the gap in the literature by evaluating the prevalence of self-efficacy and fear avoidance beliefs among patients with low back pain, thereby verifying the correlation between these beliefs and identifying their relationship with socioeconomic factors, depression, fatigue, and disability.

METHODS

Experimental Design and Data Collection

This cross-sectional study was performed at three health care centers (two public and one private) and at the outpatient clinic of two industries. The inclusion criteria were as follows: the presence of chronic lumbar pain for a period of equal to or greater than 6 months, a minimum of 6 years of education, and normative communication and comprehension abilities. The principal investigator evaluated the communication abilities of the participants through observation; objective parameters were not used. The exclusion criteria were as follows: pain of oncologic origin, recent surgery, and acute disease.

Sampling

The individuals were recruited from the study locations each week. During the data collection period, 368 individuals met the inclusion criteria. Of these patients, 153 refused to participate in the study. The reasons for refusal included lack of time (85%), physical discomfort related to pain (4.0%), and other personal reasons (11.0%). Thus, the final sample consisted of 215 participants.

The Research Ethics Committee of the Nursing School of the USP (São Paulo University, Process 684/2007/CEP-EEUSP) approved this study. The participants who volunteered signed two copies of the free and informed consent form.

Variables and Instruments

The participants completed done identification instrument and five instruments validated for the Brazilian population.

Self-efficacy and fear avoidance beliefs were considered dependent variables. The independent variables were gender, age, education level, family income, occupational status, pain intensity, pain duration, depression, fatigue, and disability.

Self-efficacy belief was assessed using the Chronic Pain Self-efficacy Scale (CPSS), which was created in 1995 and validated for Portuguese in 2005 (Anderson, Dowds, Pelletz, Edwards, & Peeters-Asdourian, 1995; Salvetti & Pimenta, 2005). This scale contains 22 items, divided into three domains: self-efficacy for pain control (PSE), self-efficacy for function (FSE), and self-efficacy for coping with other symptoms (SSE). The score for each item can vary from 10 to 100, and the sum of the three domains provides the total score of the scale (30 to 300).

Fear avoidance beliefs were measured using the Tampa Scale for Kinesiophobia (TSK), which was validated for Portuguese in 2007 (Siqueira, Teixeira-Samela, & Magalhães, 2007). This scale is composed of 17 items, and each item's score varies from 1 to 4 points. The final score can vary from 17 to 68 points.

Depression was evaluated using the Beck Depression Inventory (BDI). This scale is composed of 21 items with scores that range between 0 and 3. The total scores vary from 0 to 63. Scores from 16 to 20 were considered to denote dysphoria, and those above 20 denoted depression, as recommended by Gorestein and Andrade (1996).

Fatigue was evaluated using the Piper Fatigue Scale. This multidimensional instrument is composed of 22 items that are classified from 0 to 10 across four domains: sensory, affective, cognitive-emotional, and behavioral intensity (Piper et al., 1998; Mota, Pimenta, & Piper, 2009). To determine the cutoff point of this scale, the distribution of percentile scores was recorded. Scores of 4.32, 5.98, and 7.70 represented the 25th percentile, 50th percentile, and the 75th percentile, respectively. Using this classification structure, a cutoff point of 4 was established to define fatigued individuals. A cutoff score of 4 was used to obtain the greatest confidence in the identification of clinically relevant cases of fatigue (Salvetti et al., 2013).

Incapacity was evaluated using the Oswestry Disability Index (ODI). This scale consists of 10 items that vary from 0 to 5. The total score varies from 0 to 100. Minimal, moderate, and severe disabilities were considered to be between 0% and 19%, between 20% and 39%, and between 40% and 60%, respectively (Fairbank, Couper, Davies, & O'Brien, 1980; Vigatto, Alexandre, & Correa Filho, 2007).

Data Analyses

The data were analyzed using R 2.15.1 software (R Development Core Team, 2011). Initially, the descriptive statistics of the sample were calculated to determine the frequencies of the studied variables. Because self-efficacy and fear avoidance were considered to be correlated and dependent, a multivariate analysis of variance (MANOVA) model was selected. This statistical technique is used to simultaneously explore the relationships among various categorical and independent variables as well as two or more continuous dependent variables, assuming a multivariate normal distribution. MANOVA is an extension of univariate analysis of variance (ANOVA). The objective of this multiple dependent variable analysis is to use independent variables (whose values are known) to predict the values of dependent variables.

The assumptions of normality, linearity, and homogeneity of variance were confirmed for the model. Wilks' lambda was performed to determine whether significant differences existed among the levels of independent variables within the linear combination of dependent variables (Johnson & Wicher, 2007). A significance level of 5% was adopted for inputting variables into the model.

RESULTS

Two hundred fifteen individuals with chronic low back pain participated in this study. Of these patients, 70 (32.5%) were recruited from pain-specialized clinics, 77 (35.8%) were recruited from general clinics, 30 (13.9%) were recruited from occupational medicine, and 38 (17.7%) were industrial workers.

The majority of the sample was female (65.1%), under the age of 45 years old (50.7%), with a monthly family income between $450.00 and $1,350.00. Forty-four point two percent of patients were actively employed, and 21.9% had been removed from work (Table 1).

More than half of the participants reported intense pain (53.5%) over a longer period than 4 years (59.1%). Depression was present in 21.4% of patients, and fatigue was present in 29.3%. Sixty-eight percent showed moderate to severe disability (Table 1).

The average (standard deviation) of self-efficacy was 180.8 (60.4) and fear avoidance was 42.0 (11.5) (Table 1). The total scores of the two beliefs were negatively and significantly correlated (Pearson's $r = -0.607$; $p < .001$; Table 2).

Table 1.
Descriptive Analysis of the Sample

Variables	Frequency n (%)
Gender	
Female	140 (65.1)
Male	75 (34.9)
Age (years)	
18–45	109 (50.7)
46–65	106 (49.3)
Educacional level (years)	
6–11	143 (66.5)
≥12	72 (33.5)
Income ($US)	
≤450	56 (26.1)
>450 to ≤1350	106 (49.3)
>1,350	53 (24.6)
Occupational status	
Active	95 (44.2)
Retired/license	47 (21.9)
Unemployed/retired/student/housewife	73 (33.9)
PainIntensity	
Mild	28 (13.0)
Moderate	72 (33.5)
Intense	115 (53.5)
Duration of pain (months)	
6–18	33 (15.3)
19–48	55 (25.6)
≥49	127 (59.1)
Depression	
Absent	145 (67.4)
Dysphoria	24 (11.2)
Depression	46 (21,4)
Fatigue	
No	152 (70.7)
Yes	63 (29.3)
Disability	
Minimal	69 (32.0)
Moderate	96 (44.7)
Severe	50 (23.3)
Beliefs	
Self-efficacy	180.8 (60.4)*
Fear avoidance	42.0 (11.5)*

*Mean (SD).

The pain variables (i.e., pain intensity and duration) were collinear with disability and not included in the model. Wilks' lambda showed that gender, income, depression, disability, and fatigue were significant with regard to at least one of the two studied beliefs; therefore, these variables were included in the MANOVA model. Age, educational level, and occupational status were not included in the model (Table 3).

Table 4 shows the results of the MANOVA analysis. An income greater than $1,350.00 ($p = .016$), the presence of depression ($p = .020$), fatigue ($p < .001$), and moderate to severe disability ($p < .001$) predicted self-efficacy. Males ($p < .001$) with incomes greater than $450.00 ($p = .042$), dysphoria ($p = .002$), depression ($p < .001$), and a moderate to severe disability ($p < .001$) were most likely to show fear avoidance beliefs.

Table 2.
Correlation Between the Dependent Variables of the Model

	PSE	FSE	SSE	SE	TSK
PSE	1				
FSE	0.637*	1			
SSE	0.674*	0.718*	1		
SE	0.875*	0.891*	0.891*	1	
TSK	−0.490*	−0.550*	−0.578*	−0.607*	1

PSE = self-efficacy for pain control; FSE = self-efficacy for function; SSE = self-efficacy for coping with other symptoms; SE = self-efficacy final score; TSK = Tampa Scale for Kinesiophobia final score.
Pearson correlation. *$p < .001$.

Figure 1 shows the confidence intervals between the sociodemographic and clinical variables in relation to the two beliefs as estimated by the MANOVA model. Gender did not differ with regard to self-efficacy; however, the analysis showed that males had higher fear avoidance scores than females. Incomes greater than $1,350.00 per month was associated with lower fear avoidance scores and higher self-efficacy scores.

Scores denoting depression were associated with greater fear avoidance scores and lower self-efficacy scores. Fatigue did not affect fear avoidance beliefs; however, people with fatigue showed lower self-efficacy scores. Finally, disability was clearly related to the two beliefs; specifically, as disability increased, fear avoidance and self-efficacy scores increased and decreased, respectively.

Table 3.
Wilks' Lambda Test for Entry of the Explanatory Variables in the MANOVA Model

Variables	Wilks' Lambda Test	F Values	p
Gender	0.89	11.798	<.001
Age	0.68	19.683	.648
Educational level	0.66	47.901	.079
Income	0.80	11.430	<.001
Occupational status	0.52	35.406	.190
Depression	0.96	1.539	<.001
Fatigue	0.99	0.436	<.001
Disability	0.97	2.572	<.001

TABLE 4.
Effects of Model Variables MANOVA Regarding Beliefs of Self-Efficacy and Fear Avoidance

	Self-Efficacy			Fear Avoidance		
Variables	$\bar{x}$ **(sd)**	β	***p***	$\bar{x}$ **(sd)**	β	***p***
Gender						
Female	174.6 (55.8)			41.5 (10.6)		
Male	192.5 (67.0)	−0.9	.877	42.9 (13.0)	5.1	<.001
Income (US$)						
≤450	151.3 (59.1)			47.6 (10.9)		
>450 to ≤1350	179.4 (59.5)	1.1	.864	41.1 (11.5)	−3.3	.042
>1,350	212.7 (47.8)	19.2	.016	36.8 (8.9)	−5.1	.006
Depression						
Absent	199.5 (56.7)			38.4 (10.3)		
Dysphoria	152.7 (51.5)	−9.3	.304	49.0 (9.2)	6	.002
Depression	136.7 (46.4)	−18.0	.020	49.6 (10.8)	6.7	<.001
Fatigue						
No	198.8 (56.4)			40.1 (11.4)		
Yes	137.6 (46.4)	−23	<.001	46.5 (10.6)	−0.3	.826
Disability						
Minimal	241.0 (35.4)			33.1 (8.2)		
Moderate	167.1 (44.5)	−53.7	<.001	44.3 (10.4)	9.5	<.001
Severe	124.1 (39.9)	−97.7	<.001	49.8 (9.4)	14	<.001

DISCUSSION

This study found that self-efficacy and fear avoidance beliefs were negatively correlated with each other and associated with certain factors such as income, depression, and disability. Other factors, such as gender and fatigue, were associated with only one of the beliefs.

Differences between men and women with regard to pain perception have been discussed in various studies. Women report experiencing more pain and show greater sensitivity and less tolerance to painful stimuli (Manson, 2010; Mogil & Bailey, 2010). From a psychological perspective, however, beliefs can lead to different behaviors in men and women and influence how they cope with pain. In the current study, men showed greater fear avoidance belief scores than women, and no between-gender differences were found with regard to the self-efficacy scores. The data in the literature remain scarce and contradictory. In contrast to our findings, some authors have found that women with low back pain show lower self-efficacy scores than men (Stubbs et al., 2010). With regard to fear, our findings corroborate those of other studies. In 2007, the fear avoidance beliefs of 615 patients were evaluated. Men showed greater scores for fear avoidance beliefs than women (Swinkels-Meewisse, Roelofs, Verbeek, Oostendorp, & Vlaeyen, 2003). Another study evaluated the fear avoidance beliefs of 67 patients with chronic diseases and found that the men reported greater fears than the women (Pells et al., 2007). This finding is interesting because although women report greater pain and anxious behaviors (Kindler, Valencia, Fillingim, & George, 2010; Lucchetti, Oliveira, Mercante, & Peres, 2012), less fear most likely positively influences how patients cope with low back pain.

Patients in the current study with higher incomes showed higher self-efficacy scores and less fear avoidance beliefs with regard to pain compared with those with lower incomes. Studies that specifically address income were not found in the literature; however, some authors have shown that low self-efficacy in patients with low back pain is related to greater rates of work absenteeism and feelings of helplessness (Bush, Ditto, & Feuerstein, 1985). Another study concluded that high self-efficacy scores are a protection factor during the return to work (Richard, Dionne, & Nouwen, 2011). Similarly, patients with high fear avoidance scores were 2.4 times more likely to remain away from work for at least 2 months (Kovacs et al., 2007). Because these beliefs determine work-related behaviors, they most likely negatively affect the income of these patients.

Major depressive disorder has been widely studied with regard to patients with low back pain (Glombiewski, Hartwich-Tersek, & Rief, 2010; Moore, 2010). However, a relationship between self-efficacy and fear avoidance beliefs in patients with low back

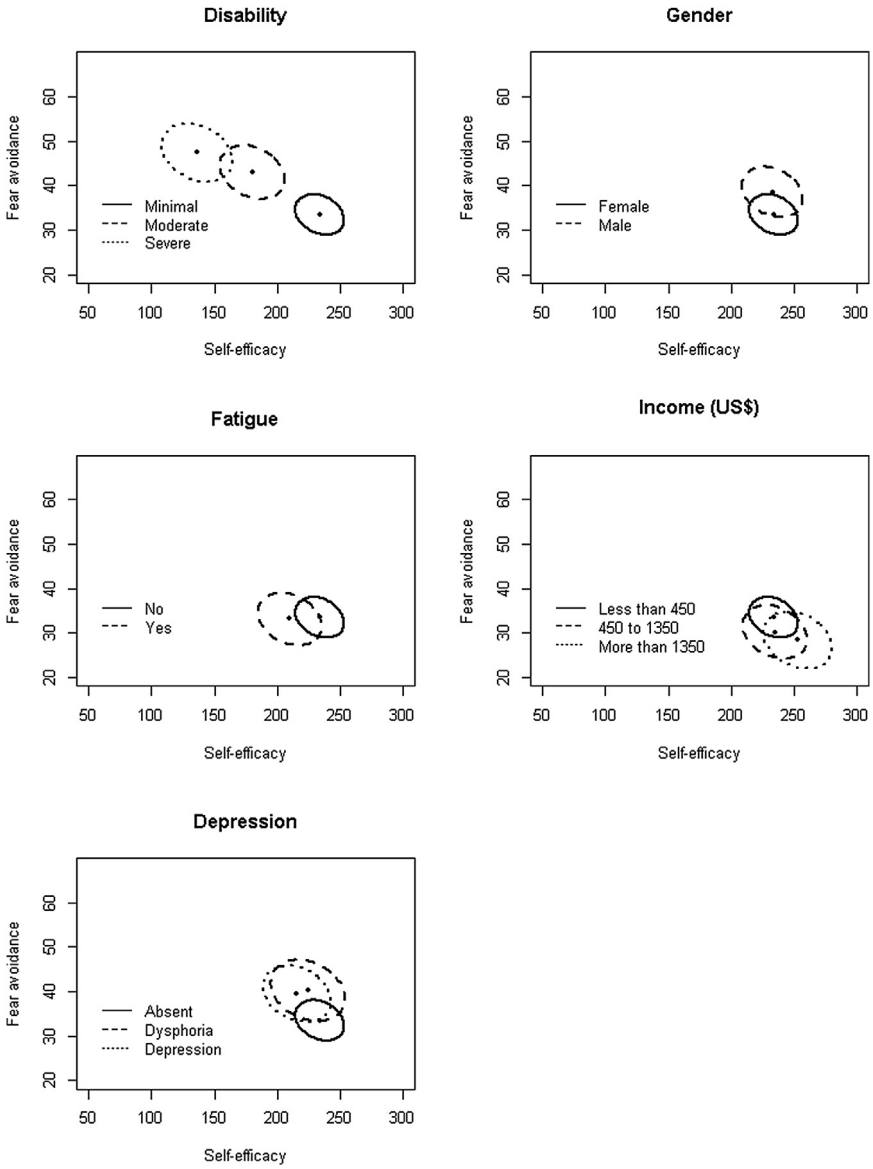

Figure 1. ■ Confidence regions estimated by the MANOVA model.

pain and depression was not found. The supposition that the presence of depression is associated with low self-efficacy and greater fear avoidance is understandable because depressed individuals cannot satisfactorily perform daily activities. In addition, dysfunctional beliefs are related to the worsening of depression with regard to other pathologies (Maciejewski, Prigerson, & Mazure, 2000).

No relationship was found between fatigue and low self-efficacy scores. Fatigue remains rarely studied with regard to low back pain; however, intervention programs that seek to modify self-efficacy have shown favorable outcomes for patients with fatigue and other chronic diseases such as fibromyalgia and rheumatoid arthritis (Engel, 2011; Pariser & O'Hanlon, 2005; Varekamp, Verbeek, de Boer, & van Dijk, 2011; Yoo, Kim, Jang, & You, 2011). Additional studies with this focus are necessary among patients with low back pain.

The increased disability in patients with lower self-efficacy scores and higher fear avoidance belief scores was expected given that people with a heightened fear of movement tend to restrict their activities, which has repercussions for their work and daily lives. Low self-efficacy causes an individual to perceive him or herself as incapable of handling pain and the situations that arise from it, thereby increasing their avoidance of movement and restricting their activities, which creates a vicious cycle.

Various studies have attempted to determine the belief that is most related to pain and disability. In 2007, a group of researchers found that beliefs were correlated with pain intensity and disability; however, a regression model showed that self-efficacy strongly predicted fear-related pain, pain intensity, and disability. These authors suggested that when self-efficacy is high, only the heightened fear related to pain does not increase disability because this individual (regardless of their fear) believes that they can perform activities. However, heightened fear most likely increases the risk of disability when self-efficacy is low (Woby et al., 2007).

In 2010, data from a randomized clinical study showed that self-efficacy, fear of movement, and pain-related disability were correlated with each other during pre- and post-treatment periods. Self-efficacy and the fear of movement explained 42% of the variance of pain-related disability at initial moment, and self-efficacy was a more important predictor than fear of movement. During the post-treatment period, after self-efficacy and fear avoidance beliefs had been modified, pain-related disability was not significant (Asenlöf & Söderlund, 2010). This result shows that chronic pain does not necessarily lead to disability, and the manner in which the individual perceives and confronts the disease are more important.

In 2011, another group conducted a study to determine whether self-efficacy beliefs mediated the relationship between fear avoidance, pain intensity, and disability among patients with low back pain. This longitudinal study evaluated 184 patients with low back pain at two time-points: at the onset of their low back pain and after 12 months. A regression analysis showed that both self-efficacy and fear avoidance mediated pain intensity and disability at the initial time-point. However, after 12 months of the disease (once in the chronic phase), only changes in self-efficacy beliefs were related to pain intensity and disability. In other words, fear avoidance beliefs lost significance after 12 months of disease, and self-efficacy was the most important variable in explaining the relationship between pain intensity and disability (Costa et al., 2011).

Although studies have suggested that self-efficacy is a more important predictor of disability than fear avoidance, the two beliefs show an important correlation ($r = -0.607$; $p < .001$). The modification of one variable might interfere with or contribute to a change in the other. This consideration is important because there is a well-defined strategy to handle the fear avoidance of pain according to Vlaeyen et al program (Leeuw, Goossens, van Breukelen, Boersma, & Vlaeyen, 2007; Vlaeyen & Linton, 2012). Regardless, strategies designed to increase self-efficacy in the face of pain have not been consolidated and follow the same principles for any chronic disease (Marks, Allegrante, & Lorig, 2005a, 2005b).

The changes in self-efficacy and fear avoidance scores explained variations in depression, fatigue, and disability, which suggesting that the treatment of individuals with low self-efficacy and high fear avoidance should be adapted. The results of Denison et al. (2007) support this suggestion; these authors evaluated subgroups of patients with low back pain based on pain-related beliefs with regard to working status. Three subgroups were identified in sample 1 and replicated in sample 2 one year later. These samples had the same socioeconomic characteristics. These authors observed that 65% of the individuals in sample 1 and 69% of the individuals in sample 2 were employed among the "high self-efficacy and low fear avoidance" subgroup. Forty-one percent of sample 1 and 38% of sample 2 were employed among the subgroup "low self-efficacy and low fear avoidance". Thirty percent of sample 1 and 27% of sample 2 were employed among the subgroup "low self-efficacy and high fear avoidance". This result reveals the influence of beliefs on work functioning and that self-efficacy was more important than fear avoidance.

Thus, different treatments are needed based on the beliefs of patients with low back pain. Denison et al. (2007) proposed that different treatments should consider self-efficacy and fear of movement. Patients with high self-efficacy and low fear of movement might have fewer disabilities. In this case, the treatment should be maintenance with exercise. Individuals with low self-efficacy and low fear of movement likely have high levels of disability; thus, the initial treatment should be focused on activities that increase self-efficacy. Finally, individuals with low self-efficacy and high fear of movement are more likely to have intense pain and disability; therefore, the focus of the therapy for these patients should be to desensitize them with regard to performing movements (to decrease fear of movement) and increase their repertoire of activities to improve self-efficacy concerning pain.

These suggestions are based on the theoretical model of cognitive-behavioral therapy, and little evidence supports them. Therefore, additional studies are needed to confirm these hypotheses. Systematic reviews have proposed cognitive-behavioral interventions to modify self-efficacy and fear avoidance beliefs. Educational strategies, vicarious learning, and modeling activities stand out with regard to self-efficacy (Marks et al., 2005a, 2005b). Gradual activity and the hierarchies of fear and exposure in vivo are emphasized for fear avoidance beliefs (Crombez,

Eccleston, Van Damme, Vlaeyen, & Karoly, 2012; Henschke et al., 2010; Kovacs et al., 2012; Vlaeyen & Linton, 2012).

The comprehensive training of nurses allows them to act across various fields of knowledge. Specifically, cognitive-behavioral approaches are expected for patients with low back pain and other chronic pains. Patients must understand that pain is a socially learned behavior reinforced by the interaction between the individual and the environment; moreover, patients can learn or relearn adaptive behaviors. Patients can be taught that beliefs, such as those related to self-efficacy and fear avoidance, can influence moods, lead to disability, and have social consequences. Using this patient-dialogue approach, individuals reflect and learn to recognize the interactive effects of pain on their behaviors, thoughts, and emotions. They learn to seek evidence that supports their feelings, question their beliefs, and investigate alternative concepts as well as the attribution of meanings (Pimenta, 2001).

This study has some limitations. Its cross-sectional design does not allow the establishment of a causal relationship between the factors associated with self-efficacy and fear avoidance beliefs. Future longitudinal studies are needed to better understand the relationship between these factors and dysfunctional self-efficacy and fear avoidance beliefs.

Nevertheless, this study is the first to simultaneously examine the factors associated with the above beliefs and to discuss the importance of considering them for intervention studies. Until now, sociodemographic factors and fatigue have been neglected and were novel aspects of this study.

In summary, the current study showed that self-efficacy and fear avoidance beliefs are correlated. Males are more likely to have fear avoidance beliefs. Furthermore, low self-efficacy and heightened fear were associated with incomes above $1,350.00, the presence of depression, fatigue, and disability.

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