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Self-efficacy and fear of pain to movement in chronic low back pain: an intervention developed by nurses

Autoeficácia e medo da dor ao movimento na lombalgia crônica: uma intervenção desenvolvida por enfermeiras

Autoeficacia y temor de dolor al movimiento en la lombalgía crónica: una intervención desarrollada por enfermeiras

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ABSTRACT

Objective: To test the effect of interventions to chronic low back pain developed by nurses in the Program to Increase Self-efficacy and Reduce the Fear of Pain and Avoidance of Movement.

Method: Clinical trial, with 81 patients, carried out in 2016, at the Pain Outpatient Clinic in São Luís, Maranhão, Brazil. The groups received: A (education and exposure), B (education) and C (control). Chi-square, Fisher's Exact, ANOVA and Kruskal Wallis tests were performed.

Results: Patients in groups A and B improved self-efficacy, anxiety, depression, and disability, compared to group C. The reduction in fear of pain and avoidance of movement was greater in Group A, which also showed a decrease in current pain and overall scores compared to Group B and C.

Conclusion: Education was effective in increasing the Self-Efficacy Belief. For the Belief of Fear of Pain and Avoidance of Movement and pain intensity, the association with exposure showed better results.

Keywords: Self efficacy. Fear. Low back pain. Anxiety. Depression. Nursing care.

RESUMO

Objetivo: Testar o efeito de intervenções para lombalgia crônica desenvolvidas por enfermeiros no Programa para Aumentar a Autoeficácia e Diminuir o Medo da Dor e Evitação do Movimento.

Método: Ensaio clínico, com 81 pacientes, realizado em 2016, no Ambulatório de Dor em São Luís, Maranhão, Brasil. Os grupos receberam: A (educação e exposição), B (educação) e C (controle). Realizaram-se testes Qui-quadrado, Exato de Fisher, ANOVA e Kruskal Wallis.

Resultados: Pacientes dos grupos A e B melhoraram a autoeficácia, ansiedade, depressão e incapacidade, comparados ao grupo C. A redução no medo da dor e evitação do movimento foi maior no Grupo A, que também apresentou diminuição na dor atual e escores gerais de dor, comparado ao Grupo B e C.

Conclusão: A Educação foi efetiva no aumento da Crença de Autoeficácia. Para a Crença de Medo da Dor e Evitação ao Movimento e intensidade da dor, a associação com exposição mostrou melhores resultados.

Palavras-chave: Autoeficácia. Medo. Dor lombar. Ansiedade. Depressão. Cuidados de enfermagem.

RESUMEN

Objetivo: Evaluar el efecto de las intervenciones para el dolor lumbar crónico desarrolladas por las enfermeras en el programa para aumentar la autoeficacia y reducir el miedo al dolor y evitar el movimiento.

Método: Ensayo clínico, con 81 pacientes, realizado en 2016, en la Clínica del Dolor en São Luís, Maranhão, Brasil. Los grupos recibieron: A (educación y exposición), B (educación) y C (control). Se realizaron pruebas de Chi-cuadrado, Exacta de Fisher, ANOVA y Kruskal Wallis.

Resultados: Los pacientes en los grupos A y B mejoraron la autoeficacia, la ansiedad, la depresión y la discapacidad, en comparación con el grupo C. La reducción en el miedo al dolor y la evitación del movimiento fue mayor en el Grupo A, que también mostró una disminución en el dolor actual y las puntuaciones generales de en comparación con los grupos B y C.

Conclusión: Educación fue efectiva para aumentar la creencia en la autoeficacia. Para la creencia del miedo al dolor y la evitación del movimiento y la intensidad del dolor, la asociación con la exposición mostró mejores resultados.

Palabras clave: Autoeficacia. Miedo. Dolor de la región lumbar. Ansiedad. Depresión. Atención de enfermería.

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INTRODUCTION

Low back pain is currently a public health problem, with high costs for the health system and society[1–2]. The prevalence affects approximately 70% to 85% of the population, with 10% progressing to chronic low back pain. This has a greater impact on patients' lives, with increased cases of disability, anxiety and depression[2–3].

Dysfunctional beliefs, catastrophic thoughts and immobility contribute to increase the disability and mood changes in patients with chronic low back pain[1]. Among the beliefs, those of self-efficacy and fear of pain and avoidance of movement have been shown to be relevant. The Self-Efficacy Belief refers to the self-assessment of how much the individual is able to deal with situations and the Fear of Pain and Avoidance of Movement proposes that the catastrophic fear of feeling pain leads to movement avoidance, due to discomfort and fear that this results in new or worsening of the lesion[2].

Beliefs of Self-efficacy and of Fear of Pain and Avoidance of Movement are negatively correlated in patients with low back pain and are predictors of disability and mood changes. The lower the Self-Efficacy Belief, the greater the amount of painful behavior and movement avoidance. Greater movement avoidance results in increased pain due to disuse, decreased activity and functionality. There is also a close relationship between these beliefs and depression and anxiety[3].

Patients with low self-efficacy and fear of pain and avoidance of high movement are at higher risk for developing disability and therefore need specific interventions to modify these beliefs. The use of exposure as a strategy to reduce the fear of pain and movement avoidance belief has shown promising results and the modification of the self-efficacy belief is still little explored as a strategy to deal with patients with chronic low back pain[2].

Exposure in patients with low back pain consists of promoting situations in which the patient performs the movements he fears, similar to the exposure used in cases of phobias. The feared situations are ranked and the patient is gradually exposed from the situation of least fear to the situation that triggers the greatest fear[4].

The results in self-efficacy beliefs and fear of pain and avoidance of movement, disability and reduction of pain intensity can be enhanced when education is combined with exposure, as it allows the patient to be informed and reflect on the existence of dysfunctional beliefs, catastrophic thoughts and potential problems associated with movement avoidance behavior[5].

Considering that patients with chronic low back pain, who have low self-efficacy beliefs and fear of pain and avoidance of high movement, are considered to be at higher risk for disability[2], this study was carried out with the objective to test the effect of interventions for chronic low back pain developed by nurses in the Program to Increase Self-Efficacy and Reduce the Fear of Pain and Avoidance of Movement (PROAME).

The hypothesis of this study was that the complete PROAME, consisting of 3 sessions of educational interventions associated with the 3 exposure sessions, would show better results in modifying beliefs, catastrophic thoughts, disability, anxiety, depression, and pain intensity, than only educational interventions or the control group.

METHOD

Study design and period

This is a clinical trial, randomized and blinded to the outcome, carried out from January to April 2016. It is described in accordance with the Consolidated Standards of Reporting Trials (CONSORT) for non-pharmacological clinical trials. The study is part of a Spine School with Rehabilitation Program for Low Back Pain. The interventions were conducted by nurses with improvement in cognitive-behavioral therapy and had the support of a physical therapist and physical educator.

Population and sample

The population consisted of patients with chronic low back pain. To calculate the sample size, it was adopted a sample power of 80%, with a significance level of 5%. The estimated sample consisted of 81 patients, organized into three groups, with 27 patients per group.

Recruitment and inclusion criteria

Patients were recruited from the Pain Outpatient Clinic of the *Universidade Federal do Maranhão*, according to the inclusion criteria: presence of low back pain for at least six months; age between 18 and 65 years; schooling equal to or greater than six years; ability to verbal communication and preserved understanding; availability to attend program sessions and Chronic Pain Self-Efficacy Scale score ≤182 points and Tampa Scale of Kinesiophobia ≥51 points.

Randomization and composition of groups

81 participants were randomized into three groups. There was a need to reschedule the intervention and evaluation, without losing follow-up. Participants were analyzed by intention of treatment without exclusions in the analysis (Figure 1).

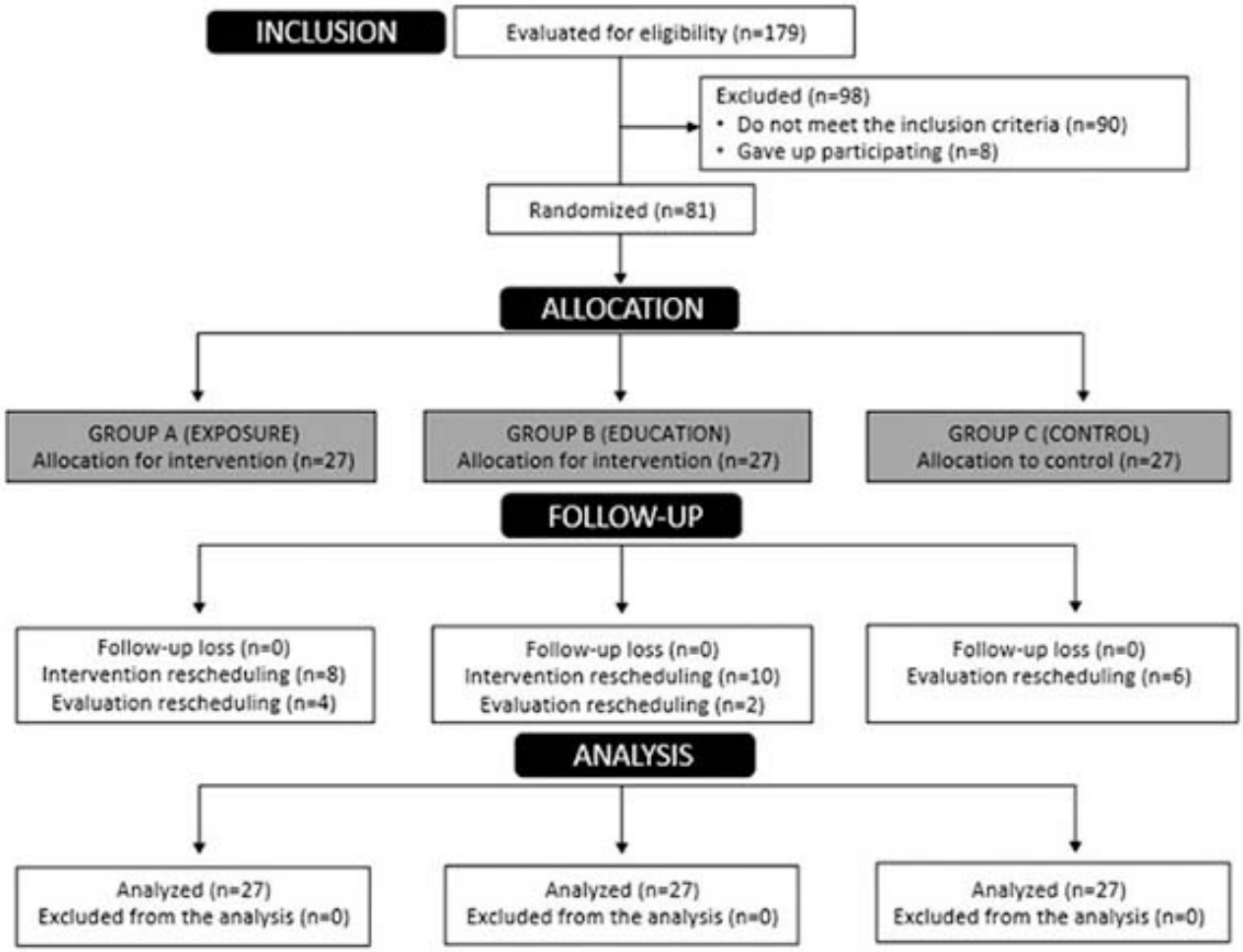

Figure 1 – Flowchart of sample recruitment. Brazil, 2019
Source: Research data, 2019.

Participants were evaluated during the pre- and post-test using the following instruments: chronic pain self-efficacy scale, tampa scale of kinesiophobia, pain catastrophizing scale, hospital anxiety and depression scale, oswestry disability index and pain intensity scale.

All patients received conventional treatment consisting of medical consultations and pharmacological treatment. The randomization of the three groups was performed in blocks:

Group A (Education + Exposure):

This group received 3 education sessions and 3 exposure sessions, totaling a month and two weeks of Program. The purpose of this group was to assess whether education associated with exposure to movement would modify beliefs of Self-efficacy and of Fear of pain and avoidance of movement, and other secondary outcomes.

Group B (Education):

This group received 3 education sessions. The purpose of this group was to assess whether only educational interventions would modify beliefs of Self-efficacy and of Fear of pain and avoidance of movement, and other secondary outcomes.

Group C (Control):

This group only received conventional care from the Chronic Pain Outpatient Clinic. The purpose was to verify whether conventional treatment alone would modify beliefs of Self-efficacy and Fear of pain and avoidance of movement, and other secondary outcomes.

Description of interventions

Education

The education phase consisted of classes in groups of up to 10 patients (sessions 1 and 2) and cognitive analysis by the Vicious Cycle (session 3), individually. In the classes, the aim was to modify the Beliefs of Self-efficacy and of Fear of Pain and Movement Avoidance through learning by information, observation and social persuasion. The objectives were for patients to perceive erroneous beliefs and behaviors in their painful experience, so that they could understand the importance of modifying distorted conceptions. Patients from Groups A and B participated in this phase.

In the first session (in group), patients received an educational booklet prepared by the researchers and guidance on low back pain, causes, symptoms and treatment. Patients had the opportunity to verbalize their conceptions and painful experience and share them with the group.

In the second session (in group), the Beliefs of Self-efficacy and of Fear of Pain and Movement Avoidance and their importance in chronic low back pain were explained. The professional articulated aspects of beliefs with the conceptions and experiences reported by the patients in the previous session.

The third session (individual) aimed at building the Vicious Cycle of Fear of Pain and Avoidance of Movement, based on an example of pain reported by the patient. The Cycle proposes the analysis of a pain situation in 4 aspects: feeling, emotion, behavior and consequences. The researcher recalled and emphasized the articulation between thoughts, feelings, behaviors and their influence on the patient's functionality and disability. The patient reported a situation of pain experienced by him and, with the help of the researcher, identified in it the meaning he attributed to the situation (thought), the feeling that this attribution caused him (emotion) and the resulting mood change, analyzed what followed (behavior) after assigning meaning and feeling to the painful event and the consequences of these behaviors in terms of functionality (consequence).

Exposure

The exhibition phase was composed by sessions 4, 5 and 6, all individual. Only patients from Group A participated.

In the fourth session, patients graded the damage that could result from each movement and chose the movements they would like to be exposed to. They used 40 photos of daily life activities that represented movements. The photos came from the Photograph Series of Daily Activities (PHODA) and, to each of them, the patient assigned a score of possible damage to his spine, using a scale of 0-100 (Harm thermometer)[6]. This score made possible to establish the hierarchy of fear of being injured with a certain movement.

Among the activities rated above 50 on the harm thermometer, patients were asked to choose five activities that they would like to be exposed to in the next two sessions. Exposures were gradual, that is, from the activity with the lowest score on the harm thermometer to the one with the highest score.

Sessions five and six were exposures to the activities chosen by the patients. Each patient was exposed to the five situations they chose, in the two sessions, to allow the strengthening of self-efficacy and reduction of fear of pain and avoidance of movement.

Each movement was modeled by the team and explained to the patient in detail how to do it. Patients performed the activities with assistance and were encouraged to perform them alone.

Outcomes and categories of analysis

Primary outcomes

The scores of Belief of Self-Efficacy and of Fear of Pain and Avoidance of Movement were the primary outcomes. Self-efficacy was assessed by the Self-efficacy Scale for Chronic Pain[7] and the Belief of Fear of Pain and Avoidance of Movement by the Tampa Scale of Kinesiophobia[8].

The cutoff points were established using the ROC curve. Using the Oswestry Disability Index score ≤40, the prevalence of disability was estimated, and ROC curves were adjusted for Self-efficacy and Fear of pain and avoidance of movement in relation to this prevalence. Self-efficacy scores less than or equal to 182 were considered low and those greater than 182 were considered high (sensitivity 73.0% and specificity 61.6%). Fear and avoidance scores below 51 were considered low and those above or equal to 51 were considered high (sensitivity 57.4% and specificity 61.6%.

Secondary outcomes

Anxiety, depression, disability, catastrophic thinking, and pain were considered secondary outcomes.

Catastrophic thinking was assessed using the Pain Catastrophizing Scale[9]. Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale[10] and disability was assessed using the Oswestry Disability Index[11]. Pain was assessed using a numerical scale (0-10) for the variables "pain now" and "pain in the general context".

Instruments

Chronic Pain Self-Efficacy Scale

The Chronic Pain Self-Efficacy Scale is a specific scale to measure the perception of self-efficacy and the ability to deal with the consequences of pain in patients with chronic pain. The scale consists of 22 items divided into three factors or domains: self-efficacy for pain control (SEPC), self-efficacy for physical function (SEPF) and self-efficacy for symptom control (SESC). The sum of the three domains provides the total score ranging from 30 to 300[7].

Tampa Scale of Kinesiophobia

The Tampa Scale of Kinesiophobia assesses fear of injury during movement. It consists of a self-administered questionnaire, consisting of 17 items that address pain, fear of movement and intensity of symptoms. Scores range from one to four points. To obtain the final total score, it is necessary to invert the scores of questions 4,8, 12 and 16. The final score can range from 17 to 68 points. The higher the score, the greater the kinesiophobia grade, that is, excessive and debilitating fear of movement and physical activity[8].

Pain Catastrophizing Scale

The Pain Catastrophizing scale consists of 9 items on a Likert scale ranging from 0 to 5 points. The total score is the sum of the items divided by the number of items answered, with the minimum score being 0 and the maximum 5. There are no cutoff points on this scale. Higher scores indicate greater presence of catastrophic thoughts[9].

Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale assesses the presence of symptoms of anxiety and depression. It has 14 items, seven for anxiety and seven for depression. Each one of the items can be scored from zero to three, making a maximum score of 21 points for each scale. It presents a cutoff point of 9 for anxiety and 9 for depression[10].

Oswestry Disability Index Scale

The Oswestry Disability Index (ODI) scale assesses disability in patients with low back pain. The scale consists of 10 items ranging from 0 to 5. The first session assesses pain intensity and the others assess the disabling effect of pain in some daily activities: personal care (bathing, dressing, etc.), walking, sleeping, sex life, social life, locomotion, etc. The total score ranges from 0 (no disability) to 100 (maximum disability)[11].

Photograph Series of Daily Activities – short electronic version (PHODA-SeV) for low back pain

The PHODA-Sev is a set of 40 photographs that show situations considered by people with low back pain as a risk for causing pain and injury to the spine. The patient is instructed to grade the harm/damage to their spine in each situation shown in the photos using the "damage/injury thermometer", graded from 0 to 100. The mean is calculated by adding the score of each photo and dividing up by 40[6]. There are no cutoff points, the higher the score, the greater the fear. The objective with its use was to know the patient's opinion about the "risk of harm" of each situation and to choose the exposure situations.

Statistical analysis

Data were digitized in an Excel spreadsheet and analyzed using the R statistical software. Quantitative variables were analyzed using means, medians and standard deviations, and absolute and relative frequencies were calculated for qualitative variables. For the comparison between Groups (A, B and C) regarding the primary and secondary outcomes, the Chi-square, Fisher's Exact, ANOVA and Kruskal Wallis tests were performed, according to the characteristics of the variables and normality of the data.

Ethical aspects

The research project was approved by the Research Ethics Committee of the USP School of Nursing, number CAAE 13647313.1.0000.5392. All participants signed the Free and Informed Consent Form (FICF).

RESULTS

Table 1 shows the sociodemographic distribution of the sample. The frequency between genders was equitable, the mean age was 44.9 years, the mean schooling was 9.9 years, and the average monthly family income was R$ 1790.59. In Group A, two participants had no income. Among those evaluated, 70.4% were inactive for an average of 26.7 months. Among the inactive, 71.9% were on sick leave and 9.9% on labor litigation. There was no difference between the Groups regarding sociodemographic characteristics.

Table 2 shows that after the interventions, patients in Group A and Group B improved their Self-efficacy Belief scores in the three domains (pain, functionality, and symptom control) and in general self-efficacy. The reduction in Belief of Fear of Pain and Avoidance of Movement scores was greater in Group A than in Group B. Beliefs of Self-efficacy and of Fear of Pain and Avoidance of Movement were stable in Group C patients. Improvement of catastrophic thoughts occurred in Group A and Group B but worsened in Group C.

Table 3 shows the scores of anxiety, depression, disability, catastrophic thoughts and pain in patients in Groups

Table 1 – Sociodemographic characterization of patients with chronic low back pain in groups A, B and C. Brazil, 2019

Variables	Group A n (%)	Group B n (%)	Group C n (%)	Total n (%)	p
Gender					
Female	14 (51.9)	13 (48.1)	14 (51.9)	41 (50.6)	**0.95** [a]
Male	13 (48.1)	14 (51.9)	13 (48.1)	40 (49.4)	
Age (years)					
Mean (SD)	46.8 (7.3)	44.4 (9.0)	43.5 (8.5)	44.9(8.3)	**0.33** [c]
Median (min-max)	45(35-63)	45(30-65)	45(26-57)	45(26-65)	
Years of study					
Mean (SD)	10.3(3.6)	10.5 (3.9)	8.8 (2.8)	9.9 (3.5)	**0.15** [c]
Median (min-max)	12 (6-18)	11 (6-18)	9 (6-16)	9 (6-18)	
Monthly family income (BRL)					
Mean (SD)	2090.37 (2403.99)	1443.05 (825.13)	1761.11 (1551.94)	1790.59 (1768.66)	**0.51** [d]
Median (min-max)	1400.00 (0.00-12000.00)	1000.00 (600.00-3000.00)	1400.00 (500.00-7000.00)	1350.00 (0-12000.00)	
Work status					
Active	7 (25.9)	5 (18.5)	9 (3.3)	21 (25.9)	**0.51**[b]
Inactive	19 (70.4)	20 (74.1)	18 (66.7)	57 (70.4)	

Group A – Exposure; Group B – Education; Group C – Control
[a] Chi-square Test; [b] Fisher's exact test; [c] ANOVA; [d] Kruskal Wallis.

A, B and C, in the pre- and post-test. In the pre-test, the mean anxiety score, in the three Groups, was compatible with anxiety; the mean depression score was borderline in Groups A and B and compatible with depression in Group C, considering the cutoff points suggested in the HADS Scale. Disability in Groups A and B was moderate and similar; in Group C the disability was intense and superior to the other groups. It is noted that patients in Group A and Group B after the intervention had similarly improved scores for anxiety, depression, disability, and catastrophic thinking ($p<0.001$).

At the time of the pre-test, patients in the three groups had a pain intensity mean above seven. Group A showed decreased mean scores "pain now" and "general pain" comparing the pre- and post-test and Group B showed decreased mean pain now score and increased mean general pain scores. Group C showed an increase in mean pain scores now and general pain. The groups had different performances and the analysis (Table 3) indicates that Group A improved after the intervention in both indicators (pain now and general pain), when compared to Groups B and C.

Table 2 – Self-efficacy, fear of pain and avoidance of movement and catastrophic thoughts in Groups A, B, C during the pre-test and post-test. Brazil, 2019.

Variables	Group A n=27		Group B n=27		Group C n=27		ANOVA Time*group	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Test F	*P*
Self-efficacy – Pain								
Mean (SD)	44.6 (14.4)	68.9 (12.9)	48.1 (11.5)	69.6 (14.8)	40.0 (19.5)	40.0 (19.5)	**18.4**	**<0.001**[a]
Median (min-max)	48 (22-72)	68 (46-100)	50 (32-72)	74 (46-100)	40 (10-72)	40 (10-72)		
Self-efficacy – Functionality								
Mean (SD)	39.5 (11.9)	71.1 (15.2)	46.4 (9.6)	69.1 (17.2)	29.0 (13.0)	28.9 (13.0)	**30.8**	**<0.001**[a]
Median (min-max)	38 (18-51)	69 (37-98)	45 (23-61)	72 (43-100)	27 (11-61)	27 (11-61)		
Self-efficacy – Symptoms								
Mean (SD)	45.3 (14.6)	66.2 (17.4)	43.2 (11.7)	67.1 (16.5)	34.9 (14.4)	33.7 (13.3)	**19.4**	**<0.001**[a]
Median (min-max)	46 (16-73)	70 (21-99)	42 (24-61)	66 (44-98)	35(10-61)	34 (10-54)		
Self-efficacy – general								
Mean (SD)	129.5 (31.9)	206.3 (40.3)	137.8 (26.8)	205.9 (44.9)	103.9 (36.2)	102.7 (35.7)	**31.6**	**<0.001**[a]
Median (min-max)	138 (63-180)	214 (133-285)	142 (79-170)	186 (135-288)	110 (34-151)	106 (34-150)		
Fear of pain and avoidance of movement								
Mean (SD)	57.4 (3.0)	43.2 (8.1)	54.0 (2.9)	46.6 (5.7)	57.3 (4.2)	57.7 (4.3)	**41.4**	**<0.001**[a]
Median (min-max)	58 (52-64)	45 (26-59)	53 (51-61)	47 (32-58)	56 (52-66)	60 (52-66)		

Group A – Exposure/Group B – Education/ Group C – Control
[a]ANOVA for repeated measures

Table 3 – Anxiety, depression, disability, catastrophic thinking and pain in Groups A, B and C during pre-test and post-test. Brazil, 2019

Variables	Group A n=27		Group B n=27		Group C n=27		ANOVA Time* group	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Test F	*p*
HADS – Anxiety								
Mean (SD)	10.0 (4.5)	8.1 (3.9)	10.0 (5.0)	8.7 (2.7)	9.1 (3.9)	9.4 (3.8)	**4.7**	**0.011**[a]
Median (min-max)	10 (3-17)	7 (2-14)	8 (5-20)	9 (5-13)	9 (2-16)	10 (2-16)		
Presence of Anxiety								
Yes	17 (63.0)	13 (48.1)	15 (55.6)	16 (59.3)	18 (66.7)	19 (70.4)		
No	10 (37.0)	14 (51.9)	12 (44.4)	11 (40.7)	9 (33.3)	8 (29.6)		
HADS – Depression								
Mean (SD)	8.4 (4.5)	6.6 (3.7)	8.1 (4.4)	5.7 (3.6)	9.9 (4.2)	10.4 (4.1)	**6.2**	**0.003**[a]
Median (min-max)	8 (1-19)	6 (1-15)	8 (0-17)	7 (0-14)	10 (2-19)	11 (3-19)		
Presence of Depression								
Yes	15 (55.6)	11 (40.7)	17 (63.0)	6 (22.2)	19 (70.4)	21 (77.8)		
No	12 (44.4)	16 (59.3)	10 (37.0)	21 (77.8)	8 (29.6)	6 (22.2)		
Disability								
Mean (SD)	43.2 (14.0)	33.1 (12.7)	41.4 (10.1)	34.5 (10.3)	52.8 (12.9)	53.1 (12.7)	**9.4**	**<0.001**[a]
Median (min-max)	44 (22 – 68)	30 (4-58)	44 (20-56)	34 (20-54)	56 (26-74)	54 (28-74)		

Table 3 – Cont.

Variables	Group A n=27		Group B n=27		Group C n=27		ANOVA Time* group	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Test F	*p*
Catastrophic Thinking								
Mean (SD)	2.2 (1.2)	1.7 (1.3)	2.3 (1.1)	1.5 (1.2)	2.1 (0.7)	2.9 (0.6)	**23.1**	**< 0.001**[a]
Median (min-max)	2 (0-5)	1 (0-4)	3 (0-4)	1 (0-4)	2 (0-3)	3 (2-4)		
Pain Now								
Mean (SD)	8.0 (1.8)	5.5 (2.0)	7.2 (2.5)	6.8 (2.1)	7.1 (2.4)	7.4 (1.8)	**16.6**	**< 0.001**[a]
Median (min-max)	6 (2-10)	4 (0-8)	5 (0-8)	5 (1-10)	7 (2-10)	8 (2-10)		
General Pain								
Mean (SD)	6.1 (2.1)	4.0 (2.6)	4.5 (2.8)	5.5 (2.8)	6.7 (2.3)	7.4 (1.7)	**11.1**	**< 0.001**[a]
Median (min-max)	8 (3-10)	5 (2-10)	8 (3-10)	7 (3-10)	8 (0-10)	8 (4-10)		

Group A – Exposure/Group B – Education/ Group C – Control
[a]ANOVA for repeated measures

DISCUSSION

The comparison between groups showed that interventions of education and exposure were effective in modifying beliefs, catastrophic thoughts, disability, anxiety, and depression. However, specifically for the Belief of Fear of Pain and Avoidance of Movement and for the intensity of pain, Group A, which received both interventions (education and exposure) had better results. The similar improvement in the Self-efficacy Belief scores in Groups A and B was surprising, as better performance of patients in Group A was expected as they received the most complex intervention (education and exposure to movement), both with the potential to improve the two beliefs.

Education is a powerful strategy for modifying beliefs and behaviors and some studies have shown that education enhances the effects of exposure when used as a first intervention[5]. The educational strategies used in this study were focused on aspects that can change beliefs: group classes allowed the use of vicarious experience (observation of other patients who experience similar situations); the researcher during the classes was able to exercise persuasion and positively reinforced the opinions and desirable behaviors expressed by the patients. The individual education session for the construction of the Vicious Cycle of Fear of Pain and Avoidance of Movement allowed the researcher to positively reinforce desirable behaviors.

The greatest reduction in the scores of Belief of Fear of Pain and Avoidance of Movement in the group that received the exposure was expected, as Group A was able to experience mastery experiences, such as performing activities. The experience of mastery is one of the factors that most contribute to the formation of beliefs related to pain and the exposure allows the patient to experience the feared situations. As the patients performed the activities chosen in the exposure, they reinforced the ability to successfully perform the movements[4].

A research assessed 88 participants in three types of psychological treatment: Long exposure, Short exposure and Cognitive Behavior Therapy (CBT). All participants had high levels of anxiety and disability related to pain. Exposure was more effective than CBT in reducing disability related to movement. Exposure and CBT did not differ in reducing pain intensity. Short exposure surpassed Long exposure after 10 sessions, which means that individuals improved more quickly when fewer sessions were offered, corroborating the findings of this study[12].

Other authors assessed fear scores in six patients who underwent exposure during the pre-test, post-test, and three-month follow-up. The percentage of decrease was from 41% to 88% between pre-test and post-test, and from 54% to 100% between pre-test and three months of follow-up. There is also no clearly defined educational program or comparison groups[13].

The evaluation of a series of cases showed the influence of education on gradual exposure and gradual activity. The sample consisted of six patients divided into two groups: one group received education and exposure and the other education and gradual activity. The results showed that fear of pain and avoidance of movement scores decreased after education, and dropped even more with exposure, with an average decrease of 21 points. Surveillance behavior in relation to pain reduced 30% after education and 70% after exposure. Disability scores dropped an average of three points with education and 13 points after exposure[14]. These data are similar to those observed in the present research.

A randomized clinical trial with 83 patients compared three groups: one group received gradual exposure (doing an activity/movement), another, graded activity (physical training) and the third, was on a waiting list. The treatment of gradual exposure consisted of eight sessions lasting four weeks. Comparisons of post-test effects showed that the exposure group had better outcomes in fear of pain and avoidance of movement ($p=0.02$), self-efficacy ($p=0.03$), disability ($p=0.06$) anxiety and depression ($p=0.02$). Only catastrophic thoughts did not differ between groups ($p=0.07$)[15].

Another research, multicentric study evaluated the effectiveness of gradual exposure versus gradual activity in patients with chronic low back pain on catastrophizing and perception of harm. Two groups of 85 patients with chronic low back pain and fear of pain and avoidance of movement were randomized. The results showed that exposure was more effective than gradual activity in reducing catastrophizing ($p=0.01$) and perceived impairment in activities ($p<0.001$). Catastrophizing and the perception of harm in activities were mediators of disability in these patients ($p<0.001$). About half of the patients, regardless of the group, showed improvement in disability[16].

In this study, patients were also evaluated for pain intensity. Although the main focus of the program was on the modification of beliefs, it was possible to observe an improvement in pain intensity in Group A patients (in Group B it was stable or worsened and in Group C it worsened). This finding is somewhat intriguing, as no additional pharmacological action was taken to modify pain intensity, but it suggests that evaluative-cognitive and affective-emotional pain components can influence the perception of pain intensity[17].

Other authors, similarly to what was observed, demonstrated that the exposure treatment was effective not only for the modification of beliefs and behavior, but also reflected in the reduction of pain intensity[18–20]. A study evaluated pain intensity in six patients during ten sessions involving education and exposure and observed that pain intensity did not increase during exposure and during the pre- and post-test period there was a 65% reduction for two patients, 14%-22% for three patients and only one had no change[13].

A crossover study compared two groups of patients (n=46) with chronic low back pain, reduced function and fear of pain and avoidance of movement: those who received usual care followed by gradual exposure to those who received exposure followed by usual care. In both groups, they observed a one-point reduction in pain scores between pre-test and post-test. The authors did not find differences in pain intensity between the groups, according to the order of treatment received[18].

Intervention research involving clinical trials and a cognitive-behavioral approach conducted by nurses are scarce in the literature. A brief program was designed, described in detail, easy to carry out and that can expand the performance of nurses with patients with chronic low back pain. Nurses who work in outpatient clinics and clinics specialized in the care of these patients, when carrying out the nursing consultation, can incorporate the validated instruments for chronic low back pain used in this research into the assessment of patients. Based on the evaluation results, the proposed program containing packages of nursing interventions can be incorporated into the institution and adjusted according to the local context.

Future research should assess the existence of generalization of exposure effects and the duration of the effect. The generalization of the effect refers to knowing whether the greater self-efficacy and less fear of movement to certain activities would extend to activities to which the patients were not exposed. Effect duration refers to how long beliefs remain desirable after the program ends. Another aspect to be tested would be to analyze the effect of performing exercises after exposure.

Chronic pain has biopsychosocial aspects, such as beliefs and mood, which modify the painful experience and functionality, and need to be evaluated and adjusted. Intervention strategies designed to act on dysfunctional beliefs, with proven efficacy in clinical research, support evidence-based nursing practice and value the role of the nurse.

As a limitation, it is pointed out the inexistence of a group that received only the exposure intervention which would allow the isolation of the effect of exposure to that of education.

CONCLUSION

In the present study, it was hypothesized that the Beliefs of Self-efficacy and Fear of Pain and Avoidance of Movement would be modified by an educational program and of exposure to the feared movements, and this hypothesis was confirmed. Education was only as effective as education combined with exposure to movement in increasing the Self-efficacy Belief, but the association between education and exposure to movement was even more effective in decreasing the Belief of Fear of Pain and Avoidance of Movement. There was also a decrease in catastrophic thoughts in Groups A and B.

As for the secondary outcomes, improvement in anxiety, depression and disability was observed in Groups A and B. For the outcome pain, only in Group A, which received education associated with exposure, it was observed an improvement in pain intensity.

The present study has several contributions to the advancement of research in this area: it was a pioneer in establishing as inclusion criteria the presence of beliefs of low self-efficacy and fear of pain and avoidance of high movement in patients with chronic low back pain; it was unprecedented in defining cutoff points for "low" and "high" belief; two interventions were compared, educational only and educational associated with exposure; both the educational program and the exposure were meticulously designed and described, which is rarely found in the literature. Still, this research included, randomly, a significant number of patients in the different Groups, unlike most studies that analyzed a reduced number of patients.

In this research, group and individual classes were carefully planned to influence the Beliefs of Self-efficacy and Fear of Pain and Avoidance of Movement, which perhaps explains the positive results achieved only with the educational program.

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