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In vivo exposure for fear of pain and avoidance of movement in low back pain

Exposição ao vivo para o medo da dor e evitação do movimento em dor lombar

Exposición en vivo al miedo al dolor y evitación del movimiento en dolor lumbar

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ABSTRACT

Objectives: to verify the effects of hierarchization and in vivo exposure for fear of pain, avoidance of movement, and anxiety in chronic low back pain. **Methods:** quasi-experimental study. The 27 patients who participated graded the damage associated with the movements in each of the 40 activities of daily living depicted in pictures using a scale from 0 to 100. The patients chose five out of all the activities that received a score higher than 50 to carry out the exposure. The intensities of fear and anxiety were measured before and after each exposure session. **Results:** the frequencies of the gender were equal, and the mean age was 44.9 years. The activities chosen more frequently for the exposure were shoveling (33.3%) and running (33.3%). There was reduction of fear and anxiety before and after exposure (p<0.001). **Conclusions:** hierarchization and in vivo exposure were effective in reducing fear and anxiety.
Descriptors: Fear; Movement; Back Pain; Chronic Pain; Nursing.

RESUMO

Objetivos: verificar os efeitos do uso da hierarquização e exposição ao vivo para a crença de medo da dor e evitação do movimento e ansiedade em pacientes com dor lombar crônica. **Métodos:** estudo quase-experimental. Os 27 pacientes que participaram graduaram o dano de cada um dos 40 movimentos de atividades da vida diária representados em fotos, utilizando uma escala de 0 a 100. Dentre as atividades graduadas acima de 50, escolheram 5 para realizar a exposição. As intensidades do medo e da ansiedade foram mensuradas antes e depois de cada sessão de exposição. **Resultados:** a frequência entre os sexos foi equitativa, a média da idade foi de 44,9 anos. As atividades mais escolhidas para a exposição foram trabalhar com a pá (33,3%) e correr (33,3%). Houve redução do medo e ansiedade antes e após as exposições (p<0,001). **Conclus**ões: a hierarquização e exposição ao vivo foram efetivas na redução do medo e da ansiedade.
Descritores: Medo; Movimento; Dor Lombar; Dor Crônica; Enfermagem.

RESUMEN

Objetivos: verificar los efectos de la jerarquización y exposición viva al supuesto miedo al dolor y evitar el movimiento y la ansiedad en pacientes con dolor lumbar crónico. **Métodos:** estudio cuasiexperimental. Los 27 pacientes que participaron clasificaron el dolor de cada uno de los 40 movimientos de la actividad cotidiana representados en fotos, utilizando una escala de 0-100. Entre las actividades clasificadas con más de 50, eligieron 5 para realizar la exposición. La intensidad del miedo y la ansiedad fueron medidas antes y después de cada sesión de exposición. **Resultados:** la muestra expresó equivalencia entre sexos, media etaria de 44,9 años. Las actividades más elegidas para la exposición fueron: trabajar con la pala (33,3%) y correr (33,3%). Hubo reducción del miedo y de la ansiedad antes y después de las exposiciones (p<0,001). **Conclusiones:** la jerarquización y exposición vivas fueron efectivas para reducir el miedo y la ansiedad.
Descriptores: Miedo; Movimiento; Dolor de la Región Lumbar; Dolor Crónico; Enfermería.

INTRODUCTION

Cognitive and behavioral factors such as dysfunctional beliefs, mood alterations, and immobility contribute to increasing disability in patients with chronic low back pain[1-2]. Fear of pain and avoidance of movement have stood out among the beliefs described as important to understand low back pain, because they have proved relevant to the outcome and the quality of life of patients[3-6].

Fear is an emotional reaction to a specific and identified threat and aims to protect people from an imminent danger, promoting self-defense with a fighting or escaping response[7]. The word kinesiophobia, whose concept was defined in 1990[8], refers to the excessive, irrational, and incapacitating fear of movement and physical activity resulting from a misinterpretation that the movement might make the injury worse or contribute to the development of new injuries. This idea, described for the first time by Lethem et al. in 1983[9-10] and reformulated in 2000[11], 2007[12], and 2012[3], has become the model for fear of pain and avoidance of movement.

According to the model for fear of pain and avoidance of movement, people who experience pain can deal with it in an adaptive or nonadaptive way. If the "potential injury" and the painful experience are perceived as nonthreatening, they can be confronted and treated adaptively. Poorly adaptive confrontation occurs when, after an injury and a painful experience, cognitive mistakes (distorted thoughts), for instance catastrophizing, lead to fear of pain, avoidance of movement behaviors, reduction in daily activities, and increase in disability[11,13]. Avoidance behaviors usually become persistent because they happen as a response to an expectation of a future pain occurrence and not necessarily in the presence of current pain[14]. The conditions of anxiety and hypervigilance (cognitive mistake) are observed in patients with this problem[4,8].

The use of exposure as a strategy to decrease the fear of pain and avoidance of movement beliefs has shown promising results[8,14-16]. Exposure in patients with low back pain consists of promoting situations in which these people perform the movements they fear, gradually and with the assistance of healthcare professionals, similarly to the exposure technique applied in phobia cases. The feared situations are hierarchized, and patients are exposed to the situations that originate the less intense and the most intense fear sensations[17-18].

Some studies advocate identifying and recruiting patients who show higher levels of fear of pain and avoidance of movement, because these meet the movement phobia criteria proposed for *in vivo* exposure procedures[18-22].

OBJECTIVE

To verify the effects of hierarchization and *in vivo* exposure of the fear of pain and avoidance of movement beliefs and anxiety in patients with chronic low back pain.

METHODS

Ethical aspects

The proposal was approved by the Research Ethics Committee of the School of Nursing at the University of São Paulo as per report no. 13647313.1.0000.5392.

Study design, period, and location

Before and after quasi-experimental study, carried out at the Chronic Pain Outpatient Clinic at the Federal University of Maranhão.

Sample and inclusion criteria

The study population was patients with chronic low back pain. The 27-participant sample was obtained by applying convenience sampling in the group of people who sought care at the outpatient facility and met the following inclusion criteria:

- feeling low back pain for at least six months;
- being from 18 to 65 years old;
- having a level of education of at least six years of formal schooling;
- showing a score equal to or higher than 51 points in the Tampa Scale for Kinesiophobia;
- not being pregnant;
- being available to attend the program sessions.

Study protocol

Used instrument - Photograph Series of Daily Activities - Short Electronic Version (PHODA-SeV) for low back pain

The PHODA-SeV instrument was developed as a diagnosis tool to determine patients' perception of harm when they execute different physical activities and movements. At first, it encompassed eight possible movements: lifting, bending, turning, reaching, falling, holding an intermittent load, unexpected movement, and holding a long-lasting load in a sitting position with limited dynamics, all of them derived from basic movements such as extension, flexion, and lateral rotation, including two movement modes, static and dynamic[19-23].

These eight possible movements reproduce actions carried out in four occupation areas (activities of daily living, housekeeping, work, and sports and leisure) and were turned into easily recognizable activities to avoid using technical terms of biomechanics with patients[23]. The movements and activities were tested, corrected, and complemented by several experts in chronic low back pain, resulting in 100 pictures of daily activities[19,23].

In 2007, a short version of the original PHODA instrument was published, entitled PHODA-SeV. It is a software that uses 40 pictures and a thermometer to grade the perception of patients regarding the harm originated in the execution of each movement. Patients are taught to pull the pictures into a "Harm/Loss Thermometer", which originates a score ranging from 0 to 100 in each category. The total points average is calculated by summing the score obtained in each category and sharing the number by 40. The time necessary to carry out the PHODA-SeV test is ten minutes approximately[23].

Validation analysis of this instrument showed that its internal consistency, assessed by calculating Cronbach's alpha, was 0.98. The correlations between the items varied from 0.42 to 0.82, pointing to moderate to high correlation. The test-retest reliability and the stability over two weeks were satisfactory, with a difference between the measurements equal to 20 points, which was attributed to measurement errors[23].

Construct validity was verified by examining the PHODA-Sev and other self-report questionnaires[23]. The instrument showed a significant correlation with the Tampa Scale for Kinesiophobia, the Roland-Morris Disability Questionnaire, and the intensity of current pain. The construct validity was corroborated by the observation that the patients who were randomly allocated in a group submitted to *in vivo* exposure treatment had significantly lower scores in the PHODA-Sev after treatment completion when compared to the scores obtained by the other group[23].

The PHODA-SeV is a simple tool that describes patients' assessment of the harmful consequences of certain movements and has been used as an instrument that evaluates the effectiveness of *in vivo* exposure[23].

Pilot study

A pilot study was carried out with three patients to adjust the instruments, test the feasibility of the materials organized to execute the movements, and check whether the PHODA-SeV movements were executable by the patients in the sample. The pictures of the PHODA instrument were printed on A3 sheets, and the Harm Thermometer was printed on a 90 cm × 60 cm canvas banner, so the patients could place the "Movement Cards" on it in a hierarchized way.

Note: PHODA - Photograph Series of Daily Activities.

Figure 1 – Pictures of the PHODA instrument being applied by a research team member

Intervention

The intervention consisted of exposing the patients to movements proposed in the PHODA-SeV instrument and occurred in three individual sessions carried out over three weeks. All the patients participated in an educational group lecture about chronic pain, self-efficacy and fear of movement beliefs and received a booklet about these aspects before the sessions of exposure to movement. The objective was to increase the understanding of the patients about their condition and the behaviors associated with it.

During the first session, the patients graded the harm that could originate in each of the 40 movements of activities of daily living shown in the pictures, obtained in the PHODA-SeV software. The patients attributed a score of possible harm to their spine to each of these pictures by using a scale ranging from 0 to 100 entitled Harm Thermometer[23-24]. This score was applied to establish the hierarchy of fear of getting an injury when executing a certain movement. The patients were asked to choose, among those activities that were given a score higher than 50 points in the Harm Thermometer, the five to which they would like to be exposed during the next two sessions.

In the second and third sessions, the exposure to the activities chosen by the patients was carried out. They were progressive, that is, the session began with the activity with the lowest score and evolved toward those with higher scores. Each patient was exposed to the situation they chose, and each performed movement was modeled and supervised by the team, made up of a nurse, a physical educator, and a physical therapist, who explained how to execute it to the patients. They performed the activities with the team's help at first, and then were encouraged to do them by themselves.

The fear and anxiety to execute the movements were measured before and after each session by using a numerical scale from 0 to 10 (0 = no fear/no anxiety and 10 = most intense fear/most intense anxiety). The reduction in the fear and anxiety scores was the outcome of the present study.

Analysis of results and statistics

The quantitative variables were analyzed with means, medians, and standard deviations, and absolute and relative frequencies were calculated for qualitative variables. Two-factor repeated measures analysis of variance was carried out to compare fear and anxiety before and after exposure.

RESULTS

The sociodemographic distribution of the 27 evaluated patients indicated that the frequencies of the genders were equal, the average age was 44.9 years, and the average number of years of formal education was 9.9. The proportion of inactive people in the sample was 70.4%, and these people had been in that situation for 26.7 months on average. In this subgroup of the sample, 71.9% were on sick leave and 9.9% were on employment litigation.

Table 1 shows the hierarchization of fear of pain obtained for the PHODA movements and the scores registered in the Harm Thermometer. Twenty-four out of the 40 pictures received an average score higher than 50 points. The pictures that obtained the highest average scores were "falling backwards on the grass" (84.5), "shoveling soil with bent back" (69.8), "carrying a child on the hip" (68.0), "lifting flowerpot with slightly bent back" (67.5), "lifting

a filled basket while walking up the stairs" (66.0), "lifting beer crate out of car with slightly bent back" (65.7), "vacuum cleaning under table with bent back" (65.5), "trampoline jumping" (63.7), and "rope skipping" (63.1). It was noteworthy that only six out of the 40 movements obtained scores lower than 40 in the Harm Thermometer.

Table 2 shows the percentage of choice of each picture whose depicted movement was reproduced in sessions 3 and 4. The activities chosen more frequently were "shoveling soil with bent back" (33.3%), "running" (33.3%), "carrying two shopping bags with both hands while walking" (25.9%), "mopping the floor with a squeegee with slightly bent back" (25.9%), "abdominal muscle exercises on the floor" (25.9%), "lifting beer crate out of car with slightly bent back" (22.2%), "back twist exercise" (22.2%), "back muscle exercise bending forward and extending" (22.2%), and "rope skipping" (22.2%). Five activities were chosen by each participant, among the 40 available.

Three out of the nine most feared activities were among the most frequently chosen for exposure ("shoveling soil with bent back", "lifting beer crate out of car with slightly bent back", and "rope skipping").

Table 1 – Hierarchization of PHODA pictures proposed by the patients according to the estimated harm to low back

Picture	Activity description	Harm thermometer n=27			
		Mean (SD)	Median (min-max)	95% CI	
PHODA 98	Falling backward on the grass	84.5 (18.8)	90 (30-100)	77.2	92.0
PHODA 2	Shoveling soil with bent back	69.8 (27.4)	76 (10-100)	59.0	80.7
PHODA 85	Carrying a child on the hip	68.0 (22.4)	70 (28-100)	59.2	76.8
PHODA 4	Lifting flowerpot with slightly bent back	67.5 (24.2)	70 (10-99)	58.0	77.2
PHODA 18	Lifting a filled basket while walking up the stairs	66.0 (27.2)	74 (10-100)	55.2	76.8
PHODA 20	Lifting beer crate out of car with slightly bent back	65.7 (22.8)	60 (0-100)	56.7	74.7
PHODA 29	Vacuum cleaning under coffee table with bent back	65.5 (26.5)	79 (20-100)	54.8	76.2
PHODA 49	Trampoline jumping	63.7 (26.8)	70 (10-100)	53.2	74.4
PHODA 50	Rope skipping	63.1 (27.4)	70 (10-100)	52.3	73.9
PHODA 93	Running through the forest	59.5 (28.7)	60 (10-100)	48.2	70.9
PHODA 33	Mopping floor with a squeegee with slightly bent back	56.8 (28.1)	60 (10-100)	45.8	68.0
PHODA 99	Mowing the lawn manually	56.3 (26.6)	64 (5-100)	45.8	66.9
PHODA 83	Lifting a toddler from its cot with bent back	56.2 (31.6)	50 (5-100)	43.8	68.8
PHODA 7	Picking up shoes from floor with bent back	55.4 (25.6)	60 (10-90)	45.4	65.6
PHODA 27	Clearing out the dishwasher with bent back	55.4 (27.2)	60 (10-100)	44.7	66.2
PHODA 95	Cycling from a low kerb	54.5 (26.7)	50 (10-100)	44.0	65.1
PHODA 40	Back twist exercise on a fitness device	54.1 (25.9)	60 (10-100)	43.6	64.6
PHODA 11	Taking book from shelf behind oneself (with twisted back)	52.9 (26.9)	60 (0-90)	42.3	63.6
PHODA 96	Looking aside while cycling	52.7 (31.7)	50 (0-100)	40.2	65.2
PHODA 44	Back muscle exercise bending forward on a fitness device	52.3 (28.2)	50 (10-100)	40.9	63.7
PHODA 100	Drilling a hole in a stone wall above the head	52.0 (27.7)	60 (10-100)	41.1	63.0
PHODA 3	Lifting flowerpot squatting down	51.8 (30.2)	60 (0-90)	39.9	63.7
PHODA 8	Picking up shoes from floor squatting down	51.3 (29.3)	50 (10-100)	39.7	62.9
PHODA 23	Carrying two shopping bags with both hands while walking	51.0 (28.5)	50 (10-100)	39.8	62.4
PHODA 22	Carrying a shopping bag with one hand while walking	49.6 (31.4)	50 (10-100)	37.2	62.1
PHODA 74	Riding a bicycle in a street with speed bumps	48.8 (31.4)	40 (0-100)	36.5	61.3
PHODA 73	Cleaning the windows with arm stretched above the head	47.8 (27.0)	46 (10-100)	37.1	58.5
PHODA 51	Abdominal muscle exercises on the floor with a fitness device	47.3 (27.0)	50 (5-90)	36.5	58.3
PHODA 59	Getting out of bed by first placing one foot on the ground	46.7 (31.2)	40 (0-100)	34.4	59.1
PHODA 36	Leg stretch exercise on a fitness device	46.3 (27.1)	40 (10-100)	35.6	57.0
PHODA 28	Taking a box from the sink cupboard above the head	44.2 (29.7)	40 (10-100)	32.5	56.0
PHODA 47	Taking a box filled with bottles from a shelf above the head	44.0 (26.8)	40 (10-90)	33.4	54.6
PHODA 26	Carrying rubbish bag with one hand while walking	43.4 (30.3)	40 (10-100)	31.4	55.4
PHODA 60	Walking up the stairs	40.3 (29.0)	30 (0-90)	28.8	51.8
PHODA 15	Ironing in sitting position	39.0 (26.8)	30 (0-90)	28.4	49.6
PHODA 57	Making the bed with bent back	37.8 (28.7)	32 (5-94)	26.5	49.2
PHODA 14	Ironing in standing position	35.3 (23.3)	30 (5-90)	26.2	44.6
PHODA 61	Walking down the stairs	31.4 (24.1)	20 (0-80)	21.9	41.0
PHODA 94	Walking through the forest	31.1 (21.9)	20 (0-80)	22.5	39.8
PHODA 92	Doing the dishes in standing position	30.5 (19.2)	30 (2-80)	22.9	38.1
TOTAL		52.2 (14.8)	53.6 (26.6 – 79.6)	46.4	58.1

Note: PHODA - Photograph Series of Daily Activities; SD – Standard Deviation; IC – Confidence Interval.

Table 2 – Analysis of the PHODA pictures according to the percentage of choice for exposure sessions 1 and 2

Picture	Activity description	Choice for exposure sessions 1 and 2 n (%)
PHODA 2	Drilling a hole in a stone wall above the head	9 (33.3)
PHODA 93	Taking book from shelf behind oneself (with twisted back)	9 (33.3)
PHODA 23	Ironing in standing position	7 (25.9)
PHODA 33	Ironing in sitting position	7(25.9)
PHODA 51	Lifting a filled basket while walking up the stairs	7 (25.9)
PHODA 20	Shoveling soil with bent back	6 (22.2)
PHODA 40	Lifting beer crate out of car with slightly bent back	6 (22.2)
PHODA 44	Carrying a shopping bag with one hand while walking	6 (22.2)
PHODA 50	Carrying two shopping bags with both hands while walking	6 (22.2)
PHODA 29	Carrying rubbish bag with one hand while walking	5 (18.5)
PHODA 59	Clearing out the dishwasher with bent back	5 (18.5)
PHODA 60	Taking a box from the sink cupboard above the head	5 (18.5)
PHODA 95	Vacuum cleaning under coffee table with bent back	5 (18.5)
PHODA 4	Lifting flowerpot squatting down	4 (14.8)
PHODA 49	Mopping floor with a squeegee with slightly bent back	4 (14.8)
PHODA 85	Leg stretch exercise on a fitness device	4 (14.8)
PHODA 3	Lifting flowerpot with slightly bent back	3 (11.1)
PHODA 8	Back twist exercise on a fitness device	3 (11.1)
PHODA 18	Back muscle exercise bending forward on a fitness device	3 (11.1)
PHODA 27	Taking a box filled with bottles from a shelf above the head	3 (11.1)
PHODA 28	Trampoline jumping	3 (11.1)
PHODA 36	Rope skipping	3 (11.1)
PHODA 83	Abdominal muscle exercises on the floor with a fitness device	3 (11.1)
PHODA 96	Making the bed with bent back	3 (11.1)
PHODA 7	Getting out of bed by first placing one foot on the ground	2 (7.4)
PHODA 11	Walking up the stairs	2 (7.4)
PHODA 14	Walking down the stairs	2 (7.4)
PHODA 15	Picking up shoes from floor with bent back	2 (7.4)
PHODA 47	Cleaning the windows with arm stretched above the head	2 (7.4)
PHODA 99	Riding a bicycle in a street with speed bumps	2 (7.4)
PHODA 22	Picking up shoes from floor squatting down	1 (3.7)
PHODA 61	Lifting a toddler from its cot with bent back	1 (3.7)
PHODA 94	Carrying a child on the hip	1 (3.7)
PHODA 100	Doing the dishes in standing position	1 (3.7)
PHODA 26	Running through the forest	0 (0.0)
PHODA 57	Walking through the forest	0 (0.0)
PHODA 73	Cycling from a low kerb	0 (0.0)
PHODA 74	Looking aside while cycling	0 (0.0)
PHODA 92	Mowing the lawn manually	0 (0.0)

Note: PHODA – Photograph Series of Daily Activities.

Table 3 – Analysis of the pictures according to the percentages of choice obtained in exposure sessions 1 and 2

Variable	N	Exposure 1 Mean (SD)	Exposure 2 Mean (SD)	F-test	*p* value
Fear (0-10)					
Before exposure	27	6.5 (2.9)	1.5 (2.1)	62.8	< 0.001[a]
After exposure	27	1.9 (2.5)	0.5 (0.8)		
Anxiety (0-10)					
Before exposure	27	5.7 (3.0)	1.1 (1.6)	68.8	< 0.001[a]
After exposure	27	1.8 (2.2)	0.1 (0.3)		

Note: SD – Standard Deviation.

Analysis of Table 3 showed that the averages for fear and anxiety of movement before the first exposure were around 6 and that, after the exposure, the value decreased to 2 approximately ($p<0.001$). Before the second exposure, the averages for fear and anxiety of movement were between 1.1 and 1.5, and after the exposure the values lowered to 0.1 and 0.5 ($p<0.001$).

DISCUSSION

The hierarchization of fear, pain, and avoidance of movement was carried out by using some PHODA pictures[24-25]. To the best of our knowledge, the present study is the first one in Brazil to use these pictures to hierarchize fear of pain and avoidance of movement, similarly to what has been done in international studies[8,14,26-30]. The authors opted to apply the short version of the instrument, with 40 pictures, because some authors consider that the movements depicted in them resemble those shown in the original version of the instrument, with 100 pictures[25].

Some PHODA pictures were adapted (numbers 36, 40, 44, 51) so they would be closer to the reality of low-income and low-level of education Brazilian patients. This is a cultural validation process and is an original characteristic of the present study. The adaptation was discussed by the nurse, the physical educator, and the physical therapist who made up the research team and tested during the pilot phase.

It was found that 24 PHODA pictures obtained scores higher than 50, a number considered high in the present study and other investigations that applied PHODA[8,14,26-30]. It was noteworthy that only six pictures had a score lower than 40 in the Harm Thermometer, which indicates the intense fear that patients experienced when they imagined themselves executing the activities.

Only one study made the fear hierarchization available in the results. Comparison of it and the one obtained in the present study showed that, among the nine pictures that reached the highest scores in the present study (PHODA 2, 4, 18, 20, 29, 49, 50, 85, and 98), four were also the most frequently cited in

the study by Leeuw et al.[26] (PHODA 2, 4, 20, and 29). The most feared movements in this study were "shoveling soil with bent back" (75.6) and "falling backwards on the grass" (71.6), a result corroborated by the present investigation. The other movements that stood out were "lifting flowerpot with slightly bent back" (71.4), "lifting beer crate out of car with slightly bent back" (67.7), and "vacuum cleaning under coffee table with bent back" (61.7), similarly to what happened in the present study. Thirteen pictures received a score lower than 40, more than twice in comparison with the present study. It is possible that this difference can be explained by the criterion established in the Tampa Scale for Kinesiophobia, which was > 33 in the study by Leeuw et al.[26] and ≥ 51 in the present one. With the different value, the cited study's sample may have encompassed less phobic patients than the present one's.

The PHODA instrument was applied as an intervention measure, but some studies use the tool as a variable in pre- and post-evaluation. An investigation that applied gradual exposure reported a reduction of 71% in the PHODA scores in the post-test phase[8]. Another study assessed the PHODA scores in the pre-test and post-test stages, as well as at the end of a three-month follow-up. The mean scores indicated improvement, with a reduction of 50% in the post-test phase and the maintenance of the result at the end of the follow-up[29].

The *in vivo* exposure intervention is widely used in phobia cases and there is similarity between phobic patients and patients who show fear of pain and avoidance of movement, which justifies the application of the technique in patients with low back pain[31]. If people do not go through situations that may contradict the experiences which caused fear of pain and avoidance of movement, they will keep distorting thoughts and beliefs about the impact of the activities on the painful experience[4,14,32]. Studies that showed changes in the beliefs of fear of pain and avoidance of movement after the exposure suggested that patients get more comfortable in executing movements after the adjustment of these beliefs. Decreasing the perception of threat by the execution of the movement and contradicting negative beliefs lead to the reduction of hypervigilance behavior, anxiety, and catastrophizing[14].

In the present study, the measure of effectiveness was the level of fear and anxiety obtained in a scale ranging from 0 to 10 (Table 3). It was found that the results were very favorable in both outcomes. The decrease in the scores was high, with a reduction of around 2/3 after the first exposure and even higher after the second session, with a final result close to zero ($p<0.001$). Studies that have measured the success of the intervention by using a fear and anxiety scale ranging from 0 to 10 were not found, and consequently a comparison could not be carried out.

The option of using the PHODA instrument as an intervention script, which is original, and the choice of fear and anxiety scales ranging from 0 to 10 to measure the effect of the procedure can be explained by the fact that the authors sought to design an intervention that could be easily executed in rehabilitation programs developed in conditions of lack of resources, a common reality in the Brazilian Unified Health System (SUS, as per its acronym in Portuguese) services, and that had a script that could be easily executed by nurses. The authors consider that the positive result represents an initial validation of the proposed intervention and justifies the continuity of similar studies, especially focused on carrying out controlled clinical trials with larger samples.

It is important to stress that studies indicating the activities chosen by the patients for the exposure were not found in the literature, and this piece of information was made available in the present study. Knowing these data allows better planning of the types of resources that will be applied when using this strategy in patients with low back pain.

The results of the studies that applied exposure in patients with low back pain who show high levels of fear of pain and avoidance of movement, although favorable, raise questions about the best way to conduct the exposure in these patients. The patient inclusion criterion is not consistent: some studies select patients using fear of pain and avoidance of movement scores by applying, for instance, the Tampa Scale for Kinesiophobia[8,15,29], while other studies do not establish scores[33,34]. The number of sessions varies significantly in the studies, and short and long therapies can be found, which implies different "exposure doses". The duration of each exposure session and the number of times that the patients can repeat the movements are not reported in the studies. During the hierarchization with the PHODA, some authors limited the choice of pictures to the set of those which received a score of at least 50 points in the Harm Thermometer[8,15,29], and some applied a questionnaire with ten items for the choice of the activities, such as the Fear of Daily Activities Questionnaire[33-34]. Last, the number of activities that could be chosen by the participants for exposure was not reported in the studies. Consequently, it is clear that it is necessary to develop a standardized protocol to use the PHODA either as a diagnosis tool or as an intervention script.

Study limitations

The present study opted to use the PHODA as an intervention script, in which the movements to be executed by the patients should have reached a score higher than 50 points in the Harm Thermometer and the exposure to five movements would be carried out in two sessions, contributing to creating a standardized protocol. The limitations of the present study were the sample size and the absence of a follow-up after the intervention.

Contributions to the nursing field

Intervention studies designed to impact dysfunctional beliefs, with proven efficacy in clinical research, support the evidence-based nursing practice and value the role played by nurses. In the present study, the authors designed a brief program, described in detail, easily executable, and that can extend the work of nurses with patients with chronic low back pain. Future investigations must evaluate the existence of generalization of the effects of the exposure and the duration of these effects, that is, how long the belief remains desirable after the completion of the program.

CONCLUSIONS

It was found that patients with low back pain had high scores of fear and anxiety to perform some movements, which, although frequent in this group of people, hinders their functionality.

The exposure to highly feared movements decreased fear and anxiety significantly. The intervention was adapted to the reality of the institution where the study was carried out, standardized, and can be easily applied in facilities with few resources, either hospital or primary care ones. The findings are favorable to the intervention, but studies with a higher evidence power, such as controlled and blind trials and those involving larger samples, must be developed.

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