

Effectiveness of back school in patients with chronic nonspecific low back pain

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ABSTRACT

Spinal pains affect 70% to 80% of the adult population at some point in life and are considered one of the most common reasons for early retirement for total or partial disability. The treatments' high cost and the lack of efficiency of conventional therapeutic practices are at the root of the Back School's creation. **Objective:** The purpose of this study was to perform a systematic review of literature over the last ten years to verify the effectiveness of the Back School with those who suffer from chronic nonspecific low back pain. **Method:** The search was conducted in the computerized databases of Medline, Embase, and Lilacs. The search's criteria for the three databases were randomized articles about the Back School's effectiveness over the last ten years. The methodological quality of the selected studies in this review was evaluated using a set composed of nine criteria. Overall, five studies were included in this review, four being considered of high quality. **Results:** Two of the study's considered articles come from Brazil, demonstrating the interest this country's researchers have for this approach to chronic nonspecific low back pain. Every study analyzed presented positive results for the effectiveness of the Back School in the short and medium-term. **Conclusion:** With this research we conclude that the Back School programs have been considered as an important tool, not just in the treatment, but also in the prevention of chronic nonspecific low back pain. However, more studies are needed to assess the referred tool in the long-term and with methodological standardized procedures.

Keywords: low back pain, posture, quality of life

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INTRODUCTION

In industrialized societies, low back pain affects approximately 70% to 80% of the adult population at some moment in their lives and is considered one of the most common reasons for early retirement by total or partial disability.¹ Low back pain is defined as pain and discomfort localized below the costal margin and above the lower gluteal line, with or without referred pain in the leg, and can be divided into three categories: specific spinal pathology (infection, tumor, osteoporosis, fracture, structural deformity, inflammatory disease, or cauda equina syndrome), radiculopathy, and nonspecific low back pain. Nonspecific low back pain is pain that is not attributable to any known pathology.²

It is known that nonspecific low back pain can develop due to an unfavorable mechanical-postural condition, with an imbalance between the effort required in daily life activities (DLAs) and work activities and the capacity to perform such tasks.³

The World Health Organization (WHO) estimates that in 40% of the cases the initial pain tends to become chronic.⁴ This can be defined as a continuous pain with minimum duration of three months.^{2,5} Due to its long duration, chronic pain tends to cause functional impairment, suffering, progressive disability, creating an impact on the health of people who present such symptoms.⁶ According to Cossermelli,⁷ aside from the gradual onset of disability, this pain, that many times has imprecise beginnings, can have periods of improvement and worsening.

To Silva et al.⁸ chronic low back pain may be caused by various clinical situations and is associated to a group of factors, from which we highlight the social-demographics (advanced age, female gender, low education), behavior (smoking), nutrition (high level of body mass), and work conditions (repetitive motion, heavy physical work, and bad posture habits).

More than a third of the Brazilian population considers that chronic pain impairs habitual activities and more than three quarters of the population considers chronic pain as a limitation to recreational activities, and to social and family relationships.⁹ In the US, low back pain constitutes the second cause for seeking medical assistance in chronic diseases, being already considered a public health issue.^{10,11}

The high cost of treatment and the ineffectiveness of conventional therapies are what originated the Back School, translated in this study as Postural School, also called Spine

School and School for the Back. It was applied initially in Sweden, in 1979, and consists of an education program and postural training used in the prevention and treatment of individuals with back pain.¹²

Studies found in the literature on the efficacy of the Back School for chronic pain are controversial. Some viewed the BS as a satisfactory therapeutic tool in the treatment of chronic nonspecific low back pain, and others did not find results to corroborate its efficacy.^{13,14} In view of these affirmations, the objective of this study is to systematically review the literature from the last ten years to verify the effectiveness of the BS in individuals with chronic nonspecific low back pain.

METHOD

Characterization of the study

This study is characterized as a systematic literature review, seeking to make a critical evaluation of the existing literature on Postural Schools, particularly on their effectiveness in the treatment of chronic nonspecific low back pain, in search of greater knowledge on this theme.

The methodology used in this study followed the orientations of the Cochrane Back Review Group for systematic reviews.¹⁵

Search in the literature

The search was made in the Medline, Embase, and Lilacs computerized databases. The search criteria on the three data bases were articles with randomized samples published over the last 11 years (2000 to February, 2011), and with the following expressions: back school, postural school, spine school, "école du dos", "escuela de columna", or "rückenschule". In this search, articles in English, French, German, Spanish, and Portuguese were considered. The bibliographies of selected articles were also verified.

Inclusion Criteria

In this review studies with randomized samples were included that evaluated the effectiveness of the BS in the reduction of chronic nonspecific low back pain in adults. To see whether the studies should be included, the abstracts of all the selected articles were evaluated, according to an evaluation questionnaire with the following questions:

1. Did the study participants present nonspecific chronic low back pain in the spine?
2. Were the results obtained measured through evaluation of symptoms,

functional state, return to work, and/or overall measurement of improvement?

In this study, chronic nonspecific low back pain was defined as a continuous pain, lasting a minimum of three months, and that was not related to any specific pathology.²

In case of doubt about the inclusion, the entire article was read. Only those studies that responded affirmatively to the two questions were included. In this way, the randomized studies included in this review analyzed the BS effect in individuals with chronic nonspecific low back pain considering pain, functional state, return to work, and/or the overall measurement of improvement.

In the electronic search, 27 original articles were found. After the analyses of titles and abstracts, 13 studies relevant to complete reading were selected, and the remaining studies were excluded for not meeting the basic criteria established; that is, they were randomized studies that did not evaluate the efficacy of a Back School program for people with chronic nonspecific low back pain, with results measured through evaluation of symptoms, functional state, return to work, and/or overall measurement of improvement. After the complete reading of the articles, eight articles were excluded. Six articles were excluded because, despite fitting into the established criteria for the selection, they used protocols in which the BS was mentioned as one of the protocol strategies, but not as the main intervention.^{14,16-20} Two more studies were excluded, since they evaluated, respectively, the efficacy of a Pilates program, using the BS program as a control group,²¹ and the efficacy of an exercise protocol, in which the trial group as much as the control group followed a BS program.²² Therefore, this review was based on the analysis of five articles (Figure 1).

Data extraction

The data was extracted using a standard spreadsheet that showed: the authors, the objective of the study, the description of the BS program (trial group) and of the control intervention (control group), the instruments used in the research, and the results obtained.

Evaluation of quality

The methodological quality of the selected studies in this review was evaluated through a group composed of nine criteria. Each one of these criteria was classified as positive or negative (Chart 1).

In the articles in which the information was insufficient to classify some of the criteria, a question mark (?) was added. The

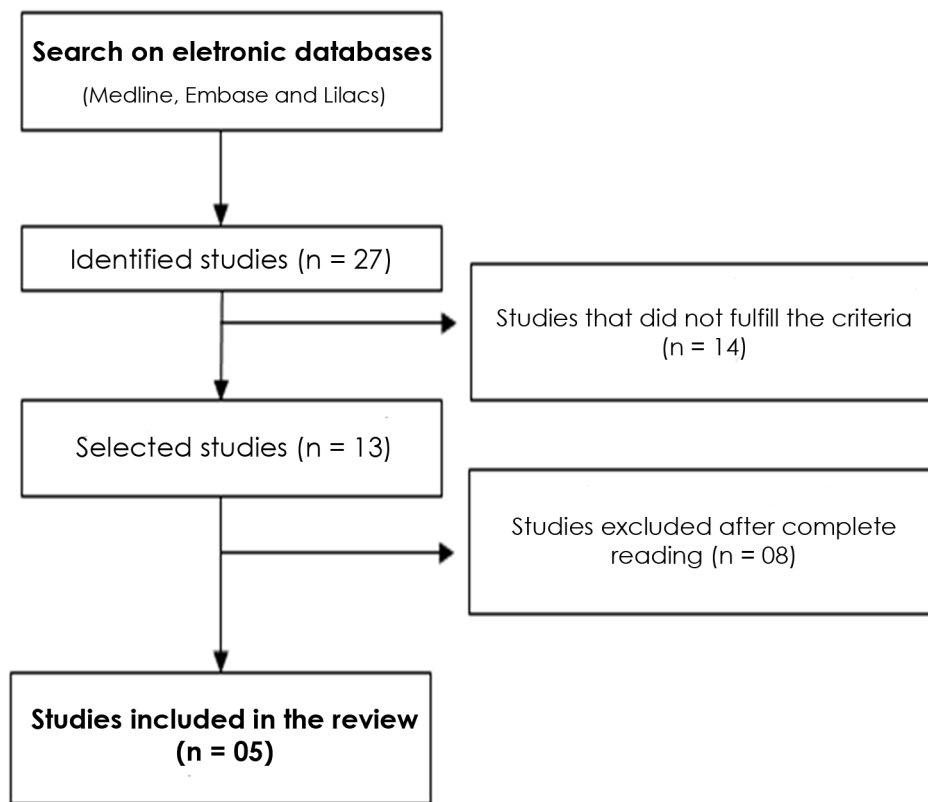


Figure 1. Flowchart of selected articles

Chart 1. Criteria used for the quality evaluation of the studies

	Criteria	Criteria classification
1.	Randomization	(+) Explicit (-) Non-explicit
2.	Initial and final sample	(+) Explicit (-) Non-explicit
3.	Inclusion and exclusion criteria	(+) It shows (-) It does not show
4.	Intervention (TG and CG)	(+) Clear and complete (-) Confused and/or summarized
5.	Co-intervention*	(+) Considered by the researchers (-) Not commented on in the article
6.	Participation of the evaluators in the intervention proposals	(+) They did not participate (-) They participated
7.	Sample uniformity in the pre-test between TG and CG	(+) Uniform (-) Not uniform
8.	Follow-up	(+) 6 months (-) No follow-up, or for less than 6 months
9.	Number of relevant outcomes measured (pain, functional status, return to work, global measure of improvement)	(+) Three or four (-) One or two

methodological quality score of each study was obtained by adding up the number of criteria classified as positive. Studies with scores equal to or greater than six were considered as having "high quality" methodology, and those lower than six were considered as having "low quality" methodology.²³

RESULTS

In Table 1 the quality evaluation is shown for the five studies included.

According to the criteria established to evaluate the quality of the studies (Table 2),

four were considered high quality, with the Heymans et al.²⁴ study having a positive classification in all the quality criteria considered in this review. The lowest-scored criteria were those evaluating the efficacy of the proposed program in relation to lasting improvement in the course of time (follow-up), and to the number of results measured on the achieved improvement evaluation (symptoms, functional state, return to work, and/or the overall improvement measurement).

Analyzing the articles

The results of the selected studies are described below and synthesized in Table 2.

The Heymans et al.²⁴ study sought to compare high intensity BS (HIBS) with low intensity BS (LIBS). Among the studies analyzed, this is the only one developed in a work environment. The BS classes were given by physiotherapists, and the participants received the same health care offered by the physician in the control group. The article does not comment on the number of participants per BS group and the sample was composed mostly of males (232 males and 63 females). The LIBS received one 90-minute session once a week for four consecutive weeks. This program was based on the Swedish model and had a theoretical part, with information on how to deal with work activities (30 minutes), and a practical part, composed of a strengthening exercise program - that involved the gradual increase of resistance - and functional exercises (60 minutes). The HIBS received two 60-minute sessions per week, totaling 16 sessions. Individual exercises that simulated the most troublesome work activities were performed, along with strengthening exercises, in which the resistance was increased progressively in the sessions. Together with the exercises, the cognitive-behavioral therapy principle was applied. The authors did not comment on whether the HIBS program had a theoretical part such as the LIBS. Both groups received a brochure with exercises to do at home and were instructed to practice them. The control group received only the usual care given by their work physicians. The instruments used to collect data were: the Visual Analog Scale (VAS), to evaluate pain; the Roland Disability Questionnaire (RDQ), to evaluate the functional state; the Likert scale, to evaluate the overall improvement index; and the Tampa Scale of Kinesiophobia (TSK), to evaluate kinesiophobia. In addition, data on absences due to illness were collected continuously from the electronic medical records of the health care service. All the instruments were applied at

Table 1. Quality evaluation of the articles

Authors	Criteria									Score
	1	2	3	4	5	6	7	8	9	
Heymans, 2006	+	+	+	+	+	+	+	+	+	9
Tavafian, 2007	-	+	+	+	+	?	+	-	-	5
Tavafian, 2008	-	+	+	+	+	?	+	+	-	6
Andrade, 2008	+	+	+	+	-	+	+	-	-	6
Ribeiro, 2008	+	+	+	+	+	+	+	-	+	8

the beginning, and again three and six months after intervention. The results found in the article showed that both BS programs improved the functional state of the workers at three and six months, when compared to the usual health care, but this improvement was significant only to the LIBS, which also obtained a significant result for kinesiophobia at three months in comparison to the usual care. There was no difference in the pain relief, overall improvement index, and in the absence from

work due to illness. No intragroup analysis was made.

The article by Tavafian et al.¹³ sought to evaluate whether the proposed BS program in the study would improve the quality of life of females, mostly housewives, with chronic nonspecific low back pain. The authors did not give the number of participants in each BS group. A description of the program presented in the article indicates that the intervention occurred in a rheumatology clinic, and

began with a focal group, in which the work staff and the participants took part. The objective was to evaluate the knowledge, perception, abilities, and needs of the participants in relation to the problems they presented and to establish some topics to be emphasized in the program. Later on, four sessions of interdisciplinary educational intervention were done, given daily by a multiprofessional team (educator, psychologist, rheumatologist, and physiotherapist), in which they emphasized the contribution of the participants in the discussion and resolution of problems. The BS program was composed of theoretical explanations on the anatomy, physiology, and pathologies of the spine, as well as the practice of exercises (strengthening and relaxation for the back, abdomen, and thighs), and discussions that highlighted the knowledge of the participants. The participants were encouraged to define and obtain their own results, and the professionals as much as the participants

Table 2. Summary of selected articles

Author	Objective	Sample	Description of the program	Control group	Measurements	Results
Heymans et al., 2006	Compare high intensity BS (HIBS) and low intensity (LIBS) with the usual health care at work (CUST)	HIBS IS = 98; FS = 66; LIBS IS = 98; FS = 71; CUST IS = 103; FS = 71	HIBS: 16 sessions (2x/week - 1h): individual exercises that simulated work activities and strength exercises; LIBS: 4 sessions (1x/week - 90 minutes): theoretical part (how to deal with work activities) and practice (strength and functional exercises); Both were instructed to exercise at home	CUST rendered by physician	Absences due to illness, VAS, RDQ, Likert Scale, and TSK. Evaluations made at the beginning, and at 3 and 6 months after intervention	Significant improvement in the LIBS for functional state at 3 and 6 months and for kinesiophobia at 3 months in comparison to the CUST. There was no difference in relation to the intensity of pain, general improvement index, or days missed at work due to illness
Tavafian et al., 2007	Evaluate the efficacy of a BS program to improve quality of life	TG IS = 50; FS = 44; CG IS = 52; FS = 47	5 sessions (initial conversation and 4 consecutive days of intervention). The participants received clinical treatment and medication. They were re-evaluated by physiotherapists at the end of the 1 st week and continued receiving weekly stimuli from a health educator	Clinical treatment and medication	SF-36 questionnaire. Evaluations made at the beginning and 3 months after intervention	TG showed significant improvement in the 8 dimensions of the SF-36 questionnaire when compared to the CG
Tavafian et al., 2008	Evaluate the efficacy of a BS program to improve quality of life	TG IS = 50; FS = 44; CG IS = 52; FS = 47	Same as previous	Same as previous	Two scores (mental and physical health) made by the association of 4 dimensions of SF-36. Evaluations made at the beginning, at 3 and 6 months, and 1 year after intervention	The quality of life scores were significantly different between the two groups over the course of the study, indicating, after one year, a better quality of life for the TG
Ribeiro et al., 2008	Evaluate the efficacy of a BS program	TG IS = 30; FS = 27; CG IS = 30; FS = 28	5 sessions (1h - 1x/week for 4 weeks + 1 reinforcement session after 30 days). Analgesics were administered	Visits to the rheumatologist on the 1 st , 2 nd , and 4 th weeks, after 30 days, and control of analgesics. Anti-inflammatory medication was considered a co-intervention	RDQ, SF-36, STAI, BDI, VAS, Shober test, and an accounting of analgesic consumption. "Blind" evaluation by a physiotherapist 1, 2, and 4 months after intervention	In the intergroup analysis four months after the intervention, there was a reduction in the use of medication and an improvement in the "general state of health" domain in the SF-36. No differences were found in the remaining instruments. In the intragroup analysis, there was a significant improvement in all the measurements after four months, when compared to the initial values
Andrade et al., 2008	Evaluate the efficacy of a BS program	TG IS = 34; FS = 29; CG IS = 36; FS = 28	4 sessions (1x/week - 1h): basics of anatomy and functions of the spine; performance of DLAs and stretching and strengthening exercises. Information brochure on DLAs and exercises to practice at home (2x day)	There was no intervention (waiting list)	VAS, RDQ and Schöber test. Evaluations made at the beginning, and at 1 and 4 months after intervention	The intragroup analysis showed a significant improvement of the TG when compared to the CG in all the instruments evaluated between the 1 st and 2 nd evaluation, as well as for the 1 st and 3 rd . The intergroup analysis showed an improvement in functional capacity and spine mobility in the 2 nd and 3 rd evaluations

BS: Back School; HIBS: High intensity back school; LIBS: Low intensity back school; TG: Trial group; CG: Control group; IS: Initial sample; FS: Final sample

were considered active members of the team. The authors mention also that the participants were re-evaluated by a physiotherapist at the end of the intervention, and continued receiving weekly encouragement from a health educator, but they did not detail the objectives, nor the form of execution and duration of these procedures. The two groups, trial (TG) and control (CG) received clinical treatment and medication, and co-interventions were controlled by the researchers. The instrument used to evaluate the efficacy of the BS program was the Medical Outcomes Study 36 - Item Short Form Health Survey (SF-36), applied at the beginning of the program, and three months after its completion. With the analysis of the results, it was confirmed that the BS program was effective in improving the quality of life of the participants in the eight dimensions of the questionnaire, when compared to the mere clinical treatment and medication (control group).

In 2008, Tavafian et al.²⁵ published a follow-up of the previous study, in which they compared the quality of life between the groups above (trial and control) at the beginning of the intervention, three months, six months, and one year after the BS program had finished. In that study, the authors created two analysis categories to evaluate the results called "physical and mental aspects". For the physical aspects, the authors grouped the following domains: functional capacity, pain intensity, and limitations due to physical problems added to the general perceptions of health in the SF-36 questionnaire. For the mental aspects, the grouped domains were limitations due to mental problems, mental health, social aspects, and vitality. In comparison with the control group, the BS participants showed significant improvement in the two analysis categories in all the re-evaluations, and between the sixth and twelfth months there were no new differences between the groups, the indices obtained were simply maintained.

The study made by Ribeiro et al.²⁶ endeavored to evaluate the effectiveness of the BS for pain, functional state, quality of life, and the anxiety and depression among patients with chronic nonspecific low back pain. In that study, the authors proposed, in conjunction with medication treatment, a BS program composed of five 60-minute sessions, given by a rheumatologist and a physiotherapist to groups of ten people. The interventions occurred in an orthopedics and rheumatology clinic. The sample was mixed, but composed mostly of females (45 females and 10 males),

which were divided into two groups: 27 in the final control group (CG) and 28 in the final trial group (TG). One session was done per week for four weeks, and a final session was done thirty days after the fourth week. The BS program consisted of theoretical orientations, strengthening exercises for the abdomen and back, and at the end of each class, relaxation posture with knees bent. In the theoretical orientations they explained the anatomy and physiology of the spine, the treatments for chronic nonspecific low back pain, and the appropriate execution of DLAs. The control group had consultations with a rheumatologist in the first, second, and fourth weeks, and again thirty days later. The use of medication was also controlled in both groups, and considered as a co-intervention. The participants were instructed to take note of the amount of medication consumed during the entire period of the study. This annotation was used as one of the parameters to evaluate the effectiveness of the program. The evaluations were made at the beginning of the program, and one, two, and four months after its completion. The instruments used in the study were: the Schöber test, to evaluate the low back mobility, the VAS, the SF-36, RDQ, Beck Depression Inventory (BDI), and State-Anxiety Inventory (STAI) questionnaires for depression and anxiety. In the intergroup analysis, the study showed a reduction in the use of medication four months after the intervention - which the authors did not consider a relevant factor for the effectiveness of the BS - and an improvement in the "general health state" domain in the SF-36. In the remaining instruments and SF-36 domains, no differences between the groups were found. In the intragroup analysis, the BS program participants showed a significant improvement in all the evaluation measurements after four months, when compared to the initial values. The authors do not comment on whether an intragroup evaluation of the control group was made.

The study made by Andrade et al.¹ sought to evaluate the effectiveness of a BS program Visual Analog Scale among people with chronic nonspecific low back pain, and, in contrast to the other studies analyzed in this review, the control group participants did not receive any type of orientation, medication or intervention during the study - they remained on the BS program waiting list. The groups had six to eight participants, but the authors did not give their gender in the study. The Swedish model was used as a reference to the program - composed of 1-hour classes, taught once a week, for four weeks, and applied by

a physiotherapist. The intervention included basics on the anatomy and physiology of the spine, ergonomics at work, and possible causes for back pain. In addition, it explained the importance of strengthening the extensor and flexor musculature of the hips, abdomen, and paravertebral. In the practical part of the classes, appropriate positions to perform the DLAs were illustrated and practiced, along with stretching and strengthening exercises for the trunk and hip muscles. The regular practice of physical activity and protective positions to the spine were encouraged, at rest as much as during DLAs. The trial group also received an information brochure prepared by the researchers containing exercises (to be practiced at home twice a day), and illustrations of postures appropriate for all types of DLAs. During the study, three evaluations were made: at the beginning and at the end of the study, and again three months later. The instruments used were the VAS, the RDQ questionnaire, and the Schöber test. The intergroup analysis showed significant improvement in the second and third evaluations, in relation to functional capacity and low back mobility of the BS participants. Significant improvements in the intragroup analysis were observed only in the trial group, in relation to pain, functional capacity, and low back mobility. Such improvements were found in the first and second evaluations, as well as between the first and the third. There was no significant difference between the second and third evaluation.

DISCUSSION

Based on the articles analyzed, it can be stated that the BS programs proposed in the last ten years preserve characteristics similar to the BS created in the 1970s as to period of duration (4 to 5 classes), and the use of theoretical and practical elements in the program, with predominance of the Swedish model.²⁷ It is interesting to observe that, in the study by Heymans et al.²⁴, a high intensity BS program did not have more positive effects, as one would expect, due to the greater impetus for strengthening exercises and to carrying out work activities.

The results presented in the analyzed articles suggest that an educational intervention on body habits and the practice of exercises helps in reducing chronic nonspecific low back pain, and must therefore be considered part of the rehabilitation and prevention process, even if other measurements are also necessary for a significant long term improvement of status.

Encouragement to take on regular body work and the brochure with exercises to do at home^{1,24} can, after finishing the program, contribute to the participants becoming less sedentary and more attentive to the need to move in order to avoid musculoskeletal pains. Scheduling meetings after the program's completion, to reinforce information and to keep the bond between the patients and professionals also serves as motivation to maintain the care with the posture and the practice of regular exercises. In the studies analyzed, Ribeiro et al.²⁶ proposed a meeting one month after the intervention, while Tavafian et al.¹³ commented on weekly meetings with a health educator.

In this systematic review, the lowest-scored criteria were those evaluating the efficacy of the proposed program for lasting improvement in the course of time (follow-up), and to those gauging the evaluation of achieved improvement (symptoms, functional state, return to work, and/or overall improvement measurement). The negative score of these criteria undermines the evaluation of results obtained during the studies, for they are criteria that correspond to the intervention's efficacy.¹⁵

The studies analyzed in this review indicate a partial or general improvement of the BS participants in evaluations made up to four months after the end of the study, confirming a tendency towards effectiveness of the BS programs in the short and medium term. Of the articles considered in this review, only the study by Tavafian et al.²⁵ had a follow-up made one year later, where the maintenance of improvement in the quality of life of the females who participated in the BS was confirmed. Three studies with a one-year follow-up,^{14,16,19} which evaluated group interventions for people with chronic pain and that included BS topics, did not identify improvements in the trial group in the long term. Some peculiarities of the study by Tavafian et al.²⁵ related to the program, to the sample, and to the instrument used, may be related to the results found.

The BS program proposed by Tavafian et al.^{13,25} shows an emphasis on the active participation of the individuals in the education process, leaving space to negotiate the structure of the program itself to include the specific needs and characteristics of the group. Andrade et al.¹ share this idea when they state that transferring part of the responsibility for health care to the patient is important. The use of cognitive-behavioral therapy principles in the BS also helped to obtain favorable results in the study by Heymans et al.²⁴ This is why a fact

that must be considered in the preparation of a BS program is the use of teaching resources that increase the motivation and the commitment of the participants to the program.

In this line of thinking, it is noted that the studies analyzed that suggest closed approaches, in which there is no concern for individual characteristics, and where there is no rapport between the therapist and the participant²⁶ have less favorable repercussions than programs that invest in a greater evaluation of physical conditions, personal characteristics, motivations, and lifestyle of each patient, such as in the studies by Tavafian et al.^{13,26} and Heymans et al.²⁴

The sample of studies by Tavafian et al.^{13,25} also shows peculiarities that may be related to the results found. It is composed only of females, which normally are more careful and attentive towards health.²⁸ The subjects were mostly housewives, and therefore do not have an overload related to physical work demands - a factor considered relevant for chronic pain symptoms.¹⁵ They also had good education, which indicates more capacity to understand the problem and socio-economic level that is more favorable to health care.^{26,29} The cultural peculiarities of the Iranian society, in various aspects distant from western cultural habits, may also have influenced the results found.

It is relevant to point out that the studies by Tavafian et al.^{13,25} used only one quality of life questionnaire as an instrument to evaluate the results, and that in the 2008 study, this analysis was simplified in comparison to the article published in 2007, evaluating only results stemming from two categories formulated by associations of the dimensions presented in the SF-36 questionnaire on physical and mental aspects. The use of other evaluating instruments, such as the one for pain intensity - which is the main symptom reported by people with chronic pain¹ - could have shown distinct results for the maintaining improvements one year after the intervention, and that is the main limitation in the studies by Tavafian et al.^{13,25}

The Cochrane group recommended using more than one instrument, in which the results must be centered on the patients, such as: measurements of pain intensity, overall improvement or satisfaction with the program, functional state, well-being, and the capacity to perform physical work tasks and/or daily life activities.¹⁵ This last measurement is also highlighted in the study by Hazard et al.³⁰ which evaluates the return to physical work tasks after a functional restoration program with behavioral support. Among the studies

analyzed in this review, only Heymans et al.²⁴ showed results related to evaluating work-related absences due to illness, and none of the studies evaluated the performance of daily life activities. This is an important evaluation to be made, for one of the goals of the BS is that the participants perform their daily life activities with the correct posture, thereby actively protecting their spine from injuries during their movements.³¹ In this way, a dynamic posture evaluation,³² for example, may serve to verify the efficacy of the intervention.

The distinction between the BS programs (focus and structure of the proposals, professionals involved), the samples (gender, socio-economic level, number of participants), and the instruments used to evaluate the results make it difficult, in many aspects, to compare the studies that evaluate the efficacy of the BS programs. This difficulty may be illustrated by a comparison between the study by Ribeiro et al.²⁶ that did not show effectiveness of the BS program in most instruments used, not even in the short term, and the study by Heymans et al.²⁴ that showed positive results for the effectiveness of the BS in the short and medium term. This was the only study that applied the program in a work environment and the sample was mostly composed of males with a low to moderate level of education. As for the study by Ribeiro et al.,²⁵ the proposed program followed a traditional approach, with no behavioral focus, was applied in an orthopedic and rheumatology clinic, and had its sample mostly composed of females with a low education level.

The study by Ribeiro et al.²⁶ was the only one among the articles selected that evaluated the consumption of medication in the TG and CG, identifying a significant reduction in the amount/frequency of its use in the TG. Despite this positive result not having been identified in the other instruments used (only in one SF-36 domain), the reduction in the use of medication may be related, as pointed out by the authors, to the positive effect of the BS in behavioral changes of the individuals in relation to pain perception and to behaviors that protect the spine.

For this reason, controlling the use of medication, whether as an intervening variable²⁴ or as a datum in the analysis of results,²⁶ it must be considered a relevant factor for studies that seek to verify the efficacy of the BS programs in the treatment of people with chronic pain. Not monitoring the use of analgesic and anti-inflammatory medication in the trial and control groups may interfere in the pain evaluation results as much as in the

quality of life, or functional state. All these variables are influenced by the use of medication and the results measured without the verification of this consumption may not be reliable. Andrade et al.¹ state that the main limitation of their study was not having monitored this, for it may have influenced the results in the control group as much as in the trial group. It is also valid to point out that the reduction in medication may avoid collateral effects from its chronic use, such as gastrointestinal problems that have a negative impact on the quality of life of individuals.³³ The importance of providing some type of intervention for the control groups is also noteworthy, since they are individuals who present chronic pain and need assistance. In the studies analyzed, only that by Andrade et al.¹ did not show any measure of intervention for the control group, and also did not control intervenient variables such as use of medication, physiotherapy sessions, and medical consultations. Even so, the CG participants showed a small improvement in all the variables used, albeit not significant. The authors believed this improvement might be related, among other factors, to the renewal of expectations for a cure, for their being on the waiting list for a new treatment.

The main limitation of the studies analyzed was the poor detailing given of the BS programs. They present a generic description of the program, not clarifying how each class was developed, nor how each theme was worked. This makes the reproducibility of the program impossible (for example, if it showed good results) as well as any deeper comparison between the programs and the results found. The approach used by the professional (or professionals) and his experience in the application of BS programs may have a great influence on the motivation, attendance, and adherence to the program, and may influence the results. Van der Roer et al.^{14,16} reported difficulty in monitoring the professionals applying the BS programs, even if they received training before the application. The divergences found in the studies that evaluate BS programs may be related to the lack of program standardization, which compromises any comparison between the different studies to certify the effectiveness of the BS programs.¹

In addition, the difficulty to prove which is the best intervention to help people with chronic nonspecific low back pain suggests that the eligibility between interventions that show similar results may stem from costs and from the satisfaction of the participants in relation to the interventions. Therefore, any

future studies should include these variables in the evaluation of BS programs.

It is relevant to point out that, in the decade studied (2000-2011), two of the articles selected were made by Brazilian researchers,^{1,26} indicating the interest for this type of intervention and the production of qualified articles within the theme.

CONCLUSION

Based on this review, it can be stated that BS programs are important in the treatment as much as in the prevention of chronic nonspecific low back pain in the short and medium term. Nevertheless, there are still a lack of studies that evaluate the effectiveness of long term programs, and considering the recommendations of the Cochrane group, that show evaluation measurements of the capacity to perform physical labor. To enable better evaluation of BS programs, it is necessary to find studies of quality and that use standardized methodological procedures, so that they can be compared.

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