ELSEVIER

The Spine Journal ■ (2007) ■

THE SPINE JOURNAL

Review Article

Systematic review of back schools, brief education, and fear-avoidance training for chronic low back pain

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Received 22 December 2006; accepted 4 July 2007

Abstract

BACKGROUND: Seven previous systematic reviews (SRs) have evaluated back schools, and one has evaluated brief education, with the latest SR including studies until November 2004.

The effectiveness of fear-avoidance training has not been assessed.

PURPOSE: To assess the effectiveness of back schools, brief education, and fear-avoidance training for chronic low back pain (CLBP).

STUDY DESIGN: A SR.

METHODS: We searched the MEDLINE database of randomized controlled trials (RCT) until August 2006 for relevant trials reported in English. Assessment of effectiveness was based on pain, disability, and sick leave. RCTs that reported back schools, or brief education as the main intervention, were included. For fear-avoidance training, evaluation of domain-specific outcome was required. Two reviewers independently reviewed the studies.

RESULTS: Eight RCTs including 1,002 patients evaluated back schools, three studies were of high quality. We found conflicting evidence for back schools compared with waiting list, placebo, usual care, and exercises, and a cognitive behavioral back school. Twelve trials including 3,583 patients evaluated brief education. Seven trials, six of high quality, evaluated brief education in the clinical setting. We found strong evidence of effectiveness on sick leave and short-term disability compared with usual care. We found conflicting or limited evidence for back book or Internet discussion (five trials, two of high quality) compared with waiting list, no intervention, massage, yoga, or exercises. Three RCTs of high quality, including 364 patients, evaluated fear-avoidance training. We found moderate evidence that there is no difference between rehabilitation including fear-avoidance training and spinal fusion.

CONCLUSIONS: Consistent recommendations are given for brief education in the clinical setting, and fear-avoidance training should be considered as an alternative to spinal fusion, and back schools may be considered in the occupational setting. The discordance between reviews can be attributed differences in inclusion criteria and application of evidence rules.

Keywords: Back school; Brief education; Fear-avoidance training; Systematic review; Chronic low back pain

Introduction

Educational interventions have been given more attention since the Swedish Back School was introduced in 1969 [1]. It was based on current knowledge about the

FDA devices/drug status: not applicable.

Nothing of value received from a commercial entity related to this manuscript.

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1529-9430/07/$ – see front matter
doi:10.1016/j.spinee.2007.07.389

intervertebral disc, spinal anatomy and physiology, and ergonomic principles [2]. Patients were taught how to protect spinal structures in daily activities. Later, exercises were included [3], and back schools were incorporated in comprehensive multidisciplinary programs or functional restoration [4].

Observations of natural history and epidemiology suggest that low back pain usually is a benign, self-limiting condition. Waddell contrasted the traditional medical model of disease with a biopsychosocial model of illness to analyze success and failure in back pain disorders [5]. Inspired by his thoughts, Indahl et al. told patients that a possible crack in the disc might cause reflex muscle activation, but that light activity would not further injure the disc or other structures [6]. The clinical examination was supplemented by a brief education given by a physiatrist, physiotherapist (PT), or nurse, and patients were given guidelines and told to set their own goals. It was emphasized that the worst thing they could do to their back was to be too careful. The link between emotions and chronic low back pain (CLBP) was explained as increased tension in the muscles. Later, brief education has been managed in the physiotherapy setting [7,8]. The value of pure educational approaches has been challenged [9].

Lethem et al. introduced the fear-avoidance model in 1983, and a questionnaire for measurement of fear-avoidance beliefs was published in 1993 [10,11]. The central concept of the model is fear of pain. Confrontation and avoidance are postulated as two extreme responses to fear, of which the former leads to reduction of fear over time [12]. Avoidance leads to maintenance and exacerbation of fear, which may generate a phobic state. Physical performance and self-reported disability are associated with cognitive and behavioral aspects of pain, in addition to sensory and biomedical ones [13–17]. Graded activity programs versus direct exposure to produce disconfirmation of expected consequences of physical activity have been evaluated [18]. Behavior that may be caused by fear of movement is commonly observed. Patients informed or experienced that the ''wrong movement'' should be avoided, may have an increased the risk of disability [15,19].

Although there is considerable overlap, back schools, brief education, and fear-avoidance training are different interventions. Back schools are defined as an intervention consisting of an education and skills program, including physical exercises. All lessons are given to groups of patients and supervised by a paramedical therapist or medical specialist. PTs most commonly run back schools. Back schools have been evaluated in an occupational setting and as part of a multidisciplinary program [20]. Brief education includes interventions that involve brief contact with healthcare professionals, self-management patient-led groups, provision of educational booklets, and Internet discussion groups [21]. The degree of clinical involvement may range from zero, in the case of mailing a back booklet to the patient [22], to an intensive course [23]. The aim is to encourage active self-management and to reduce concerns. Fear-avoidance training is defined as an intervention addressing fears and encouraging normal activities and physical exercise. Fear-avoidance beliefs or kinesiophobia can be assessed by validated questionnaires [11,24,25].

Communication is a central part of the health care professional/patient relationship.

The impact on patients' fear of lessons about biomechanics to protect the spinal structures has not been addressed. Behavior that derives from pain avoidance is inhibitory and may contribute to chronicity [26]. At present, we do not know whether this inhibition constitutes a learning explanation for gradual development of depression with its low psychomotor level in all dimensions. Automated movements are unconscious, but may be brought to conscious analysis and observation. This conscious analysis occupies more brain capacity and reduces physical performance. Back pain may be viewed as a threatening situation and anxious persons give priority to thoughts and information related to their fear. The cognitive activation theory of stress attempts to explain how pain leads to neurophysiological activation [27]. The stress alarm occurs when there is a discrepancy between what is expected and what is experienced by the individual. This unpleasantness is no health threat, but if sustained, may lead to chronic back pain. The individual outcome expectancies may alter the stress response. A positive response outcome expectancy (coping) may reduce the stress response whereas a negative response (hopelessness) may increase the risk of sustained activation. The challenge in patients with CLBP is to balance information and expectancies regarding spinal structures and the adoption of pain behavior.

The aim of the present study was to systematically assess the effectiveness of back schools, brief education, and fear-avoidance training in patients with nonspecific CLBP excluding nerve root signs and specific pathology.

Methods

We have combined the text words ''back school'', ''patient education'', ''information'', ''pain management'', ''fear avoidance'', ''kinesiophobia'', and ''pain-related fear'' with the general search strategy outlined in this number of the Spine Journal. We evaluated randomized controlled trials (RCTs) included in the latest Cochrane Review [20] and the European Guidelines [21]. Additional RCTs were identified from the date of inclusion of the latest systemic review (SR) to August 2006 for back schools and brief education, and with no time limit for fear-avoidance training.

Outcome measures

Assessment of effectiveness was based on the outcome variables: pain, disability, sick leave, cost-effectiveness,

or the use of health-care resources. For back schools also the number of recurrences was evaluated. If a trial was not assessed with regard to any of these measures, it was excluded, even if changes in other variables such as range of motion or muscle strength were detected. We systematically registered the profession of the care-provider in the included studies, but not the professional education required. We registered the setting in which the treatments included in the present study were given, but not treatment availability in various countries or states. We did not systematically evaluate reimbursement for the interventions in different countries or states, but included available evidence on cost-effectiveness. Predictors of negative outcome were not assessed.

Criteria for inclusion/exclusion

RCTs were included if patients had nonspecific back pain and/or lower limb pain of more than 12 weeks duration. Trials including patients with magnetic resonance image findings of mild neurological compression, disc degeneration or bulging, or with failed back surgery were not excluded. Studies on CLBP with a select or uniform pathology like all spondylolisthesis or vertebral fractures, and interventions that evaluated patients with serious somatic or psychiatric comorbidity were excluded. Back schools were included when given to groups of patients by a paramedical or PT or medical specialist, and if the back schools constituted the main part of the intervention. Brief education was included if the intervention consisted of up to four sessions and constituted the main part of the intervention. Fear-avoidance training was included both if the training was a separate intervention or as part of a rehabilitation program. In addition, pain-related fear had to be measured before and after the intervention.

Quality assessment

The identified studies were evenly distributed among the authors. Two independent authors assessed the methodological quality of each study. In the case of disagreement, a third independent author evaluated the study to reach consensus. Previously evaluated studies were assessed only if there was a disagreement between previous quality evaluations. The authors did not evaluate the RCTs that they had been involved in. The methodological quality of a SR identified by the search was assessed using the Oxman and Guyatt index [28]. SRs were rated from 0 to 7, with high quality for a rating of at least 5 [21].

Additional relevant RCTs not previously included in SRs, were assessed for their methodological quality, using criteria related to internal validity of the trial [29]. One point was awarded for each condition that was fulfilled on the checklist. If a trial achieved a score of 5 or more out of 10, it was considered high quality [21].

Data extraction and analysis

Two reviewers independently extracted the data on the predefined outcomes. The results of each RCT were extracted if possible as point estimates with corresponding 95% confidence interval. Attempts were made to statistically pool the data for the outcome measures: pain, disability, and return to work. Most studies did not report their results in a way that enabled statistical pooling (eg, for continuous data, means were presented without standard deviations, or only p values were presented for within group differences). In addition, trials were heterogeneous with respect to study populations, interventions, and settings. Consequently we did not perform a meta-analysis, but summarized results using a rating system with four levels of evidence based on the quality and outcome of studies [20].

Strong evidence—provided by generally consistent findings in multiple high-quality RCTs;
Moderate evidence—provided by generally consistent findings in one high-quality RCT plus one or more low-quality RCTs, or by generally consistent findings in multiple low-quality RCTs;
Limited or conflicting evidence—only one RCT (either high or low quality) or inconsistent findings in multiple RCTs;
No evidence—no RCTs.

Our recommendations were based on the grading used in the European Guidelines [21].

Recommended—strong or moderate evidence of effectiveness in relation to sham treatments considered in the RCTs to be control treatments, or usual care; especially if level A/B evidence that better than/as good as other potentially effective treatments, and no known concern;
Consider using—same as recommended, but with some known concerns such as cost-effectiveness, safety, side-effects, and general provisos regarding the evidence itself, for example, duration of effect, breadth of effect for different outcomes, and number of different studies/research groups addressing the problem;
We cannot recommend—conflicting, limited or no evidence regarding effectiveness in relation to sham treatments, treatments considered in the RCTs to be control treatments, or usual care; with/without known concerns;
We do not recommend—strong or moderate evidence that is not more effective than sham treatments, treatments considered in the RCTs to be control treatments, or usual care; with/without known concerns. We did not perform a sensitivity analysis using different cut-off points for the definition of high quality. We performed a sensitivity analysis to test whether a possible discordance between the current and previous SRs was explained by different inclusion criteria, the number of trials included, or quality assessment.

Results

Back schools

We identified seven SRs, two of them were Cochrane Reviews [20,21,30–34]. The latest Cochrane Review included studies until November 2004 and included 21 reports of 12 trials [20]. Both the latest Cochrane Review and the European Guidelines achieved the best quality score according to the Oxman and Guyatt Index [28]. Back schools had been compared with waiting list controls or placebo interventions in eight trials and with other conservative treatments in six trials. The Cochrane Review concluded that most of the trials were of low methodological quality, and that there was moderate evidence that back schools conducted in the occupational setting (six trials) were more effective than other treatments, placebo, or waiting list controls for pain, functional status, and return to work during short- and intermediate-term follow-up.

The European Guidelines included the same studies, except one [45], and concluded differently [21]. The authors reported conflicting evidence for the effectiveness of back schools with regard to pain, functional status, and return to work, compared with waiting list controls or placebo interventions, but that back schools were more effective than other treatments with regard to short-term, but not for long-term effects on pain and disability.

We excluded six of 12 studies that were included in the reviews [20,21]. The reasons were comprehensive multidisciplinary program [4]; comprehensive behavioral program [36]; assessed the effectiveness of social intercourse [37]; did not properly report differences between groups [38]; written in German [39]. Two RCTs published after November 2004 were identified [35,40]. One study evaluated a comprehensive multidisciplinary program and was excluded [35].

We included eight studies with 1,002 patients published in nine papers (Table 1) [3,40–47]. Three of the included studies were of high quality [3,40,46]. We found conflicting evidence on pain and disability for the effectiveness of back schools compared with waiting list, no intervention, placebo (five trials, 467 patients) [41–44,46], and limited evidence compared with exercises, usual care, and a cognitive-behavioral–based back school (two trials, 391 patients). For recurrences, we found conflicting evidence on the effectiveness of back schools versus no intervention (two trials, 223 patients) [45,46], and limited evidence versus exercises [45], usual care [40], and a cognitive-behavioral back school [40]. Regarding return to work, we found moderate evidence that back schools are not more effective than no intervention, waiting list, usual care, or a cognitive-behavioral–based back school (three trials, 456 patients) [40,43–44], and conflicting evidence versus no intervention for long-term return to work (two trials, 269 patients) [42,46]. One of the two latest published trials reported results in favor of back school for recurrences at short-term and for pain, disability, and return to work at long-term [46]. Results from the other recent trial suggest a clinically important benefit in return to work compared with a more comprehensive program [40].

Brief education

We identified one SR including 10 RCTs [21] that reported moderate to strong evidence for brief education being better than usual care in reducing sick leave and disability and as effective as routine physiotherapy and aerobic exercise in reducing disability. The SR found limited or conflicting evidence that Internet-based interventions/educational interventions were more effective than no intervention and as effective as massage and acupuncture in reducing pain and disability. The SR [21] recommended brief education to reduce sickness absence and disability, but did not give any recommendation on the specific type of intervention to be undertaken. We excluded one trial because physiotherapy was both part of the intervention and constituted the control treatment [7,8]. We identified seven additional studies reported in eight papers [23,48–54]. Four trials were excluded. The reasons were assessed the additional effect of stabilizing exercises and manipulation [49,51]; evaluated the additional effect of yoga [53]; did not report group comparison [48]; 75% of the patients had back pain for less than 4 weeks [23].

We included 12 studies with 3,583 patients reported in 13 papers [6,22,50,52,54–64], eight were of high quality (Table 2a, Table 2b) [6,50,52,57,60,61,64]. Five RCTs [6,56,57,60,61], four of high-quality evaluated brief education in the clinical setting consisting of examination, information, reassurance, and advice to stay active. One trial evaluated the effect of neurophysiology education, including how nerves communicate, and the adaptability of the nervous system [50]. One trial evaluated the effect of a self-care group led by one psychologist [64]. We found that there is strong evidence that brief education in the clinical setting is not more effective on pain than usual care (four trials, 969 patients) [56,57,60,61], and limited evidence versus back school (one trial, 58 patients) [50] and exercises (one trial, 93 patients; Table 2a) [60]. For disability, we found moderate evidence for the short-term effectiveness of brief intervention versus usual care (four trials, 738 patients) [56,60,61], limited evidence versus back school [50], and exercises [60]. Based on three trials in 1,596 patients [6,57,61], we found strong evidence for the effectiveness of brief education versus usual care on sick leave, although one trial did not find a difference [60].

Five studies, two of high quality [22,52], compared back book or Internet education with eight different interventions [22,52,54,59,63]. Pain was reported in all studies (Table 2b). Disability was reported in four studies. Sick leave was not reported. We found that the evidence of

Table 1
Back schools

Study	Setting; profession involved	Intervention	Duration/frequency	Effectiveness	Quality rating
Lankhorst et al., 1983, Netherlands, n=43 [41]	Primary care; PT	Swedish Back School (*I*) versus placebo (detuned shortwave) (*C*)	*I* and *C*: 4×1 hour for 2 weeks	*Pain* and *disability*, 4 and 16 weeks: *I=C* *Sick leave*: not reported	2
Klaber-Moffett et al., 1986, UK, n=92 [3]	Hospital outpatient orthopedic clinic; PT and occupational therapist	Swedish Back School including exercises (*I*) versus three sessions with exercises and a back-care leaflet (*C*)	*I*: 3×1.5 hour in 1 week *C*: 3×0.5 hour in 1 week	*Pain* and *disability*, 6 weeks: *I=C* and 16 weeks: *I=C* *Sick leave:* not reported	6
Hurri, 1989, Finland, n=188 (females) [42]	Rehabilitation department; PT and physician	Swedish Back School including exercises (*I*) versus no intervention (*C*)	*I:* 6×1 hour in 3 weeks+two classes after 6 months	*Pain*, 6 months: *I>C* and 12 months: *I=C* *Disability*, 6 and 12 months: *I>C* *Sick leave*, 6 and 12 months: *I=C*	3
Keijsers et al., 1989, Switzerland, n=80 [43]	Hospital; PT and invited lecturers[‡]	Maastricht Back School including training of skills (*I*) versus waiting list (*C*)	*I:* 7×2.5 hours+one class after 8 weeks	*Pain, disability*, and *sick leave*, posttreatment: *I=C*	1
Keijsers et al., 1990, Switzerland, n=77 [44]	Hospital; PT and invited lecturers[‡]	Maastricht Back School including training of skills (*I*) versus waiting list (*C*)	*I:* 7×2.5 hours+one class after 8 weeks	*Pain, disability*, and *sick leave*, 2 and 6 months: *I=C*	0
Donchin, 1990[§], Israel, n=142 [45]	Hospital; PT and physical education instructor	Back school in groups of 10 to 12 people (*I*) versus flexion and extension exercises in groups of 10 to 12 people (*C1*) versus no intervention (*C2*)	*I*: 4×1.5 hour in 2 weeks+1 class after 2 months, *C1*: 24×3/4 hour; 2 times weekly for 3 months	*Recurrence*: 3, 6, and 12 months: *I<C1*, *I=C2* *Pain, disability*, and *sick leave:* not reported.	4
Lønn et al., 1999; Glomsrød et al., 2001[§],Norway, n=81 [46,47]	Physical therapy in primary care	Back school including practical training and exercises (*I*) versus no intervention (*C*)	*I:* 20×1 hour (20 minutes education+40 minutes practical training and exercises) for 13 weeks	*Recurrence:* 5 months, 1 and 3 years: *I>C* *Pain* and *disability* 5 months: *I=C*, 1 and 3 years: *I>C* *Sick leave*, 5 months: not reported, 1 and 3 years: *I>C*[‖]	5
Heymans et al., 2006, Netherland, n=299 [40]	Occupational department; Physician and PT	Swedish Back School including exercises (*I*) versus cognitive-behavioral based back school including simulation of workplace tasks and a graded exercise program (*C1*) versus usual care (Dutch Guidelines) (*C2*)	*I* and *C1:* 2 hours examination+home exercises twice daily *I:* 4×2 hours (0.5 hour education+1.5 hour exercises) for 4 weeks *C1:* 16×1 hour for 8 weeks	*Recurrence*, 3 and 6 months: *I=C1=C2* *Pain*: *I=C1=C2* *Disability*, 3 months *I>C1=C2*; 6 months *I=C1=C2* *Sick leave* (*return to work*): *C2=I=C1* (*number of sick days*): *I=C1=C2*	7

PT = physiotherapy; I=intervention; C=control; C1=control 1; C2=control 2.
>Significantly better than.
[†]Reported.
[‡] Invited lecturers from psychology, pedagogy, neurology, orthopedics, rehabilitation medicine, and occupational therapy.
[§] Secondary prevention.
[‖] Back related sick leave reported.

effectiveness was limited compared with yoga, massage, exercises, stabilizing exercises, manipulation, and acupuncture, and conflicting compared with waiting list or no intervention for all outcome measures.

Fear-avoidance training

No SRs or meta-analysis were found. Six trials reported in seven papers were identified (Table 3) [18,65–70]. Three

Table 2a
Brief education in the clinical setting

Study	Setting; profession involved	Intervention	Duration/frequency	Effectiveness	Quality rating
Indahl et al., 1995/ 1998, Norway, n=975/489[6,55]	Rehabilitation department; physiatrist, nurse; PT	Examination, information about reflex activation of spinal muscles, reassurance to reduced fear and sickness behavior, mini-back school, encourage to set their own physical activity goals (*I*) versus usual care (*C*)	*I*: 1×2 to 3 hours+1×1 to 2 hours, reinforced after 3 months and 1 year, open door	*Pain and disability*: not reported *Sick leave*: 1 year and 5 years: *I>C*	5
Von Korff et al., 1998, USA, n=255 [56]	Primary care; Lay person with LBP	Information on red flags, common causes of LBP, factors contributing to pain, exercise and activity, biomechanics, stress management and problem solving, book and videotapes used for self management and exercises (*I*) versus usual care (*C*)	*I*: 4×2 hours×in 4 weeks	*Pain*, 3, 6,and 12 months: *I=C* *Disability*, 6 months: *I>C* and 3 and 12 months: *I=C* *Sick leave*: not reported	5
Moore et al., 2000, USA, n=226 [64]	Primary care; Psychologist	Information on red flags, common causes of LBP, factors contributing to pain, exercise and activity, biomechanics, problem solving, personal goals, book and videotapes used for self management and exercises (*I*) versus usual care (*C*)	*I*: 2×2 hours×2 in 2 weeks+1×45 minutes+follow-up telephone call	*Pain*, 3 and 12 months: *I=C*, 6 months *I>C* *Disability*, 3 months: *I>C*, 6 and 12 months: *I=C* *Sick leave*: not reported	5
Hagen et al., 2000/2004, Norway, n=457 [57,58]	Rehabilitation department physiatrist; PT	Examination and reassurance as described by Indahl, stay active and home activity(*I*) versus usual care (*C*)	*I*: 2×1 to 2 hours	*Pain*: 6 months and 1 year: *I=C* *Disability*: not reported *Sick leave*: 3, 6 months and 3 years: *I>C* and at 2 years: *I=C*	7
Storheim et al., 2003, Norway, n=93 [60]	Hospital—outpatient and primary care; Physiatrist, PT	Examination and reassurance as described by Indahl, assessment of function, instruction to activate deep stabilizing muscles, stay active.(*I*) versus examination and aerobic dance program modified for LBP patients (*C1*) versus usual care (*C2*)	*I*: 2×0,5 to 1 hour *C1*: 2-3×1 hour weekly for 15 weeks	*Pain*, 18 weeks: *I=C1=C2* *Disability*: *I>C2* and *C1=C2* *Sick leave*: *I=C1=C2*	7
Karjalainen et al., 2003/2004, Finland, n=164 [61,62]	Primary care, occupational medicine, physician, physiatrist, PT	Examination, information and reassurance as described by Indahl, stay active and home activity, confirmation by second physician) (*I*) versus same+worksite visit by PT (*C1*) versus usual care (*C2*)	*I*: 2 hours *C1*: 2 hours+1 hour	*Pain and disability*, 3, 6, 12, and 24 months: *I=C1=C2* *Bothersomeness*: *I>C2=C1* *Sick leave*: *I>C2=C1* *Costs*: *I>C2=C1*	7
Moseley et al., 2004, Australia, n=58 [50]	Private physiotherapy; PT	*I:* Information based on current knowledge of neurophysiology of pain *C:* Information in accordance with Swedish Back School	*I* and *C*: 1×3 hours+homework (questions related to the education) daily for 2 weeks	*Pain*: *attitudes:* *I>C*, catastrophing: *I>C* *Disability*: *I>C* *Sick leave*: not reported	8

PT = physiotherapy; I=intervention; C=control; C1=control 1; C2=control 2.
>Significantly better than.
[†]Zelens design.

small trials had a cross-over design and reported that exposure in vivo was more effective in reducing fear-avoidance, pain, and disability than graded activity [18,65,66]. These studies were considered as experimental rather than clinical trials and were excluded. In addition, we searched the latest Cochrane Review on behavioral treatment for CLBP for relevant RCTs [71]. Search terms like ''fear-avoidance'', ''kinesiophobia'', and ''pain-related fear'' were not identified. We critically evaluated six of the 21 included trials [36,72–76], but none of them met our inclusion criteria. We concluded that based on one large high-quality trial there is limited evidence that an intervention in primary

Table 2b
Brief education. Back book and Internet education

Study	Setting; profession involved	Intervention	Duration/frequency	Effectiveness	Quality rating
Cherkin et al., 2001, USA, n=262 [22]	Occupational medicine, acupuncturists and massage therapists	Educational book and video (self-care) (*I*) versus traditional Chinese medical acupuncture (*C1*) versus therapeutic massage (*C2*)	*I*: Self-care versus *C1* and *C2*: 10 visits in 10 weeks	*Pain (bothersomeness)*, 10 weeks: *I<C2* *Disability*: *I=C1>C2* *Sick leave*: not reported *Costs*: *I<C2* and *C2>C1*	6
Lorig et al., 2002, USA,n=580 [59]	Internet; physician, psychologist, PT	Back pain e-mail discussion group+a book and videotape (*I*) versus subscription to a nonhealth related magazine (*C*)	*I*: Not defined	*Pain*, 12 months: *I>C* *Disability*: *I>C* *Use of health care*, 12 months: *I=C* *Sick leave*: not reported	2
Buhrman et al., 2004, Sweden, n=56 [63]	Recruited from newspapers, psychologist and PT	Internet-based pain management program with telephone support, discuss negative thoughts and beliefs, active coping, relaxation, stretching, exercises (*I*) versus waiting list (*C*)	*I*: Active access for 8 weeks	*Pain*, 3 months: *I=C* *Disability and sick leave*: not reported	4
Sherman et al., 2005, USA, n=101 [52]	Nonprofit, integrated health care system	Mailed self-care book (*I**) versus yoga (*C1*) versus exercises (information, goal-setting, aerobic-, strength- and flexibility exercises) (*C2*)	*I*: Mailed back-book *C1* and *C2*: 12 weekly 75-minute classes	*Pain (bothersomeness)*, 6 weeks: *I<C1*, 12 weeks: *I=C1=C2*, 26 weeks: *I=C2<C1* *Disability* 6 and 26 weeks: *I<C1=C2*, 12 weeks: *I=C2<C1* *Sick leave*: not reported	8
Goldby et al., 2006, UK, n=346 [54]	Hospital—outpatient; PT	Back book+back school (*I*) versus spinal stabilization exercises+back school (*C1*) versus manual therapy+back school (*C2*)	*I:* 3 hours×1 (back school) *C1* and *C2:* 3 hours×1+10 weeks×1 hour	*Pain*, 6 months: *I=C2<C1* but not at 3, 12, and 24 months *Disability (ODI)*, 6 and 12 months: *I=C2<C1*, but not at 3 and 24 months *Sick leave*: not reported	4

>I=intervention; C=control; C1=control 1; C2=control 2. Significantly better than.
* Control group in the original study, but intervention group in this setting.

care and physiotherapy setting incorporating fear-reducing techniques is more effective than usual care in reducing pain-related fear, pain, disability, and return to work [68]. We found that there is moderate evidence (two high-quality trials, 124 patients) that fear-avoidance training incorporated in a rehabilitation program consisting of cognitive intervention and exercises is not different from with spinal fusion on back pain, disability, and sick leave [67,69,70].

Table 3
Fear-avoidance training

Study	Setting; profession involved	Intervention	Duration/frequency	Effect on fear-avoidance	Effectiveness	Quality rating
von Korff et al., 2005, USA, n=240 [68]	Primary care; psychologist, PT	Two visits to psychologist and PT, respectively (*I*) versus treatment as usual (*C*)	*I:* 1 to 2 hours×4 over 35 days	2, 6, 12, 24 months: *I>C*	*Pain,* 2, 6, 12 months: *I>C* *Disability*, 2, 6, 12, 24 months: *I>C* *Sick leave**, 6, 24 months: *I>C*	5
Brox et al., 2003, Norway, n=64 [67]	Hospital; physiatrist, PT, lay person	Cognitive intervention (information, reassurance, exposure) and exercises(general and stabilizing) (*I*) versus instrumented lumbar fusion L4–L5 and/or L5–S1+postoperative advice by PT+exercises after 3 months (*C*)	*I:* 1 week at hospital+2 weeks at home+2 weeks at hospital	*FABQ-PA*, 1 year: *I>C* *FABQ-W*: *I>C*	*Pain, disability and sick leave*, 1 year: *I=C*	7
Brox, 2006 Norway=60 [69]	See Brox, 2003	See Brox, 2003—intervention is the same, but patients with CLBP 1 year after surgery for disc herniation are included	See Brox, 2003	*FABQ-PA*, 1 year: *I>C* *FABQ-W*: *I=C*	*Pain, disability and sick leave*, 1 year: *I=C*	5

RTW = Return to work; FABQ-PA = Fear-avoidance beliefs physical activity; FABQ-W = Fear-avoidance beliefs work; PT = Physiotherapist; I=intervention; C=control.
* Includes school and housework.
>Significantly more effective than.

Sensitivity analysis

A sensitivity analysis was carried out including studies where back schools were part of multidisciplinary interventions [4,35,36]. In one trial both in- and outpatient back schools were more effective than no treatment for short- and long-term pain reduction and short-term improvement of disability, but no statistical difference was reported for long-term sick leave [4]. A recent trial in the occupational setting [35] reported that a function-based intervention was more effective than a pain-based intervention (back school) for reduction of short-term pain, disability, and sick leave, and Linton et al. [36] reported that a comprehensive back school was better than waiting list for reduction of short-term pain. We found that by including these studies the evidence would be in agreement with the Cochrane Review for the occupational setting. Five studies were either interpreted different from previous SRs [3,40] or excluded for other methodological reasons [37–39]. By including these studies we found in agreement with the European Guidelines [21] that there is moderate evidence that back schools are more effective than exercises on short-term pain and disability, and in addition on return to work. The evidence for back schools in the occupational setting was strengthened. The sensitivity analysis on brief education included two recent trials that evaluated the additional effect of either stabilizing exercises and manipulation [49,50] or physiotherapy including exercises and manipulation [7,8]. We found conflicting evidence for improved effectiveness with additional intervention on pain, short-term disability and cost-effectiveness, and moderate for no difference on sick leave and long-term disability [8,50]. The evidence for brief education was not changed. One additional study [49] reported that the addition of yoga to brief education was more effective than brief education alone on short-term pain and disability. By including this study, we found that there is moderate evidence that a brief education is less effective than yoga on short-term pain and disability. In a sensitivity analysis for fear-avoidance training, we included one trial that compared the addition of cognitive behavioral treatment to medical (usual) treatment with medical treatment only [72]. Pain, disability, and avoidance behavior, but not sick leave, was reduced posttreatment. We found that by including this trial there was moderate evidence for short-term effectiveness of fear-avoidance training versus usual care.

Discussion

Consistent recommendations are given for brief education in the clinical setting for return to work and short-term reduction of disability. Additional physiotherapy with brief intervention is not recommended for return to work (sensitivity analysis). In agreement with the European Guidelines, we found limited and conflicting evidence for the effectiveness of brief education given as a back book or Internet discussion. Consequently, but contrary to the European Guidelines, we conclude that we cannot recommend these interventions. Recommendations for back schools are limited to the occupational setting if multidisciplinary interventions are included (sensitivity analysis and previous SRs). We recommend considering incorporating fear-avoidance training in a rehabilitation program as an alternative to spinal fusion, and in primary care(sensitivity analysis).

Blinding of the therapist and patient is impossible in the interventions included. Thus, the observed difference between two interventions might be attributed to a specific method, positive (placebo) or negative (nocebo) expectations, or communicative skills of the therapist [77]. Most differences observed between treatments are within measurement error of the primary outcome variable, and the statistical significance consequently of doubtful clinical relevance. Possible limitations of this review are that we only searched Medline and that five of the authors were involved in at least one of the included trials. This may have introduced a bias, although the authors did not evaluate trials they were involved in.

Educational aspects are important to enhance the efficacy of biomedical therapies or when these therapies are not effective. By example, negative tests have great power to reassure the patient only if we carefully explain the result and dissipate the fears [78]. There is a trend to encourage patients with back pain to be more active, but to what degree the different educational interventions has challenged the injury model or just toned it down is difficult to find out [79,80]. Biomedical factors are of little value in determining the success of multidisciplinary programs, Hildebrandt et al. reported that the reduction of subjective feelings of disability was the most important variable in determining a success [81].

The discordance between the present study and the Cochrane Review [20] for recommendation of back schools was explained by different inclusion criteria. One study in the former SRs had additionally greater than 25 sessions of exercises, massage, electro-, and thermotherapy [4]. Back schools may play an important role in multidisciplinary interventions, but we believe that the homogeneity of the interventions is improved by applying more strict inclusion criteria for back schools. The discordance versus the European Guidelines [21] was mainly attributed to methodological aspects. Our interpretation of results in one high-quality study differed from that given by the authors, because the back school was better only for the change between 4 and 16 weeks [3]. Our recommendation of brief education to reduce sickness absence and disability is in agreement with the European Guidelines [21], but there is disagreement for methodological reasons on the specific intervention to be undertaken. The recommendations in the European Guidelines for back book or Internet-based discussions were weakly supported by the evidence reported [21]. From a theoretical point of view there is a major

difference between a consultation including clinical examination and advice, compared with a back book that is e-mailed to a patient. The lack of communication with a professional, might introduce negative expectations and dissatisfaction. In at least two of the included trials, we cannot exclude that the observed negative differences are because of expectations [52,54]. Most of the studies in the clinical setting have been conducted in patients on sick leave for 8 to 12 weeks. Some of these studies have, considering the delay from pain onset to sick leave, been misclassified as subacute pain. Back muscle strength and fingertip floor distance was reduced after cognitive intervention and exercises in a later article including two of the previous trials [67,69], supporting the link between fear avoidance and physical performance [70]. Other studies have reported that fear-avoidance beliefs are reduced after exercises, and after brief education, which underline the importance of further assessment to depict the key factor for reduction of pain-related fear [50,60,82]. A study in patients with acute pain suggests that fear-avoidance training should be offered to patients with high scores in fear-avoidance beliefs [83]. Cognitive behavioral interventions in CLBP may not adequately address and reduce pain-related fear and be less effective than a brief education type back school in reducing kinesiophobia [40].

Future studies to compare cost-effectiveness of brief education by a physician or a PT, or both, or with a back school, are warranted. More studies are recommended to evaluate fear-avoidance training in usual care and to better understand both indications, content, and number of sessions needed. A Cochrane Protocol exists for fear-avoidance training.

Conclusion

Consistent evidence was found only for a recommendation of brief education in the clinical setting. Back schools and fear-avoidance training should be considered in particular settings and in future studies. The discordance between this SR, the Cochrane Review, and the European Guidelines, can mainly be attributed to more strict inclusion criteria and more strict use of evidence and recommendation rules in this SR. The inclusion of recently published studies did not change our conclusions.

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