



# A randomized trial of a cognitive-behavioral program for enhancing back pain self care in a primary care setting

James E. Moore<sup>a,\*</sup>, Michael Von Korff<sup>b</sup>, Daniel Cherkin<sup>b</sup>, Kathleen Saunders<sup>b</sup>, Kate Lorig<sup>c</sup>

<sup>a</sup>Section of Physical Medicine and Rehabilitation, Virginia Mason Medical Center, 1100 Ninth Ave., Seattle, WA 98101, USA

<sup>b</sup>Center for Health Studies, Group Health Cooperative of Puget Sound, 1730 Minor Avenue, Suite 1600, Seattle, WA 98101, USA

<sup>c</sup>Stanford Patient Education Research Center, Stanford University School of Medicine, 1000 Welch Road, Suite 204, Palo Alto, CA 94304, USA

Received 19 August 1999; received in revised form 10 April 2000; accepted 13 April 2000

## Abstract

Back pain is a significant health care problem that has been managed unsatisfactorily in primary care settings. Providers typically address medical issues but do not adequately address patient concerns or functional limitations related to back pain. We evaluated a brief intervention for primary care back pain patients designed to provide accurate information about back pain, instill attitudes favorable towards self care, reduce fears and worries, assist patients in developing personalized action plans to manage their back pain, and improve functional outcomes. Patients enrolled in a large health maintenance organization were invited to participate in an educational program to improve back pain self care skills 6–8 weeks after a primary care back pain visit. Patients ( $n = 226$ ) were randomly assigned to a Self Care intervention or to Usual Care, and were assessed at baseline, 3-, 6-, and 12-months. The intervention involved a two-session Self Care group and an individual meeting and telephone conversation with the group leader, a psychologist experienced in chronic pain management. The intervention was supplemented by educational materials (book and videos) supporting active management of back pain. The control group received usual care supplemented by a book on back pain care. Participants assigned to the Self Care intervention showed significantly greater reductions in back-related worry and fear-avoidance beliefs than the control group. Modest, but statistically significant, effects on pain ratings and interference with activities were also observed. © 2000 International Association for the Study of Pain. Published by Elsevier Science B.V. All rights reserved.

**Keywords:** Back pain; Primary care; Self care; Cognitive-behavioral; Disability; Chronic pain

## 1. Introduction

Back pain occurs in most individuals and is one of the most common reasons for seeking health care (Cypress, 1983; Carey et al., 1995a; Hart et al., 1995). The annual costs of medical care for back pain in the United States have been estimated at approximately \$25 billion (Frymoyer and Cats-Baril, 1991), and productivity losses at \$28 billion (Rizzo et al., 1998).

Back pain does not typically resolve completely within a few weeks time as previously believed. Rather, recurrent and chronic back pain are common (Roland and Morris, 1983; Von Korff et al., 1993; Carey et al., 1995, 1999; Cherkin et al., 1996; Von Korff and Saunders, 1996). Recurrent or chronic back pain frequently result in significant worry and interference with activities (Von Korff et al., 1993, 1998). For these reasons, effective primary care

services need to address the concerns and activity limitations of patients, as well as meet diagnostic and pain management needs.

According to Waddell (1996), disability related to back pain has increased exponentially over the past 20 years due, at least in part, to psychological and social factors that influence adaptation to back pain early in the process. For example, fear of pain and other psychosocial variables during an acute episode of back pain are related to chronic pain status at follow-up (Gatchel et al., 1995; Klenerman et al., 1995; MacFarlane et al., 1999). There is a growing consensus that a biopsychosocial approach to back pain is needed that recognizes the non-medical factors influencing back pain (Waddell, 1987; Fordyce, 1995). Waddell (1996) suggested that the situation may improve if primary care physicians focused less on diagnostic studies and specialty referrals, and more on reassurance and returning the patient to normal roles and levels of functioning. Indeed, research has shown that repeat visits, diagnostic testing, and specialty referrals add to the cost of care, but are not associated with

\* Corresponding author. Tel.: +1-206-625-7373 ext. 64193; fax: +1-206-625-7278.

E-mail address: pmdjem@vmc.org (J.E. Moore).

better long-term outcomes (Sundararajan et al., 1998, Carey et al., 1999).

Deyo and Phillips (1996) point out that there is inadequate time during the typical 15-min primary care appointment to rule out serious medical problems, prescribe appropriate treatment, reassure and educate the patient, address occupational problems, and assist in the development of specific self care strategies for back pain management. In a study that audiotaped primary care visits for back pain (Turner et al., 1998; Von Korff, 1999), physicians often did not adequately reassure patients that serious conditions were ruled out, nor did they consistently address explicit worries raised by the patient. Furthermore, physicians infrequently asked about functional limitations at work or at home and rarely clarified patients' goals for the visit. When advice was given regarding the use of medications, exercise programs and other self care strategies, physicians did not determine if the patient agreed with the advice or was ready to follow it. Given these deficiencies, it is not surprising that outcomes are less than optimal (Cherkin et al., 1996; Waddell, 1996) and that both patients and physicians are dissatisfied with back pain care (Cherkin et al., 1988; Cherkin and MacCornack, 1989).

In managing back pain, or any chronic health condition, improved outcomes can result from better collaboration between patients and health care providers (Von Korff et al., 1997). Collaborative management of chronic illness has been defined as, 'care that strengthens and supports self care...while assuring that effective medical, preventive and health maintenance interventions take place' (Von Korff et al., 1997). Self care is an important and clinically desirable ingredient in the effective management of back pain (Fordyce, 1976; Deyo, 1983; Von Korff et al., 1991; Waddell, 1991; Von Korff, 1999), and enhancement of self care strategies has been identified as a top priority for future research in this field (Borkan and Cherkin, 1996; Borkan et al., 1998).

Clark et al. (1991); Lorig (1993) and Von Korff et al. (1997) have identified core self care tasks for chronic illness that may be directly applicable to back pain. These include engaging in health promoting activities (e.g. exercise); minimizing the impacts of illness on daily activities; monitoring illness and adapting to changes (e.g. managing a flare-up); collaborating with health care providers in developing a management plan; and carrying out or adhering to a management plan and to specific treatments. Although the ability of patients to carry out these tasks may improve health outcomes, health care interventions typically do not target these self care tasks (Von Korff, 1994, 1999). Primary care back pain visits tend to focus on diagnostic assessment, short-term pharmacological management, and directive advice from the physician regarding exercise and other self care modalities (Turner et al., 1998; Von Korff, 1999).

Turner (1996) has reviewed research on educational and behavioral interventions to enhance back pain self-management among primary care patients. She concluded that back

schools have not proven effective in improving long-term outcomes. However, educational and behavioral interventions that activate patients and encourage active management of back pain have yielded more promising results in randomized controlled trials (Turner, 1996). Turner observed that it may be useful to incorporate activating educational and behavioral interventions in primary care management of back pain, but that additional research is needed. In subsequent research using lay-persons as group leaders, we demonstrated that an educational intervention to promote self care of back pain was effective in reducing worries, stimulating positive attitudes toward self care, and improving functional outcomes over a one year follow-up (Von Korff et al., 1998). The present paper evaluates a brief professionally-led cognitive-behavioral intervention intended to enhance confidence in self care and improve long-term functional outcomes among primary care patients with back pain.

## 2. Methods

### 2.1. Setting and participants

This research was carried out among back pain patients enrolled in Group Health Cooperative of Puget Sound, a health maintenance organization in western Washington State. Primary care back pain patients, age 25–70 years, were contacted by mail 6–8 weeks after a back pain visit to a Group Health primary care physician. Only patients that had been enrolled in Group Health for at least 1 year were contacted to minimize the risk of discontinued enrollment over the follow-up period. Patients with at least one prior back pain visit who expressed interest in learning more about how to care for back pain by returning a two page questionnaire became eligible for the study.

### 2.2. Enrollment and randomization

Patients returning the questionnaire were contacted by telephone. Those who reported that they were being considered for surgery were excluded from the study. Eligible patients willing to participate after informed consent, completed a 25-min baseline interview by telephone. They were then randomly assigned to either Self Care or to Usual Care.

### 2.3. Outcome measures

Follow-up interviews were conducted 3, 6, and 12 months after randomization for all patients randomized (including those who failed to participate in the intervention, and those leaving Group Health Cooperative). The major outcomes assessed in the baseline and follow-up interviews are described below.

### 2.3.1. Attitudes toward back pain self care

At each interview, participants were asked questions about their attitudes toward back pain self care. A five-item Self Care Orientation Scale was administered. These five items were previously included in a factor analysis of a larger set of self care orientation items which yielded three factors (Saunders et al., 1999). Although the internal consistency reliabilities of this larger set were only moderate ( $\alpha = 0.51\text{--}0.61$ ), the five items in this scale were shown to predict future use of health care for back pain and/or future use of prescription pain medications in two different samples (Saunders et al., 1999). Individual items, rated on a 5-point scale from *strongly agree* to *strongly disagree*, were:

- For your back pain problem, prescription pain relievers are necessary to control pain when it is really bad.
- Your back problem requires ongoing attention and advice from a physician.
- You have found things that you do on your own are more helpful than medical treatments.
- You feel able to care for your back problem on your own.
- You would avoid using prescription medicines for back pain, even if it were severe.

### 2.3.2. Back pain worry

At each interview, participants were asked, 'How worried are you about your back problem where 0 is not at all worried and 10 is extremely worried?' While the psychometric properties of this item have not been studied, it has face validity and has shown significant response to an intervention designed to reduce back-related worry in a previous study (Von Korff et al., 1998).

### 2.3.3. Pain intensity and interference

At each interview, participants were asked to rate their average pain intensity and the extent to which back pain interfered with daily activities over the prior three months (Von Korff et al., 1992). Pain intensity was rated on a 0–10 scale where 0 was *no pain* and 10 was *pain as bad as could be*. Interference was rated on a 0–10 scale where 0 was *no interference* and 10 was *unable to carry on any activities*. Jensen et al. (1999) have concluded that 0 to 10 pain intensity ratings have sufficient reliability and validity to be used in chronic pain research. Von Korff et al. (1992) also present data on the reliability and validity of these measures.

### 2.3.4. Fear-avoidance

At each interview, participants completed a shortened version of the Tampa Scale for Kinesiophobia (TSK), a scale with well documented reliability and validity (Vlaeyen et al., 1995, 1999; Crombez et al., 1999). This ten-item scale measures fear of movement, pain and injury. Participants rated on a four-point scale (1–4 points for each item) whether they strongly agreed, somewhat agreed, somewhat disagreed or strongly disagreed with statements such as:

- My body is telling me I have something dangerously wrong.
- Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening.
- I wouldn't have this much pain if there weren't something potentially dangerous going on in my body.
- Although my condition is painful, I would be better off if I were physically active.
- Pain lets me know when to stop exercising so that I don't injure myself.
- It's really not safe for a person with a condition like mine to be physically active.

### 2.3.5. Roland Disability Questionnaire score

The 23-item version of the Roland Disability Questionnaire measuring the severity of impairment and limitation of activities due to back or leg pain was administered at each interview (Roland and Morris, 1983; Patrick et al., 1995).

### 2.3.6. SF-36 mental health inventory

The five-item mental health inventory from the Short-Form 36 was administered at each interview (Ware et al., 1994).

Study participants were interviewed by trained telephone interviewers blinded to the treatment to which subjects had been assigned.

## 2.4. The intervention

The intervention consisted of two two-hour group sessions, with 12–16 participants, led by one of two psychologists experienced in chronic pain management. Within 2 weeks following the group sessions, each participant met individually with his or her leader for approximately 45 min to develop a personal self care plan. Leaders made one brief (approximately 3 min) follow-up telephone call to each participant to encourage continued action on the self care plan.

The groups were conducted according to a fully structured protocol. Standardized information was presented via brief lectures, flip charts, and visual aids. Topics included back anatomy, the 'red flags' indicating a serious medical condition, the more common (and less worrisome) causes of back pain, factors contributing to fluctuations in pain, appropriate pacing of exercise and activity, basics of posture and body mechanics, cognitive restructuring, handling back pain flare-ups and working with health care providers. The leaders employed problem-solving techniques that engaged participants in identifying problems or limitations related to back pain, setting personal goals, brainstorming options for achieving these goals, developing specific behavioral plans and then implementing their personal plans. In subsequent sessions, participants reviewed their action plans and their progress toward goals, and engaged in problem

solving around difficulties that had arisen in trying to implement their plans.

Self care materials, developed specifically for this study, were provided to study participants at the end of the first group session as part of the intervention. These materials included a book developed for this study (Moore et al., 1996), a 40-min videotape on back pain self care, and a 25-min videotape demonstrating exercises (Patient Education Media, 1996). The self care videotape emphasized the safety and importance of resuming normal activities, and showed a variety of real back pain patients effectively managing back pain in their daily lives. The book was 168 pages long, with full color illustrations showing the anatomy of the back, pain mechanisms, and exercises for managing back pain. The book covered many topics related to back pain including:

- the anatomy of the back;
- rare and common causes of back pain;
- pain mechanisms;
- the importance of maintaining physical activities and resuming daily activities;
- action planning and problem solving techniques;
- how to work effectively with health care professionals;
- use of medicines for controlling back pain;
- physical methods of pain control;
- mind-body techniques for pain control;
- use of proper posture and body mechanics;
- stretching exercises; strengthening exercises; aerobic exercise;
- managing sleep difficulties;
- managing sexual difficulties due to back pain;
- managing flare-ups of back pain;
- strategies for increasing activity levels;
- handling emotional and interpersonal effects of back pain;
- managing work problems associated with back pain.

The book was subsequently published in a slightly revised version (Moore et al., 1999). The book and the videotapes were designed to complement and supplement the information provided in the groups. The control group received usual care supplemented by a popular book on back pain care, Augustus White's *Your Aching Back* (White, 1990).

### 2.5. Analyses

The analyses followed the intent-to-treat rule, including all randomized respondents for whom follow-up data were available. At each follow-up (3, 6, and 12 months), the significance of differences in means between the Self Care and Usual Care groups were assessed by a *z*-test, adjusted for the baseline value of the outcome variable and for education, which differed between groups at baseline. The *z*-test was estimated using empirical standard error estimates from a general estimating equations approach (Liang and Zeger,

1993), as implemented by the GENMOD procedure of SAS (SAS Institute, 1996). The general estimating equations approach was used to account for any correlation of responses within subjects assigned to the same group. We report separate tests for 3-, 6-, and 12-month follow-ups for each outcome variable since no a priori hypothesis existed about the timing of outcome effects. The criterion for statistical significance for the outcomes was  $\alpha = 0.05$ . A priori hypotheses predicted improvement in the experimental versus control condition on all measures except pain intensity and mental health.

## 3. Results

### 3.1. Enrollment, randomization and follow-up

Invitation letters were sent to all patients making a primary care visit for back pain over a 4-month period ( $n = 2582$ ). Roughly 11% of these patients returned a two page eligibility questionnaire by mail and were eligible. Among the 276 persons who returned the questionnaire while recruitment was still open, 226 completed the baseline interview and were randomized: 113 to Self Care and 113 to Usual Care. Among patients assigned to Self Care, 3-month follow-ups were completed with 108 (95.6%), 6-month follow-ups with 100 (88.5 %), and 12-month follow-ups with 97 (85.8%). Among patients assigned to Usual Care, 3-month follow-ups were completed with 105 (92.9 %), 6-month follow-ups with 101 (89.4 %) and 12-month follow-ups with 95 (84.1%).

#### 3.1.1. Characteristics of participants

The characteristics of study participants (Table 1) generally reflected the composition of the enrollment of Group Health Cooperative of Puget Sound (Saunders et al., 1994) and of primary care back pain patients in this care setting. Participants were typically middle aged, well educated, employed, married and Caucasian. Approximately half reported persistent back pain (pain on 90+ days in the previous 6 months) and a somewhat larger percentage showed moderate to severe interference with activities (Chronic Pain Grades III and IV) (Von Korff et al., 1992). The pain status of the participants suggests somewhat greater chronicity and severity than is typical for unselected primary care back pain patients (Von Korff et al., 1992). This is not surprising, given that the patients who volunteered to participate 6–8 weeks after their primary care back pain visit were likely those with continuing problems. Relatively small percentages reported having had back surgery (8%), receiving worker's compensation or disability payments (3%), or being involved in legal action related to their back problem (4%). The baseline characteristics of the intervention and control groups were similar (Table 1).

Table 1  
Baseline characteristics of Self Care and Usual Care groups (n = 226)

	Self Care (n = 113)	Usual Care (n = 113)	P-value
Mean age (SD)	49.8 (10.4)	49.1 (10.8)	0.589
Gender (% female)	58.4%	49.6%	0.182
Education			
12 years or less	13.4%	8.0%	0.042
Some college	19.6	33.6	
College graduate	67.0	58.4	
Race/ethnicity			
Caucasian	89.3 %	83.9 %	0.239
Non-white	10.7	16.1	
Employment			
Working full-time	63.7%	61.1%	0.35
Working part-time	10.6	8.9	
Homemaker	3.5	5.3	
Retired	15.9	14.2	
Unable to work	5.3	3.5	
Unemployed/laid off	0.9	5.3	
Other	0	1.8	
Marital status			
Married or living as married	66.4%	75.2%	0.431
Never married	11.5	8.0	
Separate/divorced	19.5	15.9	
Widowed	2.7	0.9	
Chronic pain grade			
Grade I	26.6%	22.1%	0.596
Grade II	16.8	21.2	
Grade III or IV	56.6	56.6	
90+ back pain days in 6 months (%)	54.0%	45.1%	0.183
Prior surgery for back pain (%)	8.9%	7.1%	0.609
Receiving worker's compensation or disability payments for back pain	4.2%	1.8%	0.249
Involved in legal action to obtain compensation for back problem (%)	2.7%	5.3%	0.307

### 3.1.2. Participation in the Self Care groups

Among those randomly assigned to the Self Care groups, 92% attended the first session and 80% attended both sessions. Individual sessions with the psychologist were attended by 83% of participants. The no-shows are included in the outcome analyses (following the intent to treat rule).

### 3.1.3. Attitudes toward self care

Attitudes toward back pain self care (Self Care Orientation Scale) were more favorable at follow-up among the participants in the Self Care group than among those in the Usual Care group (Table 2). This difference reached statistical significance at the 3- and 6-month follow-ups, but was no longer significant at 12-months due to improvement in the control group between 6 and 12 months.

### 3.1.4. Worry about back pain

Self Care group participants, relative to Usual Care

controls, showed highly significant reductions in overall worry about back pain at all follow-up periods (Table 2).

### 3.1.5. Pain intensity

There was a greater reduction in average pain intensity for the Self Care group than for the Usual Care group, but this difference was significant only at 6-months (Table 2).

### 3.1.6. Interference with activities

The Self Care group demonstrated significantly less interference with activities compared to the Usual Care group at both the 3- and 6-month follow-ups (Table 2), but there was no longer a difference between groups at 12-months.

### 3.1.7. Fear-avoidance scale

The Self Care group demonstrated significantly lower fear-avoidance scale scores compared to the Usual Care group at all follow-up periods (Table 2).

### 3.1.8. Roland Disability Questionnaire

At 3 months, the Self Care group reported significantly less disability than the Usual Care group on the Roland Disability Questionnaire. This effect was no longer significant at 6 or 12 months (Table 2).

### 3.1.9. Mental health

The Self Care group did not show more favorable mental health outcomes than the Usual Care group (Table 2).

## 4. Discussion

This research found that a brief psychologist-led cognitive-behavioral intervention designed to enhance back pain self care can be modestly effective in reducing worries about back pain, pain intensity, interference with activities, fear-avoidance and dysfunction, while favorably altering attitudes toward back pain self care. The intervention described in this study presents a method of providing patients with the information and skills they need to manage back pain and that they normally do not receive from their primary care providers.

The Self Care group in this study showed significant reductions in worry about back pain relative to controls. Worries in this population are not minor concerns. Other data from this patient sample have shown that two months after seeing a primary care physician for back pain, approximately 64% of patients still feel that the wrong movement could lead to a serious problem. Over 46% still feel they could be disabled for a long time. This degree of concern may contribute to avoidance of activities or to additional health care visits, making worry an important target of clinical care. Although the Self Care intervention reduced overall worry about back pain at all follow-up periods, a substantial number of intervention patients continued to have concerns even at the end of the 12-month follow-up. There was also room for improvement in the area of func-

Table 2  
Means (SD) and significance tests for comparisons of Self Care and Usual Care groups<sup>a</sup>

	Baseline	3 months	6 months	12 months
<b>Self care orientation</b>				
Self Care class	2.85 (0.67)	3.35 (0.75)	3.37 (0.92)	3.37 (0.93)
Usual Care	2.85 (0.70)	3.14 (0.79)	3.20 (0.75)	3.26 (0.75)
		$z = 2.7, P = 0.007$	$z = 2.1, P = 0.037$	ns
<b>Worry rating (0–10)</b>				
Self Care class	5.64 (2.59)	3.05 (2.93)	2.73 (2.60)	2.12 (2.48)
Usual Care	5.32 (2.65)	4.28 (2.72)	3.59 (2.58)	3.04 (2.64)
		$z = 4.9, P = 0.0001$	$z = 3.0, P = 0.003$	$z = 2.9, P = 0.004$
<b>Average pain intensity</b>				
Self Care class	5.40 (1.89)	3.69 (2.05)	3.15 (2.14)	2.74 (2.09)
Usual Care	5.20 (1.95)	4.06 (2.17)	3.71 (2.28)	2.98 (1.99)
		$z = 1.9, P = 0.063$	$z = 2.1, P = 0.034$	ns
<b>Interference with activities</b>				
Self Care class	4.94 (2.51)	3.17 (2.45)	2.61 (2.15)	2.40 (2.47)
Usual Care	4.69 (2.31)	3.67 (2.28)	3.30 (2.50)	2.54 (2.28)
		$z = 2.2, P = 0.032$	$z = 2.2, P = 0.029$	ns
<b>Fear-avoidance scale</b>				
Self Care class	2.34 (0.54)	1.90 (0.52)	1.90 (0.55)	1.89 (0.57)
Usual Care	2.29 (0.55)	2.19 (0.57)	2.15 (0.52)	2.05 (0.53)
		$z = 7.2, P = 0.0001$	$z = 4.5, P = 0.0001$	$z = 2.7, P = 0.008$
<b>Roland disability</b>				
Self Care class	8.58 (6.52)	5.39 (5.76)	5.23 (6.00)	4.84 (6.01)
Usual Care	8.29 (5.88)	6.55 (6.15)	6.40 (5.99)	5.56 (5.80)
		$z = 2.4, P = 0.017$	$z = 1.8, P = 0.071$	ns
<b>Mental health inventory</b>				
Self Care class	70.6 (18.4)	75.6 (17.9)	75.8 (19.0)	75.5 (18.0)
Usual Care	67.3 (18.2)	73.2 (17.9)	74.3 (17.6)	73.4 (20.2)
		ns	ns	ns
Includes subjects completing at least one follow-up interview ( $n = 218$ )				
Self Care	110	108	100	97
Usual Care	108	105	101	95

<sup>a</sup> Significance tests are adjusted for education and baseline values of outcome variables.

tional restoration. The intervention produced greater changes in functioning, as measured by the Roland Disability Questionnaire and the interference with activity rating, than was seen in the Usual Care group at 3- and 6-month follow-ups. However, problems with limited functioning remained even a full year after patients completed the intervention. In other words, many patients had continuing back pain problems. A critical question for further research is whether improved educational and behavioral interventions can further mitigate these problems for patients.

Although statistically significant, the magnitude of some of the effects of this intervention are modest, and not all were maintained at 12-month follow-up, due largely to continued improvement in the controls. This may be a reflection of the low level of initial dysfunction in this group of patients and the brief nature of the intervention. Prior research has focused on the efficacy of various lengths of treatment. For example, Lorig et al. (1998), evaluating a similar self-management program for arthritis, found that a 6-week program was more effective than a 3-week program. In contrast, a comparison of 15-, 30-, and 60-h cognitive behavioral rehabilitation programs for back pain found no differences in outcome (Rose et al., 1997). There may be no

one optimal length of treatment for all patients. It is likely that many patients improve with relatively brief treatment, whereas others, with more severe problems, may require longer treatment programs to benefit (Von Korff, 1999). This concept has been demonstrated in cognitive behavioral treatment of depression (Shapiro et al., 1994), eating disorders (Eldredge et al., 1997) and drug addiction (Bell et al., 1996). In future research, we plan to target a more disabled population, refine the intervention to produce greater behavioral activation, and add selective booster treatments for subgroups of patients who do not improve initially.

Overall, this study replicates the positive results found previously in a large randomized controlled trial using a very similar intervention, but one administered by lay volunteers rather than professional leaders (Von Korff et al., 1998). In that earlier study, the intervention was similarly brief (four group sessions) and the positive results were also modest in magnitude. However, some differences did occur. In the earlier study, we found that most treatment effects did not materialize until the 6-month follow-up. In that study, substantial improvements after 3 months were evident in both the Usual Care and intervention groups. After the 3-month follow-up, the controls tended to plateau,

whereas the Self Care group continued to improve, revealing significant group differences by the 6-month follow-up. In the current project, treatment effects were typically more significant at the 3-month follow-up, reflecting greater initial change in the Self Care group relative to controls. Both groups tended to continue to improve on measures over the 12-month follow-up, sometimes with enough improvement in the Usual Care group to leave differences no longer statistically significant by the 12-month follow-up. The reason for the stronger 3-month treatment effects in this study is unclear. However, it is possible that the use of a professional leader added more credibility to the intervention; or it might be that our efforts to strengthen the part of the intervention designed to reduce worry about back pain led to stronger 3-month outcome effects.

Although the results of this study are modest, they are not too dissimilar from other clinical trials using like measures. For example, in a randomized controlled trial comparing 8 weeks of progressive exercise with usual care controls, Moffett et al. (1999) found changes in Roland disability questionnaire scores of slightly less magnitude than was found in this study. Recruiting from the same population used in this study, Cherkin et al. (1998) found greater magnitude Roland changes following chiropractic treatment and physical therapy, but also similar large changes in their controls, who received an educational booklet. The primary care patients in that study were enrolled one week after a primary care visit for back pain (versus 6–8 weeks in this study) and had higher baseline Roland scores. It is possible that many of the patients in the Cherkin et al. study improved independent of treatment because of the relative acuteness of their back pain. Thus our sample, and those of Moffett et al. (1999) and Von Korff (1999), were less acute and less likely to show large spontaneous improvements.

This study is limited by its restriction to a largely Caucasian population with high levels of education, representative of the Seattle area. It is possible that this population is more likely to volunteer for an educational intervention, and more likely to use and benefit from the educational materials. The subjects in this study also self selected to participate, raising concerns that they may differ from the larger group of eligible subjects who chose not to participate. Indeed, analyses showed that volunteers for this study, and our prior study (Von Korff et al., 1998), differed from non-volunteers in several ways. They were more likely to be Caucasian, older, better educated, and more likely to be retired than the non-volunteers. Additionally, patients with the highest (and lowest) levels of activity interference were less likely to volunteer than those with moderate activity limitations (Saunders et al., 2000).

This study is also limited by the exclusive reliance on patient self-report for outcomes assessment. It is possible that the positive results reflect, in whole or in part, non-specific effects of the intervention for group participants, who were not blinded to the fact they received an active intervention. However, long-term follow-up of the patients

enrolled in this study will assess health care utilization for back pain (office visits and medication prescriptions), using the automated health care information systems of Group Health Cooperative. This long-term follow-up will permit assessment of whether the reported positive effects on self care attitudes, worries, fear-avoidance, pain, and functional status observed in this study are subsequently accompanied by objective changes in the use of health care services.

Some of the measures used in this study (Roland, SF-36, TSK) are well-known and have well-documented reliability and validity. Others, such as the back pain worry rating, have not been as well studied. The reader should use appropriate caution in interpreting the results based on measures with less well documented psychometric properties.

There is now sufficient evidence supporting the effectiveness of activating interventions for improving back pain outcomes to suggest the need for more refined research questions than simply whether educational interventions are effective or not in a particular study (Turner, 1996). These include what kinds of educational and behavioral interventions are effective for which patients; how intensive these interventions need to be; how they can effectively be delivered; what types of professionals or non-professionals should conduct the interventions; how educational and behavioral interventions produce effects; and when in the course of the illness or intervention do benefits occur? Critical questions for future research are whether reducing common patient worries about serious medical conditions, about long-term disability, and about activity and movement results in subsequent reductions in activity limitations and use of health care. There is research to suggest this might occur (Klenerman et al., 1995; Crombez et al., 1999). If so, for which patients is worry reduction alone sufficient to ensure a favorable functional outcome?

Questions for future research include how to best provide information to patients to reduce worries and fears and encourage functional activities. In this project we used a book and videotapes, group meetings, an individual session, and a telephone call. Which of these components are essential? Future research could contribute to our understanding of how to most effectively reduce specific patient worries about back pain by comparing the effects of different kinds of educational interventions.

Another question for future research is how primary care physicians or other health care providers can become more effective in addressing and ameliorating the common worries of back pain patients. The principal worries that our research program has identified include the belief that there might be a serious underlying medical condition causing the pain, concern that movement or activity could cause injury or increased pain, and the concern that pain could result in long-term disability. Our data suggest that these worries are sufficiently common that they should be actively addressed in every primary care back pain visit.

Von Korff (1999) has proposed a *stepped care* treatment model for primary care back pain management. He

proposed three graduated steps, with each step applying to a successively smaller percentage of patients. The first step, identifying and addressing common patient worries and enhancing readiness for self care, is relevant to essentially all primary care back pain patients and should be addressed in the initial primary care visit. A second step, relevant to the 20–30% with significant ongoing activity limitations, calls for activating patients to manage activity limitations more effectively. While the second step may be partially addressed in primary care visits, this step may require intervention modalities, like the Self Care intervention approach described in this paper, that augment what the primary care physician is able to accomplish. The third step, relevant to the much smaller percentage of patients either off work or at risk of work-role disability, calls for active management to ensure early return to work or rehabilitation of work-role function, including treatment of psychological disorders. While Self Care groups may provide support for these tasks, patients with psychological disorders, or who are at risk of work-role disability, may require more active management than is possible within these brief groups. The intervention we evaluated seems most relevant to the first and second steps of this proposed stepped care approach.

This study provides some guidance for future research efforts to find more effective ways of addressing common patient worries, and to reduce ongoing activity limitations. The intervention in this study yielded results of only modest magnitude. However, this study suggests that addressing common patient worries, and engaging patients in problem solving to overcome ongoing activity limitations, may be important components of activating interventions. In keeping with a proposed stepped-care strategy (Von Korff, 1999), we initiated this intervention more than two months after the primary care visit, a point at which the acute flare-up had typically resolved, but ongoing worries, pain, and activity limitations were still problems for many. Clearly, further research is needed to shed light on how, when and for whom interventions that enhance back pain self care produce effects on patient outcomes.

In summary, the Self Care group program yielded modest, but encouraging benefits in terms of patient worries, attitudes toward self care, pain intensity, fear-avoidance and functional outcomes. These results point to the potential for patients to assume greater responsibility for managing back pain than is often expected by health care professionals. The specific results of this study also point to avenues for improving educational interventions for primary care back pain patients.

### Acknowledgements

This research was supported by grants from the National Institutes of Health P01 DE08773, The Boeing Company and the Group Health Foundation. The contributions of

Keith Green and his staff to the production of educational materials for this study are gratefully acknowledged. We also thank Nancy Monroe and Kathy Pope for their valuable assistance.

### References

- Bell DC, Richard AJ, Feltz LC. Mediators of drug treatment outcomes. *Addict Behav* 1996;21:597–613.
- Borkan JM, Cherkin DC. An agenda for primary care research on low back pain. *Spine* 1996;21:2880–2884.
- Borkan JM, Koes B, Reis S, Cherkin DC. A report from the Second International Forum for Primary Care Research on Low Back Pain. *Spine* 1998;23:1992–1996.
- Carey TS, Evans A, Hadler N, Kalsbeek W, McLaughlin C, Fryer J. Care-seeking among individuals with chronic low back pain. *Spine* 1995a;20:312–317.
- Carey TS, Garrett J, Jackman A, McLaughlin C, Fryer J, Smucker DR. The outcomes and costs of care for acute low back pain among patients seen by primary care practitioners. The North Carolina Back Pain Project. *N Engl J Med* 1995b;333:913–917.
- Carey TS, Garrett JM, Jackman A, Hadler N. Recurrence and care seeking after acute back pain: results of a long-term follow-up study. *Med Care* 1999;37:157–164.
- Cherkin DC, MacCornack FA. Patient evaluations of low back pain care from family physicians and chiropractors. *West J Med* 1989;150:351–355.
- Cherkin DC, MacCornack FA, Berg AO. Managing low back pain – a comparison of the beliefs and behaviors of family physicians and chiropractors. *West J Med* 1988;149:475–480.
- Cherkin DC, Deyo RA, Street JH, Barlow W. Predicting poor outcomes for back pain seen in primary care using patients' own criteria. *Spine* 1996;21:2900–2907.
- Cherkin DC, Deyo RA, Battié M, Street J, Barlow W. A comparison of physical therapy, chiropractic manipulation, and provision of an educational booklet for the treatment of patients with low back pain. *N Engl J Med* 1998;339:1021–1029.
- Clark NM, Becker MH, Janz NK, Lorig K, Rawkowski W, Anderson L. Self-management of chronic disease by older adults: a review and questions for research. *J Aging Health* 1991;3:3–27.
- Crombez G, Vlaeyen JWS, Heuts PHTG, Lysens R. Pain-related fear is more disabling than pain itself: evidence on the role of pain-related fear in chronic back pain disability. *Pain* 1999;80:329–339.
- Cypress BK. Characteristics of physician visits for back symptoms: a national perspective. *Am J Public Health* 1983;73:389–395.
- Deyo RA. Conservative therapy for low back pain. *J Am Med Assoc* 1983;250:1057–1062.
- Deyo RA, Phillips WR. Low back pain: a primary care challenge. *Spine* 1996;21:2826–2832.
- Eldredge KL, Agras WS, Arnow B, Telch CF, Bell S, Castonguay L, Marnell M. The effects of extending cognitive-behavioral therapy for binge eating disorder among initial treatment nonresponders. *Int J Eat Disord* 1997;21:347–352.
- Fordyce WE. Behavioral methods in chronic pain and illness. St. Louis, MO: C.V. Mosby, 1976.
- Fordyce WE, editor. Back pain in the workplace: management of disability in nonspecific conditions. Seattle, WA: IASP Press, 1995.
- Frymoyer JW, Cats-Baril WL. An overview of the incidences and costs of low back pain. *Orthop Clin North Am* 1991;2:263–271.
- Gatchel RJ, Polatin PB, Kinney RK. Predicting outcome of chronic back pain using clinical predictors of psychopathology: a prospective analysis. *Health Psychol* 1995;14:415–420.
- Hart LG, Deyo RA, Cherkin DC. Physician office visits for low back pain: frequency, clinical evaluation, and treatment patterns from a U.S. national survey. *Spine* 1995;20:11–19.

- Jensen MP, Turner JA, Romano JM, Fisher LD. Comparative reliability and validity of chronic pain intensity measures. *Pain* 1999;83:157–162.
- Klenerman L, Slade PD, Stanley IM, Pennie B, Reilly JP, Atchison LE, Troup JD, Rose MJ. The prediction of chronicity in patients with an acute attack of low back pain in a general practice setting. *Spine* 1995;20:478–484.
- Liang KY, Zeger SL. Regression analysis for correlated data. *Annu Rev Pub Health* 1993;14:43–68.
- Lorig K. Self-management of chronic illness: a model for the future. *Generations* 1993;17:11–14.
- Lorig K, Gonzalez VM, Laurent DD, Morgan L, Laris BA. Arthritis self-management program variations: three studies. *Arthritis Care Res* 1998;11:448–454.
- MacFarlane GJ, Thomas E, Croft PR, Papageorgiou AC, Jayson MIV, Silman AJ. Predictors of early improvement in low back pain amongst consultants to general practice: the influence of pre-morbid and episode-related factors. *Pain* 1999;80:113–119.
- Moffett JK, Torgerson D, Bell-Syer S, Jackson D, Llewellyn-Phillips H, Farrin A, Barber J. Randomised controlled trial of exercise for low back pain: clinical outcomes, costs, and preferences. *Br Med J* 1999;319:279–283.
- Moore JE, Lorig K, Minor M, Laurent DD, Gonzalez VM, Cherkin D, Von Korff M, Herring SA, Deyo RA. Back pain (recurrent): self care companion for better living, New York: Patient Education Media Inc, 1996. p. 168.
- Moore JE, Lorig K, Von Korff M, Gonzalez VM, Laurent DD. The back pain helpbook, Reading, MA: Perseus Books, 1999. p. 224.
- Patient Education Media Inc. Back pain (recurrent): self care companion for better living. tape 1 (self care) and tape 2 (follow-along exercise), 1996.
- Patrick DL, Deyo RA, Atlas SJ, Singer DE, Chapin A, Keller RB. Assessing health-related quality of life in patients with sciatica. *Spine* 1995;20:1899–1908.
- Rizzo JA, Abbott TA, Berger ML. The labor productivity effects of chronic backache in the United States. *Med Care* 1998;36:1471–1488.
- Roland M, Morris R. A study of the natural history of back pain: I. development of a reliable and sensitive measure of disability in low-back pain. *Spine* 1983;8:141–144.
- Rose MJ, Reilly JP, Pennie B, Bowen-Jones K, Stanley IM, Slade PD. Chronic low back pain rehabilitation programs: a study of the optimum duration of treatment and a comparison of group and individual therapy. *Spine* 1997;22:2246–2251.
- SAS Institute. SAS/STAT Software: Changes and Enhancements for Release 6.12. Cary, NC: SAS Institute, 1996. p. 158.
- Saunders KW, Stergachis A, Von Korff M. Group health cooperative of puget sound. In: Strom BL, editor. *Pharmacoepidemiology*, 2nd ed. New York: Wiley, 1994. pp. 171–185.
- Saunders KW, Von Korff M, Pruitt SD, Moore JE. Prediction of physician visits and prescription medicine use for back pain. *Pain* 1999;83:369–377.
- Saunders KW, Von Korff M, Grothaus LC. Predictors of participation in primary care group-format back pain self-care interventions. *Clin J Pain* 2000 in press.
- Shapiro DA, Barkham M, Rees A, Hardy GE, Reynolds S, Startup M. Effects of treatment duration and severity of depression on the effectiveness of cognitive-behavioral and psychodynamic-interpersonal psychotherapy. *J Consult Clin Psychol* 1994;62:522–534.
- Sundararajan V, Konrad TR, Garrett J, Carey T. Patterns and determinants of multiple provider use in patients with acute low back pain. *J Gen Intern Med* 1998;13:528–533.
- Turner JA. Educational and behavioral interventions for back pain in primary care. *Spine* 1996;21:2851–2859.
- Turner JA, Le Resche L, Von Korff M, Ehrlich K. Back pain in primary care: patient characteristics, content of initial visit, and short-term outcomes. *Spine* 1998;23:463–469.
- Vlaeyen JWS, Kole-Snijders AMJ, Boeren RGB, van Eek H. Fear of movement/(re)injury in chronic low back pain and its relation to behavioral performance. *Pain* 1995;62:363–372.
- Vlaeyen JWS, Seelen HAM, Peters M, de Jong P, Aretz E, Beisiegel E, Weber WEJ. Fear of movement/(re)injury and muscular reactivity in chronic low back pain patients: an experimental investigation. *Pain* 1999;82:297–304.
- Von Korff M. Perspectives on management of back pain in primary care. In: Gebhardt GF, Hammond DL, Jensen TS, editors. *Proceedings of the 7th World Congress on Pain*, Seattle: IASP Press, 1994. pp. 97–112.
- Von Korff M. Pain management in primary care: an individualized stepped-care approach. In: Gatchel R, Turk D, editors. *Psychosocial factors in pain: critical perspectives*, New York: Guilford Press, 1999. pp. 360–373.
- Von Korff M, Saunders K. The course of back pain in primary care. *Spine* 1996;21:2833–2839.
- Von Korff M, Wagner EH, Dworkin SF, Saunders K. Chronic pain and use of ambulatory health care. *Psychosom Med* 1991;53:61–79.
- Von Korff M, Ormel J, Keefe F, Dworkin SF. Grading the severity of chronic pain. *Pain* 1992;50:133–149.
- Von Korff M, Deyo RA, Cherkin D, Barlow W. Back pain in primary care: outcomes at one year. *Spine* 1993;18:855–862.
- Von Korff M, Gruman J, Schaefer J, Curry S, Wagner EH. Collaborative management of chronic illness. *Ann Intern Med* 1997;127:1097–1102.
- Von Korff M, Moore JE, Lorig K, Cherkin DC, Saunders K, Gonzales VM, Laurent D, Rutter C, Comite F. A randomized trial of a lay person-led self-management group intervention for back pain patients in primary care. *Spine* 1998;23:2608–2615.
- Waddell G. A new clinical model for the treatment of low-back pain. *Spine* 1987;12:632–644.
- Waddell G. Low back disability: a syndrome of Western civilization. *Neurosurg Clin N Am* 1991;2:719–738.
- Waddell G. Low back pain: a twentieth century health care enigma. *Spine* 1996;21:2820–2825.
- Ware J, Kosinski M, Keller SD. SF-36 physical and mental component summary scales: a user's manual. Boston, MA: The Health Institute, New England Medical Center, 1994.
- White AA. *Your aching back: a doctor's guide to relief*, New York: Simon and Schuster, 1990. p. 332.