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Randomized controlled trial of a community-based psychoeducation program for the self-management of chronic pain

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Abstract

Although chronic pain is a frequent cause of suffering and disability and is costly to society, there continues to be limited access to specialty pain clinic services. Hence, there is a need for cost-effective, accessible interventions that will help people find ways to better manage this difficult problem. This randomized controlled trial examined the effect of a low-cost, community-based, nurse-delivered, group psychoeducation program entitled the Chronic Pain Self-Management Program (CPSMP). It has a standard protocol that was modified from the successful Arthritis Self-Management Program (ASMP). One hundred and ten individuals with mixed idiopathic chronic pain conditions were enrolled in the study (75% female; mean age 40 years; mean chronicity 6 years) and were randomly assigned to one of two conditions: the 12-h (CPSMP) intervention group, or the 3-month wait-list control group. Self-report measures of pain-related and other quality of life variables as well as two hypothesized mediating variables were collected pre-treatment and 3 months later by assessors blind to group allocation. One hundred and two subjects completed the study. Results of intention-to-treat analysis indicated that the treatment group made significant short-term improvements in pain, dependency, vitality, aspects of role functioning, life satisfaction and in self-efficacy and resourcefulness as compared to the wait-list control group. Because it has a standard protocol, this intervention has the potential to be reliably delivered at low cost in varied urban and rural community settings and hence be more widely accessible to a greater number of people suffering from chronic pain than is currently the case with more specialized pain clinic services. Based on the results of this study, further research evaluating the long-term impact and potential cost savings to the individual and to the health care system is warranted.

Keywords: Chronic pain; Psychoeducation; Cognitive/behavioral strategies; Quality of life; Nursing; SF-36

1. Introduction

Chronic non-malignant pain is a frequent cause of suffering and disability. It is estimated that at least one in 10 adults live with a chronic pain problem most often located in the back, head or joints (Crook et al., 1984; Millar, 1996; Smith et al., 1996). While some have pain as a result of a recognized disease process, an estimated 64% have pain of undefined pathology that is idiopathic in nature (Bonica, 1990). Many of these pain sufferers are either partially or totally disabled for periods of days, weeks, months or permanently. Poorly managed chronic pain frequently generates feelings of deep distress, hopelessness and despair, and may ultimately result in tremendous disruption to individual and family functioning (Craig, 1994; Rowat et al., 1994).

The economic impact of chronic pain to industry, the health care system and to society as a whole is considerable, an estimated $79 billion in the United States alone (Bonica, 1990). Chronic pain complaints, particularly of musculoskeletal origin, are among the most frequent reasons for visits to physicians (Schappert, 1994; Millar, 1996) and require, on average, more time per visit than any other type of health problem (Koch, 1986). The increased need to counsel patients about treatment and to help them cope with pain-related psychosocial, work and family problems is cited as

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the primary reason for this extra contact time. In addition to physician services, persons with chronic pain also spend more time in hospital and use a broad range of other health services (Crook et al., 1984; Millar, 1996).

Over the past two decades there has been a proliferation of specialty pain treatment centers, many of which use a multidisciplinary approach (Bonica, 1990; Health and Welfare Canada, 1990). However, access to these programs is limited by the nature of the referral process, by geographic location, and by cost and resource issues (Turk and Rudy, 1990; Weir et al., 1992). In the UK for example, only 1% of those with chronic pain are thought to reach a specialty pain clinic (Smith et al., 1996).

Given the scope and cost of chronic pain as well as the personal suffering, there is a need for low-cost, accessible and effective interventions that will help people find ways to better manage this difficult problem. One example of an accessible, community-based approach is the Arthritis Self-Management Program (ASMP). It is a standardized 12-h psychoeducation group program and uses a detailed protocol that has been widely disseminated through national Arthritis Societies/Foundations in the United States, Canada, Great Britain, Australia and New Zealand (Lorig, 1992). The program has been delivered by both generalist health care providers and by trained lay leaders at a cost ranging from $0 to $600 (US) per course as compared to $3000 (US) for a short-term outpatient group program at a pain clinic (Turk et al., 1993). The ASMP has been evaluated in four randomized clinical trials and has demonstrated efficacy in improving aspects of health status such as pain, depression and disability, and resulted in a reduction in health care costs up to 4 years post intervention (Lorig and Holman, 1993; Lorig et al., 1993). The evidence suggests that the ASMP may be a practical, cost-effective prototype on which to base educational programs for those with other types of chronic non-malignant pain.

Therefore, the objective of this randomized controlled trial was to examine the effect of a low-cost, community-based, psychoeducation program entitled the Chronic Pain Self-Management Program (CPSMP) on pain-related and other quality of life variables in a sample of individuals with mixed idiopathic chronic pain conditions. Since we were interested in assessing possible mediators of change, measures of two process variables were collected as well.

2. Methods

2.1. Design

Our study design was a randomized controlled trial in which eligible and consenting adults were randomly allocated to one of two conditions: the 12-h Chronic Pain Self-Management Program (CPSMP) intervention group, or the 3-month wait-list control group. Pre-treatment measures were administered prior to randomization and post-treatment measures were collected approximately 3 months later. Ethical approval for the study was received from two university-based and one hospital-based ethics review committees.

2.2. Study population and procedure

The study was conducted in St. John's, Newfoundland, Canada over a 16-month period. Subjects were drawn from a target population of men and women suffering from a chronic non-malignant pain problem that was idiopathic in nature. Chronic pain is defined as pain lasting longer than expected healing time (>3–6 months) (Mersky and Bogduk, 1994). Idiopathic refers to any pain condition where there is no readily identifiable pathology, such as with many soft tissue and musculoskeletal chronic pains. Eligibility criteria were: 18 years of age or older, idiopathic pain of longer than 3 months duration, able to speak and read English, free of major cognitive or psychiatric disorder, not currently participating in other educational or supportive interventions for their pain problem, and not awaiting surgical intervention.

Subjects entered the study in one of three ways. First, the most recent 2-year patient roster of a hospital-based 'anesthesia block' pain clinic was used to identify patients with the help of the clinic anesthetist. In all, 116 patients were listed, 84 of whom lived within 80 km of the city. Of these, 22 were unable to be contacted (two were deceased and 20 had moved). Nineteen were ineligible (10 no longer had a pain problem, three were currently enrolled in a educationally-based rehabilitation program, two were cognitively impaired due to head injuries, and four were scheduled for back surgery). Twenty-one refused (five had problems with scheduling or transportation, two were unable to sit for long periods and felt unable to participate, and 14 were not interested at this time). The number of study participants from this source was 22 or 51% of eligible subjects.

The second recruiting technique involved contacting a wide spectrum of health professionals who treat chronic pain patients in the community. Patients were referred by medical and dental specialists ($n = 18$), family physicians ($n = 17$), physiotherapists ($n = 24$), registered massage therapists ($n = 4$), chiropractors ($n = 4$), occupational health nurses ($n = 10$), rehabilitation specialists ($n = 3$), and psychologists ($n = 2$). Of these 82 referrals, 75 agreed to participate and seven refused. Finally, 14 people were self-referred having heard about the program through 'word of mouth'. Thirteen agreed to participate and one was ineligible.

Subject eligibility was initially assessed by telephone. The principal investigator then interviewed subjects individually to confirm eligibility, to obtain informed consent, and to administer the pre-treatment measures. In most cases, subjects completed the instruments in one sitting; some subjects (less than 15%) completed it in two sittings or took the

booklet home (completed within 48 h). Once pre-treatment measures were completed, subjects were randomly allocated to either the treatment or the wait-list control group. Randomization was stratified on the basis of gender using opaque, sealed, numbered envelopes using block randomization. Those randomized to the treatment condition were invited to participate in the next available program (within 3 weeks of the initial interview). The intervention lasted 12 h spread over 6 weeks and post-treatment measures were taken 6 weeks later for both treatment and control subjects. The time between pre- and post-treatment data collection ranged from 12 to 15 weeks. Every effort was made to obtain post-treatment measures on all individuals enrolled in the study (e.g., three phone calls and a follow-up letter). A research assistant who was blind to group allocation of subjects administered the post-treatment questionnaires. Once post-testing was completed, those in the wait-list control group were offered enrollment in the next available program, however they did not become treatment subjects.

2.3. The intervention

The CPSMP is a standardized, psychoeducation program (2 h per week for 6 weeks) developed for group presentation in community settings. The course is designed to maximize discussion and group problem solving, encourage individual participation and experimentation with various cognitive/behavioral self-management techniques, and facilitate mutual support. Consequently, didactic presentation is kept to a minimum and the process components are emphasized. The content of the program, although similar to the ASMP, was adapted with permission to be more directly applicable to those with various idiopathic chronic pains. Content areas were validated by six health professionals who work with chronic pain patients. Program materials were given to every participant and included a 150-page workbook and relaxation tape developed for the CPSMP and a variety of current pamphlets on chronic pain, nutrition, and walking. The intervention was delivered by the first author after participating in a 3-day intensive training workshop for ASMP course leaders and after having attended the 6-week ASMP program to become familiar with all aspects of the course. In all, 11 programs with six to ten participants per group were taught by the first author using a detailed treatment protocol developed from the ASMP Leader's Manual (Lorig, 1992) that specified content and process to ensure consistency across every session of all programs (see Table 1 for course content overview).

2.4. Self-report measures

The variables measured in this trial were guided by Braden's Self-Help Model of Learned Response to Chronic Illness Experience (Braden, 1990, 1993) and are conceptualized as antecedent variables (perceived severity of illness, dependency, uncertainty), mediating variables (enabling skill), and outcome variables (self-help activities and life satisfaction). In addition to these theory-guided measures, a norm-referenced, health-related quality of life instrument was used as a further measure of outcome. Sociodemographic and pain history data were obtained by a questionnaire developed for the study. The complete battery of instruments was pilot tested prior to the initiation of the study with 15 people with chronic pain to assess acceptability; no difficulties were noted.

2.4.1. Antecedent variables: perceived severity of illness, dependency and uncertainty

Data regarding perceived severity of illness were measured in four areas: pain quality, depression, disability and a

Table 1
Chronic Pain Self-Management Program course overview[a]

Topic	Session					
	1	2	3	4	5	6
Self-help principles	✔					
Myths about chronic pain	✔					
What is chronic pain?	✔					
Balancing rest/activity	✔			✔		
Exercise for health		✔	✔	✔	✔	✔
Pain management strategies (physical/cognitive/behavioral)		✔	✔	✔	✔	✔
Depression			✔			
Nutrition				✔		
Evaluating non-traditional treatments					✔	
Communication skills					✔	
Medications						✔
Fatigue						✔
Problem-solving	✔	✔	✔	✔	✔	✔
Contracting/feedback	✔	✔	✔	✔	✔	✔

[a]Course adapted with permission from: Lorig, K., Arthritis Self-Help Course, Leader's Manual and Reference Materials,Arthritis Foundation, Atlanta, GA, 1992.

global measure of perceived severity of the pain problem. The Pain Rating Index of the Short Form-McGill Pain Questionnaire (SF-MPQ) measured pain quality (Melzack, 1987). Depression was measured using the short version of the Beck Depression Inventory (SF-BDI) (Beck and Beck, 1972; Beck et al., 1988). Perceived level of disability was measured by the 10-item disability subscale of the Survey of Pain Attitudes (SOPA-D) (Jensen et al., 1994). A global judgment of the perceived severity of the pain problem was assessed by a single item visual analogue scale (VAS) that asks: 'How severe a problem is chronic pain in your life?' with anchors: '0 = Not a problem at all' and '100 = Major incapacitating problem'. Evidence of the item's reliability and validity is provided by Philips (1987).

Dependency was measured by a single item 100 mm VAS developed for this study based on the work of Philips (1987) and others (Wewers and Lowe, 1990; Youngblut and Casper, 1993). It asks: 'As a result of your chronic pain, how much do you have to depend or rely on others in your daily life?' with anchors '0 = Not at All Dependent on Others' and '100 = Extremely Dependent on Others'. Uncertainty was measured with the 23-item community version of Mishel's Uncertainty in Illness Scale (MUIS-C) (Mishel, 1981). Using a 5-point scale, individuals indicate how much they agree or disagree with items relating to the ambiguity, complexity, inconsistency and unpredictability of their symptoms and treatment. Evidence supports the reliability ($r = 0.75–0.90$) and validity of the instrument with various chronic illness groups including chronic low back pain (Mishel, 1981, 1983). Internal consistency reliability in the present study sample was 0.83.

2.4.2. Mediating or process variables: enabling skill

Enabling skill, defined as the ability to manage day-to-day adversities of illness, was assessed using measures of self-efficacy and resourcefulness. A modified 11-item version of the Self-Efficacy Scale (SES), originally developed for the ASMP studies, was used to measure perceived self-efficacy to successfully manage pain and other associated symptoms. Subjects respond to each item using a 10-point graphic rating scale from 10 (very uncertain) to 100 (very certain). References to 'arthritis pain' were changed to 'chronic pain'. Evidence of reliability ($r = 0.87$) and validity of the SES is provided by Lorig et al. (1989). In this study, internal consistency reliability of this modified scale was 0.90. Resourcefulness was measured using the 100 mm VAS version of the Self Control Schedule (SCS) (Rosenbaum, 1980). This 36-item instrument assesses individual tendencies to use complex cognitive, problem-solving, and behavioral skills when dealing with stressful circumstances. Reliability ($r = 0.96$) and validity are reported (Rosenbaum, 1980; Redden et al., 1983) and the instrument has been used in studies of both acute and chronic pain (Braden, 1990; Rosenbaum, 1990; Toomey et al., 1995). Items were summed and divided by the number of completed items to obtain the final score. The internal consistency reliability coefficient for the SCS in this study was 0.84.

2.4.3. Outcome variables: self-help and life satisfaction

Self-help was measured by Braden's (1990) 45-item Inventory of Adult Role Behaviors (IARB) which is based on the work of Given (1984). The IARB uses 100 mm visual analogue scales to measure the extent individuals are instrumentally involved in valued activities related to family, leisure/recreational, social, work and self-care roles such as the use of resources to stay well, paying attention to how one's body feels, attempting to eat well and exercise appropriately, etc. Items were summed and divided by the number of completed items for a total score. The instrument has been used with various chronic illness groups including arthritis and has demonstrated reliability ($r = 0.84–0.92$) and validity (Given, 1984; Braden, 1990, 1991). In this study, internal consistency reliability was 0.93. Life satisfaction was measured by the modified 17-item Satisfaction with Life Domains Scale (SLDS) (Baker et al., 1992), that is based on the work of Flanagan (1978). Using a 7-point faces scale, individuals select their degree of satisfaction with six life domains: work, leisure, relations with family members, relations with friends, and aspects of self-fulfillment including health. Evidence of reliability ($\propto = 0.93$) and validity are reported (Baker and Intagliata, 1982; Baker et al., 1991, 1992). The internal consistency reliability coefficient for the SLDS in this study was 0.94.

2.4.4. Health-related quality of life

The Medical Outcomes Study Short Form-36 (SF-36) was administered as an additional outcome measure because of its strong psychometric properties, its increasing use as an outcome measure in clinical trials, and its brevity and ease of administration (Ware et al., 1993). The SF-36 assesses eight health concepts: physical functioning (PF-10 items); role functioning related to physical (RP-4) and emotional problems (RE-3); social functioning related to physical or emotional problems (SF-2); pain index which combines a 6-point intensity scale with a rating of perceived interference with normal work (BP-2); general mental health (MH-5); vitality (VT-4); and, general health (GH-5). Scores for each health concept range from 0 to 100 with higher scores indicating better health. Data supporting its reliability ($r = 0.78–0.93$) and validity are reported (Ware and Sherbourne, 1992; McHorney et al., 1993; Ware et al., 1993; McHorney et al., 1994). In this study sample, internal consistency reliabilities for the eight scales ranged from 0.81 to 0.91.

2.5. Data analysis

Treatment and control group data were compared using chi-square analysis for discrete level data and independent *t*-tests for continuous level data on demographic, pain history, and pre-treatment variables to assess the comparability of

groups at baseline. Results of the intervention were assessed by separate analysis of covariance (ANCOVA) procedures of each post-treatment measure using the pre-treatment levels of each variable as the covariate. All data were cleaned and checked; power or square root transformations were applied to four variables to achieve adequate normality of skewed data for the analysis of covariance. Raw means for all variables are reported here for clarity. All assumptions for parametric statistical analysis including homogeneity of regression were met. Because of the large number of statistical tests, the Bonferroni correction was applied to protect against Type 1 error. An alpha level of 0.003 (0.05/18) was chosen as the level of statistical significance for analysis of covariance results. An alpha of 0.05 was the chosen level of significance for all other analyses.

The intention-to-treat principle was maintained in this study (Newell, 1992). Thus, for purposes of statistical analyses, individuals randomized to the intervention group were considered to be in this group even if they did not attend the program, or attended only a few sessions.

3. Results

3.1. Subjects and comparability of groups

Of the 110 individuals initially recruited into the study, 57 were randomly assigned to the treatment and 53 to the control group. Demographic and pain-related questionnaire data of the two groups are presented in Table 2. The subjects in both groups were not significantly different on any of these characteristics. In addition, pre-treatment scores of the study variables did not differ significantly between groups indicating that the randomization procedure was successful in producing comparable groups.

This young to middle-aged sample was Caucasian except for one subject of east Indian origin. Most were graduates of high school with women out numbering men 3:1. The average pain duration was 5–6 years. While the vast majority had multiple pain sites, the most common being the lower back and neck, some individuals had complaints confined to one area of the body such as headache, orofacial pain, nonspecific abdominal pain or non-arthritic knee pain. Over 40% attributed their pain to one or more car accidents. Others attributed their pain to lifting, falls, surgery or ‘just happened’. Most people were taking various medications for their pain including NSAIDS, narcotic combinations, antidepressants, sedatives/hypnotics and muscle relaxants. Over 60% had visited their family doctor and over 30% a medical specialist within the past month for their pain problem. In addition, many were receiving adjunctive therapy of some kind including physiotherapy, chiropractic treatment, massage or acupuncture. Chi-square analysis revealed no significant differences between the two groups on these aspects of service utilization ($P > 0.05$).

Of the 110 subjects who were randomized to the trial, eight subjects (five from the treatment and three from the control group) subsequently did not complete the post-treatment measures and were considered drop-outs, a rate of 7%. Of the treatment group drop-outs, one became ineligible after randomization, one was admitted to hospital for an extended period for a serious acute illness, and three sub-

Table 2
Baseline sociodemographic and pain-related characteristics for all subjects randomized to treatment and control groups

Characteristics	Treatment ($n = 57$)	Control ($n = 53$)
Age, mean (SD)	39 (24–57)	40 (26–60)
Gender, female (%)	42 (74)	40 (75)
Married (%)	37 (65)	37 (70)
Living alone (%)	7 (12)	5 (9)
Less than 11 years formal education (%)	10 (18)	4 (8)
Post-secondary education (%)	43 (75)	35 (66)
Working full/part-time (%)	21 (37)	18 (34)
Not working due to pain (%)	24 (42)	27 (51)
Receiving disability income (%)	20 (35)	22 (42)
Pain duration in years, mean (SD)	6.5 (1–28)	5.6 (1–20)
Number of pain locations, mean (SD)	6.7 (1–20)	7.0 (1–17)
Pain in lower back (%)	39 (68)	43 (81)
Pain in neck (%)	35 (61)	35 (66)
Cause of pain, motor vehicle accident (%)	23 (40)	22 (42)
Surgery for pain problem (%)	18 (32)	17 (32)
Any medications for pain (%)	48 (84)	43 (81)
Narcotic use (%)	25 (44)	24 (45)
In past month, visited the following for pain		
Family physician (%)	37 (65)	34 (64)
Medical specialist (%)	22 (39)	15 (28)
Physiotherapist/occupational therapist (%)	23 (40)	20 (38)
Other adjunctive therapist[a] (%)	21 (37)	19 (36)

[a]Includes registered massage therapist, chiropractor, acupuncturist, and others.

jects who had attended one or no classes declined to complete the questionnaire booklet at post-treatment. All three drop-outs in the control group were subjects who could not be contacted at 3-month follow-up.

A comparison of demographic, pain history, and pre-treatment mean scores of all variables for drop-outs ($n = 8$) versus those who completed the study ($n = 102$) was done. Although similar in demographic and most pain-history variables, the drop-outs as a group had higher pain quality scores ($P \leq 0.01$), were more depressed ($P \leq 0.001$) and had poorer general mental health scores ($P \leq 0.05$), felt more dependent on others ($P \leq 0.001$), had poorer general health perceptions ($P \leq 0.05$), had less vitality ($P \leq 0.01$), felt themselves to be more disabled ($P \leq 0.001$), had less self- efficacy ($P \leq 0.05$), had poorer social functioning ($P \leq 0.05$) and were less satisfied with their lives ($P \leq 0.05$). In addition, all of the drop-outs were female, none of them were working compared to 38% of 'completers', and 75% of them were receiving disability benefits of some kind compared to 35% of 'completers'. From these data, it appears that those who dropped out were more severely affected by their pain condition compared to those who completed the study.

To be certain that the treatment ($n = 52$) and control ($n = 50$) subjects who completed the trial comprised equivalent groups at baseline, statistical analysis using chi-square and *t*-tests of demographic, pain history, and all pre-treatment scores was repeated. No significant between-group differences were found ($P > 0.05$).

3.2. Effects of the treatment: between-group differences

The mean scores on all antecedent, mediating and outcome variables at pre-treatment and 3 months later (6-week follow-up) as well as the within-group mean change scores are presented in Table 3 for the two groups. Comparisons of post-treatment means using the pre-treatment levels as the covariate indicated that those in the treatment group had statistically significant improvement ($P \leq 0.003$) in six of the ten variables compared to the control group. At 6-week follow-up, those in the treatment group reported less dependency on others, reduced severity of the pain problem on their lives, had higher levels of self-efficacy and resourcefulness, reported greater involvement in valued adult role activities and had greater life satisfaction compared to the control group. In addition, there were strong positive trends to improvement in measures of pain quality ($P \leq 0.05$), and disability ($P \leq 0.01$) compared to the controls.

The mean scores on the SF-36 scales at pre-treatment, post-treatment and the within-group change are presented in Table 4. Comparisons of post-treatment means using the pre-treatment levels as the covariate show that the treatment group had statistically significant improvement ($P \leq 0.003$) in three of the eight scales compared to the controls. As a

Table 3

Pre-treatment mean, post-treatment mean and within-group change on antecedent, mediating and outcome variables

Variable (possible range)	Treatment ($n = 52$)			Control ($n = 50$)			ANCOVA		
	Pre-treatment, mean (SD)	Post-treatment, mean (SD)	Change, mean (SD)[a]	Pre-treatment, mean (SD)	Post-treatment, mean (SD)[a]	Change, mean (SD)[a]	df	*F*	*P*
Antecedent variables									
Pain quality, SF-MPQ (0–45)	18.94 (8.13)	17.27 (9.16)	1.67 (9.61)	18.32 (7.94)	20.14 (8.93)	–1.82 (6.83)	96	4.38	0.039
Pain problem severity (0–100)	72.67 (18.44)	60.98 (21.26)	11.69 (18.51)	73.02 (17.61)	71.22 (15.83)	1.80 (17.41)	98	9.83	0.002*
Depression, SF-BDI (0–39)	7.67 (4.91)	6.83 (5.63)	0.85 (4.71)	7.48 (4.63)	7.68 (4.75)	–0.20 (3.21)	99	2.83	0.096
Disability, D-SOPA (0–4)	2.51 (0.84)	2.29 (0.78)	0.21 (0.59)	2.79 (0.76)	2.81 (0.72)	–0.02 (0.55)	99	7.33	0.008
Dependency (0–100)	52.44 (25.24)	45.67 (26.08)	6.77 (19.50)	54.52 (29.66)	59.77 (23.00)	–5.25 (22.60)	99	12.39	0.001*
Uncertainty, MUIS-C (23–115)	68.25 (12.22)	66.12 (11.14)	2.14 (9.68)	64.54 (11.84)	64.60 (9.07)	–0.06 (9.73)	99	0.002	0.960
Mediating variables									
Self-efficacy, SES (10–100)	49.52 (15.86)	59.66 (18.12)	10.14 (13.75)	49.00 (18.04)	46.94 (17.17)	–2.06 (14.79)	98	21.74	0.000*
Resourcefulness, SCS (0–100)	64.48 (10.69)	67.77 (9.78)	3.29 (8.12)	64.81 (11.71)	62.52 (11.47)	–2.28 (6.18)	99	17.27	0.000*
Outcome variables									
Role behaviors, IARB (0–100)	55.32 (11.92)	60.41 (13.15)	5.09 (8.37)	52.76 (12.94)	51.22 (12.44)	–1.55 (7.26)	99	22.47	0.000*
Life satisfaction, SLDS (0–119)	68.85 (19.57)	76.19 (19.87)	7.35 (14.01)	67.16 (19.39)	64.28 (17.31)	–2.88 (11.78)	99	20.21	0.000*

[a]Positive change score indicates improvement from pre- to post-treatment. Negative change scores indicate deterioration from pre- to post-treatment.
*Statistically significant at $P \leq 0.003$.

Table 4

Pre-treatment mean, post-treatment mean and within-group change on Medical Outcomes Study SF-36

Scale (0–100)	Treatment (n = 52)			Control (n = 50)			ANCOVA		
	Pre-treatment, mean (SD)	Post-treatment, mean (SD)	Change, mean (SD)[a]	Pre-treatment, mean (SD)	Post-treatment, mean (SD)	Change, mean (SD)[a]	df	F	P
Physical function (PF)	41.68 (24.70)	44.64 (25.07)	2.96 (14.87)	38.41 (20.22)	38.30 (21.63)	–0.11 (15.21)	99	1.62	0.206
Role-physical (RP)	8.65 (23.16)	24.52 (33.39)	15.87 (29.30)	12.00 (30.41)	9.00 (23.56)	–3.0 (27.96)	99	11.51	0.001*
Bodily pain (BP)	27.23 (16.39)	35.0 (18.65)	7.77 (14.59)	29.74 (18.37)	27.60 (17.89)	–2.14 (15.95)	99	10.35	0.002*
General health (GH)	45.35 (19.64)	48.69 (20.28)	3.62 (16.27)	48.93 (22.54)	48.86 (21.91)	–0.07 (14.87)	99	0.99	0.323
Vitality (VT)	31.83 (19.73)	43.33 (22.16)	11.51 (16.32)	36.70 (20.69)	33.27 (19.74)	–3.43 (15.22)	99	20.99	0.000*
Social function (SF)	47.84 (26.16)	55.05 (27.48)	7.21 (20.76)	49.00 (25.36)	48.50 (24.83)	–0.50 (19.55)	99	3.90	0.051
Role emotional (RE)	41.03 (43.59)	59.62 (42.95)	18.59 (53.79)	44.67 (42.38)	56.00 (43.35)	11.33 (48.38)	99	0.325	0.570
Mental health (MH)	60.46 (19.67)	68.15 (18.37)	7.69 (16.71)	58.08 (19.27)	60.84 (19.93)	2.76 (14.87)	99	4.07	0.046

[a]Positive change score indicates improvement from pre- to post-treatment. Negative change scores indicate deterioration from pre- to post-treatment.
*Statistically significant at $P \leq 0.003$.

group, treatment subjects had reduced bodily pain (a measure of intensity and interference), improved physical role functioning, and increased vitality, when compared to controls. In addition, there were positive trends to improvement in general mental health ($P \leq 0.05$) and in social functioning ($P = 0.051$).

As a further test of the effectiveness of the intervention, the 20 subjects with the most improved scores from pre- to post-treatment for each statistically significant variable were classified according to group allocation. Fourteen to 18 of the 20 most improved subjects were in the treatment group providing more supportive evidence that the positive outcomes were due to treatment (Table 5). Lastly, as a form of process evaluation an attendance record was kept to track the number of classes attended by treatment subjects. Of the six program sessions, 44 subjects attended four or more sessions indicating that 85% of those randomized to the treatment group received two-thirds or more of the course content (Table 6). The average number of sessions attended was 4.7.

4. Discussion

This randomized controlled trial investigated the impact of a nurse-delivered, community-based, 12-h group psychoeducation program on a sample of young to middle-aged individuals with mixed idiopathic chronic pain problems. The findings present a picture of statistically reliable short-term improvement in those who were enrolled in the CPSMP as compared to a group of wait-list controls on multiple self-report measures including pain severity and impact, dependency, vitality, physical role functioning, increased involvement in valued adult roles, life satisfaction and in the two hypothesized mediating variables, self-efficacy and resourcefulness. The percent improvement on all but one of these variables in the treatment over and above changes in the control group ranged from 9% to 47%, with most in the modest range. The high rate of improvement in physical role functioning (217%) may be due to the floor/ceiling effects of this subscale (McHorney et al., 1994). Even outcomes such as pain quality measured by the short form of the MPQ, perceived disability, mental health, and social functioning which did not reach statistical significance at the 0.003 alpha level showed positive trends ($P \leq 0.05$) in the treatment over the control group. Depression as measured by the short form of the Beck Depression Inventory did not change significantly, although there was a weak positive trend to improvement. In part, this may be because most study subjects in both groups were not in the depressed range when 8 is used as the cut-off score for clinical depression (Turner and Romano, 1984). Uncertainty was the only variable that stayed virtually unchanged. This may be explained in part by the amorphous nature of chronic pain itself and the lack of clear communication about chronic pain by many health professionals.

The results of this study appear comparable to and in some outcomes showed a larger effect than the results of the Arthritis Self-Management Program studies. Lorig and Holman (1993) report statistically significant short-term improvement in pain (22%) and self-efficacy (14%), and non-significant positive trends in disability (6%) and depression (14%) in treatment subjects who attended an average of 4.5 of the six ASMP sessions over wait-list control subjects. Although these changes were modest, they were maintained

Table 5

Group allocation of 20 subjects with most improved scores on statistically significant variables

	Treatment (n = 52)	Control (n = 50)
Pain problem severity	15	5
Dependency	14	6
Role behaviors	17	3
Life satisfaction	16	4
Self-efficacy	15	5
Resourcefulness	16	4
SF-36		
Role physical (RP)	16	4
Bodily pain (BP)	15	5
Vitality (VT)	18	2

Table 6

Number of sessions attended by those in the treatment group

Sessions attended (maximum of 6)	Treatment subjects (%) (n = 52)
0	1 (1.9)
1	2 (3.8)
2	2 (3.8)
3	3 (5.8)
4	7 (13.5)
5	21 (40.4)
6	16 (30.8)

at 20 months and 4 years post-intervention and translated into cost savings to the health care system with 40% reduction in number of physician visits in the treatment over a comparison group (Lorig et al., 1993).

Our findings also appear to compare favorably with short-term outcomes of somewhat analogous pain clinic outpatient programs with similar patient populations (Philips, 1987; Peters and Large, 1990; Skinner et al., 1990; Peters et al., 1992; Williams et al., 1996), however comparisons should be viewed with caution due to differences in methodology across studies including research design, sampling procedures, and use of different outcome measures. In general, these outpatient programs report significant improvements in self-report measures of pain (8–25%), depression (11–31%), and aspects of functioning (18–40%) as well as improvement in some measures of physical performance. The programs range from 13.5 h to 28 h and involve members of a multidisciplinary team, which although ideal, adds to the cost of the program and decreases portability to other settings. By contrast the CPSMP, with outcomes that are in the lower end of this range, is 12 h in length, utilizes one facilitator, and can be delivered in a variety of community settings such as local service clubs, churches, schools, etc. (Lorig, 1986). An additional caveat is that results of our study are conservative because intention-to-treat analyses may dilute the effect of treatment (Newell, 1992).

Similar to other trials of chronic pain interventions, we measured a large number of variables to be certain to capture the full effect of the program. Our intention was to utilize the most responsive self-report instruments to small but potentially important change. We used a combination of established pain-related measures as well as instruments guided by a theoretical framework that views the broad range of self-help role behaviors and client perception of life satisfaction as important outcomes. To our knowledge, this is the first report of the SF-36 used in a randomized trial of a psychoeducation program. In part, it was a test of the instrument's responsiveness to change as a result of a non-medical/surgical intervention although the instrument has been used with other pain populations (Patrick et al., 1995; Jhingran et al., 1996). In addition to outcome measures, we were also interested in investigating hypothesized mechanisms responsible for change. The 24% improvement in self-efficacy in the treatment over the control group adds to a growing body of evidence supporting the critical role of perceived control and efficacy beliefs in the management of chronic pain (Philips, 1987; Spinhoven and Linsson, 1991; Lorig and Holman, 1993). The clinical importance of the small (9%) but significant improvement in resourcefulness (i.e., use of various coping skills) is more equivocal and requires further investigation. In general, the trend to improvement in the treatment group on most variables measured in this study supports the overall positive impact of the program.

A strength of this study is the methodology including random allocation of subjects, the low and equal rate of attrition in both groups, blind assessors at post-treatment to reduce the likelihood of bias, the use of a standard protocol to deliver the program, and intention-to-treat statistical analysis. In addition, the study used a sample that was as representative as possible of those with idiopathic chronic pain in the community who use a variety of health care services. It included a broad referral base as well as a pain clinic group. Because most of the subjects were referred, there is no reason to think that these individuals were an extraordinarily motivated group. However, baseline scores of the eight drop-outs compared to those who completed the study suggest that those with higher levels of pain and depression, and poorer functioning may not have enough motivation to engage in a program of this type. They may need more specialized treatment that is more appropriately available at a pain treatment center.

This study also has limitations. Because this study was designed to evaluate the short-term impact of the CPSMP, it is not known whether treatment effects are maintained over the long term. In addition, all programs were delivered by a single facilitator. The use of multiple facilitators would have strengthened our hypothesis that the content and process of the CPSMP rather than the personal attributes of the facilitator are the effective ingredient in this intervention. Future studies of this intervention need to use multiple facilitators, include long-term follow up at 6 months and 1 year, and monitor potential cost savings to both the individual and the health care system.

The important role of psychoeducation as an adjunct to traditional medical and physical therapies for the management of chronic pain is now well-established (Allegrante, 1996). The Chronic Pain Self-Management Program has been shown to have a demonstrable effect on a variety of pain-related and quality of life variables at 6 weeks post intervention. Because it has a standard protocol, this intervention has the potential to be reliably delivered at low cost in varied urban and rural community settings and hence be more widely accessible to a greater number of people suffering from chronic pain than is currently the case with more specialized pain clinic services. Based on the results of this study, further research of this community-based approach to chronic pain management is warranted.

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