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Efficacy of a Self-Management Group Intervention for Elderly Persons With Chronic Pain

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Abstract:

Objectives: To assess the efficacy of a self-management group intervention in improving physical functioning, mood, and pain among elderly persons with chronic pain, and to identify factors that may be associated with improvement.

Materials and Methods: Forty-five residents of three retirement communities (86% women; mean age, 82.0 years) were assigned randomly to a 7-week pain self-management group or an educational booklet control condition. Participants completed self-report measures of pain, functioning, depression, and pain-related beliefs at baseline, 9 weeks later (after treatment), and 3 months after the post-treatment assessment.

Results: The self-management group showed significantly greater pre- to post-treatment improvement in physical role function ($P = 0.04$) and characteristic pain intensity ($P = 0.02$). No significant differences were found between groups on measures of pain-related activity interference, depression, and pain-related beliefs. Improvement in characteristic pain and physical role function was not associated with baseline depression scores, pretreatment expectations, or changes in pain-related beliefs.

Discussion: This study provides preliminary support for the efficacy of a self-management group intervention for older adults with chronic pain and has implications for future studies of such approaches for this and similar populations.

Key Words: chronic pain, elderly, randomized trial, self-management

Chronic noncancer pain is a common problem in the elderly and is often associated with significant physical and psychosocial disability.[1–3] Estimates of the prevalence of chronic pain problems range from 58% to 70% among community-dwelling elderly persons[4–6] and from 45% to 80% among older persons living in nursing homes.[1,4–6] Despite its high prevalence, pain in the elderly often is inadequately assessed and treated.[1,7,8]

There is substantial empirical evidence that cognitive and behavioral factors play important roles in the chronic pain experience. Interventions that incorporate educational, cognitive, and behavioral components have been shown to be efficacious in improving pain and associated physical and psychosocial disability in younger adults.[9–12] A variety of treatment approaches have been developed, including cognitive–behavioral therapies,[9,13–15] coping-skills training,[16,17] psychoeducational or educational interventions,[10,18–20] and self-management or self-help treatments.[21–23] Although there are variations among these approaches, common components include education about pain as well as training in the following

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areas: identification and modification of negative thoughts, goal setting, communication with health care providers, and relaxation exercises and other pain coping skills, such as positive coping self-statements. Also common to these approaches is an emphasis on enhancing the self-efficacy in those with chronic pain to manage the pain.

The aims of cognitive–behavioral interventions are to improve pain and physical and psychosocial functioning. These goals are achieved by helping persons with pain to recognize and change maladaptive beliefs and coping strategies and to increase the use of adaptive coping-strategies. Specific beliefs that have been shown to be associated with poorer adjustment to pain include the following: that one cannot control pain, that a medical cure exists for one's pain, and that pain signifies physiologic damage and therefore physical activity and exercise should be avoided.[24–27] In contrast, specific beliefs and behaviors associated with better adjustment include the belief that one has the ability to control one's pain, and the use of relaxation techniques and physical activity.[28–30]

Another psychosocial factor that has been found to play an important role in the response to chronic pain and its treatment is depression. Older adults who score high on measures of depression are more likely than nondepressed control subjects to report having chronic pain.[31,32] Physical dysfunction also is associated with chronic pain and depression in older adults.[33] Although the relations among physical disability, chronic pain, and depression have not been fully elucidated, there is evidence that physical disability mediates the relation between pain and symptoms of depression.[33] Interventions aimed at increasing physical functioning and pain relief may therefore reduce depressive symptoms in persons with chronic pain.

Although cognitive–behavioral and self-management interventions have been shown to be efficacious for many chronic pain conditions, including rheumatoid arthritis, fibromyalgia syndrome, and low back pain,[9,12,16,18,21] they have not been well studied in the elderly. In a recent literature search, we found only three published randomized trials of self-management strategies for chronic pain problems in older adults.[16,34,35] These trials provide evidence to support the efficacy of self-management strategies. The studies, however, were limited in their generalizability to community-dwelling elderly. In two of the studies,[34, 35] sample sizes of older adults were small ($n < 24$), and one trial[34] examined the use of cognitive–behavioral therapy for institutionalized elderly persons. The study by Keefe et al[16] had a larger sample size ($n = 99$) but focused on osteoarthritic knee pain among predominantly young-old adults (ie, 65–74 years). There is little evidence regarding the efficacy of self-management interventions for community-dwelling older adults with diverse pain problems.

Information about changes in beliefs and behaviors associated with enhanced outcomes after treatment also is sparse for older adults. Lorig et al[36] have shown that enhanced beliefs in control and self-efficacy among young-old adults are associated with improvement in pain outcomes. Keefe et al[16] reported that older adults who were able to increase perceived control over pain and decrease catastrophizing after receiving pain coping skills training were more likely to report reduced physical disability. Lorig et al[37] evaluated the associations of changes in several behaviors (exercise, relaxation, and composite self-management strategies) with changes in health status after the Arthritis Self-Management Course. Only one significant correlation was found: increased exercise with decreased pain. It is unclear whether these findings apply to middle-old (ie, 75–85 years) and old-old (greater than 85 years) persons.

The gaps in the empirical literature are particularly serious given the high prevalence of chronic pain problems in the elderly and the rapid growth of this age group as a portion of the United States population. The primary aim of this study was to evaluate the efficacy of a self-management group (SMG) intervention, as compared with an educational booklet (EB) control condition, in improving physical functioning, role functioning, depressive symptoms, and pain among elderly persons with chronic pain. We hypothesized that participants in the SMG intervention would report greater improvement than those in the EB condition. A secondary aim was to examine factors that were associated with improvement. Based on previous research, we hypothesized that improvement would be associated with three factors: (1) increased belief that one can control one's pain, (2) decreased belief that a medical cure for one's pain is possible, and (3) decrease belief that pain signifies damage. In addition, we predicted that higher baseline depression scores would be associated with poorer outcomes.

We conducted the study in retirement communities, which allowed us to access a middle-old and old-old population that is vulnerable to physical disability, health problems, and social isolation.[38] The primary reasons cited for moving to retirement communities include loss of a spouse, decline in health, and desire to be closer to family. In addition, access to planned activities that involve opportunities for social interaction is a feature that attracts residents.[39] The growing population in retirement communities is one in which SMG therapies for chronic pain may hold great promise. Adoption of regular wellness-oriented pain management strategies may

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contribute to enhanced functioning and prolonged independence.

MATERIALS AND METHODS

Participants

Study participants were independent-living residents of three retirement communities in the greater Seattle, Washington area. All three facilities are large and have more than 200 independent-living units. One community is owned by a for-profit company and is affiliated with the University of Washington School of Nursing. The other two communities are owned and managed by nonprofit, religiously affiliated corporations.

Study eligibility requirements included (1) residency in one of the participating retirement facilities, (2) age 60 years or older, (3) pain >3 months duration that interfered with regular activities, (4) ability to read and complete study questionnaires, and (5) ability to attend at least five group sessions. Exclusion criteria were (1) current cancer requiring treatment and (2) self-reported consumption of more than two alcoholic drinks per day. No potential participants were excluded because of these criteria.

Participants were recruited in one of three ways: retirement facility newsletters, flyers posted in the facilities or delivered through facility mailboxes, and talks given by the first author at each of the facilities. Among 60 people screened, 8 were ineligible: 5 persons were unable to commit to attending at least 5 classes, 1 had misunderstood the intent of the study and did not have pain, and 2 had acute pain. Seven residents were screened but declined participation after learning more about the study. The final sample represented approximately 5% of residents who lived independently at the three facilities. Twenty-five participants lived at facility 1, 7 participants came from facility 2, and the remaining 13 came from facility 3.

The sample comprised 45 adults (mean age, 81.9 years; range, 65–94), of whom 39 (almost 87%) were women, 13 (29%) were married, and 22 (49%) were widowed. Approximately 75% attended at least some college. Three quarters of the sample had yearly household incomes of less than $45,000. The most common self-reported pain conditions were osteoarthritis (68%), old fractures (20%), and neuralgia (15%). The most common sites of pain were the back (76%), legs and feet (64%), and neck (42%).

Participants reported that they frequently experienced pain during the past 90 days (median, 90; range, 24–90 days) and that pain interfered with usual activities a median of 10 days during the past 90 days (mean, 35.9; range, 0–90 days). Many participants also reported that they had visited a health care provider for their pain in the past 3 months (median, 1.0; range, 0–18 visits), and some had made frequent visits to alternative care providers such as naturopaths and chiropractors in the same period (median, 0; mean, 4.2; range, 0–40 visits). Most participants were taking medications for their pain before the study began. Commonly used medications were acetaminophen, nonsteroidal anti-inflammatory agents, opioids, and adjuvant medications such as gabapentin (Table 1).

MEASURES

Demographic and pain variables

During the screening process and baseline assessment, participants were asked questions to elicit demographic and pain history information, including age, ethnicity, sex, marital status, education level, and sites of pain. Study participants were also asked about frequency of pain, pain-related interference with daily activities, and visits to traditional and alternative health care providers in the previous 3 months. These variables were used to describe the sample and to assess the similarity between groups on demographic and pain factors that could influence outcomes.

Outcome measures

Short Form-36

The Short Form-36 (SF-36) is a widely used measure of health status comprising 8 subscales and 2 summary measures of physical and mental health.[40] The measure has been used widely in general population surveys, clinical trials, and clinical practice as a health outcome measure, and has been shown to be valid and reliable.[41] Use of the SF-36 as a measure of health status in geriatric populations has been well documented.[42] Raw subscale scores are transformed to a 0 to 100 scale, with higher scores indicating better health status.

For purposes of this study, we focused on the physical functioning and physical role function subscales. The physical functioning subscale contains 10 items assessing the extent to which health limits activities such as self-care, walking, climbing stairs, lifting, bending, and participating in moderate and strenuous activities or sports. The physical role function subscale consists of 4 items assessing the extent to which health interferes with work and daily activities (eg, the amount of time spent on work and activities, whether less was accomplished than desired, and whether extra effort was needed to engage in activities). We selected these subscales because pain can negatively affect such physical

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TABLE 1. *Characteristics of participants in the educational booklet and self-management groups*

Characteristic	Educational booklet n = 23	Self-management group n = 22
Age, years	Mean: 80.3 SD: 6.6 Range: 65–90	Mean: 83.6 SD: 5.0 Range: 76–94
Gender		
Female	19 (83%)	20 (91%)
Male	4 (17%)	2 (9%)
Marital status		
Married	9 (41%)	4 (18%)
Widowed, separated, divorced, never married	13 (59%)	18 (82%)
Education (highest level)		
Some high school	1 (4%)	1 (5%)
High school graduate	1 (4%)	3 (14%)
Vocational/trade school	4 (17%)	1 (5%)
Some college	6 (26%)	9 (41%)
College graduate	6 (26%)	3 (14%)
Graduate/professional school	5 (22%)	5 (22%)
Annual income		
Under $30,000	5 (24%)	12 (55%)
$30,000–45,000	11 (52%)	4 (18%)
$45,001–70,000	2 (10%)	5 (22%)
Over $70,000	3 (14%)	1 (5%)
Ethnicity		
Caucasian	17 (74%)	21 (95%)
Other	6 (26%)	1 (5%)
Pain conditions		
Osteoarthritis	17 (74%)	16 (73%)
Rheumatoid arthritis	1 (4%)	2 (9%)
Old fracture site	7 (30%)	4 (18%)
Fibromyalgia	3 (13%)	2 (9%)
Migraine	1 (4%)	2 (9%)
Neuralgia	4 (17%)	3 (13%)
Painful areas		
Head	3 (13%)	3 (14%)
Neck	10 (43%)	9 (41%)
Back	18 (78%)	16 (73%)
Shoulders	9 (39%)	11 (50%)
Arm/hands	8 (35%)	8 (36%)
Buttocks/hips	7 (30%)	5 (23%)
Abdomen	0 (0%)	0 (0%)
Thighs	2 (9%)	4 (18%)
Legs/feet	14 (61%)	14 (64%)
Generalized pain	10 (43%)	10 (45%)
Days in pain (past 90 days)	Mean: 78.6 SD: 23.6	Mean: 78.0 SD: 25.3
Days kept from usual activities by pain (past 90 days)	Mean: 25.1 SD: 37.8	Mean: 47.2 SD: 44.2
Health care provider vists for pain (past 90 days)	Mean: 2.9 SD: 50	Mean: 1.6 SD: 1.9
Alternative care provider visits for pain (past 90 days)	Mean: 5.0 SD: 9.7	Mean: 3.4 SD: 6.9
Medications used in the previous two weeks:		
Tylenol	7 (30%)	12 (55%)
Nonsteroidal antiinflammatory agent	7 (30%)	7 (32%)
Opioids	5 (22%)	4 (18%)
Adjuvants (antidepressants, gabapentin, clonazepam, topical lidocaine, corticosteroid)	7 (30%)	3 (14%)
No medications	5 (22%)	2 (9%)

functioning and role functioning activities and because pain treatment programs such as the self-management intervention evaluated in this study typically target such activities for improvement.

Pain intensity and pain-related activity interference

The Graded Chronic Pain Scale[43] was used to assess pain intensity and pain-related activity interference at each assessment. Study participants rated the intensity of

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their current pain and their worst and average pain during the preceding week using a 0 to 10 scale where 0 = "no pain" and 10 = "pain as bad as could be." The mean of these ratings is the *characteristic pain intensity* score. Characteristic pain intensity has shown adequate to good internal consistency in previous research (α coefficients 0.77–0.86).[44] Such composite pain ratings have been shown to be more reliable than single pain ratings and are sensitive to change over the course of treatment.[45]

A pain-related *activity interference* score was calculated by averaging study participants' ratings of pain interference with ability to take part in daily, recreational (including family and social), and work (including housework) activities, on 0 to 10 scales where 0 = "no interference" and 10 = "unable to carry on any activities."[43]

Geriatric Depression Scale

The Geriatric Depression Scale (GDS) is a 30-item self-report measure specifically designed to assess depressive symptoms in older persons.[46] Scores of 11 or higher are considered indicative of depression in older adults.[46] The GDS has shown good sensitivity and specificity for detecting depression in geriatric psychiatric and medical outpatients.[47,48]

Process variables

Pretreatment expectations

After randomization, participants were asked the degree to which they believed that the treatment to which they had been randomized would be helpful to them, on a scale from 0 = "not helpful at all" to 10 = "extremely helpful." Assessing pretreatment expectations allowed for the comparison of expectations for improvement between the SMG and EB conditions. This measure also was used to evaluate the association of treatment expectations with outcomes.

Survey of Pain Attitudes: control, harm, and medical cure subscales

At each assessment, participants completed the following three subscales from the Survey of Pain Attitudes (SOPA)[24]: control (belief that one can control one's pain), harm (belief that pain signifies damage and that exercise and activity should therefore be restricted), and medical cure (belief in a medical cure for one's pain problem). The subscales have been shown to have adequate test–retest stability, criterion validity, and internal consistency.[24,26,49] Scores on these subscales have been found to be associated significantly with measures of physical and psychosocial dysfunction among patients with chronic pain.[24,49] The range of scores for each subscale is 0 to 4, with higher scores indicating greater agreement with the construct. These SOPA subscales were used to assess beliefs that we hypothesized would change as a result of the intervention. We also examined whether changes in specific pain-related beliefs were associated with changes in outcomes.

Use of pain management strategies

A 12-item measure was developed for the study to assess the frequency of use and perceived effectiveness of the cognitive and behavioral pain management strategies taught in the self-management intervention and covered in the EB. These strategies include relaxation, identification and modification of automatic negative thoughts, exercise, and use of pain medications. Participants were asked to rate these activities at the 3-month follow-up, using 6-point Likert scales, on two dimensions: (1) how often they used the strategy during the previous month and (2) how effective they thought the strategy was in managing their pain.

Treatment usefulness scales

To assess participants' perceived usefulness of specific topics in assigned reading materials and classes, we designed a program evaluation measure. Study participants were asked whether they read particular sections in the EB or class syllabus and, if they had read the section or attended the class, how useful it was. Participants in the self-management condition also were asked to rate the usefulness of specific topics and skills presented in the groups.

PROCEDURE

The study was approved by the Swedish Medical Center Institutional Review Board. Residents living in the participating facilities who expressed interest in the study were screened by a research nurse for the inclusion and exclusion criteria listed previously. Eligible residents read and signed consent forms and completed the baseline assessment measures before being randomly assigned to one of the two study conditions. Randomization was performed within each site so that half of the participants at each facility were assigned to the EB control condition and the other half to the SMG.

Data were collected at baseline (before randomization, 1 to 2 weeks before the first class), after treatment (approximately 9 weeks after baseline), and at follow-up (3 months after the end of the course). A research nurse who was not involved in the intervention administered all measures.

Self-management group intervention

Because of the focus on enhancing the ability of persons to manage their pain, we chose the term "self-management" to describe the intervention. The SMG intervention involved seven 90-minute group sessions

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conducted at the retirement facilities. The first six sessions were held weekly, followed by the final session 2 weeks after session 6. Each session included presentation and discussion of various topics regarding chronic pain, including the following: definitions and mechanisms of pain, pain self-monitoring, pharmacologic and nonpharmacologic therapies, decision making about specific pain therapies, and communication with health care providers. The intervention also incorporated relaxation training and regular practice of relaxation exercises. Although each class included some didactic content, regular practice of pain management skills was emphasized.

A major focus of the group was setting and working toward individualized pain management goals. For example, many participants identified the need to increase physical activity as a means of controlling pain and avoiding deconditioning. Participants worked within the group to decide which activities were most enjoyable, accessible, and realistic. They then developed a specific plan for working toward activity goals. They discussed such decisions as the number of times per week to perform the activity. The facilitators helped group members to identify potential obstacles to achieving their goals and to problem-solve by devising strategies to overcome them. At the beginning of each class, group members were asked to report on their efforts in meeting the goals they had established the previous week. The groups discussed the obstacles encountered by those failing to achieve their goals and offered suggestions for dealing with the obstacles.

Group participants received a class syllabus, a relaxation tape, and two hot/cold gel packs. The syllabus, which contained written materials to reinforce group content, covered topics similar to those included in the EB.

Each group meeting was led by a doctoral-level health professional (M.E., S.M.) experienced in leading groups. The first group meeting was cofacilitated by both group leaders, who met after each session to discuss group process and adherence to the treatment session protocol. Subsequent group meetings were led by a single therapist, and adherence to the SMG treatment content and process was ensured through the use of a detailed written protocol for each session. A total of four groups were conducted: two groups at one retirement facility and one group each at the other two facilities. Group sizes ranged from 3 to 8 participants. The treatment manual is available on request from the senior author (M.E.).

Educational booklet group

The EB condition was designed to control for the effects of education, natural history of chronic pain over time, repeated measurement, and expectation of being helped. We believed that reading the EB could assist participants in managing their pain but would be less efficacious than the SMG because the EB did not include (1) individualized assistance in developing appropriate pain management goals; (2) instruction and assistance in the use of problem-solving techniques to overcome obstacles in achieving goals; (3) instruction and repeated practice of relaxation and pain coping skills; and (4) group interaction and support.

Study participants randomized to the EB condition received an EB that was prepared by the investigators. It contained information about the following topics: definitions and types of chronic pain, gate-control theory, pharmacologic and nonpharmacologic therapies for pain, decision making about therapies, and communication with health care providers. There also were sections on chronic pain resources (books, articles, audiotapes, advocacy groups, and websites), pain medications, and basic instructions for nonpharmacologic pain management interventions, such as relaxation and hot/cold applications.

STATISTICAL ANALYSES

Scores on all measures were inspected for normality of distribution. For the SOPA subscales, normality assumptions were tenable. For the others, log transformations failed to normalize the data; therefore, differences between groups at post-treatment and follow-up sessions were assessed using change (from baseline) scores with Wilcoxon rank sum (ie, Mann-Whitney *U*) tests. Wilcoxon rank sum, χ^2, or Fisher exact tests were used, as appropriate, to assess whether there were significant differences at baseline between the SMG and EB group and between treatment dropouts and completers. Intent-to-treat analyses were performed for all outcome measures and for the SOPA subscales. Baseline values were carried forward for 4 study participants who withdrew after baseline, and post-treatment values were carried forward for 2 participants who withdrew after the post-treatment assessment. Analysis of covariance was used to assess the possible relation of facility to outcomes. Regression analyses were performed to examine the associations between baseline depression, pretreatment expectations, and changes in pain-related beliefs with outcomes.

RESULTS

Baseline comparisons

Educational booklet group versus self-management group participants

There was no statistically significant difference between participants in the two study conditions at baseline on any outcome, demographic, pain, or process measure.

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TABLE 2. *Outcome measures at baseline, posttreatment and follow-up*

Variable	Educational booklet mean (SD)	Self-management group mean (SD)	*P**
Physical functioning			
SF-36 physical functioning			
Baseline	40.9 (22.6)	38.0 (20.3)	n.s.
Posttreatment	42.4 (27.0)	38.7 (19.8)	n.s.
3 month follow-up	43.0 (23.7)	38.4 (19.0)	n.s.
SF-36 role-physical			
Baseline	20.7 (31.7)	26.1 (30.4)	n.s.
Posttreatment	21.7 (34.8)	41.7 (27.8)	.04
3 month follow-up	28.4 (35.6)	28.4 (34.8)	n.s.
Pain intensity			
Graded chronic pain scale, characteristic pain intensity			
Baseline	5.4 (2.0)	5.2 (1.7)	n.s.
Posttreatment	5.1 (1.9)	3.7 (1.6)	.02
3 month follow-up	5.1 (2.4)	4.2 (2.1)	n.s.
Pain-related activity interference			
Graded chronic pain scale-activity interference			
Baseline	4.3 (2.9)	4.0 (2.3)	n.s.
Posttreatment	4.1 (2.7)	3.3 (2.5)	n.s.
3 month follow-up	3.6 (3.0)	3.2 (2.9)	n.s.
Depressive symptomatology			
Geriatric depression scale			
Baseline	8.5 (6.1)	8.2 (4.8)	n.s.
Posttreatment	8.8 (6.8)	7.6 (4.7)	n.s.
3 month follow-up	9.6 (6.5)	8.0 (5.3)	n.s.

*Post-treatment and follow-up *P* values are for group differences in the change scores from baseline as assessed by Wilcoxon rank sum tests.

Table 1 shows sociodemographic and pain characteristics of participants in the two groups. Baseline expectations of treatment benefits did differ between groups. Participants randomized to the EB group had significantly lower expectations of treatment helpfulness (mean: 5.7; standard deviation [SD]: 2.4) than did the SMG (mean: 7.9; SD: 1.6) (Wilcoxon W: 264.5; $P = 0.005$).

Comparisons of study dropouts and study completers

Three (14%) participants who were randomized to SMG and three (13%) who were randomized to the EB group dropped out before the 3-month follow-up. Reasons given for dropping out included increased pain (1 EB group and 1 SMG), spouse's illness (1 EB group), and worsening chronic illness (1 EB group). Two SMG participants never came to any classes and did not provide a reason for dropping out of the study. Dropouts did not differ significantly from completers on any demographic variable or on baseline characteristic pain intensity or pain interference with activities.

Post-treatment and follow-up comparisons of educational booklet and self-management groups

Table 2 shows the mean scores and SD on the outcome measures at each assessment for the EB group and SMG. The two groups differed significantly on pretreatment to post-treatment change in characteristic pain intensity (Wilcoxon W: 373; $P = 0.02$) and physical role function scores (Wilcoxon W: 436.5; $P = 0.04$). On both measures, SMG participants showed greater improvement. At 3 months, there were no significant differences between groups on any outcome measure. The facility was not associated with any outcome, either after treatment or at 3-month follow-up.

Based on the work of Farrar et al,[50] we considered a pre- to post-treatment change of 2 or more on the 0 to 10 scale of characteristic pain intensity to indicate clinically significant improvement. As can be seen in Table 3, 43% of the SMG and 13% of the EB group participants showed clinically significant improvement in pain after treatment (Fisher Exact test, $P = 0.03$). The groups did not differ in the proportion of participants with clinically significant improvement at 3-month follow-up.

In addition to examining changes in outcomes, exploratory analyses were conducted to examine whether participants in the two groups showed changes in pain-related beliefs previously shown to play important roles in physical and psychosocial disability. Table 4 shows that there were no significant differences between SMG and EB group in changes from baseline in these measures at post-treatment or follow up.

At the 3-month follow-up, participants reported how often they engaged in specific pain management strategies

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TABLE 3. *Comparison of clinically significant improvement* in pain between educational booklet and self-management groups*

	Educational booklet		Self-management group	
	Posttreatment n = 23	3-month follow-up n = 23	Posttreatment n = 17	3-month follow-up n = 19
Deterioration/no clinically significant improvement	20 (87%)	18 (78%)	12 (57%)	16 (76%)
Clinically significant improvement	3 (13%)	5 (22%)	9 (43%)	5 (24%)

*Clinically significant improvement is defined as an increase of 2 or greater on the 0–10 Characteristic Pain Intensity score.

and how useful they perceived the strategies to be in relieving their pain. Table 5 shows the percentage of respondents in the SMG and EB group who reported practicing each strategy at least once a week. The strategies reported most frequently by EB group participants were engaging in pleasurable activities to distract themselves from the pain and using pain medications. These strategies also were assessed as being the most effective for this group. In contrast, the strategies reported most frequently by SMG participants were doing aerobic exercises, practicing relaxation exercises, engaging in pleasurable activities, and taking pain medications. These activities were viewed by the SMG to be most effective in managing pain. Only one strategy was used significantly more by one group than the other. The SMG reported using relaxation exercises more frequently than did the EB group (Wilcoxon W = 305, $P = 0.01$). Effectiveness ratings for this strategy were also higher in the SMG than in the EB group (Wilcoxon W: 285; $P = 0.002$).

Association of pretreatment expectations, baseline depression, and changes in pain-related beliefs with outcomes

Exploratory analyses were conducted to examine the association of specific baseline and process variables with selected treatment outcomes. First, regression analyses were performed to assess the relation of pretreatment expectations to post-treatment characteristic pain intensity and physical role functioning. Models with baseline scores, group, expectations, and group × expectations interaction terms showed that pretreatment expectations were not associated significantly with outcomes for SMG or EB group. Similar analyses showed that baseline depression also was not associated with outcomes in either condition.

We also explored the associations of changes in pain-related beliefs with outcomes. Although, on average, participants' pain beliefs as assessed by the SOPA did not change significantly from pre- to post-treatment, some participants' scores increased and others decreased. To focus our analyses, we first examined the correlations between changes in the SOPA subscales and changes in outcomes for the entire sample. These analyses showed only the following two significant correlations: changes in Harm were associated with changes in characteristic pain intensity (Spearmans ρ: 0.39, $P = 0.01$) and changes in Control were associated with changes in activity interference (Spearmans ρ: –0.45, $P = 0.002$). To determine if these associations differed in the two study groups, an analysis in which baseline pain intensity, group, change in Harm, and change in Harm × Group interaction were regressed on post-treatment pain intensity. We conducted similar analyses for change in Control and activity interference. In both analyses, the interaction term was not significant, indicating that the relations between the belief measures and the outcome variables did not differ for the two treatment groups.

TABLE 4. *Comparisons between educational booklet and self-management groups on measures of pain-related beliefs*

Variable	Educational booklet mean (SD)	Self-management group mean (SD)	P*
Pain-related beliefs			
SOPA control			
Baseline	2.1 (0.7)	2.3 (0.6)	NS
Posttreatment	2.2 (0.9)	2.4 (0.5)	NS
3 month follow-up	2.3 (0.6)	2.3 (0.8)	NS
SOPA harm			
Baseline	1.6 (0.8)	1.6 (0.6)	NS
Posttreatment	1.6 (0.9)	1.4 (0.5)	NS
3 month follow-up	1.6 (0.8)	1.5 (0.6)	NS
SOPA medical care			
Baseline	1.9 (0.6)	2.0 (0.5)	NS
Posttreatment	1.9 (0.8)	1.7 (0.5)	NS
3 month follow-up	1.6 (0.6)	1.7 (0.6)	NS

*Posttreatment and follow-up *P* values are for group differences in the change scores from baseline as assessed by *t* tests.

Attendance and treatment satisfaction

Eighty-five percent (17/20) of the SMG participants (excluding the two people who dropped out of the study) attended at least 80% (6/7) of the classes. Among the three participants who attended fewer than six classes, one attended two sessions, one attended four sessions, and one attended five sessions.

In addition to high rates of class attendance, SMG participants reported that they consistently read the class syllabus. On a scale from 0 ("I did not look at the section

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TABLE 5. *Frequency of use and perceived usefulness of specific pain management strategies at follow-up*

Pain management strategy	Percentage of participants using the strategy at least once weekly		Perceived usefulness of the strategy (0–5 scale)	
	EB n = 20	SMG n = 19	EB n = 20	SMG n = 19
Strengthening/balance exercises	45%	58%	2.1	2.3
Stretching exercises	40%	42%	2.0	2.1
Aerobic exercise	50%	89%	2.8	3.7
Applications of heat	45%	42%	2.3	2.4
Applications of cold	35%	16%	1.5	1.6
Relaxation exercises	55%	74%	1.8	3.9
Countering negative thoughts about the pain	45%	58%	2.1	2.9
Engagement in pleasant activities	75%	79%	3.3	3.4
Pain medications	60%	74%	3.3	3.6
Complementary therapies (eg, herbal remedies, chiropractic care, acupuncture)	10%	5%	1.2	0.4

EB indicates educational booklet; SMG, self-management group.

at all") to 5 ("I read the section thoroughly"), the overall mean rating for all syllabus topics was 4.4 (SD = 0.5, range = 0–5). The EB group participants also reported that they read the booklet. The mean rating on the same scale for the booklet was 4.3 (SD = 0.8, range = 0–5).

The two groups differed significantly in their ratings of treatment usefulness. On scales of 0 ("not at all useful") to 5 ("very useful"), the mean of the ratings for overall usefulness of the treatment was 2.6 (SD = 1.2) for the EB group and 4.3 (SD = 0.5) for the SMG (Wilcoxon W = 119, $P < 0.001$).

DISCUSSION

The results of this study provide preliminary evidence suggesting the benefits of a self-management group intervention for chronic pain problems in the elderly. Participants in the SMG condition showed significantly greater pre- to post-treatment improvement on measures of pain intensity and physical role function than did participants who received an EB. Furthermore, a significantly greater proportion of SMG (43%) than of EB group (13%) participants achieved clinically significant pre- to post-treatment improvement in pain, operationally defined as improvement of 2 or more on a 0 to 10 scale. By the 3-month follow-up, however, similar proportions of participants in the two groups had clinically significant improvement (from baseline) in pain.

The SMG did not seem to have a significant impact at the post-treatment evaluation on depressive symptom level, pain-related activity interference, or physical functioning as measured by the SF-36 physical functioning subscale. Although previous research has shown strong associations among measures of depression, pain, and disability in the elderly,[3,33,51] neither the self-management intervention nor the educational booklet was designed to treat depression. Moreover, study participants were not selected on the basis of depressive symptoms. In fact, on average, study participants were not depressed at baseline and thus there was little room for change. Perhaps residents who are depressed are less likely to participate in a study that requires regular, intensive interaction with others. This low level of baseline depression may also have accounted for the finding that baseline scores on the GDS did not predict outcomes in either the SMG or EB condition.

The SF-36 may not have been the best measure of physical functioning for use in this study. Several investigators have found that the SF-36 is less responsive to change than health condition–specific measures of functioning among people with musculoskeletal pain.[52–54] Moreover, questions have been raised about the applicability of SF-36 items to older adults.[55,56] It is possible that other measures of physical functioning might have been more sensitive to improvement among study participants. It is also possible that a greater number of sessions or a more structured program of physical exercise might have resulted in more impact on physical functioning.

Neither the SMG nor the EB group showed changes on measures of pain-related beliefs found in previous research to be associated with physical and psychosocial disability. Participants on average, however, did not seem to hold strong beliefs that pain indicated damage and therefore exercise and activity should be avoided or that a medical cure for their pain problem existed. Thus, there was little room for change in these maladaptive beliefs. Community volunteers might well be expected to have lower scores on measures of such beliefs than pain

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clinic patients, which is the population most studied in this area. It is also possible that older adults have lower scores than do young and middle-aged adults on measures of the belief in a medical cure. For example, the elderly may be more likely to accept having pain as a part of old age and less likely to believe they will find a medical cure for it. Further research with larger samples is needed to examine differences in pain-related beliefs among different age groups (eg, young-old vs. old-old), and among individuals recruited from different settings (community, nursing facility, primary care, tertiary care).

Participants' beliefs in their ability to control pain were not significantly altered by the SMG intervention. For the entire sample, however, increased perceived ability to control pain was associated with decreased pain-related activity interference. In a recent article, Gibson and Helme[57] provided evidence that an internal pain locus of control (IPLOC, or the belief that one's actions and behaviors determine pain levels and disability) is an important adaptive belief among older adults. They found that IPLOC was associated with the use of adaptive pain-coping strategies, as well as with lower pain, depression, and perceived interference from pain. Moreover, intensive multidisciplinary therapy was able to increase IPLOC orientation. We recommend that future studies of self-management interventions with elderly individuals with pain specifically attempt to increase individuals' perceived ability to control pain (eg, by more intensive training and practice in relaxation and other pain coping skills), as it is possible that this may increase the efficacy of such interventions.

As might be anticipated, the SMG reported significantly higher expectations about treatment than did participants in the EB condition. Pre-treatment expectations, however, did not predict treatment outcomes. This finding suggests that the efficacy of the SMG in improving pain and physical role functioning was not due to the nonspecific effects of pre-treatment expectations.

Several methodologic limitations of this study should be noted. First, the small sample size limited statistical power to detect differences between groups. Second, the study relied solely on self-report measures. Future studies would be strengthened by obtaining outcome data from sources in addition to study participants (eg, from "significant others" or objective measures of physical functioning). Third, the sample consisted largely of well-educated white women. The sample homogeneity limits the ability to generalize findings to other socioeconomic and ethnic groups. Fourth, two of the measures we used were developed for this study (the pain management strategies measure and the treatment usefulness ratings) and their reliability and validity have not been established. These measures need to be validated and the study findings related to these measures need to be replicated using measures with established reliability and validity. Finally, the study did not include an attention control group. Such a group is needed in future research to establish that the benefits of a self-management or cognitive-behavioral therapy group are due to active, specific ingredients of those interventions versus nonspecific therapy effects.

The study provides information that may be useful in designing future studies or self-management interventions for this and similar populations. First, our findings show that older adults with chronic pain are highly motivated to participate in self-management approaches. Adherence to therapy, as reflected in class attendance and reported completion of reading assignments, was high for SMG and EB conditions. This finding corroborates those of other investigators who focused on older adults[34] and further highlights the potential usefulness of applying self-management approaches to this population.

Second, the finding that some improvements were not maintained at the 3-month follow-up suggests the need for more emphasis on relapse prevention, dealing with flare-ups, and maintenance of gains, as well as for "booster sessions" after the last session. Although some investigators did not find that follow-up reinforcement through newsletter and refresher courses enhanced long-term treatment gains,[58] others argue for their utility. For example, Keefe and Van Horn[59] call for the incorporation of a relapse-prevention model of pain coping into interventions. They recommend that interventions specifically and repeatedly address obstacles to maintaining behavioral and cognitive coping strategies, and that relapse-prevention approaches be continued after the intervention in booster sessions that focus on maintenance of treatment gains. Use of booster sessions or follow-up phone calls may be particularly useful for the elderly, who may have fewer opportunities for support (eg, from spouses) and who may face multiple setbacks (eg, health problems, loss of independence).

Third, study results also point toward other changes that may increase the efficacy of self-management interventions for older adults. For example, emphasizing physical exercise and relaxation exercises may be particularly effective for this age group. Our findings show that 79% (31/39) of SMG and EB group participants reported the use of some type of exercise (strengthening, balance, stretching, or aerobic) at least 1 to 3 times per week to manage their pain; 77% (30/39) reported exercise to be somewhat to very useful in controlling their pain. The emphasis on physical activity to enhance pain management is in keeping with the recommendation of the American Pain Society and the American Geriatrics Society.[60,61] Given this emphasis, it is important to assist

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the elderly in developing an exercise plan that is based on gradual and systematic increases from baseline and in learning to pace activities.[61]

Relaxation exercises also may provide substantial pain relief in the elderly. Our experience suggests that older adults are quite willing and able to practice relaxation techniques. In this study, SMG participants were asked to practice relaxation every day. At 3-month follow-up, almost 77% of the SMG reported using relaxation at least 1 to 3 times per week, and 89% of those using relaxation reported that it was "somewhat" to "very useful" in relieving pain. This finding may be contrasted to that of a previous intervention study,[62] in which older patients with cancer were unlikely to use imagery and relaxation to manage pain and, if they did use relaxation, to find it useful. Although it is possible that the discrepancy in findings might reflect differences in study samples, it might also be the result of different approaches in teaching and reinforcement strategies. For example, in the present study, relaxation was taught during the first of seven classes and then practiced during subsequent classes. Participants also were given a relaxation tape to facilitate their daily home practice. In the study by Ferrell et al,[62] tapes were provided to participants, but there was no opportunity for repeated supervised practice or systematic problem-solving to resolve difficulties in practicing the exercises.

In summary, this study suggests the promise and need for further study of self-management group interventions for older adults with chronic pain. Future research with larger samples is needed to determine the efficacy of such interventions for specific pain-related outcomes (eg, pain intensity, physical functioning, psychosocial functioning). Research is also needed to identify specific demographic, medical, and psychosocial characteristics that may be important for tailoring interventions. Finally, there is a need to identify the most effective ingredients of self-management interventions, as well as the process variables associated with improvement.

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