

ORIGINAL ARTICLE

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Effect of a Self-Management Program on Patients with Chronic Disease

CONTEXT. For patients with chronic disease, there is growing interest in “self-management” programs that emphasize the patients’ central role in managing their illness. A recent randomized clinical trial demonstrated the potential of self-management to improve health status and reduce health care utilization in patients with chronic diseases.

OBJECTIVE. To evaluate outcomes of a chronic disease self-management program in a “real-world” setting.

STUDY DESIGN. Before–after cohort study.

PATIENTS AND SETTING. Of the 613 patients from various Kaiser Permanente hospitals and clinics recruited for the study, 489 had complete baseline and follow-up data.

INTERVENTION. The Chronic Disease Self-Management Program is a 7-week, small-group intervention attended by people with different chronic conditions. It is taught largely by peer instructors from a highly structured manual. The program is based on self-efficacy theory and emphasizes problem solving, decision making, and confidence building.

MAIN OUTCOME MEASURES. Health behavior, self-efficacy (confidence in ability to deal with health problems), health status, and health care utilization, assessed at baseline and at 12 months by self-administered questionnaires.

RESULTS. At 1 year, participants in the program experienced statistically significant improvements in health behaviors (exercise, cognitive symptom management, and communication with physicians), self-efficacy, and health status (fatigue, shortness of breath, pain, role function, depression, and health distress) and had fewer visits to the emergency department (ED) (0.4 visits in the 6 months prior to baseline, compared with 0.3 in the 6 months prior to follow-up; $P = 0.05$). There were slightly fewer outpatient visits to physicians and fewer days in hospital, but the differences were not statistically significant. Results were of about the same magnitude as those observed in a previous randomized, controlled trial. Program costs were estimated to be about \$200 per participant.

CONCLUSIONS. We replicated the results of our previous clinical trial of a chronic disease self-management program in a “real-world” setting. One year after exposure to the program, most patients experienced statistically significant improvements in a variety of health outcomes and had fewer ED visits.

Because of the large impact of chronic disease on health status and health care expenditures, there is growing interest in self-management programs.^{1,2} Such programs emphasize the patient’s central role in managing their illness. Self-man-

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agement programs aim to help patients with medical management, maintaining life roles, and managing negative emotions, such as fear and depression. In addition, programs provide patients with the necessary knowledge, skills, and confidence (self-efficacy) to deal with disease-related problems. Finally, self-management prepares patients to collaborate with their health care professionals and the health care system.

Recently, we documented improved health status and decreased health care utilization in patients randomized to a self-management program called the Chronic Disease Self-Management Program (CDSMP).³ This program consisted of a 17-hour course delivered over 7 weeks to patients with a variety of chronic illnesses. The focus of the course was the day-to-day self-management of symptoms common to chronic diseases. At 6 months, patients enrolled in CDSMP demonstrated improved health behaviors and health status, as well as fewer visits to the hospital or clinic. Despite the promising results in this trial, however, the effectiveness of self-management has not been evaluated in the context of “real-world” clinical practice. In this paper, we present the 1-year outcomes of an effectiveness study of the CDSMP as implemented by Kaiser Permanente in 1998.

Methods

Sites

In 1997, health education departments from all 11 Kaiser Permanente regions were invited to implement the CDSMP. Nine regions chose to participate in training designed to prepare personnel to teach the CDSMP, to teach others how to teach the program, and to learn how to administer the program in their regions, and six regions participated in the current study. In addition, Group Health Cooperative of Puget Sound formed an affiliation with Kaiser and also participated. Each participating region offered the CDSMP in 1 or more sites, for a total of 21 sites: 8 in Northern California, 6 in Southern California, 1 in North Carolina, 1 in Ohio, 1 in Georgia, 3 in Colorado, and 1 at Group Health Cooperative in Seattle. These 21 sites convened a total of 68 CDSMP classes. The study was approved by the institutional review boards of Stanford University and each participating region of Kaiser Permanente.

Participants

At each site, patients were recruited to the CDSMP when identified by their physicians or case managers and through announcements in waiting rooms and in health plan newsletters. In one region, letters were sent to high utilizers identified from the automated medical

record. To participate in the program, patients had to be older than 18 years of age, have one or more chronic diseases, and be physically able to attend a seven-session program. When patients arrived for the first session of the CDSMP they were asked to participate in the evaluation of the program. Patients who gave informed consent completed the baseline questionnaire and received follow-up questionnaires by mail at 6 and 12 months. The 13% of patients who did not attend the first session or declined to complete the first questionnaire continued in the CDSMP without participating in the study.

Intervention

The CDSMP is based on experience with the Arthritis Self-Management Program.^{4,5} Each class consisted of 8 to 20 participants of various ages and diagnoses, plus interested family members. Each class was led by a pair of educators who had received 20 hours of training. Fifteen percent of the classes were taught by a pair of professional leaders, 43% by a pair of peer leaders, and 42% by one leader who was a health professional and one who was a peer. Class leaders followed a detailed manual to teach the CDSMP.⁶ Topics covered in the CDSMP are included in **Table 1**. The course content has been published in *Living a Healthy Life with Chronic Conditions*, which served as a reference book for participants.⁷ The program is based on self-efficacy theory and incorporates skills mastery, reinterpretation of symptoms, modeling, and social persuasion to enhance a sense of personal efficacy (i.e., confidence in one’s ability to manage different aspects of one’s health functioning).⁸ Self-efficacy has been shown to be a common pathway through which psychosocial programs can affect health outcomes.⁸ The course includes guided mastery of skills through weekly “action planning” and feedback of progress, modeling of self-management behaviors and problem-solving strategies, and social persuasion through group support and guidance for individual self-management efforts.

Outcome Measures

Four primary classes of outcomes were assessed: health status, health behaviors, perceived self-efficacy, and health services utilization. All data were collected using self-administered questionnaires.

Health Status

Measures included self-rated health (using a scale from the National Health Interview Survey),⁹ disability (a modified version of the Health Assessment Questionnaire disability scale),^{10,11} and health distress (a slightly

TABLE 1**Description of the Chronic Disease Self-Management Program****OVERVIEW**

Number of sessions	7
Length of each session	2.5 hours
Number of leaders	2
Mean number of persons per program	9.4 (range 4–18)
Mean attendance per person	5.3 sessions

TOPICS

Overview of self-management and chronic health conditions

Making an action plan

Relaxation/cognitive symptom management

Feedback/problem solving

Anger/fear/frustration

Fitness/exercise

Fatigue management

Healthy eating

Advance directives

Communication

Medications

Making treatment decisions

Depression

Informing the health care team

Working with health care professionals

modified version of the Medical Outcome Study health distress scale).¹² The health distress scale assesses the amount of time the patient has been distressed about health (e.g., discouraged, worried, fearful, frustrated by health problems). Illness intrusiveness was measured by using a previously developed index that assesses the impact of disease on multiple aspects of one's daily life: physical well-being and diet, work and finances, marital stability, sexual and family relations, recreation and social relations, and other aspects of life.¹³ Shortness of breath,

pain, and fatigue were assessed by using visual numerical scales developed for this study. These scales are based on the more commonly used visual analogue scales,^{14,15} but differ from the visual analogue scales in that they consist of 10 bars of different heights and different intensity of shading. When the visual analogue pain scale and the visual numerical pain scale were compared (in a population of Spanish-speaking arthritis patients), the correlation was $r = 0.72$. The 2-week test–retest reliability of the visual numerical version was 0.64.¹⁵

Health Behaviors and Self-Efficacy

Measures of health behavior and self-efficacy included frequency of exercise, cognitive symptom management, and communication with physician health care providers. These were developed and tested for the original CDSM study and have been described elsewhere.¹⁶

Health Services Utilization

Four types of health care utilization were assessed: visits to physicians, visits to hospital emergency departments (EDs), number of hospitalizations, and number of nights spent in a hospital. In a previous study, self-reported utilization for all Northern California Kaiser Permanente members ($n = 216$) who participated in the CDSMP during the last 6 months of 1995 were validated against computerized medical records and medical charts.³ Self-reported outpatient physician visits, including emergency room visits, were well correlated with visits recorded in the computerized medical record ($r = 0.70$). Patients tended to underreport recorded visits by 17% when compared with the computerized medical records. Conversely, the computer records sometimes had visits recorded that were incorrectly classified. For days in the hospital, medical records data correlated even more highly with patient self-report ($r = 0.83$). Reporting discrepancies were similar over time, which lessened the concern that reporting errors biased study results.¹⁷ It should be noted that for the present study, self-reported data may well be more valid than computerized records, as 33% of the participants reported receiving some of their care outside of Kaiser Permanente.

Analysis

Paired t -tests were used to assess changes in outcome measures (health status, utilization, health behaviors, and self-efficacy) between baseline and 1 year. We used analysis of covariance to determine if health status and health care utilization outcomes differed among the programs taught by two peer leaders; two professional leaders; or a mixed pair of leaders, one of whom was a peer and the other a professional. These analyses were done by controlling for demographic variables and base-

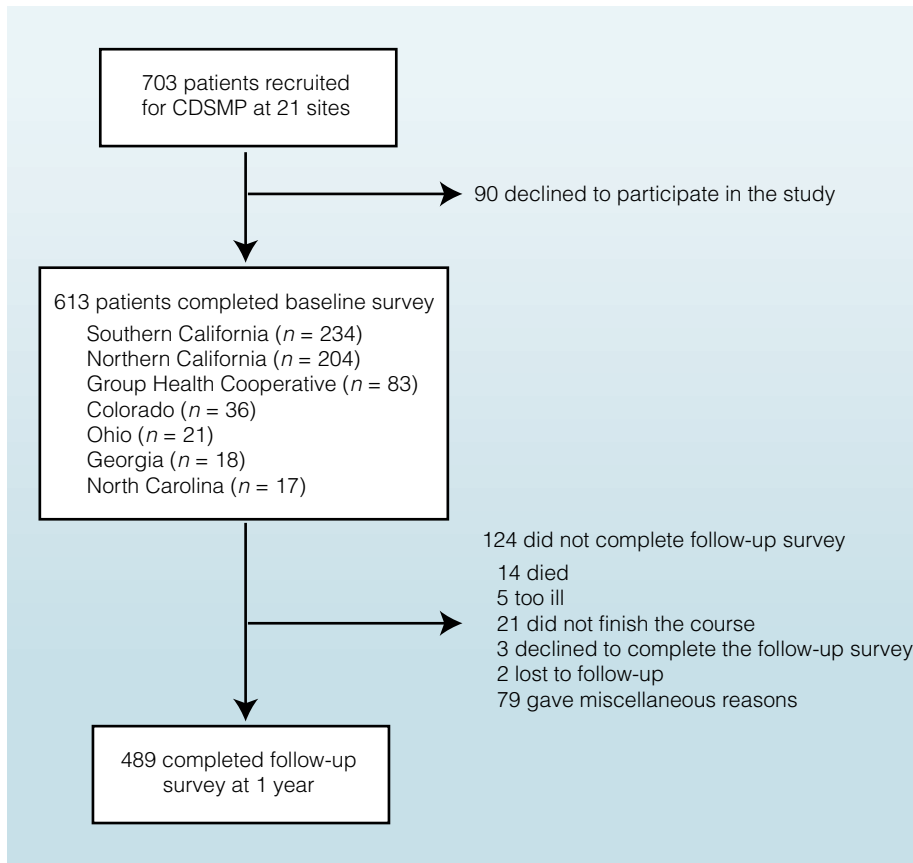


FIGURE 1. Study patients. CDSMP = Chronic Disease Self-Management Program.

line status of each outcome variable. Bonferroni corrections were also conducted for this last analysis to account for multiple comparisons.

Results

During the 1998 calendar year, 68 CDSM programs were offered in seven participating regions to a total of 703 patients (Figure 1). Six hundred thirteen patients (87%) completed the informed consent, attended one or more classes, and completed baseline questionnaires. Eighty percent of the patients ($n = 489$) completed 1-year questionnaires. There were no significant differences in the noncompletion rate by region. Patient characteristics are summarized in Table 2.

At 1 year, there were statistically significant improvements in seven of the nine health status measures: fatigue, shortness of breath, pain, social activity limitation, illness intrusiveness, depression, and health distress (Table 3). However, there were no significant differences from baseline in either self-rated health or disability. Participation in CDSMP was also associated with improvements in all health behaviors (exercise, cognitive symptom management, and improved communications with physicians) and in self-efficacy. There was a statistically significant reduction in the number of visits to EDs (0.1 fewer; $P < 0.05$) and trends toward

fewer visits to physicians (0.4 fewer; $P = 0.19$) and fewer days in the hospital (0.5 fewer; $P = 0.12$).

TABLE 2
Baseline Demographic Characteristics of Patients

CHARACTERISTICS	PATIENTS ($n = 613$)
Mean age, yr	62.2 years
Male	27%
Education (mean), yr	14.3 years
Married	64%
Non-Hispanic white	83%
Mean number of chronic diseases	2.3
Chronic disease	
Lung	21%
Heart	24%
Diabetes	26%
Arthritis	42%

We conducted 19 analyses to determine if the status of the leaders (two peer, two professional, and one peer/one professional) affected health behavior, health status, or health care utilization outcomes. After correcting for multiple comparisons, we found no significant differences. Thus, it appears that CDSMP outcomes are the same whether the program is led by peers or professionals.

Discussion

We found that patient use of CDSMP was associated with better outcomes in all study domains—small but statistically significant improvements in health status,

health behavior, and self-efficacy and less use of the ED. In this effectiveness study, participants were not recruited as “study participants,” nor were the programs given in a controlled study environment. Thus, our findings should be indicative of outcomes achievable in a “real-world” health care setting.

It is important to acknowledge several limitations in our study. First, given the before–after design, it is possible that the results obtained were not caused by the CDSMP. In fact, our results were similar to those of our previous randomized trial for the nine outcome variables common to both studies.³ A second concern involves dropouts. Approximately 20% of study patients dropped out by 1 year. These patients were younger and

TABLE 3
Changes at 1 Year in Health Status, Health Behaviors, Self-Efficacy, and Health Care Utilization

VARIABLE	BASELINE MEAN ± SD (n = 489)	12-MONTH CHANGE MEAN ± SD (n = 489)	P VALUE
Health status*			
Disability (0–3)	0.4 ± 0.4	0.0 ± 0.3	0.77
Health distress (0–5)	2.3 ± 1.3	−0.3 ± 1.2	≤ 0.001
Social/role activity limitation (0–4)	2.0 ± 1.1	−0.2 ± 1.0	≤ 0.001
Illness intrusiveness (1–7)	3.3 ± 1.4	−0.2 ± 1.2	≤ 0.001
Fatigue (1–10)	5.8 ± 2.5	−0.3 ± 2.4	0.002
Shortness of breath (1–10)	3.3 ± 3.0	−0.3 ± 2.5	0.003
Pain (1–10)	5.2 ± 3.0	−0.3 ± 2.5	0.03
Self-rated health (1–5)	3.3 ± 0.9	0.04 ± 0.8	0.20
Depression (0–3)	1.3 ± 0.6	−0.1 ± 0.5	≤ 0.001
Health behaviors			
Aerobic exercise (min/wk)	87 ± 94.7	13 ± 97.3	0.01
Range-of-motion exercise (min/wk)	35 ± 49.2	9 ± 55.8	≤ 0.001
Cognitive symptom management (0–3) [†]	1.3 ± 0.9	0.4 ± 0.9	≤ 0.001
Communication with physician (0–5) [†]	2.9 ± 1.2	0.2 ± 1.0	≤ 0.001
Self-efficacy (1–10) [†]	5.2 ± 2.2	0.5 ± 2.4	≤ 0.001
Health care utilization[‡]			
Physician visits (n, past 6 mo)	5.5 ± 6.0	−0.4 ± 7.2	0.19
Emergency department visits (n, past 6 mo)	0.4 ± 0.9	−0.1 ± 1.0	≤ 0.05
Hospitalizations (n, past 6 mo)	0.2 ± 0.6	−0.1 ± 0.7	0.14
Days in hospital (past 6 mo)	1.2 ± 5.9	−0.5 ± 7.3	0.12

*A lower score is better.

[†]A higher score is better.

[‡]Participants were asked to report utilization in the 6 months preceding the follow-up survey.

more likely to be nonwhite and unmarried (all $P < 0.05$). In addition, the impact of illness on their self-reported health was higher, they had higher activity limitations, and they made more doctor and ED visits at baseline (all $P < 0.05$). For these reasons, we repeated our analyses, carrying forward the last data collected, either baseline or 6 months. The only difference between this and the original analysis was that the trend toward fewer visits to physicians was stronger ($P = 0.08$).

Finally, as in all studies involving human patients, these participants were volunteers. Thus, the effects of this intervention can only be extrapolated to patients willing to take part in a 7-week group intervention. We have several indications that this may be a sizable percentage of the population with chronic illnesses. Glasgow and Toobert¹⁸ found that 40% of the diabetics in a group practice, when asked to participate, took part in a diabetes education program. Initially, most recruitment for the present study was centered on securing referrals from health professionals. More recently, recruiting for the CDSMP within Kaiser Permanente has been done largely through letters to panels of patients with targeted diseases. The acceptance rate with a single letter has been 5% to 10%.

Implementation of CDSMP may substantially reduce health care costs. Over the 1-year period, study participants had a mean of 0.97-day reduction in hospitalization ($P = 0.08$). This includes -0.45 days change in the first 6 months (data not shown in tables), plus -0.52 in the second 6 months (Table 3). They also averaged 0.2 fewer ED visits ($P = 0.01$) (-0.11 in the first 6 months plus -0.09 in the second 6 months). Taking \$1000 as an average cost per hospital day and \$100 for the average cost of an ED visit, the expected savings would be \$990 per participant in the first year. The cost of the intervention within the Kaiser Permanente system (including leaders' training, materials, and administration) is approximately \$200 per participant. If these changes are real, the savings for the 489 patients who completed the study were nearly \$400,000, or a 1:4 cost-to-savings ratio. This suggests that the program may more than pay for itself.

With growing recognition of the effectiveness of CDSMP, enrollment in the program in Kaiser Permanente had increased to 2500 participants in the year 2000. Further expansion of the program appears to be limited as much by system capacity (e.g., group leaders, space, scheduling) as by patient interest. Because most patient education interventions are disease-specific, it takes additional time and effort to recruit patients to our more generic program. However, we believe that the benefits likely to be achieved by self-management

Take-Home Points

- For patients with chronic disease, there is growing interest in “self-management” programs, which emphasize the patients’ central role in managing their illness.
- Although a randomized clinical trial has suggested the efficacy of self-management, we sought to examine the effectiveness of such programs in actual practice.
- We reported the effects of a Chronic Disease Self-Management Program on health status and resource use in 489 managed care patients.
- Patients enrolled in the self-management program experienced small but statistically significant improvements in health status, health behaviors, and self-efficacy. In addition, patient use of the program was associated with fewer emergency department visits.
- Because both efficacy trials and “real-world” studies suggest their effectiveness, health systems should consider implementing self-management programs for patients with chronic conditions.

justify the energy and resources required to implement the programs.

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