

Effectiveness of a Group Outpatient Visit Model for Chronically Ill Older Health Maintenance Organization Members: A 2-Year Randomized Trial of the Cooperative Health Care Clinic

John C. Scott, MD,* Douglas A. Conner, PhD,[‡] Ingrid Venohr, RN, PhD,[§] Glenn Gade, MD,^{||} Marlene McKenzie, RN,[§] Andrew M. Kramer, MD,[†] Lucinda Bryant, PhD,[†] and Arne Beck, PhD[‡]

OBJECTIVES: To compare the effectiveness of Cooperative Health Care Clinic (CHCC) group outpatient model for chronically ill, older health maintenance organization (HMO) patients) with usual care.

DESIGN: Two-year, randomized, controlled trial conducted with recruitment from February 1995 through July of 1996.

SETTING: Nonprofit group model HMO.

PARTICIPANTS: Two hundred ninety-four adults (145 intervention and 149 usual care), aged 60 and older (mean age 74.1) with 11 or more outpatient visits in the prior 18 months, one or more self-reported chronic conditions, and expressed interest in participating in a group clinic.

INTERVENTION: Monthly group meetings held by patients' primary care physicians.

MEASUREMENT: Differences in clinic visits, inpatient admissions, emergency room visits, hospital outpatient services, professional services, home health, and skilled nursing facility admissions; measures of patient satisfaction, quality of life, self-efficacy, and activities of daily living (ADLs).

RESULTS: Outpatient, pharmacy services, home health, and skilled nursing facility use did not differ between groups, but CHCC patients had fewer hospital admissions ($P = .012$), emergency visits ($P = .008$), and professional services ($P = .005$). CHCC patients' costs were \$41.80 per member per month less than those of control patients. CHCC patients reported higher satisfaction with their primary care physician ($P = .022$), better quality of life ($P = .002$), and greater self-efficacy ($P = .03$). Health status and ADLs did not differ between groups.

CONCLUSION: The CHCC model resulted in fewer hospitalizations and emergency visits, increased patient satisfaction, and self-efficacy, but no effect on outpatient use, health, or functional status. *J Am Geriatr Soc* 52:1463–1470, 2004.

Key words: chronically ill; older adults; group visits; self-efficacy; satisfaction; utilization

Group models of chronic disease management have shown improved clinical outcomes and patient satisfaction with medical care.^{1–5} An earlier 12-month clinical trial of one model, the Cooperative Health Care Clinic (CHCC), showed significant benefits compared with usual care for prefrail seniors. A second intervention trial of the CHCC model was conducted to evaluate longer-term outcomes of this model and to examine use of professional services. This trial was a larger-scale (multiple vs a single clinic and 19 vs 6 physician-led groups) and longer-term (24 vs 12 months) replication of the previous investigation.¹ In addition, utilization data for professional services was added in this trial. Professional services include services not provided by the health plan, such as durable medical equipment, non-health plan physician services, radiology, laboratory tests, physical therapy, and ambulance. The goals of this current trial were to compare the effectiveness of the CHCC model with usual care for older, chronically ill health maintenance organization (HMO) members. The results are reported for a subgroup of patients who, before enrollment and randomization, expressed an interest in participating in a group care model. People differ in their comfort with social/group interaction, and these patients represented that portion of the population that felt most comfortable with the idea of group care. Health plan decision-makers were most interested in measuring the effectiveness of the group model in members who more closely resembled those patients who would participate in CHCC groups if the model was implemented throughout the health plan. Therefore, results are presented from patients who responded with interest in participating in the group care

From the Divisions of *Geriatrics and [†]Health Care Policy and Research, University of Colorado Health Sciences Center, Denver, Colorado; and [‡]Clinical Research Unit, [§]Senior Programs, and ^{||}Administration, Kaiser Permanente, Denver, Colorado.

Supported by the Robert Wood Johnson Chronic Care Initiative, Grant 024738.

Address correspondence to Douglas Conner, PhD, Clinical Research Unit, Kaiser Permanente, PO Box 378066, Denver, CO 80237.
E-mail: Douglas.A.Conner@KP.Org

model to increase the generalizability to future participating health plan members. It was hypothesized that the CHCC group model would be associated with better care and better outcomes, defined as:

1. increased member satisfaction with their health care
2. increased self-efficacy to manage their health condition(s)
3. increased overall quality of life
4. decreased functional decline
5. reductions in use of healthcare services, especially hospital and emergency department (ED) services

METHODS

Patients

The study was conducted at Kaiser Permanente in the Colorado Region, a group model HMO currently serving approximately 410,000 members in the Denver metropolitan area. The Kaiser Permanente Northern California institutional review board reviewed and approved all aspects of the study. The 294 study patients, who had expressed a strong interest in participating in a group care model, were a subset of a larger study population of 793 patients who agreed to participate in the study (Figure 1). Study patients received primary care from 19 physicians in nine outpatient clinics. Study enrollment began in February 1995 and con-

tinued until July 1996. Study personnel mailed health surveys to patients who were aged 60 and older, had had at least 11 outpatient clinic visits in the prior 18 months (participants with frequent visits to their physician were selected), and were members of the group of patients treated by a physician participating in the study. The survey served to identify members who met the inclusion criteria for the study (described below) and to provide baseline data for group comparisons. Survey items measured health status, presence of chronic conditions, independence and mobility, living arrangement, activities of daily living (ADLs) and instrumental ADLs (IADLs), depression, and dementia. The survey also included the following statement: "Kaiser Permanente is considering starting regular group health education and patient care clinics for our adult members. The groups and their personal physician and nurse would meet once a month for health maintenance checks, health education, and discussions of both medical and nonmedical issues. Would you be interested in attending these group clinics, should they be started?" Possible responses were: yes, no, and interested but need more information.

Patients were excluded from the study if they did not express an interest in the group care model (answered no on the interest item), were home- or bed-bound, lacked transportation, or had dementia scores that indicated serious cognitive impairment. Remaining patients who returned their surveys and responded yes or interested were eligible for participation if they reported one or more chronic conditions and their physician approved their participation in the study.

Power and sample size estimates were based on results from the earlier pilot study¹ because the two study populations were similar in terms of age, chronic conditions, and utilization. Power estimates, which were performed before the start of the larger study and not for the subgroup of patients reported here, generated the following estimates of effect sizes (ES) and the samples (n) required for each arm: clinic utilization, ES = 0.28, n = 202; ED visits, ES = 0.21, n = 364; patient satisfaction, ES = 0.43, n = 86; health status, ES = 0.22, n = 327; total cost, ES = 0.21, n = 259.

Randomization

Eligible patients were randomized to the CHCC model or to a usual care control group using a computer-generated random number sequence. Randomization was done within each physician's group of patients to control for differences between physicians' practice styles. Only patients who responded yes to the interest question were included in this analysis (294 out of 793 patients (37.1%).

Recruitment into the study, which the institutional review board approved, followed a Zelen procedure in which randomization occurred before contacting patients for participation and only those randomized to a CHCC group were contacted.⁶ Control patients had no knowledge of their participation in the study, except for the health status survey that asked whether they would be interested in participating in group care. Control patients received an additional health survey and a patient-satisfaction and self-efficacy survey 24 months after their study enrollment. Control patients continued to receive the same care from their primary care physician that they had received before

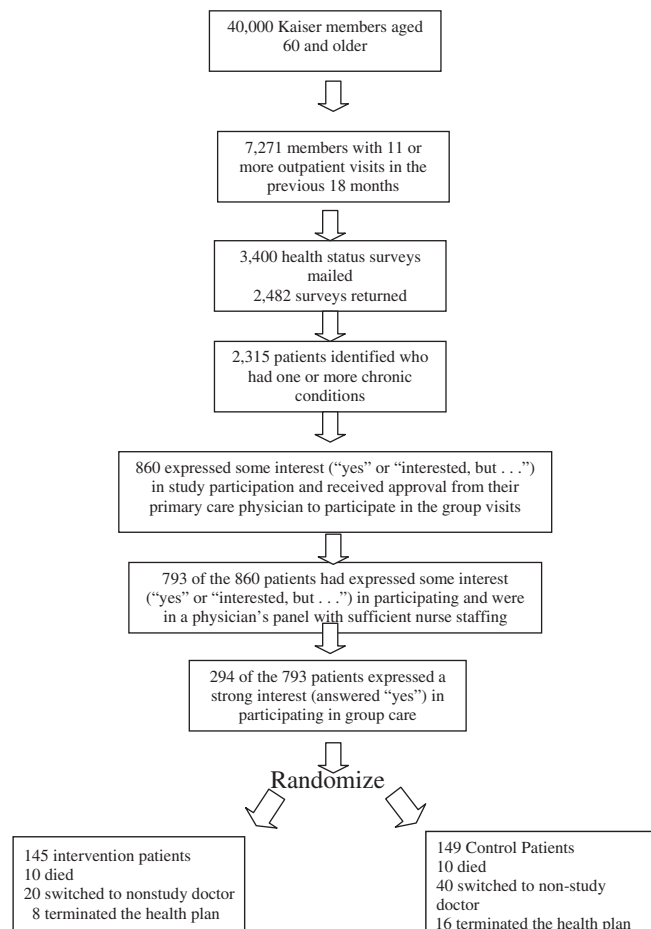


Figure 1. Cooperative Health Care Clinic patient enrollment.

the start of the study. The minimal study contact with control patients was deliberate, to minimize dissatisfaction of control group members who might have wanted to participate in the CHCC groups. Patients randomized to the intervention group received letters requesting their participation in the study, a consent form, and a return postcard to indicate their willingness to participate. Data from all consenting members were included in the analyses.

Intervention

Research staff contacted intervention members by telephone to schedule an initial group meeting. Groups met with their primary care physician and a nurse every month for 90 minutes. Other providers (e.g., physical therapists, pharmacists, occupational therapists, and individuals representing community resources) attended as needed, depending on the topics scheduled for discussion during the group visit. A typical group meeting consisted of a warm-up period, an education component, a caregiving period, and a question and answer period, followed by planning the next meeting. After each meeting, the physician would meet briefly one-on-one with individual patients as needed.

Each group visit began with a 15-minute spontaneous or organized warm-up period. For the first few meetings, reminiscence therapy techniques were used to identify common experiences among group members to build a sense of group cohesiveness. In later groups this process became more informal (e.g., jokes, stories about vacations, grandchildren).

A 30-minute presentation on specific health-related topics followed the warm-up period. Six core topics were presented during meetings after introduction to the program: patient care notebooks, routine health maintenance, pharmacy brown bags, advanced directives, emergency care, and continuing care. Other topics included chronic pain; nutrition; exercise; home safety; and disease processes such as stroke, hypertension, arthritis, osteoporosis, and Alzheimer's disease. Participants requested some topics. The physician and other members of the CHCC interdisciplinary healthcare team (nurse, clinical pharmacist, physical therapist, and dietitian) presented topics.

A 20-minute caregiving period followed, during which the nurse took blood pressures; reviewed patient charts for immunizations, laboratory tests, and immediate healthcare needs; and scheduled future, individual physician visits, if needed. At the same time, the physician responded to minor patient concerns, refilled prescriptions, and responded to individual needs. Patients not being evaluated by the nurse or physician had an opportunity to socialize and have refreshments.

Fifteen minutes were dedicated to questions and answers about material covered in the educational period or any other patient's inquiry. An additional 10 minutes were used to elicit ideas for the following month's education topic and to schedule the next month's meeting.

A 60-minute period for patients needing private office visits to meet individually with their physician for 5 to 10 minutes followed each group meeting.

Outcome Measures

The health survey sent to patients before the start of the study provided baseline health and functional status data.

Patients were asked to rate their current health status as excellent, very good, good, fair, or poor.

Functional activities were measured using three unidimensional scales.⁷ A series of theoretically directed factor and principal components analyses of items from the ADLs⁸ and IADLs⁹ were used to obtain the three unidimensional scales: basic, household, and advanced ADLs. The basic ADL consisted of four activities⁸ (assistance with bathing, dressing, getting in/out of bed, and toileting) plus one from an expanded ADL list (walking inside the house).⁷ The household ADL consisted of four activities from the IADL scale (preparing meals, grocery shopping, household chores, and traveling to places out of walking distance). ADL and IADL items that were not part of the basic or household dimensions constituted the advanced ADL (2 activities from the IADLs (managing money and using the telephone) and 1 from the ADLs (feeding oneself)). The developers of these scales⁷ suggest that the advanced ADL represents a group of activities that depend more on cognitive capacity than physical activity. Although the basic and household scales reflect a physical hierarchical relationship, the advanced scale, because of its strong cognitive component, is more independent of the other two.

A patient satisfaction survey that the health plan has used for several years in a variety of patient settings was administered at baseline and 24 months to both groups. Items included satisfaction with their primary care physician, the nurses they came in contact with, the amount of health education they received, and their overall rating of the quality of care.

Several scales measuring self-efficacy to perform self-management behaviors¹⁰ were administered at 24 months to measure patients' perceived confidence in communicating with their physician (3 items), managing their disease (5 items), doing chores (3 items), participating in social/recreational activities (2 items), and controlling/managing depression (6 items). Scores for each item ranged from 1 to 10, with 10 indicating greatest self-efficacy.

Administrative databases provided utilization and cost data, including ED visits, inpatient services, professional services, home health visits, and skilled nursing facility admissions. These databases are used for treatment, payment, and operations and are continuously checked for their accuracy. Each member's unique health record number, assigned to them by the health plan, linked all elements from the disparate databases.

Service utilization and resulting costs were measured for 12 months before a patient's study enrollment and for 24 months after enrollment. Outpatient utilization costs were measured for visits to each type of clinic department and provider. These costs are internally generated and are based on an average cost for the type of provider (physician, nurse, physician assistant) and department plus a standard administrative cost. Pharmacy charges came directly from administrative cost figures for each pharmacy fill and represented the acquisition cost to the health plan. A claims and referral database that tracks services and costs not directly provided by the health plan provided hospital, ED, professional services, home health, and skilled nursing facility charges. Costs from the claims and referral system represented amounts paid by the health plan to the outside provider.

The total cost for all CHCC group meetings was estimated as the sum of the costs for each meeting based on the amount of time providers spent at the meeting and their mean hourly salaries. There were no adjustments for the number of patients attending a meeting because the cost of a meeting remained the same regardless of how many patients attended.

Statistical Analysis

Analyses included data for all patients enrolled in the study who responded yes to the study participation interest question on the health survey (294 patients). A SAS mixed model analysis of variance (ANOVA) procedure with physician as a random effect generated comparisons between CHCC patients and controls at baseline for continuous measures (SAS Institute, Inc., Cary, NC). The Cochran-Mantel-Haenszel test, using the general association statistic (Q_{GMH}), assessed differences between intervention and control groups at baseline for dichotomous measures, adjusting for physician, and at the end of the study for patient switches to nonstudy physicians and plan terminations.¹¹

The GENMOD procedure in SAS,¹¹ adjusted for physician, assessed differences in the number of utilization encounters for each service area (e.g., outpatient visits, hospital admissions, ED visits) for CHCC and control groups. A repeated measure approach permitted inclusion of the effects of prestudy utilization. Models were adjusted for the number of months of use for the prestudy and study period to account for differences in the length of the time utilization was measured before the study (12 months) and during the study (24 months).

A \log_{10} transformation adjusted for skewed distributions in the dependent variable cost and was used in multiple regression analyses to assess differences in the cost of services between CHCC and control patients with study arm, transformed prestudy cost, and physician as the independent variables.

The GENMOD procedure in SAS,¹¹ adjusted for physician and using a repeated measures approach to include the effect of baseline satisfaction scores, assessed differences in subject satisfaction scores between CHCC and control patients. Polytomous responses were analyzed using a multinomial distribution.

Categorical changes in basic, advanced, and household ADLs, the categorical change in health status at 24 months, and several satisfaction items given to members only at 24 months were tested using the GENMOD procedure with fixed effects but without repeated measures.¹¹

Self-efficacy items were combined as a scale score computed as the mean of all item responses in the scale. A mixed model ANOVA tested differences between CHCC and control patients with each self-efficacy scale score as the dependent variable, physician as a random effect, and study arm as a fixed effect.

RESULTS

Table 1 shows the demographic and baseline data for the 146 intervention and 149 control patients. No significant differences existed for any baseline measure.

Table 1. Baseline Characteristics of Patients Enrolled in the Cooperative Health Care Clinic (CHCC) Group and Control Group

Baseline Characteristic	CHCC (n = 145)	Control (n = 149)	P-value*
Age, mean \pm SD	74.2 \pm 7.6	74.1 \pm 7.4	.90
Female, %	61	57	.43
Married, %	59.6	57.4	.65
Chronic conditions, %			
Congestive heart failure	8.4	11.5	.46
Chronic lung disease	11.2	19.6	.08
Blindness/trouble seeing	12.5	14.3	.76
Deafness/trouble hearing	31.5	30.4	.84
Diabetes mellitus	12.6	18.2	.15
Asthma	14.7	13.5	.84
Ulcer/gastrointestinal bleeding	6.3	6.8	.95
Arthritis	62.9	57.4	.25
Hypertension	42.4	45.6	.52
Angina pectoris	16.1	15.4	.73
Myocardial infarction	16.8	21.5	.33
Stroke	8.3	9.4	.79
Kidney disease	7.0	4.0	.21
Cancer	20.8	15.4	.29
Number of prescriptions, mean \pm SD	4.8 \pm 3.7	4.9 \pm 3.5	.80
No mobility limitation, %	77.8	76.0	.69
Depression, %	19.7	19.4	.95
Memory problems, %	19.2	15.3	.27
Live alone, %	34.7	34.0	.93
No basic ADL deficits, % [†]	33.8	32.2	.72
No advanced ADL deficits, % [‡]	97.9	93.3	.59
No household ADL deficits, % [§]	81.4	79.9	.97
Fair or poor health status, %	23.8	25.5	.77

* Mixed-model analysis of variance with physician as a random effect for mean comparisons. Cochran-Mantel-Haenszel test with general association statistic adjusted for physician for proportions.

[†] Able to walk without help, bathe, dress, get in/out of bed, and use the toilet unassisted.

[‡] Able to feed oneself, able to manage money, and use the telephone unassisted.

[§] Able to prepare meals, do household chores, shop for groceries, and travel to places beyond walking distance unassisted.

ADL = activity of daily living; SD = standard deviation.

Group Attendance

Four hundred fifty-nine group meetings occurred during the 24-month period (mean number of meetings/physician = 24.3). Over the same period, a mean of 7.7 patients attended each CHCC group. CHCC patients attended a mean of 10.6 group meetings (40.8% of the total number of group meetings held) during the study, but attendance varied widely over the 24-month period, with approximately 25.5% attending two or fewer group meetings.

Twenty-Four Month Utilization and Costs

Table 2 shows the repeated measure analysis results for utilization. Compared with controls, CHCC members had fewer emergency department visits (chi-square (χ^2) = 9.8, P = .008) and fewer inpatient admissions (χ^2 = 5.8, P = .013) and used fewer professional services than

Table 2. Utilization at 24 Months for Cooperative Health Care Clinic (CHCC) and Control Patients

Type/Unit of Service	CHCC (n = 145)		Control (n = 149)	P-value*
	Mean ± Standard Deviation			
Clinic visits/patient	33.0 ± 21.4		34.0 ± 22.6	.48
Pharmacy fills/patient	45.0 ± 40.4		48.0 ± 49.1	.53
Hospital admissions/patient	0.44 ± 0.89		0.82 ± 1.7	.013
Hospital observation admissions/patient	0.16 ± 0.45		0.38 ± 2.2	.26 [†]
Hospital outpatient visits/patient	0.92 ± 3.7		0.72 ± 2.2	.81 [†]
Professional services/patient	5.9 ± 10.1		10.3 ± 17.9	.005
Emergency visits/patient	0.66 ± 1.3		1.1 ± 1.5	.008
Skilled nursing facility admissions/patient	0.15 ± 0.68		0.28 ± 1.20	.28 [†]
Home health visits/patient	0.8 ± 2.5		1.3 ± 3.1	.06

* Based on type III generalized estimating equation analysis chi-square adjusted for physician.

[†] There were not enough visits/admissions by patients from each physician's group for an analysis to be run using physician as an independent variable.

controls ($\chi^2 = 7.5, P = .005$). No differences were observed in clinic visits, pharmacy fills, outpatient hospital visits, observation unit admissions, skilled nursing facility (SNF) admissions, or home health visits.

Table 3 presents differences in the cost of utilization between CHCC and control group members. CHCC members had significantly lower costs associated with ED visits than did controls (mean ± standard deviation = \$324.66 ± 675.20 vs \$607.07 ± 984.73, $t = 3.2, P = .001$). There were no other significant differences in utilization costs. Hospital, professional services, and health-plan termination costs approached significance ($P < .10$), with lower costs in the CHCC group.

The average per patient group cost over 24 months was \$484, which included salary and overhead for the physician, nurse, and any other provider attending the group. The average physician cost was \$375 (77.4% of the total average cost). The average monthly cost advantage per CHCC member over the 24 months of the study was \$133 (\$463 for control patients – \$330 for CHCC). The cost advantage for CHCC patients before the start of the study

was \$92 per patient per month. CHCC group members' monthly costs were \$42 per member less than those of control members when adjusted for costs 12 months before the start of the study (\$133 cost advantage during the study — \$92 cost advantage before the study), but this difference was not statistically significant.

Patient Satisfaction, Self-Efficacy, and Quality of Life

Seventy-eight percent of the patients returned the mailed survey at 24 months (Table 4). Patient satisfaction scores at 24 months (adjusted for baseline scores) were significantly higher for CHCC patients for satisfaction with their primary care physician ($\chi^2 = 5.27, P = .022$), the physician's unhurriedness ($\chi^2 = 7.13, P = .008$), the time spent with the physician ($\chi^2 = 3.78, P = .052$), and overall quality of care ($\chi^2 = 3.89, P = .048$). CHCC members expressed significantly greater satisfaction talking to their physician about advanced directives ($\chi^2 = 15.1, P < .001$). They also felt that they had learned things from the pharmacists that helped them manage their medications better ($\chi^2 = 6.87,$

Table 3. Average Costs by Type of Service Between Cooperative Health Care Clinic (CHCC) Subjects and Control Subjects: 24 Months of Utilization

Type of Service	CHCC (n = 145)		Control (n = 149)		Difference*	P-value [†]
	Mean ± SD	Median	Mean ± SD	Median		
Clinic	2,144 ± 1,834	1,708	2,127 ± 1,772	1,562	17	.34
Pharmacy	664 ± 759	383	802 ± 1,219	402	(138)	.66
Hospital	2,141 ± 4,918	0	4,432 ± 11,698	0	(2,291)	.07
Hospital observation	136 ± 570	0	168 ± 520	0	(32)	.14
Hospital outpatient	555 ± 2,889	0	498 ± 1,521	0	57	.46
Professional services	700 ± 1,225	93	1,326 ± 2,390	335	(626)	.09
Emergency room	325 ± 675	0	607 ± 985	113	(282)	.001
Skilled nursing facility	501 ± 2,565	0	623 ± 2,715	0	(122)	.26
Home health	211 ± 682	0	392 ± 926	0	(181)	.19
Cost of termination from Kaiser Permanente	55 ± 293	0	140 ± 453	0	(85)	.06
Total cost	7,916 ± 9,387	3,861	11,115 ± 17,037	6,025	(3,199)	.66

* Negative value = cost advantage to CHCC.

[†] P-values based on multiple regression of log10 costs adjusted for physician. SD = standard deviation.

Table 4. Self-Reported Quality of Life, Self-Efficacy, and Patient Satisfaction at 24 Months: Comparison Between Co-operative Health Care Clinic (CHCC) and Control Patients

Self-Reported Assessment	CHCC (n = 115)	Control (n = 114)	P-value*
	Mean ± SD		
Quality of life score [†]	7.2 ± 1.8	6.3 ± 2.0	.002
Self-efficacy scale			
Confidence communicating with my physician	8.9 ± 1.3	8.5 ± 1.7	.03
Confidence managing my disease	8.0 ± 1.7	8.0 ± 1.8	.94
Confidence doing chores	7.7 ± 2.4	7.5 ± 2.7	.92
Confidence with social activities	8.0 ± 2.2	7.6 ± 2.7	.26
Confidence managing depression	8.0 ± 1.8	7.6 ± 2.1	.21
Patient satisfaction with [‡]			
PCP	1.2 ± 0.5	1.5 ± 0.6	.022
PCP's attentiveness	1.2 ± 0.4	1.4 ± 0.6	.192
PCP's unhurriedness	1.5 ± 0.6	1.8 ± 0.8	.008
PCP's explanation of condition	1.3 ± 0.5	1.4 ± 0.6	.297
Time spent with the PCP	1.3 ± 0.6	1.6 ± 0.7	.052
Clinic nurse	1.1 ± 0.3	1.3 ± 0.6	.068
Overall quality of care	1.6 ± 0.6	1.9 ± 0.7	.048
Amount of health education	1.4 ± 0.6	1.6 ± 0.7	.279
Patient satisfaction at 24 months with [§]			
Talking to PCP about advanced directives	3.9 ± 0.8	3.5 ± 0.9	<.001
Talking with the pharmacist	3.9 ± 1.0	3.6 ± 1.0	.009
Education from the pharmacist	3.5 ± 1.1	3.4 ± 1.1	.759
Education from the nurse	3.7 ± 0.92	3.5 ± 0.94	.048

* P-values based on type III generalized estimating equation analysis chi-square adjusted for physician.

[†] Based on a 10-point scale, with 10 indicating the greatest quality of life possible.

[‡] Patient satisfaction at 24 months adjusted for baseline satisfaction. Four-point scale, with 1 indicating the greatest satisfaction.

[§] Patient satisfaction measured at 24 months only. Ten-point scale, with 1 indicating the greatest satisfaction.

PCP = primary care physician; SD = standard deviation.

$P = .009$) and had learned things from the nurse to better manage their health condition(s) ($\chi^2 = 3.91$, $P = .048$).

Twenty-four patients from the study sample, eight CHCC members (5.5%) and 16 control group members (10.7%) terminated their plan memberships during the 24 months of the study ($Q_{GMH} = 2.10$, $P = .147$). Sixty patients switched from a CHCC study physician to a nonstudy physician over the 24-month period ($Q_{GMH} = 8.76$, $P = .003$). Twenty were CHCC members (6.8%), and 40 were controls (13.6%).

The self-efficacy rating for communication with their physician was significantly greater for CHCC patients than for controls ($F = 4.8$, $P = .03$) (Table 4). There were no significant differences for the remaining self-efficacy scales.

CHCC members reported a significantly higher overall quality of life at 24 months ($F = 9.7$, $P = .002$) (Table 4).

Functional Outcomes

Comparisons of health status and advanced, household, and basic ADLs showed no significant differences in proportions of members whose status declined, remained unchanged, or improved during the 24 months of the study.

Effect of Group Attendance on Outcomes

More than 25% of CHCC members attended fewer than three meetings (nonattenders). Nonattenders had few

differences in baseline measures (Table 1) from those who attended three or more meetings. A greater proportion of nonattenders reported a history of diabetes mellitus and cancer. Nonattenders were also more likely to live with relatives and less likely to have a living will.

Nonattenders had significantly fewer clinic visits and pharmacy fills but significantly more SNF admissions at 24 months. Clinic costs were significantly lower for nonattenders, whereas SNF costs were higher.

DISCUSSION

CHCCs were associated with increased self-efficacy; better communication between participants and physicians; better quality of life; fewer health plan terminations and switching to nonstudy physicians; and lower emergency, hospital, and professional services utilization. There were no significant changes in function or health status. Although the only statistically significant difference in cost was for fewer ED visits by CHCC patients, the overall cost savings for CHCC patients over the 24-month study was \$41.80 per member per month. CHCC participants also expressed significantly greater patient satisfaction in a number of areas than did controls. Higher satisfaction scores are important because CHCC members and controls of the same primary care physicians were compared with control for differences in individual practice variation. Although there were likely to

be additional factors at work, fewer terminations from the health plan and switching to nonstudy physicians by CHCC members may also reflect higher satisfaction with their health care. These outcomes may be the result of benefits inherent in the CHCC group model: a multidisciplinary team approach to medical care, regularly scheduled monthly meetings, enhancement of the provider-patient relationship, increased health education, and the therapeutic benefit of group interactions between patients and between patients and their providers. Patients who actively participate in their care are also more likely to show better adherence and report higher satisfaction.¹²

Other recent studies have confirmed the benefits of multidisciplinary teams in the management of patients with chronic conditions,^{13,14} including reductions in hospital admissions,^{4,15-17} increases in self-reported quality of life,¹⁷ medication compliance,¹⁸ and improvement in clinical laboratory values such as hemoglobin A_{1c} levels.^{4,5} The CHCC group model uses the expertise of a number of different healthcare professionals (e.g., pharmacists, physical therapists, social workers, and dietitians).

The CHCC model provides regularly scheduled opportunities for patients to see their primary care providers. Regularly scheduled visits allow providers to monitor patients more closely and recognize geriatric syndromes that evolve slowly over time. Providers are better able to understand each patient's capabilities, detect adverse events and complications, check care plan adherence, encourage self care, and recognize a patient's failure to respond to treatment.^{13,19} Other types of regular follow-up that have been shown to be effective include telephone follow-up,^{16,20,21} home visits,¹⁷ and other regularly scheduled group visit interventions.^{3,4,22} These have resulted in decreased ED and outpatient visits, decreased hospital admissions, increases in self-reported patient self-efficacy and health status, and better glycemic control. Increased, regular contact with their physicians allows CHCC patients to become familiar with their providers as persons and may increase their comfort level in talking to them.

The role of education and supportive interventions in the effective treatment of chronic disease has been well documented.^{17,20,21,23,24} Interactive discussions during the CHCC group meeting, led by a multidisciplinary healthcare team, on health-related topics provide important information related to group members' health problems.

Limitations of the CHCC Group Model

A number of factors may limit benefits of the CHCC group model. CHCC and other senior group models may not be effective in other than prefrail patients. Any economic advantage depends on maintaining an adequate group size and savings in costly utilization (e.g., hospital admissions and ED use) that may occur only within an integrated system of care. The model requires periodic monitoring to maintain the interactive group environment. Group care models are not suitable for patients who are uncomfortable with group interactions or for physicians who are not comfortable leading group discussions. Finally, many benefits of the CHCC group are invisible to clinic staff, making it difficult to obtain ongoing clinic support.

There is evidence that the CHCC and other similar group care models may not benefit all older populations with multiple chronic conditions. Investigators have studied an intensive primary care intervention for patients with diabetes mellitus, congestive heart failure, chronic obstructive pulmonary disease, and extremely low quality-of-life scores over a 6-month period.²⁵ They found that intervention patients had poorer outcomes. Others have compared half-day chronic care with usual care in a frail, older population.² After 24 months, they found no significant improvement in outcomes for either group. Patients in both studies appeared to have more complex chronic conditions, greater functional impairment, and greater risk for poor outcomes than did patients in this study.

CHCC may not be a substitute for the regular office visit in prefrail seniors because clinic use did not change. Service utilization savings came from the prevention of more costly ED visits, hospital admissions, and professional services.

Limitations of the Study

A major limitation of the study was the potential loss of adequate power due to selection of a subsample of patients from a larger study population. The power analysis for the study computed before this selection provided larger sample size estimates to support small to medium effect sizes for most primary outcomes than the subsample provided. Aside from patient satisfaction comparisons, nonsignificant results for utilization, costs, health status, and self-efficacy remain open to type II error.

Generalizability of the results is limited to prefrail, high-usage seniors with limited functional impairments who had expressed an interest in participating in a group care model. Interest in a group care model may have resulted in a better match between patient and care model that then influenced the greater satisfaction and quality of care expressed by CHCC participants. This group care model is inappropriate for individuals who feel uncomfortable in a group social setting. It was attempted to avoid this problem by choosing only study patients who had expressed a strong interest in participating in a group model, but this was not completely effective because more than 25% of those who expressed an interest attended fewer than three meetings.

There were a number of significant differences between those who attended fewer than three group meetings and more frequent attendees that may also characterize nonattendees. These differences in chronic disease and utilization may represent a population for which the group care model is inappropriate. It may also suggest that patients must attend a minimum number of group meetings to benefit from the group model intervention.

Because self-efficacy data were not collected at baseline, it was not possible to examine possible changes in these items over time or whether the groups differed at baseline.

ACKNOWLEDGMENT

We are indebted to Eric Coleman for his advice during preparation of an earlier version of the manuscript and to several anonymous reviewers for their comments.

REFERENCES

1. Beck A, Scott J, Williams P et al. A randomized trial of group outpatient visits for chronically ill older HMO members: The cooperative healthcare clinic. *J Am Geriatr Soc* 1997;45:543–549.
2. Coleman E, Grothaus L, Sandhu N et al. Chronic care clinics: A randomized control trial of a new model of primary care for frail older adults. *J Am Geriatr Soc* 1999;47:775–783.
3. Noffsinger E. Increasing quality care and access while reducing cost through drop-in group medical appointments (DIGMAs). *Group Pract J* 1999;48:12–18.
4. Sadur C, Moline N, Costa M et al. Diabetes management in a health maintenance organization: Efficacy of care management using cluster visits. *Diabetes Care* 1999;22:2011–2017.
5. Wagner E, Grothaus L, Sandhu N et al. Chronic care clinics for diabetes in primary care: A system-wide randomized trial. *Diabetes Care* 2001;24:695–700.
6. Zelen M. The randomization and stratification of patients to clinical trials. *J Chronic Dis* 1974;27:365–375.
7. Wolinsky F, Johnson R. The use of health services by older adults. *J Gerontol* 1991;46:S345–S347.
8. Katz S, Ford A, Moskowitz R et al. Studies of illness in the aged: The index of ADL. A standard measure of biological and psychosocial function. *JAMA* 1963;185:94–99.
9. Duke University Center for the Study of Aging and Human Development. Multidimensional Functional Assessment Questionnaire, 2nd Ed. Durham, NC: Duke University, 1978, pp 169–170.
10. Lorig K, Stewart A, Ritter P et al. Outcome Measures for Health Education and Other Health Care Interventions. Thousand Oaks, CA: Sage Publications, 1996.
11. Stokes M, Davis C, Koch G. Categorical Data Analysis Using the SAS System. Cary, NC: SAS Institute, Inc., 2000.
12. Holman H, Lorig K. Patients as partners in managing chronic disease: Partnership is a prerequisite for effective and efficient health care. *BMJ* 2000;320:526–527.
13. Wagner E. The role of patient care teams in chronic disease management. *BMJ* 2000;320:569–572.
14. Wagner EH, Davis C, Schaefer J et al. A survey of leading chronic disease management programs: Are they consistent with the literature? *Manag Care Q* 1999;7:56–66.
15. Schraeder C, Shelton P, Sager M. The effects of a collaborative model of primary care on the mortality and hospital use of community-dwelling older adults. *J Gerontol A Biol Sci Med Sci* 2001;56A:M106–M112.
16. Maisiak R, Austin J, Heck L. Health outcomes of two telephone interventions for patients with rheumatoid arthritis or osteoarthritis. *Arthritis Rheum* 1996;39:1391–1399.
17. Rich MW, Beckham V, Wittenberg C et al. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *N Engl J Med* 1995;333:1190–1195.
18. West J, Miller N, Parker K et al. A comprehensive management system for heart failure improves clinical outcomes and reduces medical resource utilization. *Am J Cardiol* 1997;79:58–63.
19. Von Korff M, Gruman J, Schaefer J et al. Collaborative management of chronic illness. *Ann Intern Med* 1997;127:1097–1102.
20. DeBusk R, Miller N, Superko H et al. A case-management system for coronary risk factor modification after acute myocardial infarction. *Ann Intern Med* 1994;120:721–729.
21. Wasson J, Gaudette C, Whaley F et al. Telephone care as a substitute for routine clinic follow-up. *JAMA* 1992;267:1788–1793.
22. Forest CB, Starfield B. Entry into primary care and continuity: The effects of access. *Am J Public Health* 1998;88:1330–1336.
23. Holman H, Lorig K. Patient education: Essential to good health care for patients with chronic arthritis. *Arthritis Rheum* 1997;40:1371–1373.
24. Katon W, Von Korff M, Lin E et al. Collaborative management to achieve treatment guidelines: Impact on depression in primary care. *JAMA* 1995;273:1026–1031.
25. Weinberger M, Eugene Z, Henderson WG. Does increased access to primary care reduce hospital readmissions. *N Engl J Med* 1996;334:1441–1447.