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Clinical Outcomes Associated with Self-Management Classes among Patients of an Urban Community Health Center

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Abstract

The need for self-management training is increasing as more people are living with chronic conditions. In this Chronicle we compared clinical outcomes from attendees of two types of self-management training – Chronic Disease Self-Management Program (CDSMP) and diabetes self-management education (DSME) with a control group. Patients who took self-management training were more likely to lose 10% of their body weight and demonstrate a lower A1C over time compared to those in the control group.

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Background

The US healthcare system developed in response to acute infections and episodic health problems. Within this century, chronic conditions have replaced infectious diseases as the leading causes of death and disability in the US. Chronic diseases currently account for 70% of all deaths and 75% of our health care expenditures.[1] Americans now live longer and the current and projected incidence of chronic disease signifies a need to redesign health care systems and service delivery to better support people with chronic conditions.

Patients with chronic conditions make daily decisions that require skills and information to manage their illnesses. Traditional patient education provides patients the necessary information to understand and manage their condition and self-management education teaches problem-solving skills. Self-management programs have been shown to: a) enhance problem-solving skills; b) lead to improved clinical outcomes (compared to information-only programs); and c) yield cost savings (compared to usual care).[1-3]

The Stanford University Patient Education Research Center has tested and evaluated self-management programs for people with chronic health conditions for the past 20 years. Initially developed to address arthritis, Stanford's chronic disease self-management program (CDSMP) was expanded to a wide range of chronic conditions. Each variant of CDSMP has been designed to help people gain self-confidence in their ability to manage their symptoms and develop skill sets to manage their conditions.[4]

The CDSMP is designed to be led by trained lay persons, although health professionals can also co-lead the workshops. Workshop leaders meet with groups of 8 to 12 people with chronic conditions for 2 ½-hour sessions, once each week for 6 consecutive weeks. The workshop is intended for persons experiencing any type of chronic health condition. To increase social support, participants' significant others and caretakers are encouraged to attend. The CDSMP workshops address the following: starting an exercise program; managing cognitive symptoms; eating healthfully; practicing breathing exercises and other relaxation techniques; creating and modifying an action plan; solving problems; communicating with family, friends, and health care providers; and dealing with the emotions of chronic illness, particularly anger and depression.

The CDSMP was first evaluated in a 5-year randomized study involving more than 1,000 subjects.[4] This study found that people who participated in the program, when compared to people who did not, improved healthy behaviors (exercise, cognitive symptom management, coping and communications with physicians), improved their health status (self-reported health, fatigue, disability, social/role activities, and health distress), and decreased their days in the hospital, which was associated with a cost savings.[4] In one randomized trial, use of subsequent health service did not differ between the control and treatment groups; however, the treatment group (i.e., CDSMP attendees) did report greater health-related quality of life.[5]

Context

In 2006, Dr. Kate Lorig, one of the developers of the Stanford University CDSMP model, and a group of trainers came to Alaska to help the State of Alaska Section of Chronic Disease Prevention and Health Promotion initiate a state-supported chronic disease self-management program. To date, the Section has sponsored 149 workshops and taught self-management skills to over 1,000 patients.

Present at the 2006 training were 3 clinicians and a volunteer from the local federally qualified health center (FQHC). They were eager to become certified as trainers and leaders because CDSMP complemented the patient-centered care model that they had adopted as their healthcare delivery standard of care. In subsequent years, additional clinicians, volunteers, and patient lay leaders from this FQHC were trained as CDSMP leaders and cross-trained as leaders in the Diabetes Self-Management Program (DSMP) for persons with diabetes and Tomando Control de Su Salud for Spanish speakers with chronic conditions.

In addition to CDSMP, this FQHC offered DSMP workshops as well as diabetes self-management education training for persons with diabetes. Similar to CDSMP or DSMP, the diabetes self-management education (DSME) classes were highly structured and followed a national curriculum. Unlike CDSMP or DSMP, the DSME classes adhered to a traditional education model instead of a peer support model and there was no expectation that patients would attend for a 6-week session.

The benefits of CDSMP and self-management training are well-documented in the general population.[4-8] A meta-analysis of 23 studies showed significant increases in self-efficacy, health status, and health behaviors.[9] There are several published outcome studies of diabetes self-management education.[2,7,10-13] Most of these address avoided costs and/or improvement in A1C as an outcome of the training.

The purpose of this study was to learn if self-management workshop attendees show improvements in body mass index (BMI), blood pressure (BP), low density lipoprotein (LDL), or glycosylated hemoglobin (A1C).

Methods

Sample

This analysis included two groups: an intervention group of self-management workshop attendees and a control group. The workshop attendees, all of whom self-selected into the workshops, and the individuals in the control group were patients of a single FQHC. This FQHC provides healthcare to low-income urban residents in Anchorage, Alaska. In 2011, this FQHC provided services to 10,623 patients, 70% of whom were at the Alaska-adjusted federal poverty level or below. Non-whites comprised 55% of the clinic population and 22% of clients received services in a language other than English.[14]

To qualify as a workshop participant in this study, the individual must have attended 1 or more sessions of a CDSMP or DSME workshop between April and October 2009. Self-management training was widely advertised at the clinic and patients with diabetes were actively recruited. The control group was selected from the FQHC's registry of patients with diabetes who did not attend any self-management training beyond usual care.

Clinical Outcome Measures

The following biometric measures were obtained from clinic electronic health records for both workshop attendees and control group members: body mass index (BMI), blood pressure (BP), low density lipoprotein (LDL), and glycosylated hemoglobin (A1C). Biometric measures were recorded for CDSMP and DSME self-management workshop attendees and control group members. For class attendees, measures obtained prior to self-management classes were considered baseline measures. Follow-up measures for patients in all 3 groups were extracted from the patients' medical records. Class attendee measures were taken at 3, 6, and 12 months post workshop completion. Control measures were taken at 3, 6, and 12 months after baseline measures. Labs were not drawn specifically for this study; the values that were used were those recorded within a 4-week window around the 3, 6, and 12 month intervals. If there were no values recorded for a specific clinical measure during that window, missing values were assigned.

Body mass index was calculated based on the height and weight measurements. To determine if patients lost a clinically relevant amount of weight between baseline and each subsequent assessment, we used a conservative threshold of a 10% weight loss. The National Institutes of Health (NIH) recommends a 10% weight loss as an initial goal for those seeking to lose weight as this level of weight loss leads to improved health outcomes.[15]

Blood pressure was measured via a manual cuff according to American Heart Association standards and recorded by a nurse. For persons with diabetes, a blood pressure below 130 systolic and 80 diastolic is the goal of treatment, which is based on the ADA 2010 Clinical Practice Recommendations.[16] Those with both systolic BP less than 130 and diastolic BP less than 80, were considered "low risk", and those with systolic BPs greater than or equal to 130 or diastolic BPs greater than or equal to 80 were considered "high risk".

Low density lipoprotein was indirectly calculated via the Friedewald equation.[17] The goal of treatment for persons with diabetes is an LDL of less than 100, based on 2010 ADA recommendations.[16] Those with LDL less than 100 were considered "low risk", and those with LDL equal to or above 100 were considered "high risk".

Glycosylated hemoglobin was measured by a certified lab and standardized against the 1993 DCCT results.[18] According to the 2010 ADA recommendations, a target A1C of below 7.0 is associated with macrovascular disease risk reduction.[14] In this study, an A1C below 7.0 was considered "low risk" and an A1C of 7 or higher was considered "high risk".

Statistical Methods

An alpha level of 0.05 was used for all statistical tests.

Descriptive statistics, paired t-tests, and chi-square tests were conducted using SAS statistical software. Group demographics were compared at baseline using t-tests and chi-square tests.

Group baseline measures were compared using t-tests and chi-square. Baseline comparisons to 12 month measures were analyzed with paired t-tests and chi-square tests.

To analyze clinical outcomes, DSME and CDSMP group outcomes were combined into a self management group. The association between participation in self-management training and BMI, BP, LDL, and A1C was examined.

Each health outcome of interest was analyzed in two ways. For patients with baseline and 12 month measures, the first analysis used a t-test to determine if measures changed significantly over that period.

The second analysis used a chi-square to determine if there was a significant change from baseline to final measurements relative to a clinically relevant threshold. The clinically relevant threshold for blood pressure, LDL, and A1C was used to group patient baseline and final data into high or low risk groups. Final measurements for patients normally came from 12 month measurements, but for some 6 month and 3 month data were used.

For BMI, the second analysis was different. We determined whether patients met the clinically relevant threshold for BMI of 10% relative to their baseline measures.

For blood pressure, the second analysis determined if patient blood pressure increased or decreased relative to the clinically relevant threshold of 130/80. Patient blood pressure was considered "low" when systolic blood pressure was less than 130 and diastolic blood pressure was less than 80. Patient blood pressure was considered "high" when systolic pressure was greater than 130 or diastolic blood pressure was greater than 80. For clarity, we only assessed patients meeting criteria for high or low

blood pressure at baseline and 12 months, and patients whose blood pressure changed from low to high or high to low. Patients with a high diastolic and low systolic, or low diastolic and high systolic, were not included in this analysis. Patients who maintained a high or low blood pressure from baseline to 12 months were also not included.

For low density lipoproteins, the second analysis compared measurements to the clinically relevant threshold of 100. From baseline to 12 months, those who decreased from greater than to less than 100 were compared using chi-square analysis to those who increased from less than to greater than 100.

For A1C, the second analysis determined if there was a change in individual A1C levels from baseline to the 12 month relative to the clinically relevant threshold of 7.

Results

Demographics

DSME/CDSMP: The self management group was comprised of 131 persons with a mean age of 57 (range 25 to 82 years) and was 60% female. The majority of persons (78%) had type 2 diabetes; the second most common diagnosis was hypertension (23%).

Control: The control group consisted of 100 persons with a mean age of 60 (range 20-83 years) and was 62% female. All of the persons in this group had type 2 diabetes.

The mean age of the two groups was significantly different (t_{229} = 1.99, p=.05). There were no significant differences between the 2 groups by gender (X^2_1 = 0.07; p=.79).

Attrition

Clinical outcomes were measured at baseline, 3, 6, and 12 months. There were generally fewer measurements taken at 3 and 6 months for each health outcome. Although measures were taken at 4 time points, for many outcomes we only had enough data to report changes from baseline to 12 months.

Baseline Clinical Outcome Measures

BMI: Baseline BMIs ranged from 18.5 to 70.7 in the 2 groups. The mean BMI for the self management group was 33.7 and mean BMI for controls was 33.8. The means were not significantly different (t_{122} = -0.12, p=.91).

BP: Seventy-three percent of the self management group and 63% of the control group had high risk BPs at baseline. This difference was not significant (X^2_1 = 2.85; p=.09).

LDL: Across the 2 groups, LDLs ranged from 6 to 251. The mean LDL of the self management group was 116 and for the control group was 94. This difference was significant (t_{128} = -3.03, p=.003). At baseline, 61% of the self management group had low risk LDLs compared to 45% of the control group. The difference between the self management and the control group in the percentage of those with low risk LDLs was not significant (X^2_1 = 3.43; p=.06).

A1C: Glycosylated hemoglobin ranged from 5 to 14 in the 2 groups. The mean A1C of the self management group was 8.4 and of the control group, it was 7.8. The difference was not significant (t_{186} = 1.72, p=.09). At baseline, 63% of the self management group and 56% of controls had a low risk A1C (<7.0%). This difference was not significant (X^2_1 = 0.82; p=.34).

Follow-Up Clinical Outcome Measures

Sessions Attended: CDSMP patients attended between 1 and 6 sessions with a group mean of 3.7 sessions. Diabetes self-management patients attended between 1 and 8 sessions with a group mean of 2.3 sessions.

Table 1. The Number of Patients Assessed by Health Outcome and Time of Measurement

Time	BMI		Blood Pressure		LDL		A1C	
	Self Management	Control	Self Management	Control	Self Management	Control	Self Management	Control
Baseline	130	131	131	99	117	58	125	100
3 months	86	64	86	64	54	19	72	31
6 months	75	75	78	77	64	29	65	66
12 months	53	96	53	97	39	58	45	99

BMI:

BMI changes at 12 months: Considering just those patients who had baseline and 12 month measures, we assessed whether mean BMI changed significantly over time, within individuals in each group (self-management group and controls). Between baseline and 12-month follow-up, mean BMI did not change significantly within either group (self-management: t_{53}=-1.25, *P*=.22; control: t_{91}=1.07, *P*=.29).

BMI changes at 12 months relative to a 10% loss of body weight: The control group had 94 patients with baseline BMI measures and either 6 month or 12 month BMI measures. Within the control group, 1 patient lost 10% of their body weight, 85 stayed within 10% of their body weight, and 8 gained 10% of their body weight. The self management group had 85 patients with baseline BMI measures and either 6 month or 12 month BMI measures. Within the self management group, 8 lost 10% of their body weight, 71 stayed within 10% of their body weight, and 6 gained 10% of their body weight. The difference between the group's weight change category (lost 10%, stayed the same, gained 10%) was significant (X^2_2 = 6.55; *p*=.04).

Blood Pressure:

BP changes at 12 months: This analysis determined if there was a change in individual systolic and diastolic BP levels from baseline to the 12 month follow-up measurement. There was no significant change in systolic or diastolic BP levels at 12 months within either group (self-management: systolic - *t*53=1.56, *P*=.12; diastolic - *t*53=-1.06, *P*=.29; control: systolic *t*96=0.91, *P*=.37; diastolic – *t*96=-1.01, *P*=.32).

BP changes at 12 months relative to 130/80: A total of 151 patients (across both groups) did not meet criteria for this analysis. Of patients meeting the criteria for having high or low blood pressure, 10 from the self management group changed from low blood pressure at baseline to high blood pressure at 12 months, while 18 of the control group changed from low to high blood pressure. Thirty-three patients from the self management group changed from a high blood pressure at baseline to low blood pressure at 12 months, while 19 of the control group changed from high to low blood pressure. The difference between the two groups was significant (X^2_1 = 5.64; *P*=.02).

LDL:

LDL changes at 12 months: This analysis examined the magnitude of change in individual LDL levels from baseline to 12 month follow-up. Neither the controls nor the self management group experienced a significant change in LDL at 12 months (self-management: t_{12}=-0.82, *P*=.43; control: t_{35}=0.47, *P*=.64).

LDL increase or decrease at 12 months relative to 100: Individuals in neither group experienced significant change in LDL levels from baseline to 12 month(X^2_1 = 0.50; *P*=.48).

A1C:

A1C changes at 3, 6, and 12 months: Patients in both the self management and control group experienced marginally significant changes in A1C at 12 months (self-management: t_{25}=-2.03, *P*=.05; control: t_{99}=-1.87, *P*=.06). To increase the sample size, six month measures were included if 12 month A1C measures were not available. A1C measures dropped significantly for those in the self management group (self-management: t_{43}=-3.01, *P*=.004; control: t_{100}=-1.97, *P*=.05).

Change in proportion of patients with A1C ≥ 7 from baseline to 12 months: There was no significant change in A1C relative to a value of 7 for either those in the self management or control group at 12 months, (X^2_3 = 3.07; *p*=.38). Over 75% of patients in the self management and control groups had baseline and 12 month A1C either above or below an A1C of 7.

Discussion

Improvements were seen in 3 health outcomes. The analysis of baseline to 12 month BMI found attendees of the self management group were more likely to lose 10% of their weight compared to non-attendees. The data demonstrate that patients in the self management group with high blood pressure (greater than 130/80) were more likely than the control group to experience a decrease in blood pressure at 12 months to below 180/30. Further, the data suggest taking CDSMP or DSME courses can lead to better A1C outcomes.

Two explanations may explain the improvements seen in health outcomes for BMI, blood pressure, and A1C. One is the effect of the DSME or CDSMP classes.

Because of self-selection, we cannot attribute these outcomes to class participation alone. Patients who choose to take self-management classes may

also be more motivated to make lifestyle changes that improve their health. Even if these classes were not available, these patients may have experienced improved outcomes regardless.

Results may also be biased by the fact analyses were only possible for those persons with follow-up data. Persons who return to the clinic where follow-up data can be collected may be more engaged in the healthcare system and perhaps more adherent to provider recommendations than those without recorded follow-up data.

Additional limitations include the small sample size.

Conclusion

This analysis suggests taking self-management classes may improve BMI, BP, and A1C measures. Although these results are encouraging, randomized control trial studies would need to be conducted to eliminate the alternative explanation of self-selection.

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http://dhss.alaska.gov/dph/Chronic/Pages/SelfManagement/default.aspx