Effectiveness of a Generic Chronic Disease Self-Management Program for People With Type 2 Diabetes

A Translation Study

Purpose

The purpose of the study was to determine the feasibility and efficacy of a generic chronic disease self-management program for people with type 2 diabetes.

Methods

English-speaking adults with type 2 diabetes who were part of a larger US national translation study of the Stanford Chronic Disease Self-Management Program (CDSMP) were invited to be part of the current study. In addition to completing self-report questionnaires, participants submitted blood samples at baseline, 6 months, and 12 months. Of the 114 participants, half had A1C values between 6% and 6.9% and half had values of 7.0% or more.

Results

Adults with diabetes successfully participated in CDSMP workshops in a community health setting. Participants demonstrated statistically significant improvements in health indicators and behaviors but no reductions in health care utilization. Participants with A1C of 7% and above had A1C reductions at 6 months, with smaller reductions at 12 months. Those with baseline A1C less than 7% had no changes in A1C at 6 or 12 months.
Conclusions

The results suggest that the CDSMP is a useful and appropriate program for lowering A1C among those with A1C above 7% and for improving health status for people with diabetes, regardless of their A1C.

Diabetes self-management education has traditionally been offered in disease-specific programs or one-on-one by diabetes educators and other health professionals. Yet approximately two-thirds of older adults have multiple chronic conditions, and 83% of people with diabetes have other chronic conditions. Thus offering a more generic chronic conditions self-management program may be appropriate. However, the question remains, can such a program specifically improve A1C, health status, health behaviors, and health care utilization for people with type 2 diabetes? Two studies, 1 in Australia and 1 in the Texas–Mexico border region, found positive medical outcomes and behaviors for chronic disease self-management programs that included a high proportion of participants with diabetes. However, neither included a clinical measure to assess blood glucose levels. A Canadian study found that randomly augmenting diabetes patient education with a community-based chronic disease self-management program resulted in additional improvement in A1C and other health indicators for adults with type 2 diabetes. This article further examines the feasibility and efficiency of the generic chronic disease self-management approach for a national US population of people with diabetes.

As part of the American Recovery and Reinvestment Act, the Administration on Aging allotted $27 million to 45 states, Puerto Rico, and the District of Columbia to offer the Stanford Chronic Disease Self-Management Program (CDSMP). This program is offered in 6 weekly sessions of 2.5 hours by trained peer leaders. It was designed for those with comorbid conditions (for details of this program, see below). Between April 2010 and April 2012, more than 100,000 in the United States participated in 1 of 9305 workshops. Of those, 75% completed at least 4 out of the 6 sessions (completers). Of the participants, 30.3% reported having diabetes (N = 36,416). Of the participants with diabetes, 85.7% reported at least 1 other chronic condition (email from the National Council on Aging, Kristie.Kulinski@ncoa.org, October 1, 2012).

As part of this same funding, a 12-month longitudinal study was conducted. That study collected baseline and 6- and 12-month data from 1170 (English n = 958 and Spanish n = 212) participants at 22 sites in 17 US states. As a translational study, the workshops were presented and coordinated by local community agencies without assistance from the investigators. Participants did not know they would be asked to participate in a study until they arrived for their first workshop sessions.

Using separate internal funding, an auxiliary study of English-speaking participants with diabetes was designed and conducted. One hundred fourteen participants consented and supplied 3 capillary blood samples for hemoglobin A1C testing. This article reports on this auxiliary study, hence referred to as the Diabetes Study.

The purpose of the study was to determine the feasibility and efficacy of a generic chronic disease self-management program administered within existing community health and social service providers to people with type 2 diabetes.

The research team had 2 a priori hypotheses.

1. Independent of their baseline A1C, participants with type 2 diabetes in the Stanford CDSMP would demonstrate improvements in health status and health behaviors, and reductions in health care utilization at 6 months. In addition, improvements would be maintained up to 12 months.

2. Participants with a baseline A1C above 7% would demonstrate significant reductions in A1C at 6 and 12 months, and participants with a baseline A1C between 6.0% and 6.9% would not demonstrate significant changes (either positive or negative) in A1C at 6 and 12 months.

Methods

Design

The researchers utilized a baseline and 6- and 12-month 1-group longitudinal design. Such a single-group design was appropriate for assessing the "real-world" feasibility of a program administered in community settings.

The Sample

The larger national CDSMP study collected data from 22 sites that were chosen randomly from sites that had previously had at least 200 CDSMP participants with a completion rate of 70% and that were affiliated with the American Recovery and Reinvestment Act Chronic Disease Self-Management initiative. Each site was asked
to supply 50 CDSMP study participants. The sample for the current study was a subsample of that larger study. All English-speaking participants who indicated they had diabetes and subsequently returned a baseline blood sample with A1C of 6% or above became the study sample. The study was approved by the Stanford Institutional Review Board.

Data Collection and Measures

Capillary blood samples and self-report questionnaires were collected at each time point (baseline, 6 months, and 12 months) and later outcomes were compared to baseline values. Participants were asked at their first session to complete an informed consent and self-administered questionnaires. All English-speaking participants with type 2 diabetes were asked if the investigators could send them an A1C capillary blood sampling kit. A second consent was obtained for the A1C study. Within 48 hours, consents and questionnaires were mailed to the investigators. When the consents for the A1C study were received, A1C test kits were immediately mailed to participants. These were then returned by the participants to the investigators, batched, and sent to a central lab for analysis. On average, baseline sample collection took place within 3 weeks of starting the CDSM workshop. The blood samples, identified by number, were then mailed to a centralized lab, which returned the results to the investigators identified by the same numeric code. Results from each test were mailed to participants along with a brief explanation. The same procedures were repeated at 6 and 12 months, starting with the mailing of kits to participants. While testing might itself be considered an intervention, in a previous randomized study, testing and feedback to wait-list control participants did not result in positive A1C changes for the control group.

All other data were collected by self-report, validated questionnaires. For this study, in addition to A1C, there were 3 broad categories of primary outcomes identified to reflect basic tasks of self-management which the CDSMP intervention addresses in its skill building activities: role management, emotional management, and medical management. These broad concepts were operationalized by 3 standardized scales assessing health interference with social roles, depression, and communication with physicians.

Health interference with social roles was measured using the Social/Role Activity Limitations Scale, which is a 4-item scale. Values range from 0 (health problems do not interfere with activities) to 4 (almost total interference). Depression was measured by the PHQ-8 depression scale. PHQ-8 scores range from 0 to 24, with a higher score indicating more depression. Scores above 10 indicate the presence of depression. Communication with physicians was measured using a 3-item, 6-point scale. This instrument was developed and validated by the Stanford Patient Education Research Center during use in previous studies. Scores range from 0 (never engage in the 3 behavior measures, such as "discuss personal problems related to your illness") to 5 (always do all 3 behaviors). Thus, a higher score indicates more communication with medical doctors.

Secondary Outcomes

1. Quality of life: Participants reported the number of days that poor physical or mental health illness prevented participation in normal activities over the past month. This question was adapted from the Behavioral Risk Factor Surveillance System Survey. Additional quality of life outcomes (fatigue, quality of life and sleep) were measured using visual numeric scales (VNS). The VNS were adaptations of visual analogue scales (VAS). VNS differed from VAS in that they utilized size of lines, shading, and numbers, rather than just a double anchored line. Scores range from 0 to 10, with the highest scores indicating the most severe fatigue, excellent quality of life, or greatest problems sleeping, respectively. Low scores (0) indicate no fatigue, very poor quality of life, or no problems sleeping.

2. Lifestyle behavior: Medication adherence was the sum of 4 questions regarding medication use. Moderate physical activity was measured as the average number of days in the past week participants engaged in physical activity for at least 30 minutes.

3. Health care utilization: Health care utilization (physician visits and emergency department visits) over the prior 6 months was measured by self-report. In a study evaluating the validity of self-reported utilization with utilization reported by chart audit, there were no biases toward improved reporting over time.

The Intervention

The CDSMP consists of peer-led patient self-management education workshops. Three principal assumptions underlie the CDSMP: (1) people with different chronic diseases have similar self-management problems and disease-related tasks, (2) people can learn to take responsibility for the day-to-day management of their disease(s), and (3) confident, knowledgeable people practicing self-management will experience improved health status.
Most leaders had at least 1 chronic disease and were not health professionals. They received 4 days of training (24 hours) in the use of the detailed CDSMP protocol manual and were assessed through staff observation of 2 practice teaching session. During the training, each exercise in the CDSMP was modeled by staff trainers with the leaders acting as program participants. Following the modeling of activities, each activity is revisited with explanations of why it is taught in the manner it is taught. In addition leaders receive training in delivering short lectures, brainstorming, conducting structured discussions, and handling problem people. Training occurred in their local community.

### Data Analyses

To test hypothesis 1, primary and secondary outcome variables at 6 and 12 months were compared to baseline variables. Change scores (the difference between baseline and follow-up scores) were constructed and tested utilizing paired t tests or, in the case of emergency department visits, Wilcoxon tests. For hypothesis 2, the sample was segmented into those whose baseline A1C was below 7% and those with A1C 7% and above. Changes in A1C at 6 and 12 months were compared to baseline A1C using paired t tests to determine if changes were unlikely to have resulted from chance in a population where the changes were zero. The changes in A1C at 6 months and at 12 months were also compared for the 2 A1C groups using analyses of covariance controlling for demographic variables.

There are 2 additional analyses. First, outcomes, both primary and secondary, for those with a baseline A1C less than 7% and with an A1C 7% or greater were examined separately and compared to each other using analyses of covariance controlling for demographic and baseline outcome variables. Second, those with baseline A1C of 8% and above were compared to those 6% to 7.9% to explore changes in A1C for those with highest A1C values, again using analyses of covariance.

### Results

#### Participants and Leaders

The number of participants who self-identified as having type 2 diabetes, consented, and returned baseline blood kits with A1C values of at least 6% was 114 (Figure 1). Of these exactly half (n = 57) had A1C less 7% and half had A1C 7% or greater. Initially, 301 participants in the
Table 1
Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Entire Sample (N = 114)</th>
<th>Baseline A1C &lt; 7% (n = 57)</th>
<th>Baseline A1C 7% or higher (n = 57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female (%)</td>
<td>80.7</td>
<td>82.5</td>
<td>79.0</td>
</tr>
<tr>
<td>Ethnic origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American (%)</td>
<td>15</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Hispanic (%)</td>
<td>11</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Other (%)</td>
<td>75</td>
<td>81</td>
<td>68</td>
</tr>
<tr>
<td>Married (%)</td>
<td>45</td>
<td>35</td>
<td>54</td>
</tr>
<tr>
<td>Mean age</td>
<td>65.7 (SD = 11.5, range 29-93)</td>
<td>67.6 (SD = 11.1, range 29-93)</td>
<td>63.8 (SD = 11.7, range 32-87)</td>
</tr>
<tr>
<td>Mean number of chronic conditions</td>
<td>4.0 (SD = 2.0, range 1-9)</td>
<td>4.0 (SD = 1.9, range 1-9)</td>
<td>4.0 (SD = 2.1, range 1-9)</td>
</tr>
<tr>
<td>With insurance (%)</td>
<td>90.2</td>
<td>94.7</td>
<td>86.0</td>
</tr>
<tr>
<td>Mean years of education</td>
<td>13.2 (SD = 2.6, range 2-20)</td>
<td>13.4 (SD = 2.5, range 8-20)</td>
<td>13.0 (SD = 2.8, range 2-20)</td>
</tr>
</tbody>
</table>

Table 2
Diabetes Study Participants, Baseline and 6- and 12-month Change Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline (N = 114)</th>
<th>6-month Change (n = 100)</th>
<th>12-month Change (n = 96)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemoglobin A1C</td>
<td>7.26% (1.09)</td>
<td>-0.236 (1.05)*</td>
<td>-0.044 (1.07)</td>
</tr>
<tr>
<td>Role function (0-1)</td>
<td>1.54 (1.10)</td>
<td>-0.208 (1.04)*</td>
<td>-0.344 (1.22)**</td>
</tr>
<tr>
<td>PHQ-8 depression (0-24)</td>
<td>7.61 (5.28)</td>
<td>-1.32 (5.09)*</td>
<td>-2.16 (4.30)**</td>
</tr>
<tr>
<td>Communication with doctor (0-6)</td>
<td>2.92 (1.34)</td>
<td>0.183 (1.06)†</td>
<td>-0.028 (1.29)</td>
</tr>
<tr>
<td>Secondary outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days health kept from usual activities↓</td>
<td>6.74 (9.24)</td>
<td>-0.900 (10.3)†</td>
<td>-1.95 (10.3)†</td>
</tr>
<tr>
<td>Fatigue (0-10)↓</td>
<td>5.48 (2.47)</td>
<td>-0.510 (2.70)†</td>
<td>-0.750 (3.22)*</td>
</tr>
<tr>
<td>Quality of life (0-10)↑</td>
<td>6.24 (1.96)</td>
<td>0.320 (1.95)</td>
<td>0.594 (1.87)**</td>
</tr>
<tr>
<td>Sleep (0-10)↓</td>
<td>5.23 (2.98)</td>
<td>-0.720 (3.00)*</td>
<td>-1.30 (3.22)**</td>
</tr>
<tr>
<td>Medication adherence (0-4)↓</td>
<td>1.05 (1.15)</td>
<td>-0.130 (1.13)</td>
<td>-0.240 (1.22)†</td>
</tr>
<tr>
<td>Days of exercise (0-7)↑</td>
<td>2.03 (2.02)</td>
<td>0.690 (2.44)**</td>
<td>0.521 (2.76)†</td>
</tr>
<tr>
<td>Physician visits/last 6 months</td>
<td>4.12 (5.65)</td>
<td>0.070 (6.96)</td>
<td>-0.646 (6.17)</td>
</tr>
<tr>
<td>Emergency dept. visits/last 6 months</td>
<td>0.219 (0.713)</td>
<td>-0.080 (0.580)</td>
<td>0.042 (0.664)</td>
</tr>
</tbody>
</table>

*Possible ranges are given in parentheses after each variable name. Standard deviations are in parentheses after each mean. ∫ indicates a lower score is better; ↑ indicates a higher score is better.

P of change < .1. **P of change < .05. ***P of change < .01. ****P of change < .001.

The national study had indicated that they had type 2 diabetes, but 53 of those had baseline A1C levels below 6%. Thus 46% (114/248) of those possibly eligible for the Diabetes Study actually consented and participated.

The mean age of those in the Diabetes Study at baseline was 65.7 (Table 1). The mean years of education was 13.2, the percentage non-Hispanic white was 71%, percentage married was 45%, and the percentage female was 81%. All of the participants were in the English-language programs, and the mean number of chronic diseases was 4.0 (ranging from 1 to 9). Table 2 includes the mean baseline values for the outcome variables.
The Diabetes Study participants attended 1 of 66 workshops in 17 states. They attended a mean of 4.9 sessions out of 6 (SD = 1.3), and 87% attended at least 4 sessions. The 132 leaders (77% female and 77% non-Hispanic white) had taught a mean of 3.6 previous workshops. Of the leaders 34% were also master trainers (certified to train other leaders), 45% were staff members of the organization coordinating the workshop, 39% were volunteer peer leaders who were paid a small stipend, and the remainder were unpaid volunteers.

When the investigators compared participants in the Diabetes Study with those in the national CDSMP study who reported having diabetes but did not consent to participate in the Diabetes Study (n = 128; Figure 1), ethnicity was the only demographic variable that differed significantly between the 2 groups. The nonparticipants were more likely to be African American (35% vs 15%, P < .001). When the investigators compared baseline values of the outcome variables of nonparticipants with diabetes with the Diabetes Study participants, there was only 1 that was significantly different. The Diabetes Study participants had better communication with doctor scores than the nonparticipants (P = .02). The nonparticipants also attended a mean of 4.2 workshop sessions (out of 6) compared to the mean of 4.9 sessions for those in the Diabetes Study (P < .001).

Six- and 12-month Outcomes (Hypothesis 1)

Table 2 shows 6- and 12-month change scores for the entire sample. Among primary outcomes, role function and depression were significantly improved at 6 and remained so at 12 months. Communication with physician improved at 6 months, but only trended toward significance (P = .087). Among the secondary variables, for the 4 quality of life variables, 1 (sleep) was significantly improved at 6 months, while the other 3 (days health kept from usual activities, fatigue, quality of life) improved but not significantly. Days exercised improved significantly, but medication adherence did not. None of the health utilization variables changed significantly, although hospitalization tended toward a significant reduction (P = .077).

At 12 months, all 4 quality of life variables improved, and 3 were statistically significant. Number of days of exercise increased by half a day from baseline, but only trended toward significance (P = .067), similarly with medication adherence (P = .057). None of the utilization variables were significantly different from baseline at 12 months.

Changes in A1C for Participants Below 7% and Participants 7% and Above at Baseline (Hypothesis 2)

For the subset with baseline A1C 7% or greater, A1C was significantly reduced at 6 months (−0.470, P = .013; Table 3). However, a smaller reduction at 12 months was not significant (−0.138, P = .455). For the subset with a baseline A1C less than 7%, there was almost no A1C change at 6 months (0.002) and a small nonsignificant increase at 12 months (0.048, P = .720). When the authors applied an analysis of covariance model with below or above 7% baseline A1C as the factor and baseline A1C, gender, age, married, and whether non-Hispanic white as covariates, the difference between the 2 groups was significant (least square mean difference of 0.55, P = .014). For the 12-month change in A1C, the difference between the lower and higher baseline groups was no longer significant (least square mean difference 0.24, P = .303).

Additional Comparisons for Those With Baseline A1C 7% or Greater Versus Less Than 7%

Demographic Variables

The authors compared baseline age, years of education, whether married, non-Hispanic white, sex, whether have health insurance, and number of diseases. There were a few differences between those with A1C 7% and above and those with lower baseline A1C. The proportion married was 0.54 for those with higher A1C but only 0.35 for those with lower A1C (P = .039). The proportion non-Hispanic white was 0.63 for those with higher A1C and 0.79 for those with lower A1C (P = .064). And those with A1C 7% or greater had a mean age of 63.8 compared to 67.6 for those with less than 7% A1C (P = .080). In summary, those with A1C 7% and above tended to be younger, less likely married, and more likely minority than those with lower A1C. There were little differences between the groups in baseline education, number of diseases, or gender (Table 1).

Baseline Outcome Measures

There were no significant differences between baseline outcome values for the 2 groups, and thus little
Table 3

Diabetes Study Participants, 6- and 12-month Change Scores, by Baseline A1C Level

<table>
<thead>
<tr>
<th>Baseline A1C</th>
<th>6-month change</th>
<th>12-month change</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;7%</td>
<td>-0.70 (1.22)</td>
<td>-1.03 (1.22)</td>
</tr>
<tr>
<td>7% -10%</td>
<td>-0.14 (0.95)</td>
<td>-0.39 (0.95)</td>
</tr>
<tr>
<td>&gt;10%</td>
<td>-1.10 (1.05)</td>
<td>-1.40 (1.05)</td>
</tr>
</tbody>
</table>

Secondary outcomes:

- Days health kept from usual activities: 6.12 (9.73), 0.34 (9.61), -1.56 (11.0), 7.35 (8.77), -2.14 (10.9), -2.33 (10.7)
- Fatigue (0-10): 5.70 (2.64), -0.60 (2.84), -0.91 (3.61)* 5.26 (2.30), -0.42 (2.59), -0.58 (2.80)*
- Quality of life (0-10): 6.26 (2.00), 0.40 (1.95), 0.56 (1.89)* 6.21 (1.92), 0.24 (1.97), 0.62 (1.88)*
- Sleep (0-10): 5.21 (3.03), -0.38 (3.04), -1.04 (3.34)* 5.25 (2.95), -1.06 (2.95)*, -1.56 (3.11)**
- Medication adherence (0-4): 1.11 (1.13), 0.04 (1.07), -0.20 (0.921), 1.00 (1.18), -0.30 (1.18)*, -0.27 (1.47)
- Days of exercise (0-7): 2.19 (2.13), 0.78 (2.24)* 0.56 (3.07), 1.86 (1.90), 0.60 (2.63), 0.47 (2.44)
- Physician visits/last 6 months: 3.63 (5.43), 0.18 (6.48), -0.16 (5.90), 4.61 (5.87), -0.04 (5.45), -1.13 (6.45)
- Emergency dept. visits/last 6 months: 0.281 (0.661), -0.14 (0.700), 0.021 (0.668), 0.158 (0.527), -0.020 (0.428), 0.063 (0.665)

*Possible ranges are given in parentheses after each variable name. Standard deviations are in parentheses after each mean. ↓ indicates a lower score is better; ↑ indicates a higher score is better.

†p < .05 of change < .001. **p of change < .01. ***p of change < .001.

Six-month Change Scores

With the exception of A1C itself, there were no significant differences in 6-month change scores between those with 7% or higher A1C versus those with lower A1C. Those with A1C 7 or greater were more likely to improve (P = .024). Although the change scores were not significantly different for the 2 groups, only the participants with A1C between 6% and 6.9% had significant improvements in the primary variables, PHQ-8 depression (P = .006), and role function (P = .023).

Twelve-month Change Scores

At 12 months, there were no significant 12-month change score differences between those with higher baseline A1C values versus those with lower for primary or secondary variables. Although A1C went down for the group with A1C above 7% and not the lower group (-0.14 vs +0.05), the difference was not significant (P = .413). Among the primary variables, role function significantly improved only for the group with A1C below 7% (P = .023), while depression significantly improved for both groups.

Those with highest A1C

When the sample was segmented into those with a baseline A1C 8% and above (n = 16) and those below 8% (n = 81) and changes were compared, 50% of those who had A1C of 8% or above at baseline had values below 8% at 6 months. In contrast, 9% of those who were below 8% at baseline had A1C scores above 8% at 6 months (chi-square, P < .001). At 12 months 38% of those with higher baseline A1C were below 8%, and 12% of those who had baseline A1C below 8% were now above 8%.

Conclusions

In terms of the original hypotheses, the results were encouraging but mixed. First, overall, there were numerous improvements in health statuses and health behaviors at 6 and 12 months, but there were few changes in health.
References


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care utilization. Second, participants with a baseline A1C of 7% or above did have a significant reduction in A1C of -0.47 at 6 months, but this declined to -0.14 at 12 months. The participants with A1C between 6% and 6.9% did not have any significant changes at 6 or 12 months. It is important to note that participants whose A1C was under 7 (ie, in control) tended to remain under 7.

The lack of an increase in A1C among those with lower baseline values suggests that the significant decrease among those with values 7% and above is not merely the result of a regression to the mean. If this were an explanation, one would expect to see changes in both groups with the higher A1C group declining in values and the lower A1C group increasing.

There were somewhat better results for health outcomes at 12 months than at 6 months. With only a small difference in the number of cases between 12 and 6 months (96 vs 100), it unlikely that the differences were the result of those with the worst results dropping out after 6 months. Thus it appears that the improvements in health outcomes that were evident at 6 months were maintained and even continued to improve up to 1 year without formal reinforcement. This is in contrast to the 6-month improvement in A1C, which had weakened by 1 year.

For health outcomes, it appears that those with lower A1C values (between 6% and 6.9%) had greater improvements than those with higher A1C values. Both groups tended to show improvements, especially at 12 months, and it is likely that with a greater number of cases this study would have shown additional significant improvements in health outcomes in the higher A1C group.

Limitations

The study did not have sufficient number of participants for both within-group and between-group statistical comparisons of those with baseline A1C less than 7% versus those 7% and above. Thus scholars should be mindful of the possibility of differences between the 2 groups resulting from random variation within small samples. However the consistency in improvements, albeit sometimes small, in health outcomes suggests that participants in both groups benefited from the program. Although this study had sufficient cases to demonstrate the feasibility of using the CDSMP for patients with type 2 diabetes, and indicated the likelihood of such an approach being efficacious, a larger study with sufficient power, preferably randomized, would prove useful in further confirming the appropriateness of the CDSMP for patients with type 2 diabetes.

The CDSMP participants with diabetes who elected not to participate in the Diabetes Study (by refusal to consent or by not returning their blood kit) were more likely to be African American than those in the study. This may reflect a distrust of medical research that is relatively common among African Americans. A future study may need to pay particular attention to the problem of recruiting African American participants. Overall the differences between those participating in the A1C study and those not participating were small, suggesting that the CDSMP is an appropriate and feasible intervention for all those with type 2 diabetes, and not just for those willing to contribute blood samples.

Those with the highest A1C scores (above 8%) had a high likelihood of showing improvements in A1C, with 50% having scores below 8% by 6 months. While it could be argued that this is the result of regression to the mean, the lack of a comparable rise among those with lower scores suggests that the worse off did indeed benefit disproportionately. Again, a randomized controlled trial would be useful in confirming the apparent success of the CDSMP in contributing to lower A1C among those with the highest values.

Implications

This study was of people with diabetes who were offered the CDSMP in a “real-world” (nonacademic) environment by community health and social service agencies. While this translation approach precluded using a randomized control design, it enables us to indicate with some degree of certainty the generalized (population) effectiveness of the CDSMP for people with type 2 diabetes. Participants in the Diabetes Study had a relatively high level of attendance with 87% completing at least 4 of the 6 sessions. This confirms that the program was acceptable to those with diabetes.

The 6-month improvements in A1C and the 6- and 12-month improvements in health indicators and behaviors suggest that the CDSMP provided additional benefits when given in addition to usual care for people with type 2 diabetes. In summary, these preliminary results from a US national sample suggest that the CDSMP is both a feasible and useful program for lowering A1C among those with high A1C and for improving health statuses when offered to people with diabetes by community-based social service and health agencies.