

Diabetes Self-Management in a Community Health Center: Improving Health Behaviors and Clinical Outcomes for Underserved Patients

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Self-management is a crucial element of good diabetes care. Several large-scale trials have demonstrated that comprehensive interventions that include self-management can prevent complications from type 1^{1,2} and type 2 diabetes.³ In addition, interventions that promote the adoption of healthy behaviors have been shown to significantly prevent or delay the onset of type 2 diabetes in patients at increased risk for this disease.⁴ A review and meta-analysis of self-management interventions for diabetes concluded that, although education alone does not lead to improved outcomes, self-management interventions can improve glycemic control.⁵

However, outside of the research arena, “real-world” settings face challenges when seeking to replicate self-management programs such as those found in clinical trials. Such interventions are resource intensive and not generally designed to meet the needs of patients from underserved populations. Issues such as low literacy, limited English proficiency, poverty, and cultural differences present additional barriers to promoting diabetes self-management.

To combat the growing diabetes epidemic, it is crucially important that such barriers be overcome. Diabetes self-management interventions must be developed and tested to meet the needs of all patients, particularly underserved minority populations. Hispanic and African-American patients in the United States have nearly two times the prevalence of type 2 diabetes as non-Hispanic whites.⁶⁻⁸ Rates for Native

Americans are even higher.⁸ In addition to higher prevalence, ethnic and racial minority patients with diabetes have higher mortality and higher rates of diabetic complications.⁹ Although the pathophysiology and treatment may be the same for different ethnic and racial groups, differences in behaviors, cultures, and health beliefs have a significant impact on how patients understand their illness and engage in self-management. Programs that account for these differences can improve diabetes outcomes.¹⁰⁻¹³

An additional barrier to effective diabetes self-management is the high prevalence of comorbid depression, particularly in ethnic and racial minority populations. Diabetic patients have twice the incidence of depression as the general population.¹⁴ Patients with both diabetes and depression have worse clinical outcomes,¹⁵⁻¹⁷ poor adherence to treatment and self-care guidelines,¹⁸ and higher health care utilization.¹⁹

Intervention

The Community Health Center, Inc., (CHC) is the largest federally qualified health center in Connecticut, with primary care centers in cities and towns throughout the state. It developed a comprehensive program to provide self-management education to its underserved, largely Hispanic population of patients with diabetes. With funding and support from the Robert Wood Johnson Diabetes Initiative, a team of nurses, doctors, diabetes educators, and public health specialists engaged in a 4-year quality improvement effort to test

and implement a program that would meet the specific needs of its population with regard to language, culture, and literacy level and to address the extremely high prevalence of comorbid depression in patients with diabetes. Self-management was fully integrated into the primary care team, and simple tools were developed to allow all care team members to measure and track patients’ self-management goals and their progress toward achieving those goals.

I. Developing a low-literacy, culturally appropriate self-management program

CHC cared for 50,000 patients in 2006, 2,389 of whom had diabetes. These patients are 43% Hispanic/Latino (largely of Puerto Rican descent) and 13% African American. Nearly half speak a language other than English at home. Eighty-eight percent are at or below 200% of the poverty level, and 25% have no medical insurance. The self-management program was developed specifically to meet the needs of this population, particularly with regard to literacy level, language, and culture. Materials were produced in English and Spanish and geared to a fourth-grade reading level, and an initial curriculum was created to be used in a group format. Self-management is often taught in groups, with evidence supporting the benefit of this approach for a variety of chronic illnesses, including diabetes.²⁰⁻²³

Self-management differs from traditional diabetes education in that it focuses less on educational topics and

more on actions and behaviors. Therefore, in addition to providing general education on diabetes, each session focused on identifying specific desired behaviors and having patients choose a specific goal that they would adopt. Patients were encouraged to set highly specific goals with a start date and a measurable quantity/outcome whenever possible. In addition, patients were asked to rate on a scale from 1 to 10 their perception of the likelihood of achieving the goal (self-efficacy). Patients with a likelihood of < 7 were encouraged to adjust the goal or adopt a new goal.

The program was modified and improved substantially through a series of PDSA (plan, do, study, act) cycles.

- Although the idea of patient-generated goals was appealing and represents an important aspect of the self-management methodology, many patients struggled to come up with individual goals, even after a didactic session. As a result, pamphlets and posters were developed in English and Spanish with common goals that other patients had set (Figures 1 and 2). All patients received these pamphlets at the outset of the program, in an effort to generate ideas and build in their minds the concept of behavior change, action, and self-efficacy. Posters with similar goals were also placed in strategic locations throughout the health center. This encouraged patients to begin thinking about behaviors, goals, and actions they could take to improve their diabetes and were found to be very helpful in this regard.
- Repeated emphasis and encouragement, preferably from multiple members of the care team, were needed to promote goal attainment and maintenance over time. Maintaining a log of self-management goals prominently located in each patient's chart allowed each goal to be recorded, tracked, and kept available for various members of the care team to see and review with patients

(Figure 3). Repeatedly reviewing goals and reminding patients about them helped maintain gains over time.

- Group sessions were informative and fun for many patients, but CHC staff had difficulty recruiting and retaining sufficient numbers of patients to merit the outlay of staff time. In addition, with > 2,000 diabetic patients in need of self-management, the group visit approach simply was not scalable to reach such large numbers of patients. Furthermore, many patients choose not to attend such groups and find the format undesirable. Ultimately, CHC found that more patients could be reached and better outcomes achieved by offering individual sessions with nurses and diabetes educators in addition to group sessions. These sessions used the same materials as those used in the group sessions but were more individualized and gave patients greater flexibility. Ultimately, far more patients chose individual sessions and a much larger proportion of the diabetic population was reached and engaged in self-management.

II. Coping with high rates of depression

Initial experience with self-management suggested that comorbid depression was a substantial barrier to patient self-management. Early in the development of the program, staff adopted the Patient Health Questionnaire-9 (PHQ-9) screening tool²⁴ and administered it at intake for all patients participating in the diabetes self-management program. Those who were found to have depression and were not already in treatment were referred for mental health treatment either by onsite mental health staff, primary care providers, or outside community resources. Whenever possible, diabetes and depression treatment was coordinated and integrated. Details of this integrated treatment model for diabetes and depression have

been published elsewhere.²⁵ Although the data generated from this project are still being evaluated, preliminary results suggest that patients with depression and diabetes treated in an integrated manner had similar clinical improvements, as measured by hemoglobin A_{1c} (A1C), as those without depression.²⁶

III. Training staff in self-management

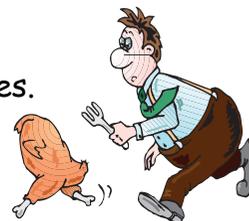
Training staff in the methodology of self-management proved more challenging than expected. Medical staff, including nurses, nutritionists, and diabetes educators, tended to lapse into a "didactic mode" and assume a more proscriptive mien unless they received frequent education, support, and review. The project coordinator received "master trainer" instruction in self-management and subsequently became the trainer for CHC employees participating in the project. Nurses from all of CHC's primary care sites then received a half-day session on self-management goal setting. In three sites, nurses received additional follow-up training, which included a review of goals facilitated with patients.

IV. Measuring goal attainment

In addition to tracking specific goals for each patient, project staff noted a need to better record patients' progress and success with attaining specific goals. Collecting information on goal attainment would allow for a more detailed analysis of the program. CHC developed a "self-management attainment score," which was assigned by the self-management facilitator at follow-up encounters. Staff found that during follow-up, patients who set goals generally clustered into four main groups: those reporting complete success, partial success, limited success, and lack of success at achieving a specific goal. As such, a four-point scale was used to measure goal attainment, with four representing a fully attained goal and one representing failure to attain the goal. As a result, CHC is engaged in a detailed analysis

You Can Do It! Are You Ready?

You can make choices that will help your health.
There are three main areas in which you can make choices.



Eat Smart

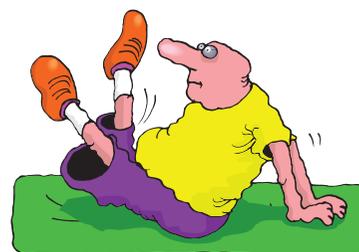
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|---|--|
| Use canola or olive oil | Eat more vegetables and fruit |
| Drink sugar-free drinks | Use artificial sugar |
| Don't supersize—watch portions | Use "make a meal" sheets or a food plan |
| Cut down on red meat | Take skin off chicken and fat off red meat |
| Use no-salt/low-salt canned vegetables or buy frozen vegetables | |
| Cut down on fried foods—grill or broil instead | |
| Learn to count carbohydrates (diabetes) | |

Your own idea

Get Moving

- | | |
|--|------------------------|
| Take stairs | Do chair exercises |
| Park far from store door | Ride a bike |
| Get an exercise videotape | Join an exercise class |
| Walk every day (home, mall) | Dance |
| Walk with your children, grandchildren, or dog | |

Your own idea



Personal Health Habits

- Brush and floss your teeth every day
- Reduce or stop smoking
- Take your meds as your doctor or nurse instructs
- Ask about your lab numbers and know what they mean
- Get tested for cancer
- Use sunscreen
- Check your blood sugar as instructed (diabetes)
- Check your feet every day (diabetes)
- See an eye doctor, a foot doctor, or a dentist (diabetes)

Your own idea



Are You Ready?

Figure 1. "Are You Ready" patient self-management pamphlet/poster (English)

¡Ud. Puede Hacerlo! ¿Está Ud. Listo?

Ud. puede controlar su diabetes. Hay 3 áreas que Ud. puede mejorar.

Coma bien

- Use solo aceite canola o de oliva
- Coma más vegetales
- Evite bebidas con azúcar
- Coma porciones pequeñas
- Aprenda a contar los carbohidratos
- Evite alimentos fritos
- Quítele la grasa a carnes rojas
- Quítele la piel al pollo

- Pierda peso
- Use azúcar artificial
- Evite carnes rojas
- Use las páginas "preparando una comida" como guía

Su idea propia

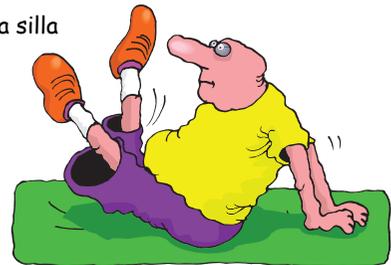


Muévase

- Use las escaleras (evite el elevador)
- Baile
- Consiga un video de ejercicios
- Camine todos los días (casa, mall)
- Camine al parque con sus niños o nietos
- Estacione lejos de la entrada de la tienda
- Encuentre un amigo/a para caminar juntos

- Haga los ejercicios de la silla
- Camine al perro
- Regístrese en una clase de ejercicios

Su idea propia



Hábitos Personales de Salud

- Chequee sus pies todos los días
- Lávese los dientes dos veces al día
- Use la seda dental todos los días
- Reduzca o deje de fumar
- Relájese (pregunte a cerca de técnicas de relajación)
- Chequee su nivel de azúcar en la sangre como le enseñaron
- Tómese sus medicamentos todos los días
- Vea un doctor de los ojos, de los pies y un dentista



Su idea propia

¿Está Ud. listo para empezar a controlar su diabetes?

Figure 2. "Are You Ready" Patient self-management pamphlet/poster (Spanish)

Patient Name:	DOB	Chart #	salmon to chart/white to patient				
Specific Self-Management Goals Especifique Sus Metas Personales	Date SMG Set Fecha de Meta	Date & Score Fecha & puntaje	Date & Score Fecha & puntaje	Date & Score Fecha & puntaje	Date & Score Fecha & puntaje	Date & Score Fecha & puntaje	Date & Score Fecha & puntaje
Pre-Contemplation (I'm not ready—No estoy listo/a) - provider introduces SMG idea each visit. If patient remains unready to set any goal, provider enters date and a "0" for adherence score.	NA						
Eat Smart Coma bien 	__/__/__	_____	_____	_____	_____	_____	_____
_____	__/__/__	_____	_____	_____	_____	_____	_____
_____	__/__/__	_____	_____	_____	_____	_____	_____
_____	__/__/__	_____	_____	_____	_____	_____	_____
Get Moving Muevase 	__/__/__	_____	_____	_____	_____	_____	_____
_____	__/__/__	_____	_____	_____	_____	_____	_____
_____	__/__/__	_____	_____	_____	_____	_____	_____
_____	__/__/__	_____	_____	_____	_____	_____	_____
Health Habits/Behaviors Hábitos de Salud 	__/__/__	_____	_____	_____	_____	_____	_____
_____	__/__/__	_____	_____	_____	_____	_____	_____
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1=goal set but not started 2=sometimes 3=usually 4=always/almost always
 Provider to initial SMG facilitated. Any team member can review and score SMGs, old and new, after discussion with patient.

Figure 3. Self-management goal (SMG) tracking log

of goal setting, looking at types of goals, predictors of success and failure, and associations with successful goal setting. In addition, the relation between attainment scores and clinical outcomes is being studied in detail.

Program Results

Participants. In all, 488 patients participated in the diabetes self-management program. Two hundred seventy-seven (63%) listed Hispanic as their ethnicity, and 140 (32%) were monolingual Spanish speakers.

Goal attainment. During the program, patients set a total of 2,139 individual self-management goals. Of those, 1,612 had at least one follow-up assessment and an attainment score assigned. Of the goals that were assessed in follow-up, 836 (52%) achieved an

attainment score of 3 or 4 (usually or always) at the first follow-up, and during the entire follow-up, 1,161 (72%) ultimately were attained with a level 3 or 4.

Clinical outcomes. For patients for whom pre- and post-intervention clinical data were available, the mean A1C dropped significantly by 0.9 of a percentage point per year ($P < 0.0001$). In all, 116 of 263 patients achieved or maintained an A1C $\leq 7.0\%$. Participant's average LDL cholesterol dropped by 23.3 mg/dl. After participation in the program, 206 (42.3%) achieved a blood pressure $< 130/80$ mmHg compared with 121 (28.8%) at the outset of the program.

Depression. A total of 414 patients had data collected regarding depression

treatment. Patients without current diagnosis and treatment for depression were administered the PHQ-9 depression screen. Two hundred sixty-six (62%) either had an established diagnosis of depression or had a score of ≥ 10 (moderate depression) on the PHQ-9.

Conclusions

Although more detailed analysis of the impact of this program is ongoing, several broad conclusions can be drawn. First, a large cohort of mainly Hispanic patients, a third of whom were monolingual Spanish speakers, were able to participate in a comprehensive self-management program, set and attain specific goals, and improve their glycemic control, blood pressure, and LDL cholesterol. Although not subjected to the rigors of a randomized, controlled trial,

these results are sufficiently positive to justify continuing the program, spreading it to additional sites, and initiating a new research project in diabetes disease management that will use a randomized, controlled methodology.

Second, depression was even more common among diabetic patients than expected. Using a simple screening tool, the PHQ-9, was effective for identifying cases. Co-managing depression with diabetes resulted in clinical improvements in the depressed group that equaled those in the nondepressed group, suggesting that such patients can effectively engage in self-management and improve their diabetes control.

Third, recording self-management goals in detail and scoring for attainment of goals provides a valuable tool for collaborative care among different care providers and for more detailed program analysis.

Fourth, experience has shown that training staff in proper self-management education techniques takes time and ongoing monitoring. There is a strong tendency for medical staff to revert back to more didactic modes of education. A method of oversight and frequent review is necessary to maintain fidelity with the self-management model.

The diabetes team was able to use quality improvement methodology to develop and adapt this program to meet the needs of the population being served and in so doing to create a flexible, highly effective intervention. The improvements seen in health behaviors and clinical indexes will serve to reduce the burden of morbidity and mortality and reduce health disparities in a vulnerable group of patients.

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REFERENCES

- ¹The DCCT/EDIC Research Group: Retinopathy and nephropathy in patients with type 1 diabetes four years after a trial of intensive therapy. *N Engl J Med* 342:381–389, 2000
- ²The DCCT Research Group: The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 329:977–986, 1993
- ³The U.K. Prospective Diabetes Study Group: Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 352:837–853, 1998
- ⁴The Diabetes Prevention Program Research Group: Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 346:393–403, 2002
- ⁵Norris SL, Lau J, Smith SJ, Schmid CH, Engelgau MM: Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. *Diabetes Care* 25:1159–1171, 2002
- ⁶Centers for Disease Control and Prevention: Self-reported prevalence of diabetes among Hispanics—United States, 1994–1997. *MMWR Morb Mortal Wkly Rep* 48:8–12, 1999
- ⁷Centers for Disease Control and Prevention: Diabetes among Hispanics—Los Angeles County, California, 2002–2003. *MMWR Morb Mortal Wkly Rep* 52:1152–1155, 2003
- ⁸Centers for Disease Control and Prevention: National diabetes fact sheet: general information and national estimates of diabetes in the United States, 2005. Atlanta, Ga., U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005
- ⁹Lanting LC, Joung IM, Mackenbach JP, Lamberts SW, Bootsma AH: Ethnic differences in mortality, end-stage complications, and quality of care among diabetic patients: a review. *Diabetes Care* 28:2280–2288, 2005
- ¹⁰Cleghorn GD, Nguyen M, Roberts B, Duran G, Tellez T, Alecon M: Practice-based interventions to improve health care for Latinos with diabetes. *Ethn Dis* 14:S117–S121, 2004
- ¹¹Maillet NA, D'Eramo MG, Spollett G: Using focus groups to characterize the health beliefs and practices of black women with non-insulin-dependent diabetes. *Diabetes Educ* 22:39–46, 1996
- ¹²Philis-Tsimikas A, Walker C: Improved care for diabetes in underserved populations. *J Ambul Care Manage* 24:39–43, 2001
- ¹³Philis-Tsimikas A, Walker C, Rivard L, Talavera G, Reimann JO, Salmon M, Araujo R: Improvement in diabetes care of underinsured patients enrolled in project dulce: a community-based, culturally appropriate, nurse case management and peer education diabetes care model. *Diabetes Care* 27:110–115, 2004
- ¹⁴Anderson RJ, Freedland KE, Clouse RE, Lustman PJ: The prevalence of comorbid depression in adults with diabetes: a meta-analysis. *Diabetes Care* 24:1069–1078, 2001
- ¹⁵de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ: Association of depression and diabetes complications: a meta-analysis. *Psychosom Med* 63:619–630, 2001
- ¹⁶Katon W, von Korff M, Ciechanowski P, Russo J, Lin E, Simon G, Ludman E, Walker E, Bush T, Young B: Behavioral and clinical factors associated with depression among individuals with diabetes. *Diabetes Care* 27:914–920, 2004
- ¹⁷Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE: Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care* 23:934–942, 2000
- ¹⁸Lin EH, Katon W, von Korff M, Rutter C, Simon GE, Oliver M, Ciechanowski P, Ludman EJ, Bush T, Young B: Relationship of depression and diabetes self-care, medication adherence, and preventive care. *Diabetes Care* 27:2154–2160, 2004
- ¹⁹Egede LE, Zheng D, Simpson K: Comorbid depression is associated with increased health care use and expenditures in individuals with diabetes. *Diabetes Care* 25:464–470, 2002
- ²⁰Lorig KR, Mazonson PD, Holman HR: Evidence suggesting that health education for self-management in patients with chronic arthritis has sustained health benefits while reducing health care costs. *Arthritis Rheum* 36:439–446, 1993
- ²¹Lorig KR, Sobel DS, Stewart AL, Brown BW Jr, Bandura A, Ritter P, Gonzalez VM, Laurent DD, Homan HR: Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Med Care* 37:5–14, 1999
- ²²Lorig KR, Ritter P, Stewart AL, Sobel DS, Brown BW Jr, Bandura A, Gonzalez VM, Laurent DD, Homan HR: Chronic disease self-management program: 2-year health status and health care utilization outcomes. *Med Care* 39:1217–1223, 2001
- ²³Lorig KR, Ritter PL, Gonzalez VM: Hispanic chronic disease self-management: a randomized community-based outcome trial. *Nurs Res* 52:361–369, 2003
- ²⁴Spitzer RL, Kroenke K, Williams JB: Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. *JAMA* 282:1737–1744, 1999
- ²⁵Anderson D, Horton C, O'Toole ML, Brownson CA, Fazzino P, Fisher EB: Integrating depression care with diabetes care in real-world settings: lessons from the Robert Wood Johnson Foundation Diabetes Initiative. *Diabetes Spectrum* 20:10–16, 2007
- ²⁶Burton J, Anderson DR, McCormack L, Fisher E, Sawyer D: Synthesizing lessons learned from the RWJ Diabetes Initiative. Presentation at the annual meeting of Academy Health, 5 June 2007

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