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A Resilience Intervention in African American Adults With Type 2 Diabetes

A Pilot Study of Efficacy

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Purpose

The purpose of this pilot study was to determine the feasibility of offering the authors' Diabetes Coaching Program (DCP), adapted for African Americans, in a sample of African American adults with type 2 diabetes.

Methods

The study used a 1-group, pretest-posttest design to test the acceptance and potential effectiveness of the DCP. Subjects were a convenience sample of 16 African Americans (8 women, 8 men) with type 2 diabetes; 12 subjects (6 women, 6 men) completed the program. The DCP included 4 weekly class sessions devoted to resilience education and diabetes self-management, followed by 8 biweekly support group meetings. Psychosocial process variables (resilience, coping strategies, diabetes empowerment) and proximal (perceived stress, depressive symptoms, diabetes self-management) and distal outcomes (body mass index [BMI], fasting blood glucose, HbA1C, lipidemia, blood pressure) were assessed at baseline and at 6 months after study entry. Qualitative data were collected at 8 months via a focus group conducted to examine the acceptability of the DCP.

Results

Preliminary paired *t* tests indicated statistically significant improvements in diabetes empowerment, diabetes self-management, BMI, HbA1c, total cholesterol, low-density lipoprotein cholesterol, and systolic and diastolic blood

pressure. Medium to large effect sizes were reported. Resilience, perceived stress, fasting blood glucose, and high-density lipoprotein cholesterol improved, but changes were not statistically significant. Focus group data confirmed that participants held positive opinions regarding the DCP and follow-up support group sessions, although they suggested an increase in program length from 4 to 8 weeks.

Conclusions

The pilot study documented the feasibility and potential effectiveness of the DCP to enhance diabetes empowerment, diabetes self-management, and reductions in the progression of obesity, type 2 diabetes, and cardiovascular disease in the African American community. Randomized experimental designs are needed to confirm these findings.

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Type 2 diabetes is becoming the most prevalent health problem in the United States, affecting more than 20.8 million people at an estimated cost of \$132 billion annually. Minority groups are affected at higher rates, with African Americans 1.8 times as likely to have diabetes as non-Hispanic whites.¹ Type 2 diabetes is almost always preceded by obesity, which has doubled among adults since 1980, with a corresponding increase in type 2 diabetes. Currently, 45% of African Americans are obese, and 76% are overweight.² Furthermore, type 2 diabetes results in a 2 to 4 times higher rate of cardiovascular disease (CVD), which is the leading cause of death among African Americans with diabetes.¹ The synergistic effects of obesity, type 2 diabetes, and CVD result in complications (eg, hypertension, stroke, depression, retinopathy, renal failure, neuropathy and nerve damage, foot disorders) that are at an all time high.³ In fact, the common progression of obesity, type 2 diabetes, and CVD is the biggest health threat facing the United States, in particular African Americans. Moreover, this unremitting accumulation of damage is largely preventable.

Components of a healthy lifestyle are well established in the current literature, yet more than 50% of US adults are not engaging in enough physical activity to provide health benefits, and only one fourth eat 5 or more servings of fruits and vegetables daily.⁴ In the past 2 decades, increased attention has been given to diabetes self-management

programs in an effort to prevent, manage, and/or impede disease progression. Nonetheless, meta-analyses^{5,6} have concluded little change with respect to the effective treatment of type 2 diabetes in the 10-year period following Brown's 1990⁷ meta-analysis. Both short- and long-term studies have focused narrowly on knowledge and glycemic control without sufficiently addressing important process variables and interventions that offer insight into the mechanisms affecting patient empowerment and diabetes self-management, quality of life, and long-term compliance.^{5,8} Furthermore, few studies have evaluated culturally sensitive interventions for African Americans.^{6,9-11}

Because type 2 diabetes is a chronic condition, individuals with the disease typically experience greater stress than nondiseased individuals, have higher levels of depression, and worry about complications from the disease.^{12,13} Chronic stress plays a critical role in the development of unhealthy lifestyle choices, which in turn contributes to the onset of obesity, type 2 diabetes, and CVD.¹⁴ Lower levels of socioeconomic status prevalent in some African American communities manifest in high levels of chronic stressors (eg, financial insecurity, low education level, lack of health care) and influence disease progression. For African Americans, the stress of type 2 diabetes compounded by higher levels of chronic life stressors make this population particularly vulnerable to complications from the synergistic effects of obesity, type 2 diabetes, and CVD.

While the relationship between stress and unhealthy lifestyle choices is well documented,¹⁴ the Transactional Model of Stress and Coping proposes that not everyone exposed to potentially stressful situations makes poor health choices.¹⁵ Such findings have led researchers to examine psychosocial process variables, such as resilience, that could potentially contribute to stress and health. Resilient individuals are more likely to perceive change and stressful situations as a challenge as well as an opportunity for personal growth, and their behavior reflects a belief in their ability to take greater responsibility and affect their life circumstances. Conversely, individuals lacking in resilience are more likely to perceive stressful situations as a threat to their sense of security or survival, are more likely to lack self-confidence and initiative, and their behavior reflects an attitude of powerlessness and victimization.¹⁶

Research suggests that higher levels of resilience (eg, hardiness) positively influence perceptions of stress and stressful life events. Resilience is related to positive

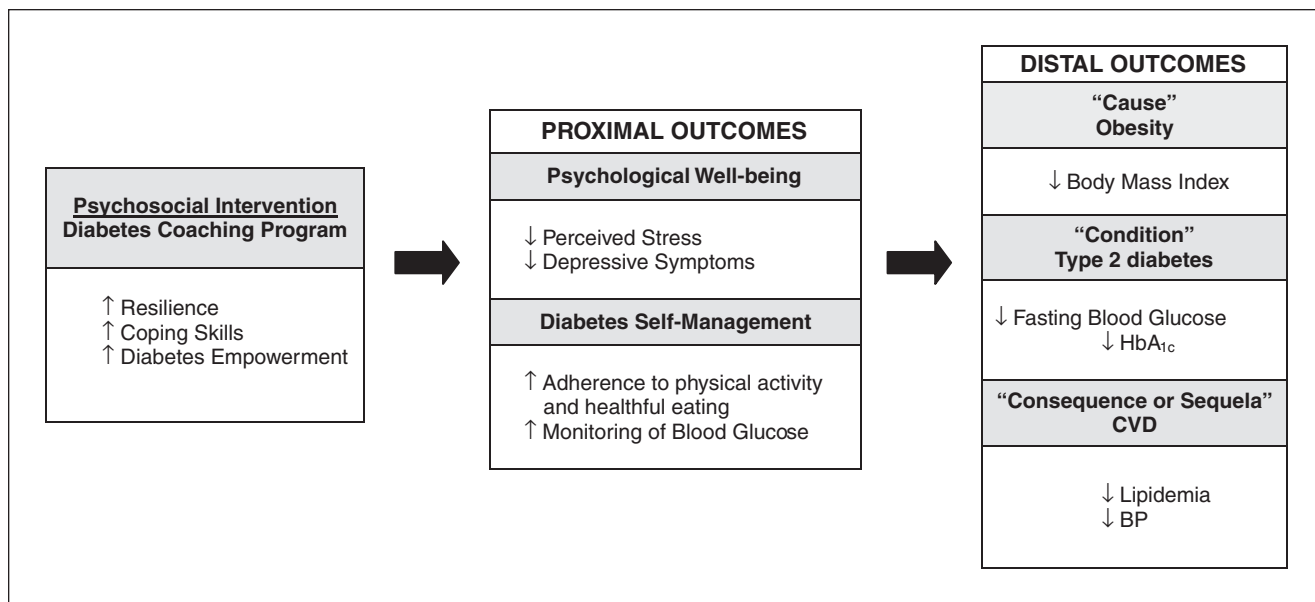


Figure 1. Conceptual model of the Diabetes Coaching Program (DCP) intervention and proposed outcomes.

self-ratings of physical health and physical symptoms^{17,18} and inversely related to depression and anxiety.¹⁹ Bonanna and colleagues²⁰ examined 2752 residents from the New York City area 6 months following the September 11th terrorist attacks and found that the absence of chronic disease was strongly associated with greater resilience, defined as low levels of depression and substance use and 1 or 0 posttraumatic stress disorder symptoms. Our research has shown that higher levels of resilience and effective coping strategies are associated with less stress and symptoms of illness in corporate employees.²¹ Furthermore, the resilience intervention, adapted for college students, resulted in decreased stress and symptoms of illness in healthy individuals.²²

Taken together, the above studies suggest that resilience interventions hold promise for African American adults with type 2 diabetes, particularly if they are designed to meet their cultural needs, goals, resources, and lifestyle.^{11,23-25} Because type 2 diabetes is a chronic condition that requires effective decisions on a daily basis regarding nutrition, physical activity, medications, and blood glucose monitoring, resilience programs that enhance the perceived self-efficacy and coping skills of patients to effectively self-manage their diabetes is paramount. Intervention strategies must facilitate collaborative relationships that enable patients to take responsibility for decisions regarding goals, daily self-care behaviors, and treatments options.^{23,24,26,27} As outlined in

Figure 1, psychosocial interventions that help African Americans with type 2 diabetes enhance their resilience, coping skills, and feelings of empowerment may improve psychological well-being and diabetes self-management and thereby prevent or at least delay the progression of obesity, type 2 diabetes, and CVD. Given the economic and personal costs associated with this disease progression, the potential impact of successful diabetes interventions on health outcomes and health care costs is tremendous.²⁵

We found only 1 study that examined the efficacy of a resiliency-training program for individuals with type 2 diabetes.²⁸ In this study, the experimental group received a 15-hour, 5-week resilience intervention containing 4 intervention components: self-efficacy, locus of control, social support, and purpose in life. Results indicated significantly higher levels of resilient qualities on individual survey items from the Living With Diabetes Subscale (eg, “I know positive ways I cope with diabetes-related stress,” “I know enough about myself to make diabetes care choices that are right for me”) and significantly lower barriers to physical activity postintervention at 3 months compared with the control group. At 6 months, the intervention group reported greater purpose in life, social support, and self-efficacy compared with the control group. HbA_{1c} level and waist measurements improved, but not significantly. Although the intervention group was Caucasian, it seems feasible that a theory based and

culturally appropriate resilience intervention for African Americans with type 2 diabetes would enhance diabetes empowerment, adherence to healthy lifestyle choices when encountering stressful situations, and ultimately the progression of obesity, type 2 diabetes, and CVD.

Purpose of the Study

The primary purpose of this pilot study was to determine the feasibility of offering the Diabetes Coaching Program (DCP), adapted for African Americans, in a sample of African American adults with type 2 diabetes. A conceptual model of proposed relationships between the DCP intervention and proximal and distal outcomes is displayed in Figure 1. The study examined whether trends in the data suggest the DCP has the potential to be an effective intervention for African Americans with type 2 diabetes as well as an acceptable approach from a cultural perspective. Specifically, the following research questions were addressed:

1. What is the feasibility of conducting a DCP intervention in a church setting with a sample of African American adults with type 2 diabetes?
2. What were the effects at 6 months of the DCP intervention on the
 - a. psychological variables of resilience, percentage problem-focused coping, and diabetes empowerment;
 - b. proximal outcomes of perceived stress, depression, and diabetes self-management; and
 - c. distal outcomes of body mass index (BMI), fasting blood glucose, HbA1c, lipidemia, and blood pressure?
3. What were participants' perceptions of the acceptability and perceived effectiveness of the DCP intervention as assessed using focus group data collected at 8 months after study entry?

Methods

Sample and Procedures

Subjects for this pilot study were a convenience sample of African Americans (8 women, 8 men) with type 2 diabetes recruited through radio and church announcements to participate in a 6-month DCP intervention. The study used a 1-group, pretest-posttest design. Quantitative data were collected preintervention and again at 6 months and qualitative evaluation data were collected at 8 months. All subjects received \$100 for their participation, dispersed in increments of \$20 throughout the study. An

additional \$25 was received for participation in a 2-hour focus group to evaluate the acceptance of the DCP intervention.

DCP Intervention

The DCP included 4 weekly 2-hour class sessions held on Tuesday evenings, 1 hour devoted to the resilience intervention, Transforming Lives Through Resilience Education, and 1 hour devoted to nutrition education related to diabetes. Eight biweekly 1½-hour support group meetings followed these class sessions with the option of attending either Tuesday evening or Saturday morning to accommodate potential scheduling conflicts and allow for maximum attendance. Support group meetings provided opportunities for participants to receive social support in an informal atmosphere and discuss their problems, ask questions, and review previously learned course content. A modified version of the resilience intervention is described elsewhere²² and available online.²⁹ The intent of the resilience portion of the DCP intervention was to empower participants to manage the stressors in their lives more effectively by taking greater responsibility for them, using effective coping strategies, thinking in more empowering ways, and creating and maintaining meaningful social connections. The general assumption was that individuals who managed stress effectively would have more effective health habits and diabetes self-management and thus better health outcomes.

The resilience model, based on the work of O'Leary and Ickovics³⁰ and Carver,¹⁶ describes 4 typical responses to stressful situations, including "give up," "put up," "bounce up," and "step up" (see Figure 2). Individuals who "give up" succumb to the stressful situation and feel defeated. Individuals who "put up" struggle with the stressful situation and are better off than those who give up, but their level of well-being is diminished. Individuals who "bounce up" fully recover from the stressful situation and return to their prior level of functioning, which is called resilience. Finally, individuals who "step up" do whatever it takes to meet the challenge and grow to an even higher level of functioning and well-being, which is called thriving. As the DCP intervention progressed, new information and activities were presented within the context of this resilience model. The scope and sequence of curriculum content for the resilience portion of the DCP as well as the nutrition education portion is summarized in Table 1. The author of the resilience curriculum, a health education professor, taught the resilience portion

of the DCP. Throughout the intervention, resilience course content was linked to nutrition education during class discussion.

The nutrition education portion of the DCP intervention was designed to provide participants with the knowledge, skills, and support necessary to feel more empowered in managing their diabetes. Participants were taught how to regulate blood glucose levels through blood glucose self-monitoring as well as how to reduce fat, sodium, and calorie intake among their favorite foods. The general philosophy for the nutrition education portion of the intervention was that providing realistic and practical suggestions for improving diabetes self-management was preferable to asking participants to make unrealistic changes frequently associated with poor adherence. Glycometers and diabetic strips were provided to all subjects, with the goal of enabling them to assume responsibility for their daily diabetes care. A PhD candidate in nutritional sciences taught the nutrition education portion of the DCP.

Follow-up support group meetings to reinforce core content and provide social support were held biweekly until 6 months after data collection. A typical support group session included a brief presentation of an interesting fact or story related to diabetes and/or review of some aspect of the DCP core content. Most of the session was devoted to problem solving and providing social support for issues raised by group members. A walk in the community followed group discussion. Healthy snacks and water were provided at all 4 weekly class sessions and 8 follow-up support group meetings.

Measures

Quantitative and qualitative data were collected to evaluate the effectiveness and acceptability of the DCP intervention. Psychosocial process variables (resilience, coping strategies, diabetes empowerment), proximal outcomes (perceived stress, depressive symptoms, diabetes self-management), and distal outcomes (BMI, fasting blood glucose, HbA1c, lipidemia, blood pressure) were assessed at baseline and at 6-month follow-up. Qualitative data were assessed at 8-month follow-up via a focus group.

Psychosocial Process Variables

Resilience. The 25-item Connor-Davidson Resilience Scale (CD-RISC) was developed as a clinical measure to assess the positive effects of treatment for stress reactions, anxiety, and depression.³¹ This scale was chosen because

Table 1

Curriculum Content for the Resilience Education and Nutrition Education Components of the Diabetes Coaching Program Intervention

Resilience Education Component	Nutrition Education Component
Week 1	
The resilience model	General facts about diabetes
The stress response	Causes of diabetes
Problem-focused coping strategies	Blood glucose self-monitoring
Emotion-focused coping strategies	
Week 2	
The responsibility model	Meal planning
Above the line/below the line behavior	Reading food labels
Circle of influence/circle of concern	Carbohydrate counting
Five-step process to move above the line	
Week 3	
Focusing on empowering interpretations	Strategies for dining out
How our thinking affects our health	Diabetes and alcohol
ABCDE thinking model	Sick day management
The origin of beliefs	Reasons to see the doctor
Week 4	
Creating meaningful connections	Diabetes complications
The healing power of love and intimacy	General hygiene
Self-leadership and the circle of influence	Exercise
Features of psychological thriving	

it includes items that represent a variety of resilient characteristics such as goal setting, patience, faith, humor, and tolerance of negative affect, as well as the ability to

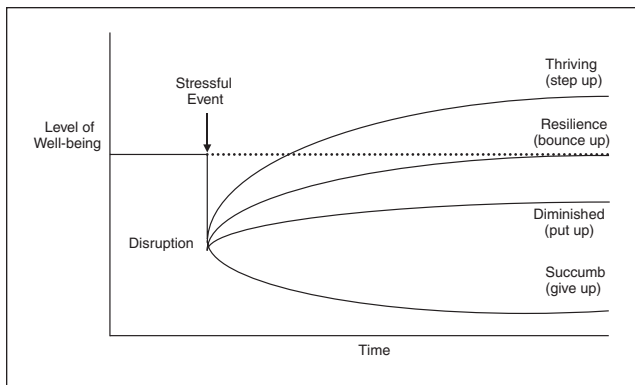


Figure 2. The resilience model taught in the Diabetes Coaching Program intervention, based on the work of O’Leary and Ickovics³⁰ and Carver.¹⁶

perceive stressors as a challenge, make a commitment, and take control. The Cronbach alpha of the CD-RISC was .92 for the pretest and .90 for the posttest.

Coping strategies. The 28-item brief version of the Coping Orientations to Problems Experienced Scale (Brief COPE) measured a broad range of cognitive and behavioral coping strategies.³² Items were grouped together into the most commonly used supersets, problem-focused or -approach coping and emotion-focused or -avoidant coping.³³⁻³⁵ Problem-focused coping (PFC) strategies were those that directly addressed the stressful situation or whose value exceeded merely reducing distress and included active coping, planning, positive reframing, acceptance, emotional support, instrumental support, and religion. The PFC alpha was .87 at pretest and .78 at posttest. Emotion-focused coping (EFC) strategies were used to reduce or manage one’s emotional reaction and feelings of distress and included self-distraction, denial, venting, substance use, behavioral disengagement, self-blame, and humor. The EFC alpha was .89 at pretest and .73 at posttest. Given the conceptual and predictive advantages of relative versus absolute coping scores, this study focused on percentage of PFC, computed by dividing PFC by the sum of PFC and EFC.³⁶

Diabetes empowerment. The 28-item Diabetes Empowerment Scale (DES) assessed participants’ self-efficacy in managing their diabetes.²⁷ The DES contains 3 subscales: managing the psychological aspects of diabetes (9 items; pretest $\alpha = .52$; posttest $\alpha = .91$), assessing dissatisfaction and readiness to change (9 items; pretest $\alpha = .74$; posttest $\alpha = .82$), and setting and achieving diabetes goals (10 items; pretest $\alpha = .87$; posttest $\alpha = .91$). Across

all items, DES reliability was $\alpha = .89$ at pretest and $\alpha = .95$ at posttest.

Proximal Outcomes

Perceived stress. The 10-item version of the Perceived Stress Scale³⁷ assessed the degree to which situations in one’s life were perceived as stressful (pretest $\alpha = .72$; posttest $\alpha = .83$).

Depressive symptoms. Depressive symptoms were measured using the 20-item Center for Epidemiologic Studies Depression Index,³⁸ with pretest $\alpha = .80$ and posttest $\alpha = .85$.

Diabetes self-management. Physical activity, nutrition, and monitoring of blood glucose were assessed using the DCP participant journal developed by the authors. The journal contained several months of daily pages, each providing an inspirational quote, and a quick and convenient checklist to monitor a variety of health behaviors for effective diabetes self-management. The checklist had 10 items that provided realistic and practical suggestions for improving diabetes self-management, such as eat 5 fruits and vegetables in a variety of colors, choose fat-free or reduced-fat foods most often, use sodium and refined sugars sparingly, and monitor blood glucose. Scores for the daily journal ranged from 0 to 100. Subjects were asked to recall the previous 3 days, and scores were averaged across days (pretest $\alpha = .58$; posttest $\alpha = .85$).

Distal Outcomes

BMI. BMI was determined using the following equation: $BMI = (\text{weight in kg})/(\text{height in m}^2)$. The body weight of each of the subjects was assessed using a portable digital scale; subjects wore street clothes and no shoes. Height was determined using a wall-mounted stadiometer.

Fasting blood glucose. A BD Logic Blood Glucose Monitor (BD Biosciences, Franklin Lakes, NJ) was used to test fasting blood glucose (minimum of 8 hours of fasting). This portable blood glucose monitor uses test strips and a very small amount of blood (0.3 μL) to return accurate results from the fingertip.

Lipidemia and HbA1c. Fasting plasma concentrations of total cholesterol, low-density lipoprotein (LDL)-cholesterol, high-density lipoprotein (HDL)-cholesterol,

and triglycerides were determined by enzymatic methods with a semiautomated chemistry analyzer (Vitros DT60 II; Johnson&Johnson, Rochester, NY). An aliquot of whole blood from the fasting blood sample was also used to determine glycosylated hemoglobin (HbA1c) concentration measured on a Micromat II HbA1c (Bio-Rad, Hercules, CA).

Blood pressure. An Omnicron model HEM-712C Automatic Inflation Blood Pressure Monitor (Omnicron, Philadelphia, PA) was used to assess systolic and diastolic blood pressures. Following a 5-minute rest period, 3 measurements were taken using the subject's right arm. The first measurement was omitted, and the remaining 2 measures were averaged.

Qualitative Data

As part of the evaluation, a 2-hour focus group was conducted 8 months following baseline data collection to examine subjects' opinions of the acceptability and perceived effectiveness of the DCP intervention. A trained facilitator moderated the session, with the goal of providing insight into DCP strategies that were successful and worth replicating as well as those that needed to be modified or discontinued.

Results

The first research question examined the feasibility of providing the DCP intervention in an African American community church setting. Of the 16 subjects who began the program, 12 (6 women, 6 men) completed the intervention and post-data collection, ranging in age from 43 to 66 years, with a mean of 54.83 years. Subjects had some high school ($n = 1$), a high school diploma or GED equivalent ($n = 1$), some college ($n = 4$), a bachelor's degree ($n = 5$), or a master's degree ($n = 1$) and reported a yearly family income before taxes of \$19 000 or less ($n = 4$), \$20 000 to \$39 000 ($n = 2$), \$40 000 to \$59 000 ($n = 2$), \$60 000 to \$79 000 ($n = 1$), and more than \$100 000 ($n = 1$).

Both attendance and attrition were monitored during the intervention and follow-up support group sessions. Three subjects completed the 4 educational sessions but did not attend any support group sessions or show up for post-data collection. One subject moved out of town. The remaining 12 subjects completed all 4 of the educational sessions and on average attended 5 of the 8 support group sessions. Throughout the DCP, 3 participants required

transportation; however, this was nonproblematic, as the church was on the city bus route, and spouses and group members provided rides on several occasions. Individual class sessions were provided on 2 occasions, once in the home of a wheelchair-bound subject and once at a local hospital for a subject whose husband was hospitalized.

The second research question examined the effects of the DCP intervention on the psychological process variables as well as proximal and distal outcome variables (see Figure 1). Means and standard deviations for all study variables at baseline and postintervention at 6 months are shown in Table 2. Effect sizes were calculated as the averaged individual difference between posttest and pretest, divided by the standard deviation of the difference, and are thus expressed in standard deviation units.³⁹ An effect size of 0.20 may be considered small, 0.50 medium, and greater than 0.80 as large. Preliminary paired *t* tests indicated significant improvements from preintervention to postintervention for the psychosocial variable diabetes empowerment, the proximal outcome of diabetes self-management, and the distal outcomes of BMI, HbA1c, total cholesterol, LDL cholesterol, and systolic and diastolic blood pressure. Although the baseline HbA1c group mean was not unusually high (6.94), improvements occurred in 11 of the 12 participants, resulting in a significant postintervention improvement (5.57), reflecting a change score of -1.37 percentage points. Resilience, perceived stress, fasting blood glucose, and HDL cholesterol improved, but results were not statistically significant.

The third and final research question examined participants' perceptions of the effectiveness of the DCP intervention. Qualitative information was gathered via a 2-hour focus group at 8 months led by a trained facilitator. Eleven of the 12 subjects participated and indicated that the DCP was effective. The central location of the meetings was convenient, the size of the group was appropriate and allowed for maximum participation, and participants enjoyed meeting in a church setting. Several subjects expressed an appreciation of the conversational style of the instructors and the flexibility to attend support group sessions on either a Tuesday evening or Saturday morning. They especially liked the class handouts, food models illustrating healthy portion sizes, discussions of ways to prepare their favorite foods more healthfully, computer printouts of their blood glucose self-monitoring, and the DCP daily journal. For example, one participant commented, "I loved it when they brought the portions that

Table 2

Pre and Post Means, Standard Deviations, and Effect Sizes for Psychosocial Variables, Proximal Outcomes, and Distal Outcomes

	Pre Mean (SD)	Post Mean (SD)	Effect Size	<i>t</i>
Psychosocial variables				
Resilience	83.18 (8.48)	84.08 (8.38)	0.10	0.35
% Problem-focused coping	0.65 (.06)	0.64 (.06)	-0.18	-0.64
Diabetes empowerment	3.75 (0.39)	4.37 (0.41)	1.23	4.25 ^b
Psychological aspects	3.63 (0.36)	4.36 (0.40)	1.51	5.23 ^c
Readiness to change	3.79 (0.41)	4.28 (0.46)	1.08	3.73 ^b
Setting and achieving goals	3.83 (0.54)	4.41 (0.42)	0.76	2.65 ^a
Proximal outcomes				
Perceived stress	16.50 (4.03)	15.58 (5.00)	-0.26	-0.91
Depressive symptoms	11.57 (7.08)	11.75 (7.79)	0.03	0.10
Diabetes self-management	49.55 (24.72)	63.06 (16.84)	0.74	2.46 ^a
Distal outcomes				
Body mass index	32.83 (5.36)	32.08 (4.94)	-0.99	-3.45 ^b
Fasting blood glucose	140.92 (53.48)	131.42 (42.15)	-0.18	-0.62
HbA1c	6.94 (1.70)	5.57 (0.81)	-1.04	-3.61 ^b
Total cholesterol	178.00 (30.82)	163.45 (37.79)	-0.70	-2.31 ^a
Low-density lipoprotein cholesterol	107.50 (33.56)	91.64 (30.95)	-1.08	-3.58 ^c
High-density lipoprotein cholesterol	39.42 (9.27)	40.36 (8.29)	0.09	0.31
Systolic blood pressure	134.58 (16.66)	124.50 (17.61)	-0.80	-2.78 ^a
Diastolic blood pressure	82.00 (11.24)	76.00 (10.12)	-0.71	-2.47 ^a
^a <i>P</i> < .05.				
^b <i>P</i> < .01.				
^c <i>P</i> < .001.				

you are really allowed to eat and some of the men looked at it, and said, 'oh my, that's all I'm really supposed to have!' But that really helped." With respect to favorite foods, one participant remarked, "My favorite food is fried chicken . . . I find out I can still have my fried chicken if I cook it in canola oil . . . or I can do the shake and bake." Finally, with regard to the glucose self-monitoring computer printouts, a participant remarked, "The thing that I found most interesting was when the instructor would read meters and she could pinpoint it down to the day . . . they would show me, hey what did you do on this day, you know, and think about it, and I couldn't deny that I knew that there was something I did."

Social support was reported as the single most important benefit subjects got from the class. For example, one female group member said,

If we felt like we were not doing right and we weren't feeling good at other times we had someone to call, like a call buddy. And they would pick you up and say, "Hey, you're ok. You messed up this time but that's ok, you can do better tomorrow." And I enjoyed that.

Participants also reported that they discussed their disease with family members and gained their support in addition to enhancing their knowledge of diabetes. For example, one participant commented,

I come from a family of diabetics . . . one of the greatest things that I found is going back relaying [the information] to my relatives. . . . I try to keep them abreast, you know, giving them the information . . . and they are doing better with their own diabetes.

For many group members, the social support received provided the courage and inspiration to take responsibility for their diabetes rather than be in denial, blame others, make excuses, or shame themselves. For example, one participant said, "I was in denial, you know, they send you to classes but they don't give you what you really need." Another commented,

It was satisfying to hear some of the challenges that they were going through, you know, sometimes when their numbers were off . . . it was almost like they were doing what you were doing, and so it helped to talk.

Finally, the importance of feeling supported from within one's community was reflected by the following comment:

And I've lived in Austin all my life and I know that a lot of us have structured times when you went to see a doctor, you know, when you were diagnosed with diabetes, they say, "you go see the nutritionist," and "you talk to someone about exercise," but to have support within your community, that was support!

The group especially liked the DCP journal and linking a passing score (70) more days than not as an indicator of their overall glycemic control. One participant remarked, "You just can't lie and say you did this and that, because when they did the A1 hemoglobin it told the truth." The sharing of struggles experienced in trying to get a daily passing score normalized the struggle and provided encouragement. For example, one participant commented,

Since I've been a part of this, it's so much useful information, it clarifies a lot of myths about being a diabetic and little things like [a participant] being a nurse and being afraid to prick her own finger. We experience little things like that that really encouraged us on an individual level.

Another shared his paradigm shift with respect to monitoring blood glucose:

I used to always kind of live, or see, the pricking part as being the event, but what I learned was actually it's the reverse . . . it's all the stuff in between that really is

important and that really helped me. I really kind of reversed my thinking on that whole process.

The main suggestion to improve the program related to time. For example, "We just didn't have enough time . . . this was just the beginning. We were just getting started." Another commented, "If there were more sessions we could go a little slower and break it down more." Most participants thought 8 sessions with the follow-up support groups would be sufficient. When subjects were asked if they might be willing to help teach the material to members of their community in the future if provided with participant manuals and facilitator manuals, several expressed an interest as long as they could "get some instructions and some training." Another commented, "As long as you had the manuals."

Discussion

This pilot study demonstrated the feasibility of providing the DCP and support group sessions, the strong interest of subjects in participating in the DCP, the potential efficacy of the DCP to affect health outcomes of adults with type 2 diabetes, and the acceptability of the intervention in a church setting in this African American community. Statistically significant improvements were observed in diabetes empowerment, diabetes self-management, BMI, HbA1c, total cholesterol, LDL cholesterol, and systolic and diastolic blood pressure. However, because of the small sample size and other study limitations, these data must be interpreted cautiously. A next logical step is to incorporate the lessons learned during this pilot study, including suggestions from the focus group, and conduct a larger experimental study.

During the beginning stages of this research, the authors were reminded of the value and necessity of having the support of a key opinion leader in the community. Although several churches expressed an interest in the DCP, follow-up and subject recruitment proved to be challenging. After several months, a breakfast meeting with members of the Women's Health Ministry from a local Baptist church was a key turning point. A church nurse with type 2 diabetes was very interested in the DCP and became the program champion. Her efforts in communicating with churches in the surrounding area and her willingness to be interviewed on local radio to enhance subject recruitment proved most effective. This same nurse also secured the church group room for the class sessions and the support of the church pastor.

Although the psychosocial variables of resilience and coping skills did not significantly increase as expected, they may have played a role in enhancing diabetes empowerment and self-management. The foundational component of the resilience intervention is taking responsibility for one's life circumstances. Participants practiced taking greater responsibility by reflecting on the relationship between the choices they made on a daily basis and the consequences of those choices. They also identified the most important values in their lives and set goals and priorities based on these values. Furthermore, they practiced thinking about stressful life situations in ways that brought power to them, as opposed to interpreting situations in ways that gave their power away and left them feeling threatened and/or defeated. It is likely that taking greater responsibility for their stressful situations, accompanied by empowering, yet realistic, interpretations of these situations resulted in the significant increases found in diabetes empowerment and self-management. This interpretation is consistent with the study of Bradshaw and colleagues²⁸ in that higher levels of resiliency were reflected by such things as knowing positive ways to cope with diabetes, staying motivated to care for diabetes, eating healthier, and increasing physical activity.

Complications from the synergistic effects of obesity, type 2 diabetes, and CVD result in an enormous burden for the African American community. Identifying possible causal mechanisms among the psychosocial process variables and proximal and distal outcomes outlined in Figure 1 is essential. This pilot study suggests that diabetes empowerment results in enhanced diabetes self-management, which in turn positively affects the distal outcomes associated with the progression of obesity, type 2 diabetes, and CVD (eg, BMI, fasting blood glucose, HbA1c, lipidemia, and blood pressure). The authors were surprised that these beneficial changes occurred without a corresponding significant increase in resilience and effective coping strategies or decreases in perceived stress and depressive symptoms. Qualitative data from participants suggested that the program needed to be longer (8 weeks rather than 4 weeks) and that they were "just getting started." Increasing program length will bring the DCP more in line with the dosage effect⁴⁰ suggested in the literature for successful diabetes self-management. Future interventions are planned to examine the effects of a longer intervention using an experimental design on these psychosocial process and outcome variables.

The findings of this pilot study should be considered in light of several limitations. First, participants were not randomly selected from the population, a process that is often not feasible in social science research. Thus, the sample may not be representative of the population from which it was drawn, which has implications for generalizability of the results. Second, the use of self-report survey data has inherent limitations, such as the potential for untruthful or inaccurate responses due to lack of self-awareness. Third, while comparable to some pilot studies, the sample size was relatively small and may have contributed to the lack of significant findings in some instances. Nonetheless, the pilot study documented the feasibility and potential effectiveness of the DCP to enhance diabetes empowerment, diabetes self-management, and reductions in the disease progression of obesity, type 2 diabetes, and CVD in the African American community. Randomized experimental designs are needed to confirm the potential benefits found in the pilot study.

References

1. National Institute of Diabetes and Digestive and Kidney Diseases. National Diabetes Statistics Fact Sheet. US Department of Health and Human Services. National Institutes of Health, 2005. <http://diabetes.niddk.nih.gov/dm/pubs/africanamerican/index.htm>. Accessed December 15, 2007.
2. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA*. 2006;295:1549-1555.
3. National Institute of Diabetes and Digestive and Kidney Diseases. Complications of Diabetes in the United States. US Department of Health and Human Services. National Institutes of Health, 2005. <http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm#13>. Accessed December 15, 2007.
4. Centers for Disease Control and Prevention. Physical Activity and Good Nutrition: Essential Elements to Prevent Chronic Diseases and Obesity, 2007. <http://www.cdc.gov/nccdphp/publications/aag/dnpa.htm>. Accessed December 15, 2007.
5. Norris SL, Engelgau MM, Venkat Narayan KM. Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. *Diabetes Care*. 2001; 24(3):561-587.
6. Gary TL, Genkinger JM, Guallar E, Peyrot M, Brancati FL. Meta-analysis of randomized educational and behavioral interventions in type 2 diabetes. *Diabetes Educ*. 2003;29(3):488-501.
7. Brown SA. Interventions to promote diabetes self-management: state of the science. *Diabetes Educ*. 1999;25(6):52-61.
8. Glasgow RE, Klesges LM, Dziewaltowski DA, Bull SS, Estabrooks P. The future of health behavior change research: what is needed to improve translation of research into health promotion practice? *Ann Behav Med*. 2004;27(1):3-12.
9. Amoako E, Skelly AH. Managing uncertainty in diabetes: an intervention for older African American women. *Ethn Dis*. 2007;17:515-521.

10. Tang TS, Gillard ML, Funnell MM, et al. Developing a new generation of ongoing diabetes self-management support interventions: a preliminary report. *Diabetes Educ.* 2005;31(1):91-97.
11. Loftin WA, Barnett SK, Bunn PS, Sullivan P. Recruitment and retention of rural African Americans in diabetes research: lessons learned. *Diabetes Educ.* 2005;31(2):251-259.
12. Everson-Rose SA, Torrens JI, Meyer PM, et al. Depressive symptoms, insulin resistance and risk of diabetes in women at midlife. *Diabetes Care.* 2004;27:2856-2862.
13. Boyle SH, Helms MJ, Surwitt RS, et al. Depressive symptoms, race, and glucose concentrations. *Diabetes Care.* 2007;30:2484-2488.
14. McEwen B. *The End of Stress as We Know It.* Washington, DC: Joseph Henry Press; 2002.
15. Lazarus RS, Folkman S. *Stress Appraisal and Coping.* New York, NY: Springer; 1984.
16. Carver CS. Resilience and thriving: issues, models, and linkages. *J Soc Issues.* 1998;54(2):245-266.
17. Judkins S. Stress among nurse managers: can anything help? *Nurs Res.* 2004;12(2):58-70.
18. Soderstrom M, Dolbier CL, Leiferman JA, Steinhardt MA. The relationship of hardiness, coping strategies, and perceived stress to symptoms of illness. *J Behav Med.* 2000;23(3):311-328.
19. Beasley M, Thompson T, Davidson J. Resilience in response to life stress: the effects of coping style and cognitive hardiness. *Pers Individ Dif.* 2003;34(1):77-95.
20. Bonanno GA, Galea S, Bucciarelli A, Vlahov D. What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *J Consult Clin Psychol.* 2007;75(5):671-682.
21. Dolbier CL, Smith SE, Steinhardt MA. Relationships of protective factors to stress and symptoms of illness. *Am J Health Behav.* 2007;31(4):423-433.
22. Steinhardt MA, Dolbier CL. Evaluation of a resilience intervention to enhance coping strategies and protective factors and decrease symptomatology. *J Am Coll Health.* 2008;56(4):445-453.
23. Anderson RM, Funnell MM. Patient empowerment: reflections on the challenge of fostering the adoption of a new paradigm. *Patient Educ Couns.* 2005;57:153-157.
24. Funnell MM, Anderson RM. Empowerment and self-management of diabetes. *Clin Diabetes.* 2004;22(3):123-127.
25. Brown SA, Garcia AA. Reaching underserved populations and cultural competence in diabetes education. *Curr Diab Rep.* 2002;2:166-176.
26. Brown SA, Garcia AA, Kouzekanani K, Hanis CL. Culturally competent diabetes self-management education for Mexican Americans. *Diabetes Care.* 2002;25(2):259-268.
27. Anderson RM, Funnell MM, Fitzgerald JT, Marrero DG. The diabetes empowerment scale: a measure of psychological self-efficacy. *Diabetes Care.* 2000;23(6):739-743.
28. Bradshaw BG, Richardson GE, Kumpfer K, et al. Determining the efficacy of a resiliency training approach in adults with type 2 diabetes. *Diabetes Educ.* 2007;33(4):650-659.
29. Steinhardt MA. Transforming lives through resilience education. The University of Texas at Austin. <http://www.utexas.edu/education/resilience/viewings>. Accessed December 15, 2007.
30. O'Leary VE, Ickovics JR. Resilience and thriving in response to challenge: an opportunity for a paradigm shift in women's health. *Women's Health: Research on Gender, Behavior, and Policy.* 1995(1):121-142.
31. Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). *Depress Anxiety.* 2003;18:76-82.
32. Carver CS. You want to measure coping but your protocol's too long: consider the brief COPE. *Int J Behav Med.* 1997;4:92-100.
33. Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: a theoretically based approach. *J Pers Social Psychol.* 1989;56:267-283.
34. Folkman S, Moskowitz JT. Positive affect and the other side of coping. *Am Psychol.* 2000;55:647-654.
35. Skinner EA, Edge K, Altman J, Sherwood H. Searching for the structure of coping: a review and critique of category systems for classifying ways of coping. *Psychol Bull.* 2003;24:326-335.
36. Vitaliano PP, Maiuro RD, Russo J. Raw versus relative scores in the assessment of coping strategies. *J Behav Med.* 1987;10(1):1-18.
37. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav.* 1983;24:385-396.
38. Radloff LS. The Center for Epidemiologic Studies Depression Index. *Appl Psychol Meas.* 1977;1:385-401.
39. Cohen J. *Statistical Power Analysis for the Behavioral Sciences.* 2nd ed. Hillsdale, NJ: Erlbaum; 1988.
40. Brown SA, Blozis SA, Kouzekanani K, Garcia AA, Winchell M, Hanis CL. Dosage effects of diabetes self-management education for Mexican Americans. *Diabetes Care.* 2005;28:527-532.

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