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ARTICLE *in* JOURNAL OF THE NATIONAL MEDICAL ASSOCIATION · MARCH 2011

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Translation of the National Institutes of Health Diabetes Prevention Program in African American Churches

John M. Boltri, MD; Monique Davis-Smith, MD; Ike S. Okosun, PhD, MPH; J. Paul Seale, MD; Barbara Foster, PhD

Funding/Support: This project was supported in part by grants from the Hatcher Foundation, Macon Georgia; the US Department of Health and Human Services, Health Resources and Services Administration, grant 5D12HP00159; and National Institutes of Health grant 1 K07 HL04305-01.

Objective: To translate the Diabetes Prevention Program (DPP) for delivery in African American churches.

Methods: Two churches participated in a 6-week church-based DPP and 3 churches participated in a 16-week church-based DPP, with follow-up at 6 and 12 months. The primary outcomes were changes in fasting glucose and weight.

Results: There were a total of 37 participants; 17 participated in the 6-session program and 20 participated in the 16-session program. Overall, the fasting glucose decreased from 108.1 to 101.7 mg/dL post intervention ($p = .037$), and this reduction persisted at the 12-month follow-up without any planned maintenance following the intervention. Weight decreased 1.7 kg post intervention with 0.9 kg regained at 12 months. Body mass index (BMI) decreased from 33.2 to 32.6 kg/m^2 post intervention with a final mean BMI of 32.9 kg/m^2 at the 12-month check ($P < .05$). Both the 6- and 16-session programs demonstrated similar reductions in glucose and weight; however, the material costs of implementing the modified 6-session DPP were $934.27 compared to $1075.09 for the modified 16-session DPP.

Conclusion: Translation of DPP can be achieved in at-risk African Americans if research teams build successful community-based relationships with members of African American churches. The 6-session modified DPP was associated with decreased fasting glucose and weight similar to the 16-session program, with lowered material costs for implementation. Further trials are needed to test the costs and effectiveness of church-based DPPs across different at-risk populations.

Keywords: diabetes ■ prevention ■ research

J Natl Med Assoc. 2011;103:194-202

Author Affiliations: Department of Family Medicine (Drs Boltri, Davis-Smith, and Seale), Mercer University School of Medicine and the Medical Center of Central Georgia in Macon; Institute of Public Health, College of Health and Human Sciences, Georgia State University, Atlanta (Dr Okosun); Department of Family and Community Medicine at The University of Texas Southwestern Medical Center in Dallas (Dr Foster).
Correspondence: John Boltri, MD Center for Educational Research, 3780 Eisenhower Pkwy, Ste 3, Macon, GA 31206 (boltri.john@mccg.org).

INTRODUCTION

It is estimated there are currently 24 million people in the United States with type 2 diabetes mellitus (T2DM) and another 57 million with prediabetes (impaired fasting glucose or impaired glucose tolerance), with these numbers likely to double by the year 2030.[1,2] T2DM significantly increases the risk for many diseases, including cardiovascular disease, blindness, renal disease, and nontraumatic amputation.[3-8] For these reasons, T2DM is costly, accounting for more than 18% of all direct US medical care costs ($132 billion in 2002). Direct medical costs are 2.4 times higher in individuals with T2DM[3-11] and are elevated even among those with impaired fasting glucose.

In the United States, approximately 4 million African Americans have T2DM, with a prevalence rate nearly one-third higher than non-Hispanic whites.[12-14] As T2DM continues to increase, the greatest increases are occurring among African Americans.[15-18] Hemoglobin A_{1c} levels are more likely to be elevated in African Americans with diabetes compared to other ethnic groups, reflecting poorer glycemic control.[19-21]

Fortunately, recent studies have demonstrated that T2DM can be delayed or prevented through the use of medications and/or lifestyle modification with diet, exercise and weight loss. Six randomized controlled trials (RCTs) have demonstrated that T2DM can be prevented or delayed with medication or lifestyle modification.[12-14,22-24] Studies that have included lifestyle interventions have resulted in greater risk reductions (49%-58%) compared to those that utilized medications without lifestyle intervention (25%-55%).[12-14,22-24]

The National Institutes of Health (NIH) Diabetes

Prevention Program (DPP) has been the largest RCT studying a lifestyle intervention to delay or prevent T2DM. The DPP was a randomized, controlled US multicenter trial in which 3234 persons who were at increased risk for developing TDM2 were randomly assigned to receive either placebo, metformin, or intensive lifestyle modification. In the intensive lifestyle arm, each participant was provided 16 weeks of intensive education by a lifestyle coach followed by 24 months of individualized support and financial support (such as exercise shoes and fitness training). Lifestyle modification resulted in a 58% reduction in development of T2DM compared to placebo.[23] Consequently, the NIH has called for the translation of the DPP into real-world settings using methods that are effective and sustainable.[25]

In order to successfully disseminate the DPP, several barriers must be overcome. The intensive lifestyle arm of the DPP included components that are expensive and potentially impractical for community interventions.[26] Trained research staff met independently with each participant to deliver the 16-session core curriculum and used an individualized approach that included self-monitoring of diet and exercise as well as attention to individual challenges. For those having difficulty with weight loss or physical activity, the DPP included "toolbox" funding for personal incentives: exercise tapes, home exercise equipment, enrollment in an exercise facility, liquid formula diets, and home visits. To be successfully disseminated to the general population, an individualized plan of this magnitude and scope would incur high initial costs.[27,28] The direct cost of the DPP over 3 years was $2780 per participant in the lifestyle intervention group, and the cost per case of T2DM prevented was $15 700.[29-31] Unfortunately, although many individuals are willing to participate in interventions to delay or prevent T2DM, most will participate only if the program is subsidized.[32] Implementing the lifestyle intervention using a group of 10 rather than an individual format could potentially reduce the cost per case[28] of T2DM prevented to $4500. Thus, creating a group-based DPP appears to be a desirable component of DPP translation to general community intervention.

Translation research strives to transform current knowledge into operations in real-world practice.[33,34] A major challenge is to translate the findings from ideal clinical trials with highly selected populations and rigid protocols to less-than-optimal situations with finite resources and competing demands. Translation must be flexible to deal with diversity, time constraints, financial issues, organizational politics, and complex systems.[34] Interventions are needed that are broadly applicable and that increase participation, especially among minorities.[35] Effective, real-world translational research must be driven by a multifactorial approach that combines biological, cultural, social, and psychological influences.[33]

African American churches are a possible setting for implementing a group-based DPP. With more than 313 000 churches and 162 million members in the United States, churches are present in almost every community. They also connect with individuals who may not use or have access to traditional health promotion resources.[36,37] Church members, who value helping others and promoting a spirit of volunteerism, are very effective in conducting community-based health promotion programs, as demonstrated by their long history of promoting, encouraging, and facilitating community-based screening and health care programs in African American communities.[38-48]

A high percentage of programs in African American churches have focused on primary prevention.[45] These screening and intervention programs have addressed a wide range of health concerns, including breast cancer, hypertension, cervical cancer, smoking cessation, cholesterol education, and cardiovascular risk reduction.[40,42,47-54] African American churches are ideal sites for diabetes screening and prevention, because they have large numbers of people at risk for diabetes, a long history of providing health promotion activities and an established social network that can be utilized to address maladaptive lifestyles.[44,49-52,55-57] Moreover, diabetes has been identified as a leading health concern in a study regarding chronic diseases in the African American faith-based community,[50] and African American church congregants are highly receptive to collaborative prevention activities addressing this concern.[57,58]

The question guiding this research is, "How can the NIH-DPP be successfully implemented in African American churches?" This report describes the effect of a modified 16-session and 6-session NIH-DPP in 2 and 3 African American churches, respectively. Specifically, this pilot study sought to compare the impact of the modified NIH-DPP on weight and fasting blood glucose.

METHODS

This pilot study was carried out in a total of 5 African American Baptist churches in small rural communities in middle Georgia. The intervention used in this study was modeled after the lifestyle intervention arm of the NIH-DPP, which has been previously described.[26] Two group-based programs, a 6-session program and a 16-session program, were developed using a community-based participatory research (CBPR) approach. Two churches participated in the 6-session diabetes prevention program and 3 churches participated in the 16-session program (see Figure 1 for a summary of the protocol). Six-month and 12-month postintervention follow-up testing of fasting glucose and weight were performed with all church participants. All adult church congregants aged 18 years or more with a Diabetes Risk Assessment (DRA) score of at least 10 were invited to obtain a fasting glucose at the church. Participants with

a fasting glucose in the prediabetes range (100-125 mg/dL) were invited to participate in either the 6-session or 16-session program**.** Persons with diabetes were excluded (Figure). This study was approved by the Mercer University institutional review board.

Translating the 6-Session and 16-Session DPP for Implementation in African American Churches

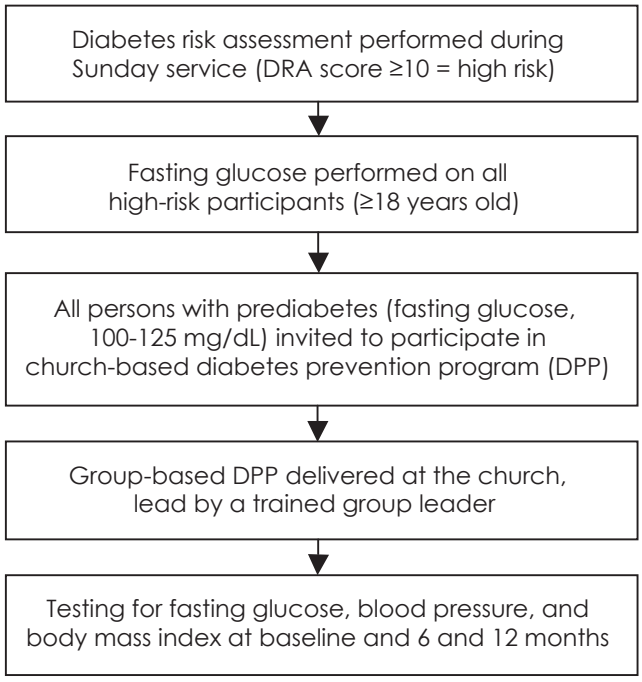
Our team included a research assistant, a nurse educator, and 2 physicians, one of whom is an African American church member. The team modified the lifestyle balance curriculum of the DPP from an individual-based design to a group-based design that is culturally appropriate for implementation in an African American church setting. Time for prayer and group interaction were built into the meetings. To encourage group interaction, discussion questions were added based on session content. This new format was test piloted in a small-group setting using a research team that included African American members of local churches. Minor modifications were made based on feedback from church participants who completed the program. To increase participation and acceptance, all screening, data collection, program implementation, and follow-up activities were performed at the church.

The goals underlying the development process were to make the DPP more cost effective, to reach more people, and to tap into behavior change led by social action theory. The shorter 6-session program was designed to evaluate the effects of maintaining the core principles of the DPP's lifestyle balance curriculum with fewer sessions. The research team chose 2 sessions from each of the 3 core areas of the curriculum: nutrition, physical activity, and behavior change.

Church Recruitment

Churches were recruited based on size (membership of 200-400) and interest in participating in the program. The church membership of 200 to 400 was necessary to yield a group size of 8 to 15 participants with prediabetes. No honorarium was provided to any churches or participants; however, each church was given a standard digital bathroom scale to keep at the church because some participants did not own home scales. The first contact was made with the church pastor and his/her commitment to participate was secured. Next, an information session was provided to all but 1 church to inform the key leaders and decision makers of the program, to explain the need for diabetes prevention in high-risk persons, and to identify barriers and resources specific to the church for implementation of this program. During this meeting, programmatic issues were resolved, including best dates and times for implementing the Sunday screening and the group diabetes prevention program sessions.

Figure. Study Schema



Diabetes Risk Assessment Screening

High-risk adult members of the church were identified using the American Diabetes Association's 7-question risk questionnaire. The Diabetes Risk Assessment (DRA) tool was developed by the Centers for Disease Control and Prevention.[59,60] A score of 10 or greater indicates increased risk for developing diabetes and need for further testing with either a fasting glucose test or an oral glucose tolerance test. Two weeks prior to implementing the DRA, weekly announcements were placed in the Sunday bulletin detailing the dates of the DRA. The DRA was performed during 2 successive Sunday services. A member of the research team explained the church-based DPP and the DRA to the congregation during the Sunday services. The DRA was distributed to every adult congregant, collected on the same day, and the score was tallied by the research team on the following Monday.

Fasting Glucose Testing

All participants with a DRA score of at least 10 were notified that their screening indicated high risk. They were invited to return to the church after an 8-hour fast for glucose testing. Fasting fingerstick glucose testing was performed at the respective churches 3 to 4 times weekly for 2 weeks at times determined by each church. All participants with an elevated fasting glucose in the prediabetes range (100-125 mg/dL) received a second fasting glucose fingerstick test, which was averaged with the first test. Participants with a fasting glucose in the prediabetes range were invited to participate in the church-based DPP.

Church-Based Group Program Implementation

The best time and location of the group sessions were determined based on communication with each church's contact person and on knowledge gleaned from the information session. The intervention sessions occurred on either Tuesday evening or Wednesday evening between 5 PM and 6:30 PM, except for the first and last sessions, which were held on a Saturday from 9 AM to noon to facilitate determination of fasting glucose. Each session was led by a volunteer with a medical or psychology background. All group leaders attended a 1-hour training session to learn the goals of the DPP, the use of the DPP materials and the format for leading the group sessions.

Session content and delivery. At the beginning of each session, every participant was weighed and the workbook materials for the session were distributed. If participants were unable to attend a session the materials were sent to them. Each session was preceded by a prayer led by a participant, usually a deacon or minister. Following the prayer the group leader facilitated a discussion for 60 to 90 minutes using the information adapted from the NIH-DPP. Each session was delivered

Table 1. Church-Based Diabetes Prevention Program Baseline Site Data[a]

	All Church Participants	6-Session Church Participants	16-Session Church Participants
	N = 442	N = 177	N = 265
Eligible participants	400	153	247
High risk (DRA ≥10)	234	70	164
Obtained fasting fingerstick glucose	180	58	122
No. with prediabetes	74	25	49
No. participating in DPP[b]	37	17	20
Attended all sessions	8 (21.6%)	5 (29.4%)	3 (15%)
Percent participation[c]	62.1%	68.7%	56.6%
	Participants in CBDPP	**6-Session CBDPP Participants**	**16-Session CBDPP Participants**
	n = 37	**n = 17**	**n = 20**
Mean fasting fingerstick glucose ± SD	108.0 ± 6.4	107.1 ± 7.9	108.0 ± 5.0
Mean weight (kg) ± SD	95.1 ± 20.5	95.0 ± 23.7	95.3 ± 18.3
Mean systolic blood pressure (mm Hg) ± SD	137.6 ± 12.9	139.5 ±12.6	135.9 ±13.2
Mean diastolic blood pressure (mm Hg) ± SD	84.9 ± 10.5	85.6 ± 7.9	84.2 ±12.5
Mean body mass index (kg/m^2) ± SD	33.2 ± 6.2	32.8 ± 6.4	33.6 ± 6.3
Mean age ± SD	57.2 ± 9.0	56 ± 8.4	58 ±9.6
Female gender	23 (62.2%)	9 (53.9%)	14 (70.0%)
African American	37 (100%)	17(100%)	20(100%)

Abbreviations: CBDPP, church-based diabetes prevention program; DRA, Diabetes Risk Assessment.

[a] Statistics are based on unadjusted raw data.

[b] Attendance in all sessions.

[c] Mean attendance/number of sessions.

in lecture/workshop format. This discussion was designed to disseminate the content of the DPP, to provide a forum for group discussion, and to encourage peer support. During the presentation the leader asked participants to complete questionnaires from the participant workbook concerning DPP topics and to share their answers with the group. Questions dealt with topics relevant to the session.

Outcomes

The primary outcomes were participation rates and changes in fasting glucose and weight, measured at baseline, 6-month, and 12-month follow-up. Blood pressure and BMI (kg/m^2) were secondary outcomes.

Height was measured in inches using a standard stadiometer. Weight was measured to the nearest 0.05 kg using a Professional Digital Healthometer (Pelstar model 597K, Bridgeview, Illinois). Blood pressure was measured by a licensed nurse or physician using a Trimline certified blood pressure cuff and a Welch Allen stethoscope. Fasting glucose testing was performed after a fast of 8 or more hours using an Accu-Check compact glucometer.

Statistical Analysis

All data were analyzed using SPSS version 15.0. The outcome measures of weight, BMI, blood pressure, and fasting glucose were assessed individually. A multivariate analysis of variance with 1 within-factor (study time periods) and 1 between-factor (6 sessions vs 16 sessions). Study time periods included baseline, end of session, 6 months, and 12 months post study. *P* values of < .05 were used to determine statistical significance. Small sample sizes make it difficult to assess parametric assumptions; however, checks indicated that the assumptions were tenable. Means and standard deviation and frequencies were used to describe the data. Analyses were based on an-intent-to-treat basis. For missing values, the most conservative value was used, eg, the highest weight was substituted for a missing weight.

Determination of costs. The research team recorded the costs of all materials associated with implementation of the DPP. The purpose of recording costs was to gather data for a future RCT and to inform interested churches of the material costs associated with implementing the 6-session and the 16-session program. Costs included all program materials, binders, paper, food, and program materials. Programmatic materials included a scale measuring up to 158.8 kg, food measuring devices (scales, measuring spoons, etc), calculators, and diaries for recording dietary intake and physical activity. Volunteer costs, travel, and costs of the research assistant's time were not included in the implementation cost report.

Table 2. Demographic and Diabetes Risk Characteristics of Participants (n = 37)

Factor	X ± SD
Age, y	57.2 ± 9.0
Mean body mass index	33.2 ± 6.2
Mean DRA risk score	13.2 ± 2.4
	n (%)
Male	11 (29.7)
Female	26 (70.3)
High-risk weight (BMI ≥25)	33 (89.2)
Age between 45 and 64	23 (62.2)
Age >65 y	7 (18.9)
Age <65 y and inactive	17 (45.9)
Had baby = 4.1 kg (n = 27)[a]	3 (13.0)
>1 diabetes risk factor[b]	35 (94.6)
>2 diabetes risk factors[b]	17 (45.9)
Parent with diabetes	13 (35.1)
Sibling with diabetes	16 (43.2)

Abbreviations: BMI, body mass index; DRA, Diabetes Risk Assessment.

[a] Values are for women only.

[b] Risk factors include elevated glucose or prediabetes, BMI ≥25, age ≥45 y, high blood pressure, first-degree relative with type 2 diabetes mellitus, high-risk ethnic group, and women with polycystic ovarian syndrome or having delivered baby >4.1 kg.

RESULTS

The basic characteristics of the 5 African American Baptist churches that participated in this pilot study and the 37 subjects who participated in the 6-session and 16-session church-based DPP are presented in Table 1. Two churches received the 6-session church-based DPP and 3 churches received the 16-session church-based DPP. A total of 442 people completed the DRA during 2 Sunday services at the 5 churches. Forty-two were not eligible because they already had diabetes or they were not at least 18 years old. Two hundred thirty-four (58.5%) were high risk (risk score ≥ 10) for diabetes and 180 (76.9%) of the high-risk individuals returned for fasting glucose testing. The mean fasting glucose was elevated in the prediabetes range (100-125 mg/dL) in 74 (41.1%) of the high-risk individuals, and 37 (50.0%) participated in the church-based DPP. The overall participation rate was 62.1%, and the rates for the 6-session and the 16-session programs were 68.7% and 56.6%, respectively. There were more females participating in the 16-session than in the 6-session church-based DPP. Comparing the results from the 6- and 16-session programs, there were no differences between both programs for weight, glucose, and BMI (p >.7 for all outcomes).

The demographic and risk characteristics of subjects who participated in the 6 sessions and 16 sessions are shown in Table 2. The mean BMI of participants was 33.2 kg/m^2. Approximately 89% of the participants had *high-risk weight* defined by BMI of 25 kg/m^2 or greater. The mean DRA risk score was 13.2, and the rates of participants with 1 or more and 2 or more diabetes risk factors were 76% and 37%, respectively. Of the 23 female participants, 3 reported having had a baby weighing 4.1

kg or more. Overall, 46% of participants were both physically inactive and under 65 years of age. Eighty-one percent of the participants were of risk age (≥45 years).

There was a statistically significant difference across time for all outcomes (Table 3). Following the intervention, the mean fasting glucose significantly decreased from 108.1 to 101.7 mg/dL ($p = .037$). Furthermore, the significant decrease in fasting glucose was maintained at the 12-month follow-up despite a lack of any follow-up support from the research team after the intervention. The final fasting glucose value at 12 months was 100.4 mg/dL. While weight decreased 1.7 kg after the intervention, by the 12-month follow-up, there was an average of 0.9 kg regained. Similarly, there was also a significant reduction in BMI from 33.2 to 32.6 with a final mean BMI of 32.9 at the 12-month check. There were no significant changes in blood pressure following the intervention.

Comparisons of fasting blood glucose, weight, and BMI across studied time periods were evaluated using Sidak's pairwise comparison tests (Table 4). As shown, there was a significant change in fasting blood glucose over the 3 studied time periods, decreasing over study time period from baseline to 12 months post intervention ($p < .05$). The relative difference in fasting glucose between baseline and end of study session, and 6 months and 12 months post study were 6.41 mg/dL, 6.43 mg/dL, and 7.78 mg/dL, respectively. The values for weight were 1.7 kg, 1.1 kg, and 0.9 kg; and for BMI 0.56 kg/m^2, 0.28 kg/m^2 and 0.24 kg/m^2, respectively.

Implementation Costs

The mean cost for implementing the 6-session DPP in each church was $934.27. The mean cost for implementing the 16-session DPP in each church was $1075.09. These costs include supplies for glucose testing, handouts, and materials distributed to participants, bathroom scales distributed to churches, and materials used by group leaders during the intervention. These costs do not include the volunteer time or research assistant costs associated with data collection.

An unforeseen development was the establishment of a faith-based maintenance program by graduates of the church-based DPP. This program was initiated by participants from one of the church-based DPP churches in 2006, includes members from all 5 church-based DPP churches, and was named the Temple Maintenance Program by the founding members from the 5 churches. With minimal support from the Macon research team, they have continued meeting for more than 30 months. The members collect their own donations to provide healthy food choices at each meeting and they meet on a monthly basis, rotating the meeting place among the churches. The research team provides an occasional volunteer speaker and sends a research assistant once a month to measure weight, glucose, and blood pressure. Eighteen of the original 37 participants (49%) were present at the 30-month Temple Maintenance Program meeting.

DISCUSSION

This report describes the successful translation of the NIH-DPP into an African American church-based setting, which is a traditional support center for many

Table 3. Weight, Glucose and Body Mass Index All Decrease Following Intervention (6-session and 16-session Data Are Combined)[a]

	Baseline Data	Program Completion (End of Intervention)	6 Months Post Intervention	12 Months Post Intervention	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	*p*
	n	Mean Change (SD)[b]	Mean Change (SD)[b]	Mean Change (SD)[b]	Value[c]
Fasting glucose, mg/dL	108.1 ± 6.4	101.7 ± 7.9	101.7 ± 10.4	100.4 ± 8.6	<.01[d]
	n = 37	6.4 (8.4)	6.4 (10.3)	7.8 (9.8)	
Weight, kg	94.6 ± 20.5	92.9 ± 19.7	93.6 ± 21.8	93.8 ± 21.1	.02[e]
	n = 37	3.8 (6.5)	2.3 (7.2)	1.9 (8.3)	
Body mass index, kg/m^2	33.2 ± 6.2	32.6 ± 6.0	32.9 ± 6.6	32.9 ± 6.5	.01[e]
	n = 37	0.56 (0.98)	0.28 (1.2)	0.24 (1.3)	
Systolic BP, mm Hg	137.6 ± 13.3	132.7 ± 13.3	134.3 ± 13.3	134.0 ± 15.7	.13
	n = 36	4.9 (13.9)	2.8 (13.0)	3.7 (12.1)	
Diastolic BP, mm Hg	84.3 ± 10.5	80.7 ± 10.3	82.1 ± 10.7	80.4 ± 14.6	.17
	n = 36	3.7 (10.1)	2.3 (11.0)	4.4 (13.5)	

Abbreviation: BP, blood pressure.

[a] Analysis performed on intent-to-treat basis.

[b] Average of individual differences from baseline.

[c] *p* value of omnibus test.

[d] Indicates a significant linear trend across time.

[e] Indicates a significant quadratic trend across time.

African Americans. In this pilot study, the research team was able to develop an ongoing community-based participatory research relationship with the church community in middle Georgia and to successfully implement faith-/church-based research projects in 5 churches. Key elements of the project were the development of strong ties and trusting relationships within the African American church community and redesigning the DPP for delivery in a group format. Several of the study's findings are particularly noteworthy. One is the high participation rate: more than 75% of the high-risk individuals returned for fasting glucose testing, with 68.7% of eligible subjects participating in church-based DPP sessions for the 6-session program and 56.6% for the 16-session program. Such high participation rates in a community-based health prevention project without financial incentives would seem to predict a high likelihood of success in future dissemination efforts. Another noteworthy finding of this study is the significant decreases in weight and fasting glucose that were maintained during the 12-month follow-up period. This is important because these changes were achieved without several of the costly components of the original NIH-DPP: intensive individualized instruction and coaching, follow-up support after the intensive 16-session instruction period, and a toolbox that included financial support. As a result, implementation costs were significantly reduced: mean total costs were $934.27 per church for the modified 6-session DPP and $1075.09 for the modified 16-session DPP.

Although the numbers of participants were small in these pilot studies, the improvements in glucose and weight in the 6-session and 16-session programs appear to be similar. The more focused program (6 weeks) may fit better with the time that individuals within the community are willing to put into a lifestyle modification program, as reflected by a higher participation rate when compared with the 16 week program (68.7% vs 56.6%). Future studies are needed to determine the cost-benefit ratio of longer vs shorter church-based diabetes prevention programs.

The most exciting aspect of this project was the unexpected development of a faith-based maintenance program entitled the Temple Maintenance Program. As of January 2010, 2.5 years after the initial program, many church-based DPP alumni remain active in monthly maintenance meetings, and participation has expanded to include individuals who did not attend the core DPP sessions but who are interested in losing weight and decreasing their risk for diabetes. These are encouraging signs of the potential for success of church-based disease-prevention programs.

Limitations

This study was conducted only in churches in middle Georgia and therefore may not be representative of churches in other areas. Due to the small sample size, findings from 2 different programs, the modified 6-session and the modified 16-session program, were combined and reported together in this study. Even though a comparison of the 2 programs revealed no significant difference in the outcomes, the number of participants may have been too small to determine whether the modified 6-session program is as effective as the modified 16-session program. Although the standard tests for diabetes and prediabetes include plasma fasting glucose and oral glucose tolerance tests, in this study, prediabetes was diagnosed using a fasting fingerstick glucose test. Although this test is not as accurate as standard test procedures, fasting fingerstick glucose testing was used because it provides an easy, inexpensive method for identifying people with prediabetes and is easier to disseminate on a large scale. It can be done at the church, thereby increasing participation rates. Performing fingerstick glucose testing at churches also avoids more complicated procedures such as performing a venipuncture on each individual to be tested, centrifuging blood samples, and delivering specimens to a lab in less than 1 hour for analysis. It is also noteworthy that, in this study, individuals with increased risk for diabetes were selected for fingerstick testing using an American Diabetes

Table 4. Comparison of Fasting Glucose, Weight and Body Mass Index Across Time Using Sidak's Pairwise Comparison[a]

		Fasting Glucose		Weight		Body Mass Index	
Time (I)	**Time (J)**	**Mean Difference (I-J)**	***p* Value**	**Mean Difference (I-J)**	***p* Value**	**Mean Difference (I-J)**	***p* Value**
Baseline	End of sessions	6.41	<.001	1.7	.008	.56	.007
	Post 6 mo	6.43	.003	1.1	.303	.28	.681
	Post 12 mo	7.78	<.001	0.9	.651	.24	.851
End of sessions							
	Post 6 mo	.03	1.00	-0.7	.699	-.28	.492
	Post 12 mo	1.38	.944	-0.8	.608	-.32	.452
Post 6 mo							
	Post 12 mo	1.35	.936	-0.2	1.00	-.04	1.00

[a] Values are based on estimated marginal means.

Association risk assessment tool and a cutoff score of 10 or greater. It has been suggested that screening with only one risk factor may be preferable due to much higher sensitivity in identifying high risk individuals.[61] Further research is needed to compare these 2 screening approaches. Finally, this study did not include a control group and therefore was not a randomized trial. Future randomized church-based diabetes prevention studies should include a control group.

CONCLUSION

A targeted program that focuses diabetes prevention through lifestyle change in the high-risk African American church community appears to reduce the cost of diabetes prevention, with a mean cost for implementing the modified 6-session DPP of $934.27 compared to $1075.09 for the modified 16-session DPP. Focused diabetes prevention through lifestyle change was associated with significant decreases in weight and fasting glucose during a 12-month follow-up period. The project demonstrates that successful translation of diabetes prevention studies can be achieved by research teams who build enduring community-based participatory research relationships with members of African American churches. Fully powered randomized trials are needed to further assess the most cost-effective methods for implementing church-based diabetes risk reduction programs.

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