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# Diabetes is a Community Issue: Evidence-Based Diabetes Education Outreach Programs in the African American Population

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Diabetes is a Community Issue: Evidence-Based Diabetes Education Outreach Programs in the  
African American Population

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## Table of Contents

Abstract.....	4
Introduction.....	5
Statement of Purpose .....	5
Literature Review.....	5
Methodology.....	15
Results.....	15
Discussion & Conclusion.....	34
References.....	36
Appendices.....	41
Appendix 1: Summary of Diabetes Self-Care Activities Questionnaire .....	41
Appendix 2: Problem Areas in Diabetes (PAID) Questionnaire .....	43
Appendix 4: List of Competencies Met in CE.....	44

### Abstract

The purpose of this study was to assess the health needs of Montgomery County and determine which populations are at a greater risk for diabetes. The research looked at evidence-based diabetes outreach programs geared towards those populations and how they can be implemented in Montgomery County.

**Methods:** The Montgomery County Community Health Assessment 2010 was examined. The assessment was conducted using data from the Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System, Ohio Department of Health Data Warehouse, Ohio Department of Health Vital Statistics, U.S. Census Bureau, Greater Dayton Area Hospital Association hospital discharge data, Dayton Children's Medical Center's Child Health Assessment Report, and the Ohio Disease Reporting System.

**Results:** The Montgomery County Community Health Assessment 2010 identified Blacks as having more poor health than Whites. Diabetes was identified as one of the top leading causes of death in Montgomery County. This shows that there is a significant need for diabetes education programs, especially for African Americans. Several evidence-based diabetes outreach programs targeted for the African American population were researched and analyzed.

**Conclusions:** Results suggest the effectiveness of evidence based diabetes in regards to dietary self-management intervention improving the outcomes for African Americans.

*Keywords:* community health assessment, health disparities, African American health, diabetes prevalence, diabetes prevention, diabetes treatment

Diabetes is a Community Issue: Evidence-Based Diabetes Education Outreach Programs  
in the African American Population

Diabetes mellitus is a group of diseases characterized by high blood glucose levels that result from defects in the body's ability to produce and/or use insulin (American Diabetes Association, 2009). There are two types of diabetes: Type I diabetes, known as insulin-dependent or juvenile-onset which accounts for about 5% of all diagnosed cases; Type II diabetes, known as non-insulin dependent or adult-onset which accounts for 90 to 95% of all diagnosed cases. Gestational diabetes is a type that only pregnant women can get and develops in 2-10% of all pregnancies. This type usually disappears once the pregnancy is over (American Diabetes Association, 2009). Compared to the general population, minorities are disproportionately affected by diabetes. The target for eliminating this disparity can be done by reducing the rate of complications from diabetes through evidence-based diabetes education programs.

### **Statement of Purpose**

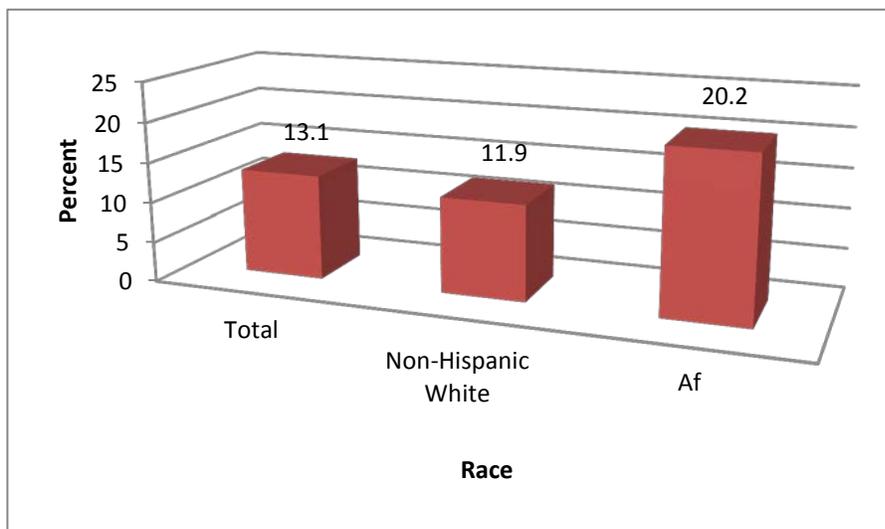
The purpose of this study was to assess the health needs of Montgomery County and determine which populations are at a greater risk for diabetes. This study examined self-care behaviors and review evidence-based diabetes outreach and education programs that have been effectively utilized in the United States (U.S.).

### **Literature Review**

Diabetes is a chronic illness that affects the world on an epidemic scale. Currently, over 285 million people worldwide live with diabetes and the International Diabetes Federation (IDF) (Canadian Medical Association Journal, 2009) predicts that this number will exceed 435 million by 2030. Nearly 6% of the world's adult population is affected by diabetes with a majority of

the total living in under-developed countries. In the U.S. alone, 25.6 million people have diabetes, totaling 8.3% of the population. Diabetes, however, shows an increased prevalence among minority groups, including Asians, Hispanics, Native Americans, and African Americans.

Compared to the general population, African Americans bear a disproportionate share of the impact of diabetes with about two times the prevalence (Shelly et al., 2000). Locally, 13% of Montgomery County adults have been diagnosed with diabetes (Figure 1) and the rate is continually trending upward (Public Health - Dayton & Montgomery County, 2010). Death from diabetes is primarily related to heart disease, as adults with diabetes have mortality rates about two times higher than those without diabetes (National Diabetes Statistics, 2011). Complications such as kidney disease and cardiovascular disease are common as well. Lower limb amputations occur among diabetics and can be attributed to neuropathy, as 60% to 70% of people living with diabetes have this condition (Norris et al., 2002).



*Figure 1.* Percent of adults who have ever been diagnosed with diabetes by race in Montgomery County, 2007-2008 (Public Health - Dayton & Montgomery County, 2010).

Although there are several treatment drugs available for managing diabetes, the cost burden that diabetes places on the U.S. health care system is extraordinary. A person with diabetes mellitus spends \$11,744 annually on health care costs and the growing prevalence of diabetes will only add to this number. Nonetheless, there is a high demand for a preventative intervention such as diabetes education programs rather than relying solely on the use of drugs.

Despite advances in diabetes treatment, patient education has been considered a crucial part of comprehensive diabetes care. The key aims of diabetes education are to promote self-management, while providing tools and support to patients as they learn how to manage their disease. The potential benefits of diabetes knowledge include a sense of empowerment and improved quality of life (Beaser, Richardson, & Hollerworth, 1994). A growing body of research has proven that certain strategies for working with diabetics can positively impact their lives by the use of evidence-based programs.

In the Greater Dayton area, Public Health - Dayton & Montgomery County's Diabetes Prevention Program at the Dr. Charles R. Drew Health Center is dedicated to improving the lives of individuals affected by chronic illnesses through management and preventative health care services. In addition, Public Health - Dayton & Montgomery County at the Dr. Charles R. Drew Health Center offers support and health education in the area of diabetes. Public Health - Dayton & Montgomery County conducted the Community Health Assessment to provide an overview of population health in Montgomery County which also recognized trends and populations at-risk. The Community Health Assessment (CHA) is an essential tool of public health practice. This ongoing process helps to identify and analyze a community's health problems, needs, assets, and the capacity to address priority needs. The information that is obtained for the community health assessment is used to prioritize and make decisions about improvements and allocation of

resources through development of a community action plan (Ohio Department of Health, 2014). Public Health - Dayton & Montgomery County has conducted a Community Health Assessment to provide an overview of population health in Montgomery County.

The Community Health Assessment shows that Montgomery County ranked 68th out of the 88 Ohio counties for behavioral and socioeconomic health factors. Blacks, in general, report more fair or poor health than Whites. An interesting finding is that with decreased income, poor physical, mental and oral health increases. Diabetes is listed as one of the top ten causes of death in Montgomery County and is significantly higher in Blacks than Whites. Consistent with the Community Health Assessment 2010, the need for a policy, systems, and environmental (PSE) change approach to chronic prevention in Montgomery County is clearly warranted. Thus, there is a significant need for a diabetes education and prevention program geared towards the African American population.

### **Patient Education**

Diabetes education is defined as “a collaborative process through which people with or at risk for diabetes gain the knowledge and skills needed to modify behavior and successfully self-manage disease and its related conditions” (Boren, Fitzner, Panhalkar, & Specker, 2009, p. 73). This process involves the person with diabetes, along with a diabetes educator, a health professional whose focus is on helping people with and at risk for developing diabetes to achieve behavior changes that improve one’s health status.

Diabetes education is an effective way to help those with diabetes control their illness. According to the American Association of Diabetes Educators (n.d.), measurable behavior change is the desired outcome of diabetes education. This can be achieved by using the seven self-care behaviors (American Association of Diabetes Educators, 2010):

- Healthy eating
- Being active
- Monitoring
- Taking medication
- Problem solving
- Reducing risk
- Healthy coping

### **Self-care Behaviors**

**Healthy eating.** Healthy eating is an important part of one's life, especially for those who are diabetic. As a diabetic, one must establish a healthy diet which is done by making good food choices, understanding portion sizes, and learning when are the best times to eat. These practices are key, particularly for youth with diabetes. Children with diabetes are not able to maintain normal blood glucose levels for optimal health (Daneman, 2006). The American Diabetes Association gives recommendations on which foods are appropriate for diabetics, especially children, who should consume a diet rich in fruits, vegetables, and lean protein. Figure 2 shows the recommendation for the United States Department of Agriculture (USDA), advising people to make one half their plate fruits and vegetables. Research shows that poor eating habits along with sedentary lifestyle result in the emergence of insulin resistance and double diabetes in some youth (Gellar, Schrader, & Nansel, 2007). In the African American culture, 'fare' sometimes referred to as 'soul food' is based on food practices that have been passed down through generations (Kulkarni, 2004). Green leafy vegetables, such as collard, mustard, and kale greens are a principle type of soul food (Kulkarni, 2004). Cornbread, fried meats, buttermilk and several types of beans are also popular in the African American culture. In

diabetes education, educators teach the specifics of choosing food, as well as assisting individuals in gaining the knowledge about the effect that food has on blood glucose levels.

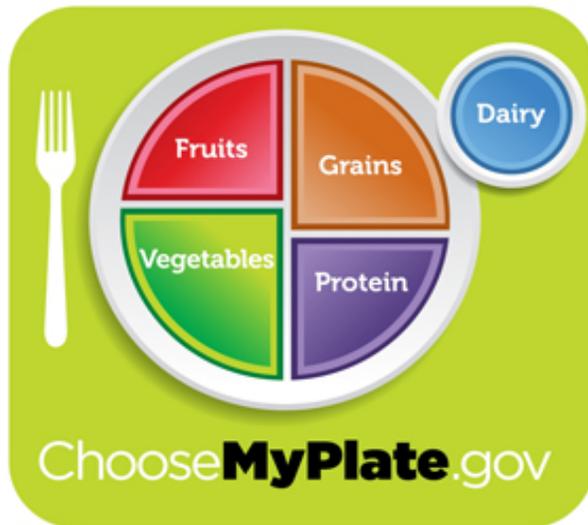


Figure 2. USDA's Center for Nutrition Policy and Promotion recommendation, *MyPlate* (<https://www.choosemyplate.gov/>).

**Being active.** Exercise has been considered the foundation for the treatment regimen for people with diabetes mellitus (Eriksson, 1999). Obesity is due to small amounts or no exercise and is partially responsible for the high rate of diabetes among African Americans. A National Health and Nutrition Examination Survey showed that 50% of African American men and 67% of African American women reported getting little to no exercise at all (Cleveland Clinic, 2002). Being active is vital for overall fitness, maintaining weight, and for controlling blood glucose levels. Studies show that participating in physical activity has improved insulin sensitivity in patients with type I and type II diabetes (Eriksson, 1999). Lehmann, Vokac, Niedermann, Agosti, and Spinaz (1995) reported that regular aerobic exercise resulted in significant improvements in lipid profile, blood pressure and body fat distribution in patients with type II diabetes. Ultimately, being active maintains glycemic control, improves body mass index, blood

pressure, stress levels, and enhances weight loss. Educators often address physical, environmental, and psychological barriers to exercise and how to overcome them during diabetes education sessions.

**Monitoring.** Daily self-monitoring of blood glucose levels is an important component of therapy for diabetes. It is imperative to monitor glucose levels, because it facilitates the development of an ‘individual blood glucose profile’, which guides professionals in treatment planning. It also is an important part of a diabetic regimen, as it helps to prevent or recognize hypo- or hyperglycemia (Benjamin, 2002).

The hemoglobin A1C test is used to diagnose type I and type II diabetes and to gauge how well one is managing their diabetes. The hemoglobin A1C test results reflect blood glucose control for the past two to three months and measures what percentage of hemoglobin is coated with sugar. Table 1 indicates the range for hemoglobin A1C levels according to one’s diabetic state. A higher hemoglobin A1C level indicates poor blood glucose control and a high risk for diabetes complications.

Table 1

*Range for Hemoglobin A1C Levels*

<b>Diabetic State</b>	<b>Hemoglobin A1C level (%)</b>
Non Diabetic (Normal Range)	4.5 to 6
Pre-Diabetic	5.7 to 6.4
Diagnosed Diabetic (Target Range)	≤7
Uncontrolled Diabetic	>8

Following the American Diabetes Association, 2009.

Regular check of blood pressure, weight, and urine ketones are also recommended in order to provide diabetics with critical information about how food, exercise and their medication can affect glucose levels. During diabetes education classes, educators show patients how to interpret glucose levels, teach about the use of equipment, and how frequent one should test for their glucose level.

**Taking medication.** Diabetes patients' knowledge about their medication plays an important role in determining the success of long-term adherence in their disease management. Patients must be aware of the knowledge about diabetes and its medication, adverse effects of medication, administration, and the cost of medication. Research shows that patients have little awareness about diabetes medication, particularly about adverse effects that medication may impose, because they do not receive information about it from their physicians. Studies on awareness of diabetic patients showed that 20-33% of patients were aware that the drug can cause hypoglycemia and/or gastrointestinal effects (Al-Qazaz, Hassali, Shafie, Syed Sulaiman, & Sundram, 2011).

It is important for a diabetic to be knowledgeable of the frequency of administration and the correct administration technique. Incorrect administration of tablets in relation to food can result in reduced efficacy and an increased side-effect profile (Dunn & Peters, 1995). For example, metformin side effects are reduced when taking it with food. In diabetes education educators can help determine which medication the patient should be taking and can demonstrate patients on how to administer medication. This will help to provide a better understanding for how the medication works. The goal is for the patient to be knowledgeable about each medication, possible side effects, dosage, toxicity, appropriate timing of administration, frequency of administration, as well as storage instructions (Dunn & Peters, 1995).

**Problem solving.** Diabetes patients must have sharp problem-solving skills, due to the fluctuation of blood glucose levels, and may need to respond quickly by making decisions about their food and medication. Problem solving requires an analysis of the problem, possible solutions, evaluation of risks and benefits of these solutions, and an analysis of outcomes.

Patients may be confronted with questions such as:

- What is the diabetes problem here?
- Why is this a problem? What would happen if I did nothing?
- Tell me all the ways this problem could be fixed.
- How would you fix this problem?
- How would that solution work?
- How would I know if I really fixed the problem?

Thomas, Peterson, and Goldstein (1997) reported that older youth demonstrate more sophisticated problem solving skills in social situations, compared to younger children who were more likely to avoid utilization of problem solving skills. Younger youth may rely more on parental involvement in decision making in response to blood glucose results. Therefore, it is important that educators address social barriers as well as develop strategies to make the patient and family more comfortable about making informed decisions (Wysocki et al., 2008).

**Reducing risk.** An important part of self-care is learning to understand, seek, and obtain preventative strategies. Effective risk reduction behaviors can significantly improve the quality of life.

**Regular exams (Eye, foot, and dental).** Since diabetes is the third leading cause of blindness, it is important to have annual eye exams as individuals who have diabetes are at a higher risk for developing retinopathy, cataracts, and glaucoma. Patients should inspect their

feet every day and seek early care if a foot injury ever occurs. Patients often have reduced blood flow, which may often cause neuropathy and also may result in skin and shape changes in feet. Routine dental examinations every six months are essential for good dental health. The dentist may recognize signs of heart disease simply from an oral examination. Diabetes patients are often immunosuppressed (reduced efficacy of immune system) and some infections can lead to more serious complications.

***Smoking cessation.*** Smoking intensifies harmful effects of diabetes by increasing insulin resistance and making it more difficult to control diabetes. Smoking increases the incidence and risk of lung disease, heart attack, and stroke.

***Vaccination.*** It is important to keep up-to-date vaccinations, which can prevent further illness for people with diabetes. Such vaccines include influenza, pneumococcal, tetanus, diphtheria, polio, hepatitis A and B, varicella, measles, mumps, and rubella (Centers for Disease Control and Prevention [CDC], 2012).

***Healthy coping.*** Not only does diabetes affect people physically, but it affects them emotionally. Healthy coping methods such as faith-based activities and meditation help to manage psychological stress and are key factors to diabetes self-management. Patients may often suffer from depression and experience other negative emotions, making mental and emotional health worse. Educators would address psychological issues, such as depression and anxiety, along with stress-management, coping, psychoanalytic inpatient treatment, as well as the importance of support groups (Jack, 2007).

Several studies have provided evidence and reinforced the importance of these self-care practices with type I and type II diabetes, which have improved overall health. Research has also indicated the use of language and cultural values of studies as significant, along with

understanding the sociocultural basis of variables that influence these self-care behaviors as important for designing culturally sensitive interventions (Shelly et al., 2000).

### **Methodology**

Relevant research concerning evidence-based diabetes programs in the African American community were identified by searching databases for research material. A total of four databases were searched for publications from year to present; with key articles obtained primarily from MEDLINE<sup>®</sup> and PubMed<sup>®</sup> using terms of evidence-based diabetes and African American diabetes outreach programs. Other electronic resources included the Ohio Department of Health, Centers for Disease Control and Prevention, National Diabetes Association, Public Health - Dayton & Montgomery County's Community Health Assessment of Dayton and Montgomery County, Ohio. Information was also provided by Public Health - Dayton & Montgomery County Public Health for diabetes programs that have been used across the nation. An analysis of each program was provided and compared with each to show similarities.

### **Results**

#### **Evidence-Based and Education Programs**

**Racial and Ethnic Approaches to Community Health (REACH).** Racial and Ethnic Approaches to Community Health (REACH) is the Centers for Disease Control and Prevention's (CDC) effort to eliminate racial and ethnic disparities in health. It is believed that everyone should have the opportunity to attain their optimal health and the CDC seeks to eliminate barriers in order for people to achieve it. Through REACH, the CDC supports awardee partners that use community-based approaches to recognize, expand, and execute effective strategies for addressing health disparities in seven priority areas, including diabetes. These programs are

tailored interventions which serve African Americans, American Indians, Latinos, Asian Americans and other minority groups.

Currently, \$22 million is used to fund the REACH program's 50 partners through REACH U.S. and REACH CORE. Awardees distribute at least 75% of their funds to support approximately 90 community based programs annually, to apply evidence-based initiatives that reduce health disparities for individuals with a high burden of chronic disease and risk factors. The program also focuses on proper nutrition, changes in weight, physical activity, and mental well-being, in addition to addressing disparities in heart disease and diabetes.

Presently, several projects across the nation have been implemented to increase diabetes-related knowledge, specifically for African Americans. The South Eastern African American Center of Excellence in the Elimination of Disparities in Diabetes (SEA-CEED) is working to reach over 1.7 million African Americans, about 300,000 with diabetes in 121 counties in Georgia and both North and South Carolina with populations greater than 30% African Americans at risk and with diagnosed diabetes. According to the Medical University of South Carolina, the SEA-CEED community action plan not only addresses an area with a high burden and disparity, but it builds on previous REACH coalitions which capitalizes on academic and community partners that have effectively implemented evidence-based programs.

A previous REACH coalition that has effectively implemented a successful evidence-based program is one that took place in Detroit. REACH Detroit Partnership's mission was to provide a community driven approach to preventing diabetes and its conditions and improving quality of life through partnerships and collaborations. This intervention used a community-based approach to reduce risk factors for type II diabetes and its complications in African Americans and Latinos residing in neighborhoods with limited resources. The purpose of this

study was to assess whether this lifestyle intervention would result in significant diabetes-related knowledge, behavioral changes, and glycemic control.

**Journey to Health REACH Detroit Partnership.** In the study by Two Feathers and colleagues (2005), ten African American and Latino community residents who completed a 10-week 'Family Health Advocate' (FHA) training program invited participants to take part in this intervention. These participants included one hundred fifty one African-American and Latino males and females who had a diagnosis of type II diabetes; were over 18 years old; had insurance or received care from a federally qualified health center; were mentally able; and resided in at least one of the six REACH Detroit zip codes.

The effectiveness of the intervention was examined through a non-randomized, one-group, before and after the design. The baseline and post-intervention hemoglobin A1C levels of the participants were compared to levels from a random sample. This random sample was composed of insured African American and Latino patients who didn't participate in the REACH study, but had type II diabetes and received care in the same health care systems as those who were part of the study. These results served as the guide for the content, format, and delivery of the diabetes lifestyle intervention.

The intervention was designed to reduce risk factors related to diabetes complications by increasing understanding of diabetes self-management as well as increasing self-efficacy and self-motivation. The program sought to help participants gain knowledge and skills associated with healthy eating, stress reduction, and physical activity. This program consisted of five two-hour group meetings every four weeks by Family Health Advocates in which participants were encouraged to bring a family member. The preliminary meeting provided an overview of diabetes, the relationship between diabetes stress and depression, and gave effective methods to

reduce stress. Later meetings focused on increasing physical activity, encouraging fruit and vegetable consumption, along with encouraging decreased sugar and dietary fat intake. The last meeting focused on the maintenance of behavioral changes and named social support as a key strategy.

Within the study, knowledge questions derived from the Behavioral Risk Factor Surveillance Survey (BRFSS) were used to assess participants' understanding of the relationship between diet, exercise, and blood sugar control. These questions ranged from the number of fruits and vegetables they consumed per day and per week, consumption of fried and sweet foods, whole grains, flavored and soda beverages, and also if they poured the fat off of meat after cooking (Table 2). To evaluate the frequency of following a healthy eating plan and self-glucose monitoring, the Summary of Diabetes Self-Care Activities questionnaire was used (Appendix 1). Also, the Problem Areas in Diabetes scale was administered to measure the diabetes-specific quality of life (Appendix 2).

Table 2

*Significant Pre-and Post-intervention Changes for Racial and Ethnic Approaches to Community Health (REACH) Detroit, by Gender/Race/Ethnicity, and Age*

Outcomes	Males (n=23)		Females (n=88)		AA (n=71)		Latinos (n=40)		18-59 Years (n=58)		≥60 Years (n=53)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
<b>Dietary knowledge</b>												
Well/very well	18 (78.3)	19 (82.6)	55 (64.7)	68 (78.2)	44 (62.0)	49 (70.0)	29 (78.4)	38 (95.0)	36 (63.2)	48 (84.2)	37 (72.5)	39 (73.6)
Not at all/somewhat	5 (21.7)	4 (17.4)	30 (35.3)	19 (21.8)*	27 (38.0)	21 (30.0)	8 (21.6)	2 (5.0)	21 (36.8)	9 (15.8)**	14 (27.5)	14 (26.4)
<b>Exercise knowledge</b>												
Agree	22 (95.7)	17 (100)	74 (86.0)	67 (94.4)	62 (88.6)	64 (94.1)	34 (87.2)	20 (100)	51 (87.9)	47 (100)	45 (88.2)	37 (90.2)
Don't know	1 (4.3)	0	12 (14.0)	4 (5.6)	8 (11.3)	4 (5.9)	5 (12.8)	0	7 (12.1)	0	6 (11.8)	4 (9.8)
Vegetable consumption, mean ±SD	2.23 ±1.57	2.66 ±1.84	1.97 ±1.24	2.46 ±1.14***	2.1 ±1.4	2.7 ±1.4**	1.9 ±1.2	2.1 ±1.0	1.9 ±1.4	2.6 ±1.3***	2.2 (1.3)	2.4 (1.3)
<b>Pour fat off meat</b>												
Yes	11 (78.6)	20 (95.2)	56 (72.7)	80 (92.0)	40 (67.8)	62 (91.2)	27 (84.4)	38 (95.0)	39 (73.6)	54 (96.4)	28 (73.7)	46 (88.5)
No	3 (21.4)	1 (4.8)	21 (27.3)	7 (8.0)***	19 (32.2)	6 (8.8)***	5 (15.6)	2 (5.0)	14 (26.4)	2 (3.6)**	10 (26.3)	6 (11.5)
<b>Whole-grain bread (times/wk)</b>												
0-1/wk	9 (39.1)	7 (30.4)	26 (30.2)	20 (23.0)	17 (24.6)	10 (14.3)	18 (45.0)	17 (42.5)	23 (40.4)	13 (22.8)	12 (23.1)	14 (26.4)
2-4/wk	3 (13.0)	10 (43.5)	21 (24.4)	37 (42.5)	14 (20.3)	31 (44.3)	10 (25.0)	16 (40.0)	15 (26.3)	26 (45.6)	9 (17.3)	21 (39.6)
5-7/wk	11 (47.8)	6 (26.1)*	39 (45)	30 (34.5)**	38 (55.1)	29 (41.4)**	12 (30.0)	7 (17.5)	19 (33.3)	18 (31.6)*	31 (59.6)	18 (34)**
<b>Beverages (times/wk)</b>												
0-1	10 (43.5)	17 (89.5)	33 (37.9)	67 (83.8)	21 (30.0)	45 (76.3)	22 (55.0)	39 (97.5)	20 (34.5)	44 (83.0)	23 (44.2)	40 (87.0)
2-7	13 (56.5)	2 (10.5)**	54 (62.1)	13 (16.3)***	49 (70.0)	14 (23.7)***	18 (45.0)	1 (2.5)***	38 (65.5)	9 (17.0)***	29 (55.8)	6 (13.0)***
<b>Follow a healthy eating plan (days)</b>												
0-1	3 (13.0)	1 (4.5)	17 (19.5)	4 (4.7)	13 (18.3)	5 (7.2)	7 (17.9)	0	13 (22.4)	3 (5.4)	7 (13.5)	2 (3.8)
2-3	6 (26.1)	4 (18.2)	20 (23.0)	14 (16.3)	18 (25.4)	16 (23.2)	8 (20.5)	2 (5.0)	17 (29.3)	10 (17.9)	9 (17.3)	8 (15.4)
4-6	5 (21.7)	4 (18.2)	23 (26.4)	29 (33.7)	17 (23.9)	17 (24.6)	11 (28.2)	16 (41.0)	13 (22.4)	13 (23.2)	15 (28.8)	20 (38.5)
7	9 (39.1)	13 (59.1)	27 (31.0)	39 (45.3)***	23 (32.4)	31 (44.9)*	13 (33.3)	21 (53.8)***	15 (25.9)	30 (53.6)***	21 (40.4)	22 (42.3)
<b>Test blood sugar (days)</b>												
0-1	5 (21.7)	1 (4.3)	25 (28.7)	8 (9.2)	17 (24.3)	8 (11.4)	13 (32.5)	1 (2.5)	16 (27.6)	6 (10.3)	14 (26.9)	3 (5.8)
2-3	5 (21.7)	1 (4.3)	17 (19.5)	11 (12.6)	14 (20.0)	9 (12.9)	8 (20.0)	3 (7.5)	14 (24.1)	7 (12.1)	8 (15.4)	5 (9.6)
4-6	5 (21.7)	5 (21.7)	4 (4.6)	15 (17.2)	5 (7.1)	13 (18.6)	4 (10.0)	7 (17.5)	6 (10.3)	9 (15.5)	3 (5.8)	11 (21.2)
7	8 (34.8)	16 (69.6)**	41 (47.1)	53 (60.9)**	34 (48.6)	40 (57.1)*	15 (37.5)	29 (72.5)***	22 (37.9)	36 (62.1)*	27 (51.9)	33 (63.5)**
A1C	7.8 (2.3)	6.8 (1.3)**	8.5 (2.3)	7.9 (2.0)***	8.2 (2.5)	7.5 (2.2)***	8.6 (2.0)	7.9 (1.5)***	8.9 (2.6)	8.2 (2.4)***	7.8 (1.8)	7.0 (1.1)**

Note. Actual questions were Dietary knowledge: "How well do you understand the relationship between healthy eating and blood sugar control?"; Exercise knowledge: "Exercise helps to improve your blood sugar."; Pour fat off meat: When you prepare foods or meals, do you pour the fat off meat after cooking?; Whole grain bread: "How often do you eat whole grain bread?"; Beverages: "How many times per week do you drink regular soda and/or fruit-flavored drinks?"; Follow healthy eating plan: "On how many of the last 7 days did you follow a healthy eating plan?"; Test blood sugar: "On how many of the last 7 days did you test your blood sugar at least as often as your doctor has recommended?"  
 \*P<0.05, \*\*P<0.01, \*\*\*P<0.001.

Source: Copied and pasted verbatim from Two Feathers et al., 2005, p. 1556.

In order to provide an overview of the characteristics of REACH participants, summary statistics that included frequency distributions, means, and descriptive analyses were calculated.

One-way analysis of variance and chi-square tests were used to compare characteristics of

participants with and without post-intervention data. Participants were grouped into two categories, 18-59 years and 60 and older, fairly equal, for analysis purposes. Results showed that there were statistically significant improvements in post-intervention dietary knowledge and behaviors, along with physical activity knowledge. There was also a statistical improvement in hemoglobin A1C levels. The mean A1C for REACH participants at baseline was 8.4. There were significantly more African American participants whose A1C levels were 7% or less, compared to Latinos. Male participants had a larger improvement in A1C than did female participants. Post intervention, a significant number of participants had a better understanding of the relationship between healthy eating and blood glucose control ( $p=0.13$ ). REACH participants showed a significant decrease in consumption of soda and fruit-flavored beverages ( $p<.0001$ ). Overall, participants significantly improved in their knowledge that exercise can improve their blood glucose levels ( $p=0.35$ ), however, there was no significant change in the level of physical activity or diabetes-specific quality of life (Two Feathers et al., 2005).

**Soul Food Light: A culturally competent diabetes education.** According to Mokdad et al. (2001) the prevalence of diabetes, overweight, and obesity in South Carolina is among the highest in the nation, with African Americans having greater diabetes prevalence, overweight, and unhealthy behaviors than Whites. The single most important issue reported by southern African Americans is dietary self-management and has much to do with their ethnic beliefs and food patterns. In the medically underserved county where the study was conducted, African Americans comprised of 60% of the population and accounted for 75% of all diabetes hospitalizations in the state (Anderson-Loftin et al., 2005). The purpose of this longitudinal study was to test effects of a culturally competent dietary self-management intervention on

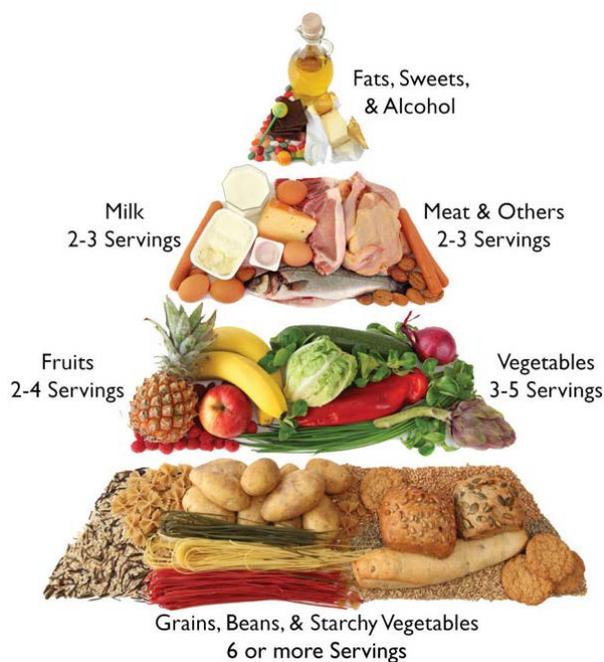
physiological outcomes and dietary behaviors for African Americans with type II diabetes in rural South Carolina (Anderson-Loftin et al., 2005).

This study, using pre- and post-test control group design, was conducted at a diabetes education center in rural South Carolina which included 97 high-risk African American adults with type II diabetes. The participants, recruited and referred by their primary care physician, were African American, who had a diagnosis of type II diabetes, 18 years of age or older, absent of mental or physical limitations, and had at least one of the following indications of diabetes complications defined as high risk and modifiable by diet:

- Hemoglobin A1C level at or above 8%
- LDL Cholesterol at or above 200 mg/dL
- Triglycerides at or above 200 mg/dL
- Weight at or above 25kg/m<sup>2</sup>
- High-fat dietary patterns (score on the Food Habits Questionnaire at or above 2.5)

The principal investigator assigned participants identification numbers and were randomly assigned to an experimental or control group. Psychological and dietary fat food habits were collected at baseline and 6 months post-intervention. The participants were taught by dietitians with experience, specifically, in nutrition therapy for rural African American southerners with diabetes. During these sessions, participants were educated on how to make healthy food choices according to the Diabetes Food Pyramid (Figure 4), strategies for reducing fats, and how to set individual goals. During four weekly 1.5 hour sessions the Dietitian emphasized planning, purchasing, and preparing healthy low-fat meals and making healthy choices when eating away from home. To teach meal planning, ethnic food models were used and food preferences were incorporated into cooking demonstrations. Dietitians also assisted

with meal planning, reading food labels, and making food choices at a simulated church homecoming dinner.



*Figure 3.* Diabetes food pyramid. From American Diabetes Association, 2010, via Adams, 2010, p. 1

A nurse case manager, an expert on questions related to diabetes care, facilitated four monthly one-hour peer-professional discussion groups that provided professional group education and peer discussion. The nurse case manager followed up with participants by placing weekly telephone calls in order to offer additional educational support, identify complications early, help solve various problems, as well as assist with making informed decisions. The control group was referred to an eight-hour diabetes class, instructing about the nature and complications of diabetes at the first screening visit. All participants received \$15 for their attendance, along with *Soul Food Light* sweatshirts, door prizes and small gifts at each testing session and results of laboratory tests.

Fasting glucose samples from participants were collected then analyzed for lipids and A1C, along with calculation of their Body mass index (BMI) and measurements of their height

and weight. The Food Habits Questionnaire, or FHQ, assessed dietary fat behaviors with five dimensions of fat-dietary habits:

- Modify meats (four items)
- Avoid fat (four items)
- Replace high fat foods and food preparation (six items)
- Substitute processed lower-fat foods (seven items)
- Fruits and vegetables (three items)

Results showed that the mean hemoglobin A1C was 7.8% and that a large majority reported high-fat food habits. Body mass index (BMI) was decreased by a mean of 0.81mg/mm<sup>3</sup>. Men significantly decreased in Body mass index (BMI) compared to women and the FHQ decreased from 2.7 to 2.4 for the experimental group, while the control group remained at 2.6.

**Project DIRECT.** The Centers for Disease Control and Prevention funded a large community-based intervention known as *Project DIRECT*, which stood for Diabetes Interventions Reaching and Education Communities Together. This project was intended to develop, implement, and evaluate strategies that can be integrated into State-Based Diabetes Prevention Programs to be used nationwide. *Project DIRECT* involved partnerships among the community of southeast Raleigh, NC, the Division of Public Health in the NC Department of Health and Human Services, alongside Wake County Human Services and the CDC.

*Project DIRECT* was the largest diabetes project in the United States and was the first comprehensive approach to reduce the burden of diabetes. The program's mission was to reduce the burden of diabetes and its complications in an African American community through a diabetes demonstration project. *Project DIRECT* included programs to address the three levels

of prevention: primary; health promotion, secondary; outreach, and tertiary; diabetes care. Each level had its own workgroup coordinator and workgroups which consisted of community members, health care professionals, and representatives of local organizations. The workgroup coordinator's duty was to plan and implement activities to address each level of prevention.

To address the primary level of prevention, workgroups aimed at implementing programs to reduce risk factors for developing diabetes. Several studies have found that modifying one's diet and increasing physical activity are effective ways of preventing diabetes. Workgroups took initiatives to promote health and educate participants to increase physical activity and decrease fat intake. Such initiatives included several walking programs and were held at community centers, parks, and recreational facilities. Other techniques of the study consisted of churches modifying recipes and cooking techniques, printing recipes on low-fat cooking, radio announcements, and cooking segments on TV shows.

In order to address the secondary level of prevention, the project sought to raise awareness about risk factors for diabetes, increase screening among those at risk, and also increase the percentage of those with diagnosed diabetes who were receiving diabetes care. Outreach activities included raising awareness through the media, in churches, and by distributing educational materials in community health centers. Community partners, along with churches, public housing groups and community centers, were able to provide sites for screening and to help with promotion. Those who had high levels of blood glucose were scheduled for further testing and tracked to determine if they needed follow up, while those who were newly diagnosed were referred for medical care.

Lastly, the program sought to improve the quality of care, along with self-care practices, and to increase access. Diabetes care activities included self-management workshops, sessions

that addressed nutrition, physical activity, blood glucose, managing medication, and to assist with filing for insurance. By working with primary care providers, *Project DIRECT* improved the quality of diabetes care with participants. Providers assisted by implementing manuals, resource materials, and individualized practice plans. The goals in practice were to provide more routine eye and foot examinations, and detect and treat heart disease risk factors such as hypertension, hyperlipidemia, and smoking.

A comprehensive evaluation of *Project DIRECT* was critical to determine the program's effectiveness and to see how it could be implemented in other communities. The evaluation consisted of internal and external levels. The internal evaluation consisted of assessing process outcomes and the frequency of participation in programs. Evaluations also included participating rates and estimates of media coverage for promotion; proportion of population at-risk for diabetes who were screened; proportion of those who completed follow up testing and/or follow up care; percentage of people with diabetes who received annual eye and foot exams and measurements of hemoglobin A1C; and assessment and participant feedback on self-management classes, knowledge and skills. The external evaluation assessed the effect of the intervention in changing health behaviors, diabetes awareness, screening of people at-risk for diabetes, and diabetes care through surveys, focus groups and interviews.

Within the first year, *Project DIRECT* increased the number of diabetes patients who received foot care counseling and foot exams from approximately 20% to 50%. Auditing from patient information showed an increase in the number of diabetics who conduct at-home monitoring of their glucose levels, increase in diabetes education, and an increase to receiving ophthalmology referrals, kidney disease assessments, and vascular exams.

**A New Leaf...Choices for Healthy Living with Diabetes.** *A New Leaf... Choices for Healthy Living* is an intervention designed to help improve healthy eating behaviors, increase physical activity, tobacco use cessation, improve blood pressure or control hypertension, improve cholesterol or blood lipid profile, and achieve a healthy weight. It was primarily designed for a low-income and low-literacy southern population in health care settings such as public health departments and in community-based organizations such as churches. *A New Leaf* was created to prevent and treat cardiovascular disease, diabetes, and other chronic diseases and to address the individual and interpersonal levels of the socio-ecologic model.

The program contains several modules; including those on nutrition, physical activity, tobacco cessation, achieving healthy weight, diabetes prevention and management, bone health, and dealing with stress and depression. The modules, as well as the intervention are delivered by a health counselor and often by a variety of health care providers. Core elements of the intervention are responsible for the program's effectiveness and are critical to the programs intent and design:

- Assessments of diet, physical activity, and smoking
- Goal-setting
- Self-efficacy and building participants' confidence
- Guidelines and strategies
- Tailored feedback and follow-up
- Social support

During the intervention, risk assessments are used to identify barriers to change, problem areas, and points in which the participants are doing well. These assessments help to identify best practices and attitudes of participants and assist the health counselor with focusing on areas

where participants are ready to make change. The assessments are also used to list goals, monitor progress, troubleshoot issues, and reinforce success among participants.

Goal-setting is a process that is collaborative between health counselors and participants. Within this component, participants select goals that address areas of diet and exercise and make specific plans on how they will reach their goal. In order to increase confidence and self-efficacy the program uses positive reinforcement and encourages participants to make small achievable steps. Through this reinforcement, counselors help to increase participant confidence in making their lifestyle changes.

During the program, tip sheets are provided to serve as a low-cost strategy for lifestyle change and also give counselors recommendations on how to help participants overcome barriers to smoking cessation, increasing physical activity, and healthy eating. Tips included are southern style recipes low in fats and cholesterol; importance of fruits and vegetables; safety guidelines for increasing exercise and stretching.

Feedback during the program is provided by a health counselor, which affects participants' motivation and also provides cues to action. Follow-up is also imperative; especially with regards to goal-setting, many times during the program, counselors follow-up with participants by phone, computer, or face-to-face meetings in order to assess progression toward reaching goals and give advice on setting new ones. Lastly, one of the most vital core elements in the program is social support of family and friends. This type of support plays a key role in lifestyle change and also teaches participants how to generate and sustain a successful support network.

*New Leaf program implemented in North Carolina.* There is considerable evidence that available treatment programs, particularly behavioral programs for diabetes, are less effective for

African American women than for white women (Keyserling et al., 2002). This can be due to inadequate sociocultural match between intervention models and the needs of African American women with diabetes. In order to assist with improved management of physical activity, an intervention program was developed to meet the psychosocial, cultural, and economic needs of lower-income African American women with type II diabetes in North Carolina. The program was developed to address obstacles to lifestyle counseling and behavior change. This study was based on behavior change theory, trans-theoretical model, social cognitive theory, and basic behavior modification principles.

The intervention comprised of a dietary intake, physical activity, and diabetes care component. These interventions were designed to decrease total and saturated fat intake; to increase moderate intensity physical activity to 30 minutes per day; and to address medication use, home glucose monitoring, and foot care.

Seventy-six African American women with type II diabetes participated in 11 focus groups and an additional six focus groups with 47 participants were summoned to pretest the intervention materials. These women were aged at or above 40 years with type II diabetes and had a diagnosis of diabetes at or above 20 years with no history of ketoacidosis. The sessions were supervised by a community diabetes advisor, where participants met three times for ninety minutes each. Dietitians provided one-on-one counseling with participants, worked to develop goals, and walked participants through the educational diabetes self-care, diet, and physical activity notebook. Community diabetes advisors provided social support and reinforced behavior goals by monthly follow-up.

The overall impact of this intervention increased knowledge, along with social and mental wellbeing. Physical activity also increased amongst participants and daily caloric intake decreased.

**National Diabetes Prevention Program.** The National Diabetes Prevention Program is a partnership of community organizations, private insurers, employers, health care organizations, and government agencies. The program is led by the CDC and based on the Diabetes Prevention Program research led by the National Institutes of Health. It was designed to bring evidence-based lifestyle programs for preventing type II diabetes to at-risk communities. It also showed the importance of behavior change, such as improving food choices and increasing physical activity in order to lose body weight. There are four components of the program (Figure 4).



*Figure 4.* Components of the National Diabetes Prevention Program. Figure by the CDC Division of Diabetes Translation. Downloaded from <http://spectrum.diabetesjournals.org/content/27/1/63>

Participants of the National Diabetes Prevention Program work with a lifestyle coach in a group setting to receive a one year lifestyle change program. The program includes 16 core-

sessions and six post-core sessions where participants learn about how to lose weight, manage stress, incorporate healthy eating into their life, and the importance of physical activity.

Lifestyle coaches also work with participants to identify emotions and situations that interfere with success and encourage them to share their strategies for dealing with difficult situations.

The Diabetes Training and Technical Assistance Center at Emory University (DTTAC), along with partners from the University of Indiana, University of Pittsburg, and the CFC worked to develop the program curriculum, which was adapted from the original Diabetes Prevention Program. DTTAC also played a role in training the workforce to deliver the program effectively. Lifestyle coaches are properly trained to ensure that the elements of the evidence-based program are delivered to give participants the information needed to prevent or delay type II diabetes. The goal of the program is to lose body weight by reducing calories from fat and by being physically active for 150 minutes per week. During the program, participants receive information about nutritional foods, portion sizes, reading food labels and increasing physical activity. The 16-week program consists of the following sessions (one per week):

- Week 1: Welcome to the National Diabetes Prevention Program
- Week 2: Be a Fat and Calorie Detective
- Week 3: Three Ways to Eat Less Fat and Fewer Calories
- Week 4: Healthy Eating
- Week 5: Move Those Muscles
- Week 6: Being Physically Active—A Way of Life
- Week 7: Tip the Calorie Balance
- Week 8: Take Charge of What's Around You
- Week 9: Problem Solving

- Week 10: Four Keys to Healthy Eating Out
- Week 11: Talk Back to Negative Thoughts
- Week 12: The Slippery Slope of Lifestyle Change
- Week 13: Jump Start Your Activity Plan
- Week 14: Make Social Cues Work For You
- Week 15: You Can Manage Stress
- Week 16: Ways to Stay Motivated

Under the Prevention and Public Health Funds 2012, the CDC awarded over six million in grants to the National Diabetes Prevention Program for preventing type II diabetes among people at high risk. These funds will be utilized to expand the program and assist in implementing an evidence-based program to prevent type II diabetes for those who are at risk. Partnerships that were developed with the funds will assist the Centers for Disease Control and Prevention to reach people with prediabetes and expand the number of organizations offering the program.

In a study, participants from 27 clinical centers were randomly assigned to three treatment groups. The 3,234 participants were overweight, had impaired glucose tolerance, and were at an increased risk of developing diabetes. About 45% were of African American, Latino, Asian American, and American Indian minority groups. The first group, which was the intervention group, received one-on-one intervention with a health care provider who provided information about exercise, nutrition and behavior modifications. The group's goal was to lose five to seven percent of their body weight and maintain it by eating less food, lowering calorie intake, and exercising for 150 minutes per week. The second group received care and took

850mg of metformin two times a day, while the third group received care and took a placebo. Both the second and third groups addressed diet and exercise during sessions.

The Diabetes Prevention Program overall found that better nutrition and more exercise reduced the chance of a person with impaired glucose tolerance to develop diabetes by 58%. Metformin was found to have reduced the risk also, but by 31%.

**Project POWER.** Currently, the American Diabetes Association sponsors *Project POWER*, a faith-based program which targets the African American community. It was developed to provide churches with a foundation for integrating diabetes awareness and health lifestyle information into church and family. This program not only engaged the church with activities year round, but provided lessons on improving health of church members living with diabetes.

*Project POWER* offers workshops that are facilitated by an ambassador trained by the Diabetes Association staff. Within the curriculum, there are six educational workshops offered, each of which lasts for an hour. The workshops include the following:

- **Diabetes Day:** an introductory course which focuses on risk factors, diabetes prevention and the severity of the disease.
- **POWER Over Diabetes:** emphasizes the education of diabetes, management of the condition, and treatment methods.
- **Fit for the Master's Use:** focuses on the importance of physical activity and healthy weight.
- **Taste and See:** demonstrates healthy eating and cooking for the family, including the education of portion sizes and healthy food preparation.
- **A Clean Heart:** illustrates the relationship between diabetes, heart disease, and stroke.

- Train Up a Child: creates awareness of the increase of type II diabetes among African American youth and teaches ways on how to become healthier. Participants learn how to assist youth with eating healthy, increasing physical activity, and living healthy lives.

Table 3 provides visual of each program as it compares to the seven self-care behaviors, along with factors such as individual or community-based, if it utilizes medical personnel or a community health worker, and if it includes support from the faith community such as the church. Both *A New Leaf* and the National Diabetes Prevention Program strongly exhibited all of the seven self-care behaviors. *Soul Food Light*, however, exhibited the least number of self-care behaviors throughout the program, only intensely displaying three out of six.

Table 3

*Comparison of Programs with Self-Care Behaviors and Other Factors*

	<b>A New Leaf...</b>	<b>National Diabetes Prevention Program</b>	<b>Project DIRECT</b>	<b>Project POWER</b>	<b>REACH</b>	<b>Soul Food Light</b>
Healthy Eating	X	X	X	X	X	X
Being Active	X	X	X	X	X	
Monitoring	X	X	X	X	X	X
Taking Medication	X	X	X	X		
Problem Solving	X	X				X
Reducing Risk	X	X	X	X	X	
Healthy Coping	X	X		X	X	
Individual	X			X		X
Community Based		X	X		X	
Medical Personnel			X		X	X
Community Health Worker or other	X	X	X	X	X	X
Faith Community			X	X		X

Each program provided a wide range of health eating strategies including the importance of food planning, reading food labels, lowering calorie intake, and educating about different ways to eat soul food. Monitoring blood glucose levels was also a self-care behavior that was exhibited throughout each program. Facilitators would have sessions that would address the importance of daily monitoring of glucose as well as providing the range for target hemoglobin A1C levels. Problem solving tactics were not addressed in all programs, as only three taught patients how to understand the way diabetes affects the body, helped to identify common problems or scenarios, and how to solve them in a timely manner.

Half of the programs were individual-based as two of them targeted southern African American population while the other half were community-based. All programs used community health workers, such as dietitians, lifestyle coaches, ambassadors, or family health advocates to facilitate diabetes sessions. Only three out of six programs used medical personnel such as a physician or nurse to assist with improving the quality of diabetes care. Although *Project POWER* is not an evidence-based program, its curriculum focuses strongly on six out of seven self-care behaviors as it provided a framework for the management of diabetes in the faith community. A particularly noteworthy feature was the use of the faith community in three out of six programs to offer long term support to participants and implement the healthy coping self-care behavior.

### **Discussion and Conclusion**

The several findings of programs that have been used across the nation shows that culturally tailored interventions are effective with lowering risk factors for diabetes. Between the programs, all improved diabetes self-care knowledge and dietary behaviors. Participants in

many of the programs increased their physical activity and improved their diet. All studies are consistent with showing the efficacy of lifestyle interventions in improving glycemic control, improving knowledge and behaviors. Programs were unique in adapting to minority groups, particularly African Americans, and understanding the way in which these groups learn effectively.

Future implications may suggest utilizing the church to educate African Americans on diabetes as health messages may be trusted more coming from faith-based communities.

Earnestine Walker, the Director of Community Outreach for the American Diabetes Association stated that the church is still a trusted source of information. By providing the church with information you're casting a big net. Since a high percentage of African Americans attend church and view church as an important institution within their community, it can be a setting that effectively implements and evaluates diabetes education programs. Congregations hold morals and traditions, but more importantly, they are able to provide social support for those at risk or affected by diabetes.

The Congregational Health Index (CHI) is an assessment tool that addresses practices within one's congregation that impact nutrition and physical activity of members. It illustrates how the worshiping environment influences food choices and physical activities, which play a role in determining health. The CHI helps to identify strengths and weaknesses of congregation's facilities and practices for promoting health; develop an action plan for improving such facilities and practices; and involve the faith community in implementing the plan. By using the spiritual values of the church, programs can reach populations that may not respond to messages provided in other settings.

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Appendix 1: Summary of Diabetes Self Care Activities Questionnaire (Follows Toobert, Hampson, & Glasgow, 2000).

The questions below ask about your diabetes self-care activities during the past seven days. If you were sick during the past seven days please think back to the last seven days when you were not sick.

Diet	Number of Days							
<b>1. On average, over the past month, how many days per week have you followed your eating plan?</b>	0	1	2	3	4	5	6	7
<b>2. On how many of the last seven days did you eat five or more servings of fruits and vegetables?</b>	0	1	2	3	4	5	6	7
<b>3. On how many of the last seven days did you eat high fat foods such as red meat or full-fat dairy products?</b>	0	1	2	3	4	5	6	7
<b>4. On how many of the last seven days did you space carbohydrates evenly through the day?</b>	0	1	2	3	4	5	6	7
<b>5. On how many of the last seven days have you followed a healthful eating plan?</b>	0	1	2	3	4	5	6	7

Exercise	Number of Days							
<b>1. On how many of the last seven days did you participate in at least 30 minutes of physical activity?</b>	0	1	2	3	4	5	6	7
<b>2. On how many of the last seven days did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?</b>	0	1	2	3	4	5	6	7

**Blood Sugar Testing**

**Number of Days**

<b>1. On how many of the last seven days did you test your blood sugar?</b>	0	1	2	3	4	5	6	7
<b>2. On how many of the last seven days did you test your blood sugar the number of times recommended by your health care provider?</b>	0	1	2	3	4	5	6	7

**Foot Care**

**Number of Days**

<b>1. On how many of the last seven days did you check your feet?</b>	0	1	2	3	4	5	6	7
<b>2. On how many of the last seven days did you inspect the inside of your shoes?</b>	0	1	2	3	4	5	6	7

Appendix 2: Problem Areas in Diabetes (PAID) Questionnaire

**Problem Areas In Diabetes (PAID) Questionnaire**

**INSTRUCTIONS:** Which of the following diabetes issues are currently a problem for you?  
 Circle the number that gives the best answer for you. Please provide an answer for each question.

	Not a problem	Minor problem	Moderate problem	Somewhat serious problem	Serious problem
	0	1	2	3	4
1. Not having clear and concrete goals for your diabetes care? .....	0	1	2	3	4
2. Feeling discouraged with your diabetes treatment plan? .....	0	1	2	3	4
3. Feeling scared when you think about living with diabetes? .....	0	1	2	3	4
4. Uncomfortable social situations related to your diabetes care (e.g., people telling you what to eat)? .....	0	1	2	3	4
5. Feelings of deprivation regarding food and meals? .....	0	1	2	3	4
6. Feeling depressed when you think about living with diabetes? .....	0	1	2	3	4
7. Not knowing if your mood or feelings are related to your diabetes? ..	0	1	2	3	4
8. Feeling overwhelmed by your diabetes? .....	0	1	2	3	4
9. Worrying about low blood sugar reactions? .....	0	1	2	3	4
10. Feeling angry when you think about living with diabetes? .....	0	1	2	3	4
11. Feeling constantly concerned about food and eating? .....	0	1	2	3	4
12. Worrying about the future and the possibility of serious complications? .....	0	1	2	3	4
13. Feelings of guilt or anxiety when you get off track with your diabetes management? .....	0	1	2	3	4
14. Not "accepting" your diabetes? .....	0	1	2	3	4
15. Feeling unsatisfied with your diabetes physician? .....	0	1	2	3	4
16. Feeling that diabetes is taking up too much of your mental and physical energy every day? .....	0	1	2	3	4
17. Feeling alone with your diabetes? .....	0	1	2	3	4
18. Feeling that your friends and family are not supportive of your diabetes management efforts? .....	0	1	2	3	4
19. Coping with complications of diabetes? .....	0	1	2	3	4
20. Feeling "burned out" by the constant effort needed to manage diabetes? .....	0	1	2	3	4

Appendix 3: List of Competencies Met in CE

**Tier 1 Core Public Health Competencies Checklist**

<b>Domain #1: Analytic/Assessment Skills</b>
Describes factors affecting the health of a community (e.g., equity, income, education, environment)
Selects comparable data (e.g., data being age-adjusted to the same year, data variables across datasets having similar definitions)
Describes public health applications of quantitative and qualitative data
Describes assets and resources that can be used for improving the health of a community (e.g., Boys & Girls Clubs, public libraries, hospitals, faith-based organizations, academic institutions, federal grants, fellowship programs)
Contributes to assessments of community health status and factors influencing health in a community (e.g., quality, availability, accessibility, and use of health services; access to affordable housing)
Describes how evidence (e.g., data, findings reported in peer-reviewed literature) is used in decision making
<b>Domain #2: Policy Development/Program Planning Skills</b>
Contributes to development of program goals and objectives
Identifies current trends (e.g., health, fiscal, social, political, environmental) affecting the health of a community
Gathers information that can inform options for policies, programs, and services (e.g., secondhand smoking policies, data use policies, HR policies, immunization programs, food safety programs)
Describes implications of policies, programs, and services
<b>Domain #3: Communication Skills</b>
Communicates in writing and orally with linguistic and cultural proficiency (e.g., using age-appropriate materials, incorporating images)
Solicits input from individuals and organizations (e.g., chambers of commerce, religious organizations, schools, social service organizations, hospitals, government, community-based organizations, various populations served) for improving the health of a community
Communicates information to influence behavior and improve health (e.g., uses social marketing methods, considers behavioral theories such as the Health Belief Model or Stages of Change Model)
<b>Domain #4: Cultural Competency Skills</b>
Describes the effects of policies, programs, and services on different populations in a community
<b>Domain #5: Community Dimensions of Practice Skills</b>
Describes the programs and services provided by governmental and non-governmental organizations to improve the health of a community
<b>Domain #6: Public Health Sciences Skills</b>
Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making
Describes evidence used in developing, implementing, evaluating, and improving policies, programs, and services
Suggests partnerships that may increase use of evidence in public health practice (e.g., between practice and academic organizations, with health sciences libraries)
<b>Domain #7: Financial Planning and Management Skills</b>
N/A
<b>Domain #8: Leadership and Systems Thinking Skills</b>
Contributes to development of a vision for a healthy community (e.g., emphasis on prevention, health equity for all, excellence and innovation)

**Concentration Specific Competencies Checklist**

<b>Global Health</b>
Identify strategies that strengthen community capabilities for overcoming barriers to health and well-being
Exhibit interpersonal skills that demonstrate willingness to collaborate, trust building abilities, and respect for other perspectives
Identify and respond with integrity and professionalism to ethical issues in diverse economic, political, and cultural contexts
Apply the health equity and social justice framework for the analysis of strategies to address health disparities across different populations
Conduct evaluation and research related to global health
Enhance socio-cultural and political awareness
Apply systems thinking to analyze a diverse range of complex and interrelated factors shaping health at local, national, and international levels