

# Diabetes Self-Management Education and Self-Efficacy Among African American Women Living With Type 2 Diabetes in Rural Primary Care

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African American women suffer the highest prevalence of type 2 diabetes (T2D). Self-efficacy is important for optimal diabetes self-management (DSM). **Purpose:** To evaluate DSM by comparing pre- and postintervention responses to a diabetes self-efficacy scale. **Design:** Descriptive pilot study. **Sample:** Participants for this study were  $N = 15$  African American women aged 25–65 years ( $M = 47.4$  years) and recruited from a rural health clinic in the Southeastern United States, who received a 4-hr DSM class. **Method:** Data were collected using the Stanford Self-Efficacy for Diabetes (SED). **Results:** The increase in the pre- and posttest SED scores were statistically significant, ( $p < .001$ ). **Implications for Nursing:** Health care providers should tailor a diabetes education program for these individuals living with T2D. Through a collaborative patient–provider relationship to care, individuals may ultimately experience increased self-efficacy leading to improved DSM.

**Keywords:** African American women; diabetes self-efficacy; diabetes self-management; self-care behaviors; diabetes self-management education

## Introduction

Diabetes is a chronic disease that is increasing in worldwide prevalence, and type 2 diabetes accounts for 95% of the diagnosed diabetes in the United States (Office of Minority Health, 2014). African American women have the highest prevalence of diabetes and suffer a greater burden of diabetes at twice the rate of non-Hispanic Whites (Office of Minority Health, 2013). Diabetes is listed as the fourth leading cause of death in African American women and the seventh leading cause of

death in the United States (Center for Disease Control and Prevention [CDC], 2013). The diabetes epidemic in African Americans is problematic because they suffer more complications, morbidity, and mortality from the disease (CDC, 2013).

Numerous complications are associated with diabetes including cardiovascular disease, cerebrovascular accident, hypertension, diabetic retinopathy, diabetic nephropathy, diabetic neuropathy, hearing loss, birth defects, dental disease, and nontraumatic limb loss in the United States

(American Diabetes Association [ADA], 2013). Diabetes complications, morbidity, and mortality can be prevented or reduced by diabetes self-management (DSM) and performance of self-care behaviors (SCBs), which includes nutrition, healthy eating, exercise, glucose monitoring, medication regimen, and diabetes education (Haas et al., 2012; Shrivastava et al., 2013; Rahim-Williams, 2011). The cornerstone of diabetes care is DSM, SCBs, and diabetes self-management education (DSME), which may prevent diabetes complications and improve patient health outcomes (Gumbs, 2012; McCleary-Jones, 2011; Onwudiwe et al., 2011). African American women with diabetes are candidates for participation in DSME to improve diabetes SCBs and self-efficacy (SE).

### Significance

There were approximately 422 million people living with diabetes in the year of 2014 worldwide (World Health Organization, 2014). African Americans are 1.8 times as likely to develop diabetes than White Americans, and one in four African American women older than 55 years has diabetes (ADA, 2013). Diabetes risk factors for African American women are overweight or obesity, older than 45 years, African American, history of hypertension, hyperlipidemia and cardiovascular disease, and lack of physical activity (Office of Women's Health, 2013). African Americans who have T2DM suffer greater diabetes complications such as blindness, kidney failure, amputations, heart disease, and even death if diabetes is not well controlled (ADA, 2014; CDC, 2014). Mississippi ranked first in the nation for overall diabetes prevalence in 2010 (Mississippi State Department of Health, 2012).

In 2010, diabetes ranked as the sixth leading cause of death in Mississippians, and 17.9% of African American women in Mississippi have been diagnosed with diabetes (Diabetes Foundation of Mississippi, 2014). Mississippi was the second state with the highest obesity rate, which can contribute to type 2 diabetes (CDC, 2014). Obesity is characterized by body mass index (BMI) greater than 30 or higher (CDC, 2012). African American women were twice as likely to be obese than other women and four out of five (80%) African American women are overweight or obese (Gumbs, 2012; U.S. Department of Health and Human Services, 2015; Williams, 2011). African American women who are overweight or obese with diabetes have a shorter life expectancy than those without diabetes and are at risk for diabetes complications (CDC, 2014). African American women age-adjusted diabetes death rate per 100,000 in 2013 was 2.4 in comparison to other races and gender (ADA, 2013; Office of Minority Health, 2013). Because African American women are disproportionately

affected by diabetes and obesity, the health care providers must find a way to improve DSM in these women. Haas et al. (2012) stated that DSME is necessary for all who are diagnosed or at risk for developing diabetes to prevent or delay diabetes complications. This disease creates increase demands on health care facilities and leads to mortality and morbidity (Upadhyay, Izham, Alurkar, Mishra, & Palaian, 2012).

In 2012, an estimated cost of diabetes totaled \$245 billion including \$176 billion direct medical costs and \$69 billion in reduce productivity. This was a 41% increase from 2007 for diabetes care, medical expenditures, and indirect medical costs. People with diabetes are likely to have 2.3 times higher medical expenditures than those without diabetes, and providing them with DSME and increasing their SE to perform daily self-care behaviors can enhance their ability to manage their diabetes and improve quality of life.

### Diabetes Self-Management Education

DSME is an ongoing process of facilitating knowledge, skill, and ability necessary for diabetes self-care/management of the disease such as diet, exercise, medications, foot care, and glycemic control. The American Association of Diabetes Educators [AADE] defined the AADE7 Self-Care behaviors as the framework for DSME and diabetes self-care (AADE, 2014). Per the AADE (2014), the seven diabetes self-care behaviors: being active (physical activity and exercise), eating healthy (diet composition and caloric content), taking medications, monitoring (blood glucose, weight, blood pressure), problem solving (hypoglycemic or hyperglycemic, sick days), reducing risks (diabetes complications and smoking cessation), and healthy coping should be implemented in diabetes education. DSME has been shown to improve health outcomes and quality of life in those living with diabetes (CDC, 2011; Haas et al., 2012). The aim of DSME is to help the individual learn how to problem solve, engage in self-care, and perform positive SCBs necessary for successful self-management of diabetes while increasing SE (AADE, 2014). Diabetes is a complex disease requiring many life adjustments including diet, nutrition, and glucose monitoring (CDC, 2011).

### Self-Efficacy

SE is a psychological behavior specific construct that plays an important role in DSM (Mishali, Omer, & Heymann, 2011). It has been studied and proven to be more predictive of diabetes SCBs (Walker et al., 2014). SE is a person's belief in his or her ability to perform a goal-directed behavior and overcome difficulties in performing such task (Howells, 2002). The social cognitive theory (SCT)

describes SE as an individual's confidence in performing certain health behaviors (McCleary-Jones, 2011). Diabetes is a chronic disease that requires daily self-management of the disease, and patients must be comfortable and confident in performing the SCBs as described by AADE. Diabetes management interventions should focus on increasing SE, which can be an important predictor of SCBs and improve diabetes outcome (Ahola & Groop, 2013; Bohanny et al., 2013; Onwudiwe et al., 2011).

Diabetes is an incurable disease, but it is preventable, treatable, and manageable through lifestyle changes such as diet, nutrition, physical activity, weight loss, glycemic control, and most importantly diabetes education and self-management. The self-management of type 2 diabetes (T2D) in the African American women community is challenging and attempts to improve education; knowledge and management must be targeted. Diabetes self-management is important for those with diabetes and/or prediabetes to reduce the medical cost and complications associated with diabetes and improve patient clinical outcomes. The aim of this pilot study is to evaluate the effectiveness of a DSME intervention in African American women with T2D and how SE can improve diabetes self-care behaviors (management) of diabetes.

## Literature Review

Diabetes is a major chronic disease that affects individuals from countries at all stages of economic and social development. Behavioral and lifestyle changes are considered one of the most effective strategies in managing T2D until the end of life. Disease awareness, self-management skills, and SCBs are essential in controlling glucose for positive optimal diabetes outcomes (Kavin, Añel-Tiangco, Mauger, & Gabbay, 2010).

Sarkar, Fisher, and Schillinger (2006) performed a study among Asian Americans (18%), African Americans (42%), Latino Americans (42%), and Whites (15%) investigating the association between diabetes SE and self-management. It was concluded that SCBs (diet, exercise, glucose monitoring, and foot care) were associated with improving DSM and SE in this group regardless of race or ethnicity. Gumbs (2012) study explored relationship between DSME and SCBs among African American women with T2D. The study reported the African American women who participated in a DSME to promote SCBs were more likely to engage in SCBs than those who had not had participated in DSME. Walker, Smalls, Hernandez-Tejada, Campbell, and Egede's (2014) study examined the effect of SE on glycemic control, SCBs, and quality of life in low-income minority adults with diabetes. In conclusion, it was evident that higher SE was associated with improvement in glycemic control, SCBs (diet, exercise, glucose monitoring), medication adherence, and mental

health. Lorig, Ritter, Villa, and Armas's (2009) study was to determine the effectiveness of a community-based DSME program among adults with T2D. It was discovered that there were improvements in diabetes SE regarding diet, reading food labels, healthy eating, and improvement in glycemic control.

Bandura's (1986) SCT is a health behavior theory, which emphasizes an interaction between the behavioral, personal, and environmental factors in health and chronic disease management such as diabetes. Bandura (1997) theorized that SE is a link between knowledge application and actual behavioral change and is one of the most effective predictors of health behavior. Therefore, SE provides a framework for understanding and predicting diabetes SCBs. Daily diabetes management requires the person to be knowledgeable about their disease, perform SCBs, and integrate SE in their disease management. By increasing their SE in association with performing diabetes specific SCBs which can minimize or prevent diabetes complication, improve quality of life, and promote positive clinical outcomes.

## Purpose of the Study

The purpose of this descriptive pilot study was to evaluate the effectiveness of a DSME intervention in African American women with T2D and how SE can improve diabetes self-care behaviors (management) of diabetes.

## Method

This project was a descriptive pilot program using a one group, pre-, posttest design to assess levels of diabetes SE among ( $N = 15$ ) African American women living with T2D aged 25–65 years. The DSME intervention focused on AADE7 self-care behavior—healthy eating (AADE, 2014). It was to include carbohydrate counting, reading nutritional food labels, and plate method for portion control, which are all elements of healthy eating.

## Instruments

The structured questionnaire used in this project was The Stanford Diabetes Self-Efficacy Scale (DSES), which is an 8-item self-reported measure of diabetes SE that was used to assess how confident the participants were in performing certain activities about diabetes management. The 10-point Likert scoring ranged from 1 (not at all confident) to 10 (totally confident) in conducting diabetes daily activities such as dietary, exercising, meals, sickness, and physician appointments. The internal consistency reliability of this scale is 0.828 (Lorig et al., 2009; Stanford Patient Education Research Center, n.d.). Participants completed a pre- and post-DSES questionnaire.

## Sample

A purposive sampling of  $N = 15$  African American women were recruited for this project. A target population of African American women was chosen from a rural health clinic located in the Southeastern United States. Inclusion criteria included self-identified as being an African American women, aged 19–65 years, ability to read and speak English, and possessing adequate visual and manual skills. Exclusion criteria for this study were visual difficulties such as blindness, physical or cognitive impairments, pregnancy, and those with a diagnosis of a mental illness, dementia and/or Alzheimer's disease. All participants were classified as overweight to obese with an average BMI of 35.23 ( $SD + 8.91$ , range = 25.2–51.75).

## Procedures

After institutional review board approval was obtained from the university, the recruitment process was initiated. Recruitment flyers were posted in the rural health clinic lobby and exam rooms. Participants contacted the project coordinator after seeing the recruitment flyer. The program was discussed and eligibility determined using a screening tool to help the PI determine if potential participants met inclusion/exclusion criteria for enrollment.

## Educational Intervention

The DSME intervention was a 4-hr class containing information on healthy eating, reading nutritional label, carbohydrate counting, and food portion control. The AADE (2014) suggest skills such as reading nutrition labels, carbohydrate counting, and measuring foods for portion control can assist with diabetes self-management and glycemic control. The plate method, which is a 9-in. visual plate, was used for teaching meal planning and encouraging food portion control to educate participants about healthier food choices to improve glycemic control. The dinner plate serves as a pie chart to show what proportions of the plate should be covered with various food groups and colors (green, yellow, orange) indicating a balanced meal. This visual dietary method requires no precise measuring of your food and is an easy way to manage glucose levels and lose weight. This method allows one to choose desired foods but changes the portion sizes for larger portions of nonstarchy vegetables and a smaller portion of starchy foods. A visual nutrition label was used to teach participants how to read, understand, and count carbohydrates. It is imperative that those with diabetes understand how serving size, total number of carbohydrates, fiber, protein, and sugar in foods influence their blood glucose.

**TABLE 1.** Physiological Characteristics of Participants:  $N = 15$

	<i>M (SD)</i>	Range
Age	47.4 (13.79)	25–65
Weight	203.07 (38.03)	14–264
BMI	35.23 (8.91)	25.2–51.75
A1C	8.28 (10.1)	6.5–10.1
Systolic Blood Pressure	132.29 (14.84)	120–165
Diastolic Blood Pressure	81.29 (6.39)	70–94
Cholesterol	178.07 (42.11)	129–292
Triglycerides	160.29 (67.25)	66–324
HDL	56.86 (19.58)	35–97
LDL	89.07 (38.03)	48–190

After completion of the diabetes education course, the participants again completed the DES via telephone 2 weeks later. The project director documented the response on the DSES form. This was done to assess whether the participant's SE increased after the DSME intervention from baseline.

Additional physiologic data collected from each participant included blood pressure, height, weight, and BMI. Their most recent laboratory studies for A1C (3 months) and lipids (1 year) were used for participant's personal use during review of the ABCs of diabetes (e.g., A1C, blood pressure, and cholesterol) regarding DSM (Table 1). Normal parameters were discussed for each and the effect of elevated numbers could potentially have on their diabetes. Participants received information on the ABCs of diabetes before the educational intervention. This was done to help the participants understand goals for glycemic and lipid controls regarding DSM. Participants reviewed their own laboratory data during the discussion.

## Data Analysis

Data from the pre- and posttest participant response documents were imported into Excel then downloaded into SPSS (Version 22) for additional analysis. Descriptive statistics were used to report demographic characteristics of the sample population (see Table 1). Pre- and posttest Stanford DES scores were analyzed using a paired samples  $t$  test (Table 2).

## Results

The participants were comprised of 15 African American women ranging in age from 25 to 65 ( $M = 47.4$ ;  $\pm 13.79$ ). All participants offered a self-reported previous diagnosis of diabetes, high blood pressure, and high



**TABLE 2.** Differences in Pre- and Post-Test Stanford Diabetes Efficacy Scale Scores for Participants

Measurement	Pre-Test <i>M(SD)</i>	Post-Test <i>M(SD)</i>	<i>t</i>	<i>df</i>
Stanford Diabetes Efficacy Scale	6.12 (1.36)	7.38 (1.23)	8.68*	14

\* $p < .001$ .

cholesterol. Six (40%) participants stated they had participated in some form of diabetes education in past. The average A1C for participants was 8.28 (6.5–10.1, +0.99).

The mean Stanford DES pretest score was 6.12 ( $SD = 1.36$ , range = 4–8.5). The mean posttest score after the intervention was 7.38 ( $SD = 1.23$ , 5.12–9.5) with each participant improving their score. A paired samples  $t$  test (see Table 2) was used to determine differences in the pre- and postintervention scores in participants ( $n = 14$ ). The increase in the pre- and posttest scores of the Stanford DSES were statistically significant for the mean scores in the two measurements  $t(14) = 8.67$ ,  $p < .001$ . This program demonstrated significant differences in pre- and postinterventions scores via the Stanford DES assessment tool. Overall, these women were at high risk for the deleterious complications related to uncontrolled glycemic control. Their mean BMI was 35.23 ( $SD = 8.91$ ), indicating that many were overweight with some being obese. In addition, the average hemoglobin A1C was 8.28 ( $SD = 10.1$ ), which indicates poor glycemic control and increased risk for diabetes related complications. These findings were noteworthy and further compounded for some participants scoring low on their Stanford DES assessment.

## Discussion

Women living with T2D need to have confidence in self-managing their diabetes. Diabetes education is essential for improving health outcomes for patients living with diabetes. DSME is the cornerstone of optimal diabetes care, and teaching patients the expected set of self-care behaviors needed to be performed daily. These include engaging in lifestyle behavioral changes, meal planning, exercising, adhering to medications, monitoring blood glucose, and coping skills. Diabetes education interventions can lead to promoting positive SCBs and improving SE and health outcomes in African American women living with diabetes.

Empowering African American women living with T2D through the development of increased knowledge and skills necessary for DSM is a critical aspect on the patient's diabetes self-care. T2D is a chronic disease that requires active patient participation in daily diabetes SCBs. In this pilot program, the African American

women became more comfortable and confident with DSM/SCBs practices after participating in the DSME.

Educating the African American women on the significance and importance of A1C, BMI, dyslipidemia, and blood pressure are critical for optimal DSM. Elevated A1C, dyslipidemia, hypertension when uncontrolled can lead to diabetes complications. Patients with a BMI of 25–29.9 are considered overweight, and those with a BMI greater than 30 as in this project are considered obese, which can lead to diabetes complications. It is imperative that A1C, blood pressure, and cholesterol along with stabilize healthy weight be within acceptable ranges for diabetes management and optimal outcomes.

## Limitations

Diabetes is listed is the sixth leading cause of death in African American women in the Mississippi (U.S. Department of Health, 2013) and therefore, it is an important disease process to address in this geographical area. However, there were limitations to this project including the use of African American women small purposive sample size and the recruitment of participants from only one family practice clinic. Another limitation was the one-time follow-up 2 weeks after the educational intervention to evaluate outcomes and no control group for comparison. The findings from this study are not generalizable to all African American women.

## Conclusion

Diabetes mellitus is a common chronic disease that affects millions of people and can lead to mortality and morbidity if uncontrolled. This debilitating disease requires constant managing, continuance of health care, patient self-management, and diabetes education to prevent long-term complications and mortalities. Diabetes educations and self-management is essential to managing diabetes and improving diabetes outcomes (Funnell et al., 2010).

Clinicians can tailor or individualize their diabetes education program for their population to improve self-care behaviors that will likely improve diabetes SE. The goals are to improve diabetes outcomes, reduce diabetes complications, and increase diabetes SE via self-diabetes management care through a DSME.

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