The effect of a diabetes self-management program for African Americans in a faith-based setting (pilot study)

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ABSTRACT

Background: Integrating spiritual principles with practical principles may be a strategy to assist persons to understand how to make positive health decisions. Faith-based programs can allow individuals to acquire the diabetes knowledge necessary to manage their disease and practice the necessary lifestyle changes within the context of their culture and community. Therefore, the purpose of this study was to test a 6-week faith-based diabetes self-management program for African American adults diagnosed with diabetes. The aim of the intervention was to increase knowledge about diabetes and diabetes self-management practices, improve lifestyle behaviors, and increase knowledge about symptom management to prevent and treat hypoglycemia for African Americans living in the southeastern United States. Methods: A quasi-experimental design with one group pre-test post-test design was used to test a 6-week pilot study of a faith-based diabetes self-management program for African American adults. The non-normality of the variables required use of a nonparametric dependent samples test. The Wilcoxon Signed Rank Tests were used to examine difference in self-efficacy, symptoms management, and diabetes self-management before and after the intervention. Results: There were significant improvements among participants in diabetes knowledge, p value=<0.001, self-efficacy, p value=0.004, diabetes symptom management, p value=0.015, and improvements in diabetes self-care activities (diet, p value=0.001, exercise, p value=0.007, and foot care, p value=0.027). Conclusions: These study findings have important implications for Accountable Care Organizations (ACOs) and Patient Care Medical Homes (PCMHs) to improve quality and patient centered care as well as to decrease unexpected hospitalizations, readmissions, and Emergency Department (ED) visits for diabetics. This type of brief but efficacious intervention has the potential to improve patient satisfaction and allay cost concerns with diabetic Medicare recipients.

Introduction

In the United States, 21 million Americans have been diagnosed with diabetes and an estimated 8.1 million remain undiagnosed. The prevalence of diabetes in African Americans is nearly double that of Caucasians at 13.2% and 7.6%, respectively [1]. African Americans with diabetes have a five times higher rate of leg amputations compared to Caucasians [2]. African Americans with diabetes have a greater risk of stroke and a greater mortality rate from heart disease. Blood sugar values within a specific range, along with proper dieting, and physical activity can prevent or slow the progression of diabetes complications [3]. To improve blood sugar control, diabetes self-management education (DSME) programs target lifestyle and behavior modifications. These programs have the potential to help those with diabetes avoid complications associated with the disease and eliminate the disparity associated with this disease.

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Therefore, the purpose of this study was to test a 6-week faith-based diabetes self-management program for African American adults diagnosed with diabetes. The aim of the intervention was to increase knowledge about diabetes and diabetes self-management practices, improve lifestyle behaviors, and increase knowledge about symptom management to prevent and treat hypoglycemia for African Americans living in the southeastern United States. By reaching these goals, this project contributes to Healthy People 2020 objective D-14, which is to increase the proportion of persons with diabetes who received diabetes self-management education [4]. Further, the study has the potential to help ameliorate the disparity in diabetes experienced by African Americans in this study.

Primary care clinics are where most patients are diagnosed and treated for diabetes. Activities that occur in primary care settings are critical because this starts the course of treatment for the patient's disease and has implications for the eventual outcome. Teaching diabetes self-management skills and knowledge about the illness can be challenging in the primary care setting, especially when health care providers are limited for time spent with patients [5]. Consequently, many patients diagnosed with diabetes are not receiving diabetes self-management education at a time when they are seeking information about the disease. Healthy People 2020 guidelines noted in 2009 of African Americans with diabetes, 62.1% have never taken a course on diabetes self-management. Self-management education is needed because many patients lack self-management knowledge. Given the burden that this group faces regarding diabetes and its negative outcomes, African Americans need diabetes self-management education.

Diabetes self-management knowledge and lifestyle modifications have been directly associated with improved blood sugar control, fewer hospitalizations, and lower diabetes related medical costs. Diabetes self-management education has been shown to be associated with lower blood sugar averages, and fewer acute emergency complications such as hypoglycemia [low blood sugar] and hyperglycemia (high blood sugar) [6,7]. Other benefits of self-management education include reduced health care utilization and health care costs, and an overall improved health for those suffering from diabetes.

An understanding of African Americans characteristics including culture and spirituality, and the influences these have on diabetes self-management behaviors is an important step in designing accurate, relevant, and effective DSME programs. The characteristics and lifestyles among African Americans are based on traditional values and religious background, which included poor nutrition and lack of physical activity that still exist [8]. Because spirituality is embedded within the culture of African Americans, a program which includes a faith-based institution and faith-based messages has the potential to have a compelling influence on diabetes beliefs and health care behaviors.

Initiating diabetes self-management education in faith-based settings can motivate members to adopt healthier habits. Integrating spiritual principles with practical principles may be a strategy to assist persons to understand how to make positive health decisions. Faith-based programs can allow individuals to acquire the diabetes knowledge necessary to manage their disease and practice the necessary lifestyle changes within the context of their culture and community. In addition, individuals may acquire the skills necessary to treat signs and symptoms of hypoglycemia which may result in a decreased utilization of emergency room visits.

■ Knowledge gaps and the relationship with diabetes self-care management

Researchers and collaborative communities have implemented culturally relevant diabetes self-management programs in communities. These DSME programs emphasized and focused on diabetes knowledge, self-management skills, problem solving skills, diabetes complications, physiological and psychosocial measures, and quality of life indicators [2,9-13]. The use of Community Health Representatives (CHRs) has proven to be effective in reducing health disparities in underserved communities. CHRs have an intimate understanding of their community's cultural background, experiences, and strengths [14].

Spirituality plays an important role in the lives of many African Americans. Within these studies, designed to test interventions to improve health knowledge and outcomes among African Americans the spiritual, psychosocial, and cultural practices of African Americans were integrated into DSME. The curriculum focused on healthy eating, being active, glucose monitoring, and medication adherence. The participants were allowed an opportunity to

interact directly with the clergy or the trained spiritual counselors regarding their emotions, beliefs, and perceptions about diabetes self-care practices and individual problem solving. Sessions included: prayer, scripture reading, praise and worship, and meditation [15-22]. These studies demonstrated the need for and importance of integrating DSME into spiritual practices, thus addressing the whole needs of individuals. Designing holistic faith-based diabetes self-management programs may have positive effects on diabetes self-care practices and improve overall health.

Based on the review of the literature, it is reasonable to view diabetes self-management education delivered in community-based settings effective in improving diabetes outcome indicators. This study proposed that providing culturally tailored faith-based diabetes self-management education to adult African Americans with type 2 diabetes, within the Social Cognitive Theory Framework would improve diabetes knowledge, self-efficacy, diabetes symptoms management, and diabetes self-management outcomes. This intervention study was guided by the Social Cognitive Theory as a conceptual framework with focus on person (diabetes knowledge, self-efficacy, symptom management) and behavior (diabetes self-management) at a church setting (as the environment component of the model). Within this study, the diabetes self-management program is conceptualized as the foundation that supports the development of improved self-efficacy, symptoms management, and self-management behaviors (**TABLE 1**).

The uniqueness of this study is that it included 6-weekly 1 hour educational sessions and participants were encouraged to practice self-care behaviors independently and concurrently within the 6-week sessions. Also, participants were given weekly homework assignments to complete and return for discussion. The activities were strategically planned to produce positive outcomes.

This study is different than previous studies because 1 hour sessions were used rather than 2 hour sessions used in previous studies. This required less time off from work and family, and avoided information overload. Participants were given several homework assignments that were intentional to improve diabetes knowledge, self-efficacy, symptom management, and diabetes self-care activities. A 6-week intervention was selected rather than the traditional 8 to 12 week sessions to be more realistic and accessible for the participants.

■ **Research aims and hypotheses**

This study included content on physical activity, diet, medications, glucose monitoring and foot checks in African Americans with type 2 diabetes. The following hypotheses were tested:

After receiving a 6-week faith-based intervention, participants will show significant improvement from pre-to post intervention in:

Hypothesis 1: Self-efficacy and diabetes symptoms management.

Hypothesis 2: The outcome of diabetes self-management (physical activity, diet, glucose monitoring, medication, and daily self-foot checks).

■ **Instruments**

The Diabetes Self-Management Participant Questionnaire Measurement demographic questionnaire requested the following: Age, gender, race, employment inquires, marital status, learning style, level of education, smoking status, lifestyle habits, weight and height, and diabetes related questions.

Hemoglobin A1C

A hemoglobin A1C level was obtained by the pricking of a finger by the PI from all participants. The instrument that was used to measure the hemoglobin A1C was an over-the-counter Bayer A1C Now test kit, similar to the point of care kits used in many community settings. Chang et al. conducted a study to evaluate the accuracy of over-the-counter glycated hemoglobin (A1C) test kit. A total of 221 participants and 110 health care professionals completed the A1CNow SelfCheck test. The findings of that study indicated, of the 177 participants A1C values, 165 (93.2%) were within adequate range with a correlation value at 0.93 respectively [23].

Table 1. Bandura's conceptual framework for diabetes self-management.			
Construct	**Concept**	**Operational Level**	**Data Collection**
Person	Symptoms Management	Diabetes Symptom Checklist, DSC-r	Pre-test, Post-test
-	Diabetes Self-efficacy	Empowerment Scale SF (DES-SF) Revised	Pre-test, Post-test
Behavior	Diabetes Self-Management	Summary of Diabetes Activities Scale (SDSCA)	Pre-test, Post-test

Body Mass Index (BMI)

Anthropometric measurements were taken at baseline by the PI. Heights were obtained without shoes to the nearest 0.1 cm with a stadiometer. Body weights were obtained on an electronic weight scale. BMI were calculated by dividing body weight (in kilograms) by the square of height [in meters].

The Diabetes Empowerment Scale-Short Form (DES-SF)

The Diabetes Empowerment Scale-Short Form (DES-SF) is an 8-item questionnaire developed to assess psychosocial efficacy of people with diabetes. Participants were asked their perceived ability to the questions "in general I believe that I…" and offers the response option of "strongly disagree" (1) to "strongly agree" (5). The total scale scores were summed, higher scores (>3) indicates positive attitudes and will be interpreted as a higher level of self-efficacy, and lower scores (≤3) indicates a lower level of self-efficacy. The Cronbach's alpha for this instrument in this study was 0.80.

The Diabetes Symptoms Checklist Revised (DSC-R)

The Diabetes Symptoms Checklist Revised (DSC-R) scale is a 34-item questionnaire developed to assess diabetes symptoms that measures symptom frequency and severity during the past month. The DSC-R was analyzed based on eight domains: Psychological fatigue, psychological cognitive, neurology pain, neurology sensory, cardiology, ophthalmology, hypoglycemia, and hyperglycemia. Participants were asked to note the inconvenience of symptoms of diabetes with a response option of "yes" (1) or "no" (0) to symptom occurrence followed by a rating of symptom troublesomeness (1-5). Items scores are the sums of the symptom occurrence and troublesomeness, with a maximum score of six per item. The Cronbach's alpha for this instrument in this study was 0.80.

The Summary of Diabetes Self-Care Activities Scale (SDSCA)

The revised Summary of Diabetes Self-Care Activities scale (SDSCA) is a short self-report instrument for measuring the frequency of diabetes self-care across the different components of diabetes regimens. The tool was designed to measure the frequency of self-care behavior activities over the previous seven days [24]. Participants' were given number scores for each component (exercise, diet, foot care, and blood glucose testing) creating item scales evaluated by the revised SDSCA tool. Numerical scoring of items is based on the number of days of the week that the behavior was performed using a 7-point reply format. The total scores range from 0-77 points, higher scores indicated more days that participants performed self-care activities. The summed scores of each item were used in this study. The Cronbach's alpha for this instrument was 0.70.

DSME intervention

The DSME intervention included six weekly 1 hour class sessions held on Sunday mornings and Sunday evenings directly after worship services. The sessions occurred at two African American churches led by an African American professional. The African American professional felt that it was important to build rapport with participants' and church leaders. This was accomplished by attending and participating in bible study and worship services prior to and during the intervention study. Each session began with a scripture verse, and the materials and presentations displayed African American images (**TABLE 2**).

Methodology

■ Study design

This was a quasi-experimental study (pre-post design) with two groups of African Americans (morning group and evening group) to test the impact of a six-week (total of 6 hours) diabetes self-management intervention (based on the American Diabetes Associated (ADA) recommended topics), on self-efficacy, diabetes symptom management, and diabetes self-care activities.

■ Setting/study population

The study was conducted at two local African American churches located in the south-eastern part of the United States. Each congregation had over 300 members, predominately African Americans. A convenience and snowball sample of 32 African Americans 18 years or older who met the criteria for inclusion were recruited into the study. The study sample included participants with a self-reported diagnosis of Type 2 diabetes made by a health care provider. Further inclusion criteria included the ability to speak and read English and the ability to complete surveys. Exclusion criteria included: Diabetes as a secondary diagnosis, patients with

type I diabetes, having participated in a diabetes self-management program during the past year, pregnant women, and diabetes complications that would impede responses to questionnaires. The PI scheduled enrollment visits at each church for interested persons for consent signing, obtainment of hemoglobin A1C and weight measurement, and completion of a set of questionnaires pre-intervention (baseline). A trained community Research Assistant (RA) was the African American data collector in this study, and this procedure may have fostered a since of trust and may have minimized attrition. The RA attended a 1 hour training workshop led by the PI on data collection, viewed a power point slide on human subjects' protections, and signed a confidentially form provided by the University's IRB.

An Institutional Review Board (sIRB) application was submitted and approved by the University of North Carolina at Greensboro. The participants who elected to participate in this study were asked to take part in a diabetes self-management education study. The participants were informed that the PI anticipated minimum risks for this study such as discomfort from finger sticks and potential injuries from performing physical activity. Participants were informed that their participation was voluntary, and that they could end study participation at any time. Potential participants were also informed that; refusing to participate or leaving the study later would not result in any penalty.

■ **Dosing schedule**

This diabetes self-management educational program intervention in the current study was a pilot study conducted over a six-week period, with six weekly 1 hour educational sessions and participants practicing self-care behaviors independently and concurrently within the 6-week sessions. The participants were given activities to complete outside of the face-to-face sessions, and the activities included planning and goal setting. The activities were monitored by the PI to ensure completion of the activities. This technique reinforced self-efficacy and accountability for participants' own self-care.

■ **Data collection**

The Research Assistant collected data through self-reports using a set of questionnaires during enrollment days prior to the start of the program. Participants were offered assistance in completion of questionnaires in a confidential manner to avoid any embarrassment or literacy concerns.

Clinical measures included obtaining hemoglobin A1C levels and weights at baseline.

Table 2. Application of the social cognitive theory in the diabetes self-management intervention.			
Sources of Outcome Expectation	**Intervention Strategies**	**Content and scripture verse for the day**	**Teaching Methods**
Physiological and emotional states	Group discussion Participants shared their feelings about the diagnosis of diabetes including their successes and struggles	Session 1 (3 John 1:2) Diabetes in African Americans: Prevalence, signs, and symptoms	1. Presentation of a poster displaying statistics, signs and symptoms of diabetes. Discussion about diabetes
Social Persuasion	Group discussion 1. Participants discussed the impact of carbohydrates on blood glucose levels. 2. Participants discussed carbohydrate foods that have the greatest effect on blood glucose levels. 3. Participants discussed the impact of protein on blood glucose levels and identified healthier proteins to include in their intake. Take home activity (Planning) 1, Participants planned a healthy meal, recorded in the diet diary and returned the following session to discuss their successes and struggles	Session 2 (1 Corinthians 6:19) Carbohydrates, Fats, and Protein • Discussed the impact of carbohydrates, protein and fat on BG • Reviewed the sources of carbohydrate. • Carbohydrates are necessary for important body functions. • Carbohydrate foods raise blood glucose regardless of the source. Will stress to participants that milk, fruit, and bread raise blood glucose just as a cakes and sweets. • Reviewed sources of protein. • Stressed that proteins are necessary for important body functions. • Proteins affect blood glucose levels but at a lesser impact. • A source of protein should be included at each meal. • Choose very lean and lean protein.	1. Discussion 2. Presented a poster presentation: displaying foods appropriate for African Americans with diabetes

Vicarious experiences	Group discussion 1. Participants discussed the importance of physical activity and its impact on blood glucose levels. 2. Participants were able to discuss the relationship between diet, exercise, and medication and its effects on glucose. Take home activity (Goal setting) 1. Recorded in their calendars the number of times exercised for 1 week and included the duration and type of exercise. The participants shared their experience the following week	Session 3 (James 2:17) Being Active: • Stressed to participants to never begin an exercise program without check with your primary care provider. • Stressed the positive aspects of physical activity. 1. Lowers blood glucose levels 2. Helps maintain and achieve a healthy body weight. 3. Helps to keep heart and lungs healthy. 4. May improve blood pressure. • Discussed reasonable goals for beginning an exercise program. Strive for 30-45 minutes per day. Start out slow, increase minutes gradually, exercise. For example exercise 10 minutes three times per day. • Stressed any amount of exercise is better than none. • Always carry identification and a quick acting carbohydrate. • Comfortable shoes, and visually check the inside of the shoe before it is worn. • Wear comfortable socks, cotton socks preferably. • Discussed that diabetes therapy may be managed by various treatment modalities. 1. Diet and exercise 2. Diet, exercise, and oral medication 3. Diet, exercise, oral medication, and insulin • Importance of maintaining a healthy body weight is one of the keys to managing diabetics. Being overweight makes insulin less able to do its job (keeping glucose levels normal in the blood). Losing even a small amount of weight helps lower the blood glucose levels. • Physical activity helps to decrease blood glucose levels and other aspects of health.	First half of the session: promoted group discussion to allow participants to discuss their success and struggles with meal planning. Second half of the session: a poster presentation: displaying African Americans being physical active.
	Group discussions 1. Participants described the basic action of the medications that may be utilized to control diabetes 2. Participants discussed the side effects of medications, and when to notify their health care provider. 3. Participants understood the function of insulin and why it might be used to manage diabetes.	Session 4: (1 John 4:4) Medications • Types of medications, mechanism of action, and side effects. • Stressed the importance of medication adherence. • Types of insulin and non-insulin medications.	First half of the session: promoted group discussion to allow participants to discuss their success and struggles with physical activities. Second half of the session: present medications (oral and insulin) regimens.
	Group Discussion 1. Participants shared their experiences with self-blood glucose monitoring. 2. Participants discussed the potential complications of poorly manage diabetes. Take home activity: Planning and goal setting 1. Record one fasting glucose for one week in your glucose journal. 2. Record one post prandial glucose reading for one week in your glucose journal, (bring journal to next session for discussion)	Sessions 5: (Hosea 4:6) Glucose Monitoring/Diabetes Complications • Cardiovascular disease • Eye damage • Kidney damage • Nerve damage	Discussion Images displaying African Americans experiencing diabetes related complications Discussed fasting blood sugar goal and postprandial goal.

Mastery experiences	Group discussion 1. Participants were able to distinguish between hypoglycemia and hyperglycemia. 2. Participants will define the appropriate action(s) to take if experiencing hypoglycemia. In class activity: reinforcing information 1. Participants wrote down signs and symptoms of hypo/hyperglycemia on a sheet of paper provided by the PI. 2. Participants wrote down treatments for hypoglycemia on a sheet of paper provided by the PI.	Session 6: (Philippians 4:13) Symptom Management • Discussion of hyper/hypoglycemia • Signs and symptoms • Treatment	First half of the session: promoted group discussion to allow participants to share their experiences with glucose monitoring. Second half of the session: Discussion about symptom management.

Participants were provided scheduled time slots at 20 minute intervals for A1C and weight measurement to ensure adequate time for data collection. The questionnaire data collection occurred on pre-intervention enrollment days and at the end of the study at each church in private areas provided by the facility. The questionnaires were administered in the following order: The Summary of Diabetes Self-Care Activities (SDSCA) Scale, Diabetes Empowerment Short Form (DES-SF) self-efficacy scale, and the Diabetes Symptoms Checklist-R (DSC-R) scale for participants to complete independently (or with literacy assistance) in the designated areas of the church. Location of data collection was done to ensure privacy and confidentiality for all participants. The Diabetes Self-Management Participant Questionnaire Measurement was used to collect date of birth, marital status, years of education, race/ethnicity, gender, employment, comorbidities, and diabetes related inquiries. At the end of the program the participants returned to church one week after program completion for the post data collection process.

■ Statistical analysis

Descriptive statistics such as frequency and percentage or Mean (M), Standard Deviation (SD), and minimum and maximum were used to describe characteristics of the sample and pre- and post-test measures. Paired-t-tests were planned for examining differences pre-to post on the major variables. Distribution tests were conducted for the major continuous outcomes using skewness, kurtosis, box plots, and Kolmogorov-Smirnov tests. The non-normality of the variables required use of a nonparametric dependent samples test. The Wilcoxon Signed Rank Tests were used to examine difference in self-efficacy, symptoms management, and diabetes self-management before and after the intervention.

Results

■ Patients demographics

The sample of 28 participants used for data analysis consisted of 21 females (75%) and 7 males (25%). All the participants identified their ethnicity as African American. The age range of the participants was from 32 to 83 years, with a mean of 61 years (SD=13.9). The duration of diabetes for the participants ranged from 1 to 25 years, with a mean duration of 5.79 years (SD=6.23) and more than half had experienced the diagnosis of diabetes for 5 years or less. The participants' diabetes regimens included: diet and exercise alone, insulin, non-insulin injections (glucagon-like peptide-1), and oral hypoglycemic agents. Most the participants were on oral hypoglycemic agents.

■ Demographic site differences

Of the 28 persons who completed the study, site differences were examined for baseline data. An independent sample t-test was conducted to examine whether there were statistically significant differences for participants' age, hemoglobin A1Cs, or duration of diabetes between the different church sites where the programs were held. There were no statistically significant differences between sites on the mean values for age, hemoglobin A1Cs, or duration of diabetes for participants. **TABLE 3** displays these results.

Two baseline clinical measures, obesity level and hemoglobin A1Cs levels, were obtained to evaluate the participant's progression of their diabetes, to provide motivation for change, and for future follow-up. The A1Cs and weights were obtained at baseline only. This was due to the short duration of the study and it would not be anticipated that the A1C levels or weights would change appreciably over just six weeks.

Table 3. Examining site differences for baseline variables.			
	t	**df**	**Sig. (2 tailed)**
Age	-0.028	21.93	0.978
Hemoglobin A1C	0.617	24.50	0.543
Diabetes Duration	0.314	25.92	0.756

The participants' weights and heights were converted into Body Mass Index (BMI). The BMIs were calculated by dividing body weight (in kilograms) by the square of each participant's height (in meters). The baseline BMI of the sample ranged from 24 to 56 with a mean BMI of 35.4 (SD=7.13). Twenty-two (78.5%) of the sample participants were classified as obese. The baseline hemoglobin A1C values of the sample ranged from 5.8 to 13% with a mean A1C of 7.6% (SD=1.78). Fourteen (50%) participants had poor glycemic control which was defined as greater than 7%.

There were statistically significant changes in the total scores of the DES-SF from the beginning of the self-management program to completion in managing the psychosocial aspects of diabetes. This result indicated that self-efficacy improved after the intervention. Further investigation showed that at baseline twenty-one (75%) participants had higher levels of self-efficacy and at the completion of the study twenty-eight (100%) participants had higher self-efficacy. Seven persons moved from low self-efficacy to high self-efficacy after the intervention (**TABLE 4**).

The DSC-R eight subscales were analyzed for differences in pre-and post-intervention: (1) psychology, fatigue, (2) psychology, cognitive, (3) neurology, pain, (4) neurology, sensory, (5) cardiology, (6) ophthalmology, (7) hypoglycemia, and (8) hyperglycemia. There were statistically significant changes in DSC-R scores for the participants from baseline to end of study in fewer psychology fatigue symptoms, fewer neurology pain symptoms, fewer neurology sensory symptoms, fewer cardiology symptoms, and fewer ophthalmology symptoms (**TABLE 5**).

The Summary of Diabetes Self-Care Activity scale reports the total summed scores from

Table 4. Differences in total DES-SF scores from pre- to post-test (N=28).			
Pre **n=28** **Mean (SD)**	**Post** **n=28** **Mean (SD)**	**Z**	**p Value**
3.75 (1.72)	4.56 (0.53)	2.894	0.004
Standard deviation (SD)			
Changes in participants' self-efficacy from pre- to post-test (N=28)			
Self-efficacy variable	**Pre**		**Post**
High self-efficacy >3	21		28
Low self-efficacy ≤3	7		0

Table 5. Differences in the scores of the DSC-R scale from pre- to post-test				
Pre **n=28** **Mean (SD)**	**Post** **n=28** **Mean (SD)**	**z**	**p value**	
1.02 (0.817)	0.648 (0.544)	-2.443	0.015	
Standard deviation (SD)				
Differences in the scores of the DSC-R subscales from pre- to post-test				
Symptom Management Variables	**Pre- Mean (SD)**	**Post-Mean (SD)**	**z**	**p Value**
Psychology, fatigue	0.68 (0.372)	0.44 (0.389)	-2.953	0.003
Psychology, cognitive	0.45 (0.448)	0.34 (0.328)	-1.546	0.122
Neurology, pain	0.45 (0.458)	0.27 (0.288)	-2.091	0.037
Neurology, sensory	0.53 (0.416)	0.31 (0.296)	-2.855	0.004
Cardiology	0.42 (0.441)	0.17 (0.226)	-2.463	0.014
Ophthalmology	0.45 (0.431)	0.24 (0.295)	-2.286	0.022
Hypoglycemia	0.38 (0.460)	0.27 (0.385)	-1.592	0.111
Hyperglycemia	0.51 (0.428)	0.43 (0.359)	-0.885	0.376
Standard Deviation (SD)				

pre-test to post-test for diet, physical activity, glucose monitoring, and daily self-foot checks. There were statistically significant changes noted for self-care practices. Thus, participants significantly improved their self-management of diabetes after participation in the intervention. The total summed scores of each subscale items were analyzed with significant improvements noted in healthy eating, physical activity, and self-foot checks (**TABLE 6**).

Discussion

Findings indicated that participation in the diabetes self-management program showed significant changes across the diabetes self-management components. There were significant improvements in self-efficacy, diabetes symptoms management, and diabetes self-care activities for the participants who participated in the intervention.

Self-efficacy is an essential part of diabetes self-management; because it can impact self-care activities positively or negatively. Self-efficacy is having the confidence to carry out tasks [25,26]. Interactive learning and active engagement were used in this study aimed at improving self-efficacy among participants. Studies have found that including interactive activities and actively engaging participants in diabetes self-management interventions can improve self- efficacy [27-29]. Also, being in an intervention group can have positive effects on diabetes management. Participants' scores indicated high self-efficacy levels from baseline to completion of study.

It is important for people with diabetes to recognize signs and symptoms of diabetes, particularly, hypoglycemia and hyperglycemia. It is also important for people with diabetes to know how to treat hypoglycemia. Prior research studies were limited with respect to integrating activities to promote diabetes knowledge about symptoms and symptoms management, indicating that more studies are needed in this content area of diabetes care and management [2,15]. Integrating activities to increase knowledge about symptoms

and symptoms management may help reduce the unnecessary use of health care resources. In this study, there were improvements in symptoms management with respect to decreased symptoms and decreased severity of symptoms from baseline to study completion. Also, there were improvements with respect to decreased symptoms of hypoglycemia and hyperglycemia, but the findings were not statistically significant. Participants showed significant improvements from pre- to post- intervention in the outcomes of diabetes self-management, measured in this study as specific self-care activities. There were significant improvements in behaviors for diet, physical activity, glucose monitoring, and self-foot checks.

Limitations

There were several limitations noted in this study. First, the small non-randomized sample was not representative of the population and may have demonstrated a lack of significant findings due to a lack of power. Second, lack of a control group makes it difficult to compare the effects of the intervention. Additionally, the Hawthorne effect may have been functioning during the intervention, thus introducing threats to internal validity. Data were based on self-reported information that may have been not fully accurate. The study was conducted in two churches which may not be reflective of the general population of African Americans in the southeast United States. Finally, the study was limited to one culture, affecting generalizability.

The study findings provided some useful data for clinicians with respect to self-management education. Although this study had a shorter duration compared to other studies in the literature [16,19-22], this six-week intervention showed impact and may be more practical and realistic to reach most diabetics in the community. A shorter culturally tailored intervention may be especially important for vulnerable groups such as ethnic and racial minorities, those with lower education, blue collar workers who cannot take

Table 6. Wilcoxon signed ranks test SDSCA total subscale score items.				
Scale Variables	**Pre-Mean (SD)**	**Post-Mean (SD)**	**z**	**p value**
Diet	15.11 (4.78)	18.93 (3.85)	-3.363	0.001*
Exercise	4.57 (4.15)	7.21 (3.91)	-2.681	0.007*
Blood Sugar	6.18 (5.07)	8.12 (5.07)	-1.806	0.071
Foot Care	6.07 (5.40)	8.89 (5.05)	-2.212	0.027*

SD: Standard Deviation; *p<0.05

off work multiple times to attend programs, and low income or uninsured persons who cannot afford the formal programs offered through health systems and hospitals.

These study findings have important implications for Accountable Care Organizations (ACOs) and Patient Care Medical Homes (PCMHs) to improve quality and patient centered care as well as to decrease unexpected hospitalizations, readmissions, and Emergency Department (ED) visits for diabetics. This type of brief but efficacious intervention has the potential to improve patient satisfaction and allay cost concerns with diabetic Medicare recipients. Though this intervention was provided by a health professional, it is possible that this intervention could be led by trained lay persons

or Community Health Workers (CHWs). In addition, the shorter intervention may be more adaptable and acceptable in settings such as schools, work places, or community centers. Culturally tailoring to the population and locale would be important to consider and include.

Conclusion

This was a pilot study of a faith-based culturally tailored DSME intervention for African American adults with type 2 diabetes. The findings indicated that interventions focused on self-efficacy, symptom management, and diabetes self-care activities can be implemented in the community and can lead to improvements in diabetes self-care management.

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