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Culturally Tailored Intervention for Rural African Americans With Type 2 Diabetes

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Abstract

Purpose—The purpose of this pilot study was to evaluate a culturally tailored intervention for rural African Americans. Social Cognitive Theory provided the framework for the study.

Methods—Twenty-two participants were recruited and randomly assigned to either Group or Individual diabetes self-management (DSME). Group DSME included storytelling, hands-on activities, and problem-solving exercises. Individual DSME sessions focused on goal-setting and problem-solving strategies. Sessions were offered in an accessible community center over a 10-week period.

Results—Outcomes included glycosylated hemoglobin (A1C), self-care actions, self-efficacy level, goal attainment, and satisfaction with DSME. Participants in both Group and Individual DSME improved slightly over the 3-month period in self-care activities, A1C level, and goal attainment. Although differences were not statistically significant, trends indicate improved scores on dietary actions, foot care, goal attainment, and empowerment for those experiencing Group DSME.

Conclusions—The culturally tailored approach was well received by all participants. Improvements among those receiving Individual DSME may indicate that brief sessions using a culturally tailored approach could enhance self-care and glycemic control. Additional testing among more participants over a longer time period is recommended.

The prevalence of type 2 diabetes (T2DM) among African Americans is 13%, a rate nearly twice the 7% population average in the United States.¹ These rates are likely to be underestimates, because many people have undiagnosed diabetes or impaired glucose tolerance (prediabetes).¹ Rates of long-term complications of diabetes are much higher among ethnic minorities compared with non-Hispanic whites.^{1–3} Studies indicate that African Americans have high rates of poor glycemic control,^{4,5} and high rates of serious complications—particularly older African Americans low in health literacy⁶ and those with high rates of poverty and/or limited access to health care.⁷ A high incidence of complicating conditions such as hypertension, arthritis, and depression has also been found in one-third to half of those with diabetes,⁸ complicating the already complex regimen. The majority of African Americans in the United States reside in large cities in the South; therefore, most studies of this population have been done with urban groups. Unique cultural aspects of the lives of rural African Americans require that interventions be tested that are congruent with

cultural patterns of these groups. Recent studies involving rural people are limited to mostly women participants.^{9,10} Studies are needed to test diabetes self-management (DSME) interventions that are culturally tailored to rural African American men and women.¹¹

In addition to the complex challenges faced by all individuals with diabetes, rural African Americans often face problems of multiple illnesses, distance from health care, and limited financial resources. Typical barriers for rural African Americans include the cost of care, the complexity of regimens for diabetes management added to other chronic conditions, a lack of knowledge about what to do and how to get help, and the stigma of the disease.¹² National standards recommend that people with diabetes receive DSME from a multidisciplinary team of physicians, nurses, and dietitians (certified diabetes educators/CDEs).² Rural areas rarely have such programs because of distance and small numbers of health professionals, thus limiting access to quality diabetes care. This in turn increases the likelihood that rural residents will have to seek expensive, less effective urgent or emergent care.^{13,14} As with the majority of people with diabetes, rural people receive health care mostly from physicians in solo or small group practices that offer disease care but rarely include comprehensive DSME.¹⁵ Although it is well established that cultural tailoring increases acceptance and effectiveness of DSME,³ few studies have compared group with individual diabetes education,¹⁶ but no reported studies examined outcomes of these approaches among rural African Americans.

It is unknown whether rural African Americans respond best to group or individually tailored approaches to DSME. Extensive behavioral research about DSME shows that adults benefit from an approach that empowers them with knowledge, skills, and confidence/self-efficacy for success in diabetes self-management.^{17,18} An empowerment approach for diabetes education among African Americans has been successful among urban African Americans,^{19,20} but studies using this approach are needed among rural African Americans.^{14,21} The rich history of active church groups in rural communities may enhance the openness to group learning. In contrast, rural traditions of privacy and beliefs about the stigma of diabetes may lead some to prefer individual diabetes education sessions.¹² Group-delivered DSME is efficient; however, whether outcomes of a group DSME are better than individual DSME for rural African Americans is unknown. The impact of both approaches on outcomes of glycemic control and self-management of diabetes needs to be tested among rural African American men and women. The purpose of this pilot study was to evaluate a culturally tailored intervention for rural African Americans. Specific aims of this pilot study were (a) to determine the feasibility of conducting a trial to compare a culturally tailored *Group DSME* to *Individual DSME* among a sample of rural African American adults with T2DM; (b) to obtain preliminary data to compare the impact of the Group versus Individual DSME on outcomes of self-management and glycemic control; and (c) to determine whether particular demographic characteristics are associated with more positive outcomes.

Research Design and Methods

Research Design

A quasi-experimental design was used in which participants were randomly assigned to either Group or Individual DSME—both delivered by certified diabetes educators (CDEs). Before planning a large-scale study, a pilot study was needed to ascertain whether adequate numbers of participants from the African American community would volunteer, be willing to be randomly assigned, and would complete a series of sessions lasting over 8 weeks.

Recruitment and Sample

The study was conducted in 1 rural county of Central Virginia, with a population of approximately 28,000 residents, 21.6% of whom are African American. To ascertain that the county was rural, definitions of rural were examined using a Web site with 7 definitions used by agencies of the U.S. government,²² with a result that the selected county met 6 of the 7 definitions of rural. Given national estimates of a 13% rate of diabetes among African Americans, researchers calculated a potential pool of nearly 800 individuals with diabetes. Recruitment methods included contacting key community leaders (ie, teachers, pastors, clinicians), distributing flyers, making church announcements, newspaper articles, and radio announcements in sites appropriate to reach African Americans. To advertise the study, the project was titled “Taking Care of Sugar: African Americans Deal With Diabetes.” Participants were prescreened and enrolled in this study if they were African American (self-identified), age 18 or above, reported being diagnosed with T2DM, resident of a rural county; and able to give informed consent (eg, no evidence of dementia or mental illness during routine screening). A convenience sample of 22 volunteers participated (18 women, 4 men) were screened at an accessible, centrally located community center then randomly assigned (using a table of random numbers) to the culturally tailored Group or Individual DSME. A second random drawing was done to even out the number of men in the groups so that both groups had a similar gender proportion. Incentives for participants included payments of \$25 at 3 times during data collection (total of \$75); 2 free blood tests (finger stick) for blood glucose levels (A1C); a set of diabetes education materials culturally tailored for African Americans²³ along with similarly tailored brochures from the American Diabetes Association (ADA); and small gifts such as foot care kits, exercise videotapes, and/or free books with recipes for African Americans with diabetes. The use of small gifts, given at intervals during the study, has been found to enhance retention of participants in other studies with rural African Americans (A.H. Skelly, Personal communication, 2004).^{24,25}

Procedures

The study was conducted over a 6-month period during 2005-2006. All sessions were held in a community center in 1 rural community. Because of the small number of participants ($n = 6$) for the first offering of the experiment, the Group DSME approach alone was offered without comparison individual DSME participants. Additional recruitment efforts were conducted, resulting in a sufficient number for both Group ($n = 7$) and Individual DSME ($n = 8$). The final sample was 21 with 1 participant lost right after enrollment due to lack of time to participate. All participants in the study were taught by the same experienced certified diabetes educators. Participants in both interventions set an individual goal with the diabetes educator, based on his/her priority for self-management. Group DSME sessions were held weekly for 2 hours each over an 8-week period. Participants assigned to Individual DSME met with a CDE on 3 occasions over the 8-week period at the same time as the group sessions but in a separate room. Individual sessions were typically 10–15 minutes and focused on reviewing the goal, obstacles, and progress, facilitating problem-solving or goal revision. Educators provided information and/or resources as needed by participants in both arms of the intervention. Progress toward goals was reviewed at each session, within the group or by participant’s individual discussion with CDEs. Participants in both the Group and Individual DSME received the same materials, incentive gifts, and payments.

Interventions

For all participants, the overall content of the culturally tailored approach was based on the 7 areas of self-management identified by the American Association of Diabetes Educators in their recently published brochure and goal-setting form.²⁶ This concise list synthesizes decades of research in diabetes self-management and focuses on helping individuals balance

optimal management of the disease with desired quality of life. The 7 areas of self-care are (1) healthy eating, (2) being active, (3) monitoring (blood glucose), (4) taking medication, (5) problem solving, (6) reducing risks, and (7) healthy coping.²⁶ All participants received a loose leaf notebook of materials organized by the 7 areas of self-care, and concise, 1-page handouts while identical larger-sized posters on each topic were used by educators.

Culturally Relevant Group Intervention

In developing the culturally tailored intervention, this team of researchers used cultural understandings from focus group research conducted by these researchers.¹² Two educators delivered the Group DSME consisting of eight 2-hour educational sessions over an 8-week period, incorporating activities and problem-solving in each group session based on the priorities of the group and topics emphasized by the AADE.²⁶ The culturally tailored Group DSME was delivered as follows: (1) ground rules for the group emphasized learning in a supportive atmosphere; (2) storytelling related to diabetes care and overcoming chronic illness, using figurative language characteristic of the region and delivered by an African American woman as a “lesson” to begin most group sessions; (3) diabetes education materials were simple, colorful 1-page handouts culturally tailored to African Americans²³; (4) “lessons” were based on the 7 areas of diabetes self-management; (5) educators were responsive to priorities of the group and ensured that key content based on ADA Standards was included, using an interactive approach emphasizing respect and empowerment.²⁷

Educators also emphasized adult learning principles by (1) involving African American group leaders and role models; (2) using problem-solving about diabetes management issues brought by group members; (3) guiding hands-on activities, (such as label-reading, exercises for counting carbohydrates for meal planning, cooking, practicing walking exercises using an videotape); (4) offering ideas about ways to decrease costs of care (obtaining free medications, less expensive supplies, financial assistance); (5) offering guidelines for using complementary and/or alternative therapies; (6) involving supportive family and/or friends in selected sessions; and (7) celebrating successes, including giving a completion certificate at the end of the program.

Individual Education Intervention

Those randomly assigned to receive Individual DSME were seen by a CDE on 3 occasions after baseline: (1) week 1—setting a goal (using goal form based on the 7 areas of self care)²⁶ and receiving the notebook of educational materials; (2) week 4—reviewing progress toward the goal previously set, problem-solving ways to improve self-care, offering additional information or resources, and giving a gift of a cook book, exercise videotape, pedometer, and/or foot care kit (based on the goal set and individual preference); (3) week 8—final review of progress toward individual goal, offering information and resources, discussion about diabetes self-management achieved, and plans for future self-care.

Outcome Measures and Instruments

Outcome measures are summarized in Table 1. Outcomes were measured at baseline and 10 weeks after baseline and consisted of a self-care activities inventory, empowerment scale, rating of personal goal achievement, and a glycosylated hemoglobin (A1C) blood test. An anonymous questionnaire about satisfaction with the diabetes education was also administered after the DSME was completed. Demographic data were collected as part of baseline data, using a standardized form developed by the University of Virginia Rural Health Care Research Center and included zip code, a brief description of one’s region of residence, race/ethnicity, age, gender, formal education, and insurance coverage. Outcome measures were collected at baseline and immediately postintervention (10 weeks after baseline). It was hypothesized that participants in the Group Intervention would have bigger

improvements on the outcome measures compared with the participants receiving Individual DSME. The specific outcomes, variable definitions, and instruments used for this pilot study are summarized in Table 1. The outcome measures are described below.

Goal Achievement—measured by the “7 Self-Care Behaviors Tracking” form developed by the AADE,²⁶ a 1-page form for setting individual goals in specific areas of self-management (previously described).

Daily Actions for Diabetes Self-Care—measured by the Summary of Diabetes Self-Care Activities (SDSCA),²⁸ which measures diabetes self-management as to general diet, specific diet, exercise, blood glucose testing, foot care, and smoking. Normative data, inter-item and test-retest reliability, correlations between subscales and a range of criterion measures, and sensitivity to change scores have been examined in 7 different studies, which have included diverse samples (including African Americans), mostly older adults with T2DM. Average inter-item correlations within scales were high ($r = 0.47$), correlations with other measures of diet and exercise support validity of subscales ($r = 0.23$). This instrument is considered a brief and reliable self-report measure, consisting of several subscales on specific areas of self-management. There are 25 items, divided into 9 subscales having a response range of 0 to 7, referring to the number of days that a particular self-care behavior had been practiced during the previous week. SDSCA developers recommend subscales be scored separately because self-care activities vary across categories of 9 basic activities: general diet, specific diet, carbohydrate spacing (dividing carbohydrates throughout the day), exercise, blood glucose self-monitoring, foot care (foot examination), comprehensive foot care (foot examination and hygiene), medication administration, and smoking. Higher scores indicate more positive self-care activities.

Self-Efficacy—measured by the Diabetes Empowerment Scale-Short Form (DES-SF), a valid and reliable measure of overall diabetes-related psychosocial self-efficacy, derived from the extensively tested Diabetes Empowerment Scale (28 items). The short form consists of 8 items with an α reliability of 0.84 and content validity supported by a recent study and comparisons to the original 28-item instrument.²⁹ A higher number indicates more self-efficacy.

Glycemic Control—measured by glycosylated hemoglobin blood test (A1C), the gold standard for testing the adequacy of blood glucose management over the prior 3 months. This blood test is a measure of the amount of glucose that has been bonded to the red blood cell (RBC), and thus reveals the average of the blood glucose over a period of 3 months (the 120-day lifespan of the RBC). Achieving an A1C level of 7% or below is associated with a significant reduction in the microvascular complications of diabetes, therefore, this clinical indicator is closely followed by clinicians to achieve current standards of care.³⁰ In recent years, newly developed technology has made it possible to obtain accurate A1C measures at the point of care with a finger stick method rather than a venipuncture in a lab. This technology greatly enhances the convenience and decreases the cost to patients and their providers who need results of this test to guide them in diabetes management. In this study, the A1c analyzer (Siemens DCA 2000®⁺ analyzer³¹) was validated in the main laboratory of the University of Virginia Health System. For this study, a score of 7 or below was considered desirable.

Satisfaction With Diabetes Education—forms were developed for the pilot study with appropriate versions for each set of participants to evaluate the specific aspects of the Group or Individual DSME experience. The questionnaires were found to be adequate for evaluation of the culturally tailored intervention, including storytelling. Participants seemed

to understand the questions, and responses were consistent with anecdotal comments, reflecting content validity.

Statistical Methods

Demographic and outcome measures are described as means with standard deviations (SDs) for continuous variables and percentages (frequencies) for categorical variables. Differences between the Group DSME and Individual DSME scores were assessed using a 2-sample t test for continuous variables and χ^2 test for categorical variables. Distributions of all these outcome measures were examined and they were normally distributed within each treatment group, except for smoking and medication administration which had skewed distributions, thus, a 2-sample t test did not apply to these 2 measures. To examine whether the participants in the Group DSME would have better outcomes compared with participants receiving an Individual DSME approach, for each of the outcomes change scores from the baseline to the 10-week postintervention were calculated for all subjects and used in a 2-sample t test. Because of the small sample size in this pilot study, results for the intervention effect may be vulnerable to possible outliers, therefore, a median test was also used to test robustness of the results. In addition, to eliminate confounding from the length of diabetic status, intervention effect was further investigated in the analysis of covariance (ANCOVA) which relates the postintervention level of the outcome to the group assignment, while controlling for the baseline level of the outcome and the number of years since diagnosis of diabetes. Although the sample is too small for conclusive findings, use of the ANCOVA provides information about which variables may account for differences between variables, which is an appropriate goal for a feasibility study.

Results and Conclusions

Demographic characteristics of the cohort divided by group assignment are summarized in Table 2. The majority of participants were female (76%) with an average age of 60 years (range, 27-85 years). Education level ranged from less than 6 years of schooling to achievement of doctoral education, but the majority had relatively little formal education (58% had less than a high school education, 33% completed high school). The average number of years diagnosed with diabetes was 9 (range, 1-22 years; SD 6.9), with most participants (90.5%) reporting comorbidities of hypertension and complications of diabetes such as cardiovascular disease, neuropathy, and eye disease. Comparisons of the 2 intervention groups using a 2-sample t test and χ^2 test, as appropriate, indicate none of these variables were significantly different between the groups, indicating the 2 groups were comparable at baseline. Scores for self-care activities and A1C at baseline and postintervention are shown in Table 3. Results from a 2-sample t test indicate that baseline levels of these outcomes were comparable between the 2 groups.

Instruments for measuring outcomes were previously described. Two-sample t tests using change scores from the baseline to the postintervention did not indicate significant differences on outcomes between the 2 groups (See Table 4). Results of the A1C change scores indicate that both groups were able to lower their blood glucose levels slightly over the 10-week period (Group DSME = -0.32 ; Individual DSME = -0.24). Statistical comparisons reveal slight group differences in 2 aspects of the SDSCA: those receiving Group DSME showed more improvement in activities such as carbohydrate spacing (eg, counting the number of carbohydrates and spacing them across a 24-hour period), and comprehensive foot care. Item analysis indicates those receiving Group DSME increased carbohydrate spacing over time, while those receiving Individual DSME slightly decreased this activity (Group DSME change scores $+2.27$ compared with -1.14 ; $P = .073$). A statistical trend was noted for change scores in comprehensive foot care. Those who received Group DSME show more improvement than Individual DSME participants ($P = .189$). Those

receiving Group DSME increased their comprehensive foot care scores (+3.64), while those receiving Individual DSME increased this self-care activity only slightly (+0.38). Change scores on measures of self-efficacy (DES-SF), were in a positive direction for those receiving Group DSME (+3.58), while self-efficacy scores of those receiving Individual DSME were diminished (-1.13) ($P = .111$). Because of the small sample size, researchers also examined a median test and obtained similar results as those from the t test presented above. Additional analysis was conducted to assess intervention effect by using Analysis of Covariance while controlling for the baseline level of the outcome and the number of years since diagnosis of diabetes. No significant differences were found between intervention groups.

Another outcome measured in this study was ability to achieve individual diabetes self-care goal, or Goal Attainment. Differences between group means indicated a mild trend toward statistical significance ($P = .129$) with participants who received Group DSME showing higher rates of achieving their goals (average score 7.57 or 76%), compared with participants receiving Individual DSME who achieved their goals at a lower average rate of 50% (score = 5.25).

To test feasibility and acceptability of both Group and Individual DSME, researchers compared average scores from questionnaires of Satisfaction with Diabetes Education among both groups. Results indicate that the majority of participants in both interventions were pleased with the diabetes education they received, and found it acceptable and helpful, without significant differences between groups ($P = .272$). The role of the storyteller was evaluated after the Group DSME in the following ways: (1) a question on the written program evaluation stated, "The storyteller helped me learn about diabetes management" (all responded positively, with 80% reporting they "strongly agree"); (2) by observing reactions and listening to audio taped responses to the stories in the group sessions. Overall, team members concluded that stories were well received. Anecdotal comments along with written surveys indicated enthusiasm for the story-telling as a part of the culturally tailored group program.

Discussion

It is well established that among the greatest challenges of self-management of diabetes are making changes in dietary and exercise patterns.^{15,19} As noted, rural African Americans face these challenges with few resources or assistance from health professionals. In testing a culturally tailored intervention in this study, results indicate that participants in the Group DSME tended to show improvement in difficult areas such as carbohydrate spacing and foot care, compared with those receiving Individual DSME. Participants receiving the Group DSME improved in measures of self-efficacy, while the participants receiving Individual DSME showed reduced scores in this outcome. Although these differences were not statistically significant, they reflect preliminary indications that the culturally tailored empowerment Group approach used in this pilot study may be more effective with rural African Americans with T2DM, compared with the Individual DSME typically used in primary care practices.

The educational materials used were tailored to African Americans,²³ were concise, appealing, with accurate information about each of the 7 areas of self-care.²⁶ Having simple, 1-page handouts and posters depicting self-care actions appeared to be helpful to these participants, many of whom were low in formal education and/or had little previous diabetes education. Some argue that cultural competence is the key to reducing racial and ethnic health disparities, although the evidence base for effective techniques is limited.³²⁻³⁴ Storytelling is a culturally appropriate education and empowerment strategy that was well

received by participants in this study. As noted in a study of hypertension care for African Americans,³⁴ storytelling as a strategy for culturally tailored approaches holds promise among African Americans due to traditions of oral history, valuing the teaching and community-building functions of storytelling.

The interventions in this study used a community-based approach, a strategy often recommended for reaching populations historically excluded and underserved, such as rural African Americans. The approach of offering diabetes education in an accessible community site was strongly recommended by the Task Force on Community Preventive Services.²¹ This intervention study provided an opportunity to explore whether community-based DSME would be accepted and effective. One strength of this study is the inclusion of randomly selected groups of participants to test the 2 different DSME approaches of a culturally tailored intervention. This study demonstrated that participants were willing to be randomly assigned to an intervention, an important factor in a population difficult to recruit due to historic and logistical barriers. Both approaches to diabetes education were well-received by participants, as evidenced by the high scores on the “Satisfaction with Diabetes Education” questionnaires from both groups.

The intervention for both groups of participants emphasized helping each individual select 1 key area of self-care and attaining an individual goal. This focused tailoring of self-management reflects an effective approach for changing self-care behaviors and building self-efficacy.^{35–37} In contrast, Lorig and Gonzalez³⁸ noted that a typical diabetes education program presents “over 100 things patients should do and not do to control diabetes”, which is bound to be overwhelming and ineffective. In the present study, the focus on 1 individual self-care goal may account for the fact that the majority of participants in both groups were able to slightly reduce blood sugar levels (A1C) during the 10-week period. Findings showing the high success rate for achieving individual goals by those who received the Group DSME provide encouragement about the value of group approaches in comparison to Individual DSME. However, results in this study are significantly limited by the small sample size and the brief follow-up of only 10 weeks. A longer period of follow-up is needed to determine whether brief interventions can promote sustained self-care improvements and glycemic control.

A positive element of this study was the use of the point-of-care blood test of A1C to obtain instant results and empower participants with information about their glycemic control status. A recent study showed that giving immediate information to individuals about results of their laboratory tests is associated with an increased awareness of their test results and better self-management after a 3-month period.³⁹ In another recent study, Brown et al⁴⁰ noted the benefits of the point-of-care results that offer immediate feedback, promote proactive patient education, and enhance a focused interaction between providers and patients.

Implications for Practice and Research

Results of this study need to be examined in light of several limitations, noting that it was a pilot study with a small budget and limited time. The postintervention A1C measure was collected 10 weeks after baseline, possibly too soon to reveal the changes in long-term blood sugar levels, that is, an average of 12 weeks is typically recommended for changes in red blood cells.³⁰ In addition, this short follow-up period is insufficient to determine the long-term impact of the DSME intervention on self-care actions and glycemic control. Another limitation is the lack of information about whether participants continued to take their medications or had changes in medical regimens that could have impacted clinical findings such as A1C. Nonetheless, slight decreases in A1C among participants in both intervention

groups may be an indication that 1 or both approaches to diabetes education could be effective in reducing blood glucose levels if measured in a larger sample over a longer period of time.

Results of this study must also be interpreted in light of the purpose, which was to test feasibility of delivering the intervention, and examining preliminary data for intervention effects. The sample size of 21 was small, consisted of mostly women, and was derived from only 1 rural community. Based on initial difficulties recruiting a sufficient sample, researchers developed additional strategies and were able to recruit enough participants to test the culturally tailored intervention using both Group and Individual DSME approaches. The challenge of recruiting an adequate sample among rural African Americans has been recognized by other researchers.²⁵ Success with this population requires extensive planning, resources and diligence for researchers to derive an adequate number of participants. Such work is increasingly important to enhance knowledge for clinicians about the kinds of approaches that are effective with rural African Americans. Although this population has very high rates of diabetes and prediabetes, and, therefore, is an important population in which to test diabetes management approaches, the culturally tailored intervention was developed specifically for rural African Americans, and may not be generalizable to others. An important limitation of the study design is the difference in the amount of time spent by educators with participants who received the Group DSME versus Individual DSME. The importance of reporting overall contact time by researchers was emphasized in a recent review of diabetes self-management interventions, which noted this serious gap in nearly all research reports of DSME studies.⁴¹ For the present study, the amount of contact time with educators with participants in the Group DSME was 16 hours, versus those receiving Individual DSME, who received an estimated total of 1-2 hours over the course of 3 brief one-on-one sessions. The results are interesting in light of this difference in contact time, that is, results show that even the small amount of time spent in Individual DSME, focused on individual goals, is associated with slight reductions in A1C in the majority of participants. If this result is found in a larger study over a longer time, it could be an indicator of the importance of focused goal-setting, as reported in other recent studies.³⁶ However, given the finding that self-care activities were *not* improved in the individual education participants, this may mean that the slight improvements in A1C would not be sustained overtime due to insufficient changes in daily self-care practices and/or level of self-efficacy. These results need to be examined in a larger sample to determine whether glycemic control improvements are sustained among those with a minimal individual intervention, a finding that may be particularly important in the real world of the practice setting.⁴¹

One final limitation of this study is the possibility of intervention contamination that could have impacted results. The sharing of information between members of the 2 differing interventions is very likely, given the size of the rural community and the close-knit nature of the African Americans who live there. Researchers observed that participants in each arm of the study often knew and interacted with one another when they came to the community center, even though they met in different rooms. However, it is the researchers' belief that this threat to validity is unlikely to have a major impact on the outcomes of the study. This conclusion is based on the literature about the power of the group experience which cannot be "given" to another person who has not been a part of the group. In the culturally tailored Group DSME sessions, the experience consisted of a problem-solving approach based on the principles of adult education, emphasizing the empowering nature of learning through stories and active, hands-on activities. The latter aspects of the culturally relevant intervention appear to be unique to the group education and unlikely to be shared through casual conversation among participants. However, the possibility of intervention

contamination needs to be considered in both designing other studies and interpreting results.¹⁶

In conclusion, results of this pilot study indicate that the culturally tailored DSME intervention is feasible and acceptable to members of a rural African American community. Although there were no statistically significant differences in the outcome measures such as self-care activities and A1C, statistical trends in the data indicate improvements in goal attainment and in several self-care activities among the participants who received Group compared with Individual DSME. If these results are found in a larger sample over a longer time period, they could provide guidance to clinicians about approaches to caring for the large numbers of African American adults with T2DM who are at high risk for complications, thus improving health, enhancing quality of life and addressing an important health disparity.

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Table 1

Outcomes, Variable Definitions, and Instruments

Outcome	Definition of Variable to be Measured	Instrument Used
Goal attainment	Ability to achieve individual diabetes self-care goal at 50% or more on a scale of 0-10	"AADE 7 Self-Care Behaviors" goal form ²⁶
Daily actions taken for diabetes self-care	Increase in weekly diabetes self-care actions from baseline to postintervention	"Summary of Diabetes Self-Care Activities" (SDSCA) ²⁸
Diabetes self-efficacy	Improved score on self-efficacy instrument from baseline to postintervention	"Diabetes Empowerment Scale- Short Form" (DES-SF) ²⁹
Glycosylated Hemoglobin (HbA1C or A1C)	Improvement in A1C measure over 10-week period pre/postintervention	Point-of-care fingerstick measure using HbA1c analyzer equipment ³¹
Satisfaction with diabetes education program	Score on satisfaction questionnaire immediately postintervention	"Satisfaction with Diabetes Education Program, 'Taking Care of Sugar'" (researcher developed versions for each of 2 intervention groups)

Table 2

Participant Characteristics at Baseline

	All Participants (n = 21)	Group DSME (n = 13)	Individual DSME (n = 8)
Age			
Mean Age, years (SD)	60.2 (14.6)	62.4 (14.7)	56.6 (14.7)
Gender			
% Female	76.2% (16)	76.9% (10)	75% (6)
% Male	28.5% (6)	23.1% (3)	37.5% (3)
Education (highest grade or year completed)			
Less than high school completion	47.7% (10)	53.9 (10)	37.5% (3)
High school graduate	33.3% (7)	23.1% (3)	50% (4)
College Education		15.4% (2)	12.5% (1)
Type of insurance (% covered)			
Public insurance	66.7% (14)	69.2% (9)	62.5% (5)
Private insurance	47.6% (10)	46.2% (6)	50% (4)
Residence (%)			
In a rural area (not a farm)	47.6% (10)	53.8% (7)	37.5% (3)
In a small rural town	33.3% (7)	23.1% (3)	50% (4)
In a small town	19% (4)	23.1% (3)	12.5% (1)
Diabetes history			
Years with diagnosed diabetes (Mean, SD)	9.2 (6.9)	10.4 (7.1)	7.1 (6.3)
Has ever attended diabetes education (% yes)	57.1% (12)	61.5% (8)	50% (4)
Health history (% present)			
Cardiovascular disease ^a	33.3% (7)	30.8% (4)	37.5% (3)
High blood pressure	90.5% (19)	92.3% (12)	87.5% (7)
Eye disease	19% (4)	23.1% (3)	12.5% (1)
Kidney disease	9.5% (2)	15.4% (2)	0
Numbness/tingling in the legs or feet	23.8% (5)	15.4% (2)	37.5% (3)
Diabetes treatment and management (% yes)			
Takes oral medication	71.4% (15)	69.2% (9)	75% (6)
Takes insulin shots	38.1% (8)	46.2% (6)	25% (2)
Regular exercise	66.7% (14)	61.5% (8)	75% (6)
Special diet	52.4% (11)	53.8% (7)	50% (4)
Losing weight	47.6% (10)	53.8% (7)	37.5% (3)

^aIndicates self-reported history of heart problems and/or stroke.

Table 3

Scores of Outcomes at Baseline and Postintervention

	Baseline Mean (SD)		Baseline Differences	Post Mean (SD)	
	Group Education	Individual Education	<i>P</i> Value	Group Education	Individual Education
HbA1C (range 4-13)	8.1 (1.44)	8.14 (1.58)	.952	7.78 (1.48)	7.69 (1.43)
Self-efficacy (range 0-40)	33.0 (4.57)	34.25 (4.27)	.547	36.69 (3.68)	33.13 (6.71)
Self-care activities					
General diet (range 0-14)	9.23 (3.77)	9.63 (4.14)	.825	11.0 (2.77)	10.63 (2.45)
Specific diet (range 0-14)	8.69 (2.95)	9.25 (1.98)	.643	10.46 (2.37)	9.75 (2.71)
Carb spacing (range 0-7)	3.0 (3.0)	4.0 (2.58)	.479	5.38 (1.76)	4.25 (2.19)
Exercise (range 0-14)	5.69 (4.13)	6.5 (5.68)	.71	6.69 (3.38)	7.88 (4.49)
Blood glucose testing (range 0-14)	7.23 (5.23)	9.0 (6.02)	.486	10.85 (5.1)	10.63 (4.81)
Foot care (range 0-14)	8.46 (4.98)	8.63 (5.13)	.943	10.62 (3.71)	10.5 (3.46)
Comprehensive foot care (examination and hygiene) (range 0-35)	26.17 (7.06)	25.0 (5.01)	.692	29.5 (4.85)	25.38 (4.53)
Medication administration (range 0-14)	12.09 (4.53)	12.6 (3.13)	<i>a</i>	13.56 (1.33)	12.29 (4.54)
Smoking (range 0-7)	1.62 (3.95)	0 (0)	<i>b</i>	0.77 (2.77)	0 (0)

^aScores for medication administration are skewed: In Group DSME: scores were 14 (n = 9), 7 (n = 1), and 0 (n = 11). Individual DSME scores were 4 (n = 1), 1 (n = 1) and 0 (1). Postintervention scores were virtually unchanged.

^bScores for smoking at baseline included only 3 smokers, thus insufficient data for *P* value.

Table 4

Mean Change Scores for Outcomes

	Post-Baseline Change Mean (SD) ^a		t Test of Change Scores	95% Confidence Interval
	Group Education	Individual Education	P Value	of Group Difference
HbA1C	−0.32 (0.98)	−0.24 (0.38)	.855	(−0.89, 0.75)
Self-efficacy	3.58 (5.43)	−1.13 (7.12)	.111	(−1.18, 10.6)
Self-care activities				
General diet	1.77 (3.56)	1.0 (3.55)	.637	(−2.59, 4.13)
Specific diet	1.77 (3.39)	0.5 (3.55)	.423	(−1.98, 4.52)
Carbohydrate spacing	2.27 (3.58)	−.14 (1.68)	.073	(−0.25, 5.08)
Exercise	1.0 (3.7)	1.38 (4.17)	.832	(−4.02, 3.27)
Blood glucose testing	3.62 (4.31)	1.63 (4.87)	.34	(−2.27, 6.25)
Foot care (examination)	2.15 (3.24)	1.88 (3.72)	.858	(−2.94, 3.5)
Comprehensive foot care (examination and hygiene)	3.64 (5.92)	0.38 (3.7)	.189	(−1.76, 8.29)
Medication ^b				
administration	−0.44 (1.33)	−1.0 (2.24)	<i>b</i>	(−1.5, 2.61)
Smoking ^c	−0.85 (3.05)	0 (0)	<i>c</i>	(−3.13, 1.43)

^aSample sizes vary, ranging from 18 to 21, due to missing values for some of the outcomes at either baseline or postintervention.

^bChange scores for medication administration are negligible with 80%-88.9% no change.

^cChange scores for smoking are negligible with 92.3%-100% with no change.