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Translating an Evidence-Based Diabetes Education Approach Into Rural African-American Communities: The “Wisdom, Power, Control” Program

Ninfa C. Peña-Purcell,¹ Luohua Jiang,² Marcia G. Ory,³ and Ryan Hollingsworth²

■ ABSTRACT

Purpose. The aim of this exploratory study was to assess the efficacy of the “Wisdom, Power, Control” diabetes self-management education (DSME) program with regard to diabetes knowledge, self-efficacy, self-care, distress level, and A1C in an African-American population.

Methods. A prospective, quasi-experimental, repeated-measure design was employed to measure these outcomes. Study participants were assessed at baseline, 6 weeks post-intervention, and at a 3-month A1C follow-up.

Results. A total of 103 participants were recruited from the intervention counties, and 14 were identified from the control counties. At the post-test, participants in the intervention group reported a significantly higher level of diabetes knowledge ($\Delta = 9.2\%$, $P < 0.0001$), higher self-efficacy ($\Delta = 0.60$, $P < 0.0001$), more self-care behaviors ($\Delta = 0.48$, $P < 0.0001$), lower distress level ($\Delta = -0.15$, $P = 0.05$), and higher health status ($\Delta = 0.49$, $P = < 0.0001$). About 56% of the intervention group completed all six classes, and 25% attended five classes.

Conclusions. Findings from this study demonstrate the initial success of translating a culturally adapted DSME program into rural African-American communities. The study highlights important lessons learned in the process of implementing this type of program in a real-world setting with a minority population.

Approximately 4.9 million African Americans >20 years of age have type 1 or type 2 diabetes (diagnosed and undiagnosed), with the highest rate (31%) among those >64 years of age (1,2). African Americans experience marked disparities in diabetes care and outcomes compared to other populations, especially non-Hispanic whites. For example, African Americans have been estimated to be 2.2 times more likely to die from diabetes than whites (3). Furthermore, there is evidence documenting higher rates of initiating diabetes-related treatment for end-stage renal disease, visual impair-

ment, lower-extremity amputations, and uncontrolled high blood pressure (>140/80 mmHg), a comorbidity that increases the risk of other complications (4,5). As these data suggest, many African Americans with type 2 diabetes, and especially those who are not routinely monitoring their disease, are vulnerable to poor outcomes.

Diabetes self-management education (DSME) is a first line of defense to mitigate diabetes complications (6). Specifically, DSME programs aim to support informed decision-making, promote self-care behaviors, help with problem-solving,

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TABLE 1. Research Design

	Week 0		Week 6	Week 12
Intervention Group	Pre-test	Intervention	Post-test	3-month A1C
Wait-List Control Group	Pre-test		Post-test	3-month A1C Intervention

and encourage active collaboration with the health care team to improve patients' clinical outcomes, health status, and quality of life (6). Despite these benefits, only 57.8% of African-American adults with diabetes (≥ 18 years of age) report having attended a diabetes education class (7). A lack of cultural adaptation in the curriculum could be one of the barriers preventing more African Americans from taking advantage of existing DSME programs.

One approach to address this problem is to provide DSME programs that are culturally appropriate, especially empowerment-based interventions (6). Translating evidence-based practices and programs in DSME for African Americans has shown promise to narrow the gap in diabetes disparities (8–13). The dearth of culturally relevant DSME for disadvantaged, minority populations has been the impetus for the Texas A&M AgriLife Extension Service (Extension) to translate its generic “Do Well, Be Well with Diabetes” (DWBW) education program for both Spanish-speaking Hispanic/Latinos and African-American groups. “¡Si, Yo Puedo Controlar Mi Diabetes! (Si, Yo Puedo),” Extension's first translated version of DWBW, was found to yield positive health improvements among Texas Hispanic/Latino audiences with type 2 diabetes (14). Given this success, a similar need was identified for Texas African Americans, who experience mortality rates double that of whites (36.8 versus 16.5 deaths per 100,000) (15). “Wisdom, Power, Control” was subsequently developed as a second adapted version of DWBW for African-American audiences.

This article reports the preliminary findings of an exploratory study evaluating “Wisdom, Power,

Control” for lower-literate African-American adults (>18 years of age) in rural communities. The researchers targeted rural counties to expand Extension DSME programming in areas where such services are limited. Extension has the capacity to reach rural sites (population $\leq 2,500$) through its statewide network of county offices (16).

Methods

Study Design

Originally, this study was planned to employ a prospective, quasiexperimental, repeated-measure design to compare the “Wisdom, Power, Control” program, which offered culturally tailored DSME, to a wait-listed comparison group who received their usual medical care. However, as will be explained, it proved difficult to obtain sufficient numbers of participants in the control group. Thus, primary comparisons were based on a pre/post-design for the intervention group. Participants were assessed at baseline, 6 weeks after the intervention, and at a 3-month A1C follow-up (Table 1). Researchers obtained study approval from the Texas A&M University institutional review board.

Sample and Recruitment

Eligibility criteria included self-identified African-American race, self-reported diagnosis of type 2 diabetes, and willingness to participate for the duration of the study period. A total of 103 eligible participants were recruited from the intervention counties, and 14 were recruited from the control counties. Despite conducting numerous recruitment events at community sites and churches, we found that delaying the intervention was an obstacle to enrolling participants in the wait-listed control group.

Under the leadership of county Extension agents, each county formed a coalition to mobilize community support in recruiting participants. A pre-screening was conducted for those who registered for classes through their local county Extension office. The pre-screening included eight questions related to the study's eligibility criteria. This process was used to gauge recruitment numbers because the DSME program was offered to all registered individuals regardless of their race/ethnicity. However, data collection was limited to those satisfying the study eligibility criteria.

Study Setting

Seven East and Southeast Texas counties were selected as sites to conduct the intervention classes. Control sites included two Texas counties that differed from the intervention locations. To recruit an adequate sample size of 250, the researchers identified nine county Extension agents who agreed to implement two classes each, with a goal of enrolling 15 participants per class. Additional classes were planned in other counties in case of low enrollment in the selected project sites. To minimize cross-contamination between intervention and wait-listed cohorts, different counties were selected for each group. For all counties, the communities were predominately rural, with a higher proportion of African Americans than the state as a whole (17). African Americans in these communities are characterized as having a low median household income and a high poverty rate and are medically underserved (18,19).

Intervention

“Wisdom, Power, Control” is a 7-week, community-based, group DSME program. An empowerment-

based approach was the overarching focus of the intervention. The intervention was designed to be culturally appropriate for African-American audiences; it addresses African Americans' dietary food preferences and traditional values and beliefs about diabetes and disease management. Weekly sessions were ~2 hours long. Sessions were facilitated by a trained registered nurse, a registered dietitian, or a certified diabetes educator. Curriculum content was theory-based and predicated on the standards for DSME developed by the American Diabetes Association and the American Association of Diabetes Educators (6). The course included an orientation session (week 1) followed by six educational sessions. A manual has been created to aid in replication of the intervention in other settings and locations and is available upon request to the corresponding author.

Data Collection

Data collection occurred at several stages during the project. Participants completed pre-intervention surveys at week 1 and post-intervention surveys at week 7. Each had an A1C test at baseline and at a follow-up session 5 weeks after the final program week. Control subjects' assessments were scheduled as a group, with the first survey administered as part of an information/enrollment session, the second survey administered at week 7 as part of a cooking demonstration class, and the final A1C tests performed during their orientation for the intervention, which they received after the study period.

Measures

Diabetes knowledge, self-efficacy, diabetes self-care behaviors, and depression were measured at baseline and at the time of the final survey. Demographic data collected included age, sex, race/ethnicity, education level, income, and health insurance status reported at baseline. Baseline and 3-month A1C tests were conducted onsite using an accredited

laboratory service for blood sample collection and analysis.

The following instruments were used as the major outcome variables to assess the effectiveness of the intervention: Diabetes Knowledge Questionnaire (10 items), Diabetes Self-Efficacy Scale (8 items), Summary of Diabetes Self-Care Activities (13 items), Psychological Distress Scale (6 items), and Healthy Days Measure Scale (1 item) (20–23). Except for health status, an overall score was created for each of the instruments by calculating the mean of answered items. The overall scores for participants with more than half of the items missing were assigned as missing values.

Response scales for the self-efficacy and diabetes self-care questionnaires were modified from the original instruments to simplify the choice options and ease administration, particularly for senior and low-literacy audiences (20,21). The original version of the Diabetes Self-Efficacy Scale used a 1–10 rating system, with higher scores indicating more confidence. In the Summary of Diabetes Self-Care Activities tool, participants reported the number of days they engaged in a health behavior in the past week. Because previous research has shown that the optimum number of response options is between four and seven, we chose to simplify the response choices for these tools (24). Evidence also suggests that psychometric properties (reliability and validity) decrease when there are fewer than four options, and only small improvements are observed when there are more than seven options (24).

For the self-efficacy scale, the response options were modified to a 4-point Likert scale ranging from 1 = "I don't feel sure to" 4 = "I feel very sure." A higher mean self-efficacy score suggests higher confidence in controlling diabetes. The scale has high internal consistency, with a Cronbach's alpha of 0.93 at baseline. A comparable scale was used by

Bernal et al. (25) to measure self-efficacy. These authors reported an alpha of 0.83 in their Spanish-translated Insulin Management Diabetes Self-Efficacy Scale. Similarly, we modified the self-care assessment tool to rate self-management behaviors on a 4-point Likert scale ranging from 1 = "none of the days" to 4 = "all of the days." A higher mean self-care score indicates engagement in more positive diabetes self-management behaviors. This scale also has high internal consistency, with a Cronbach's alpha of 0.88 at baseline. For the original instrument, the authors documented good consistency (with the exception of specific diet). The mean inter-item correlation of scale items was 0.47, the mean retest correlation of scales was 0.40, and the mean criterion-related correlation (estimated for general diet, specific diet, and exercise) was 0.23 (21).

The Diabetes Knowledge Questionnaire is a 10-item multiple-choice instrument based on the Spoken Knowledge in Low Literacy in Diabetes Scale and formulated in a manner deemed appropriate for minority populations (26). For the psychological distress tool, participants reported their mental health on a scale ranging from 1 = "none of the time" to 4 = "most of the time" (22). A low mean distress score indicates low psychological distress, whereas a higher value implies more psychological distress. Table 2 provides details about each of the instruments.

Data Analysis

Baseline characteristics were compared between the intervention and control groups using χ^2 tests for categorical variables (or Fisher exact tests if any cell size was <5) and two-sample *t* tests for continuous variables. The relationships between class attendance and baseline characteristics were examined using logistic regression models.

Because the sample size of the control group was extremely small at

TABLE 2. Intervention Instruments

Diabetes self-efficacy ^a	<ol style="list-style-type: none"> 1. How confident do you feel that you can eat your meals every 4 to 5 hours every day, including breakfast every day? 2. How confident do you feel that you can follow your diet when you have to prepare or share food with other people who do not have diabetes? 3. How confident do you feel that you can choose the appropriate foods to eat when you are hungry (for example, snacks)? 4. How confident do you feel that you can exercise 15 to 30 minutes, 4 to 5 times a week? 5. How confident do you feel that you can do something to prevent your blood glucose from dropping when you exercise? 6. How confident do you feel that you know what to do when your blood glucose level goes higher or lower than it should be? 7. How confident do you feel that you can judge when the changes in your illness mean you should visit the doctor? 8. How confident do you feel that you can control your diabetes so that it does not interfere with the things you want to do?
Diabetes self-care ^b	<ol style="list-style-type: none"> 1. How many of the last 7 days have you followed a healthful eating plan? 2. On average, over the past month, how many days per week have you followed your eating plan? 3. On how many of the last 7 days did you eat 5 or more servings of fruits and vegetables? 4. On how many of the last 7 days did you eat high-fat foods, such as red meat or full-fat dairy products? 5. On how many of the last 7 days did you space your carbohydrates evenly through the day? 6. On how many of the last 7 days did you participate in at least 30 minutes of physical activity? 7. On how many of the last 7 days did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work? 8. On how many of the last 7 days did you test your blood sugar? 9. On how many of the last 7 days did you test your blood sugar the number of times recommended by your health care provider? 10. On how many of the last 7 days did you check your feet? 11. On how many of the last 7 days did you inspect the inside of your shoes? 12. Have you smoked a cigarette—even one puff—during the past 7 days? If yes, how many cigarettes did you smoke on an average day? Number of cigarettes:
Psychological distress ^c	<ol style="list-style-type: none"> 1. During the last 30 days, about how often did you feel so depressed that nothing could cheer you up? 2. During the last 30 days, about how often did you feel hopeless? 3. During the last 30 days, about how often did you feel restless or fidgety? 4. During the last 30 days, about how often did you feel that everything was an effort? 5. During the last 30 days, about how often did you feel worthless? 6. During the last 30 days, about how often did you feel nervous?

^aScale from 1 = “I don’t feel sure” to 4 = “I feel very sure.”

^bScale from 1 = “None of the days” to 4 = “All of the days.”

^cScale from 1 = “None of the time” to 4 = “Most of the time.”

the second survey ($n = 5$), researchers evaluated intervention effectiveness using data from the intervention group only. Paired t tests were used to test the statistical significance of the changes between pre- and post-intervention surveys for continuous

variables. For changes in proportions of binary variables, McNemar’s tests were performed to assess the significance of the changes. Finally, linear regressions were employed to investigate the bivariate relationships of class attendance and improvements in the

outcome variables. Missing values were dropped from the analysis.

Results

As shown in Table 3, the intervention group ($n = 103$) and the control group ($n = 14$) had similar de-

TABLE 3. Baseline Characteristics of “Wisdom, Power, Control” Participants

	Missing (n)	Total (n [%])	Treatment (n [%])	Control (n [%])	P ^b
Age (years) ^a	3	63.3 (10.3)	63.4 (10.3)	58.6 (10.7)	0.07 ^c
Sex	2				0.93
Male		23 (20.5)	20 (20.4)	3 (21.4)	
Female		89 (79.5)	78 (79.6)	11 (78.6)	
Education	5				0.007 ^d
<High school graduate		10 (9.2)	6 (6.3)	4 (28.6)	
≥High school graduate		99 (90.8)	89 (93.7)	10 (71.4)	
Income	21				0.94
<\$20,000		42 (45.2)	36 (45.0)	6 (46.2)	
≥\$20,000		51 (54.8)	44 (55.0)	7 (53.9)	
Health Insurance	5				0.12
No		16 (14.7)	12 (12.6)	4 (28.6)	
Yes		93 (85.3)	83 (87.4)	10 (71.4)	
Worked for pay	5				0.11
No		64 (58.7)	59 (61.5)	5 (38.5)	
Yes		45 (41.3)	37 (38.5)	8 (61.5)	
Years of diabetes	17				0.23
<1		12 (12.4)	12 (14.0)	0 (0.0)	
1 to <5		27 (27.8)	25 (29.1)	2 (18.2)	
≥5		58 (59.8)	49 (57.0)	9 (81.8)	

^aMean (SD).

^bP for χ^2 test unless otherwise noted.

^cP for two-sample t test.

^dP for Fisher’s exact test.

mographic characteristics. Overall, the average age of the intervention participants was 63.3 years. About one-fifth of participants (21%) were male, 91% graduated from high school, 45% had an annual income <\$20,000, 85% had health insurance, and 41% worked for pay. Regarding the duration of type 2 diabetes, 60% of participants reported having had the disease for ≥5 years. Group differences were observed only in participant education. The intervention group had significantly more participants who had graduated from high school than the control group (94 vs. 71%, *P* = 0.007).

Among the 103 intervention participants, 85 completed the post-program survey. Yet, only 5 of the 14 control group participants finished the second survey. The average

number of classes attended by those in the intervention group was 5.18 (SD 1.25). About 56% of the intervention group completed all six classes, and 25% attended five classes. The criterion for course completion was attending all six sessions of the course. This course completion requirement is necessary for participants to acquire the knowledge and skills taught through the program. Higher absence rates lower participants’ likelihood of realizing the full benefit of the intervention and achieving the anticipated outcomes. Participants with higher baseline diabetes knowledge levels and longer durations of diabetes were significantly more likely to finish all six sessions. Those who were employed were less likely to complete all sessions (odds ratio [OR] 0.38, *P* = 0.03) (Table 4).

Table 5 presents the changes from pre- to post-intervention in the major outcome measures among intervention group participants. At the post-intervention survey, participants reported a significantly higher level of diabetes knowledge (Δ = 9.2%, *P* < 0.0001). Among the 10 diabetes knowledge questions, 5 were significantly improved from before to after the sessions. The largest improvement was observed in participants’ knowledge regarding the definition of normal A1C (24% of participants) and frequency of foot checks (22%). The items that did not change significantly were frequency of eye exams, symptoms of low blood glucose, symptoms of high blood glucose, relationship between exercise and blood glucose, and identification of complications of diabetes. Participants

TABLE 4. Bivariate Associations Between Class Attendance and Baseline Characteristics

	Attended All Six Classes (Yes/No) ^a	
	OR	P ^b
Baseline self-efficacy	1.34	0.31
Baseline self-care	1.81	0.14
Baseline health status	0.63	0.09
Baseline distress	1.00	0.99
Baseline diabetes knowledge	1.03	0.04
Age	1.02	0.41
Female sex	2.46	0.10
Education ≥high school graduate	1.87	0.48
Income ≥\$20,000	0.61	0.27
Health insurance (Yes)	1.24	0.73
Worked for pay (Yes)	0.38	0.03
Years of diabetes		
<1 (reference)	1.00	NA
1 to <5	4.61	0.08
≥5	7.25	0.02

^an = 100.^bP from bivariate logistic regression model.

at baseline already had very good knowledge for the first and last of these questions (>90%) and hence did not have much room to improve for those items.

Table 5 also reveals that participants' reported self-efficacy scores significantly increased after the intervention ($\Delta = 0.60$, $P < 0.0001$). With the exception of one item (confidence regarding getting regular exercise), all self-efficacy items significantly improved from before to after the intervention. The greatest increases in confidence were shown in ratings for preventing blood glucose from dropping during exercise and knowing what to do when blood glucose levels go higher or lower than they should be. Similarly, participants reported significantly higher self-care scores after than before the intervention ($\Delta = 0.48$, $P < 0.0001$). With the exception of frequency of eating high-fat foods, the average levels of self-care behaviors all had statistically significant improvements.

Intervention participants reported marginally lower distress levels ($\Delta = -0.15$, $P = 0.05$) after than before the intervention. Among the six distress items, only the first—frequency of feeling so depressed that nothing could cheer you up—had significant improvement after the intervention ($\Delta = -0.27$, $P = 0.006$). Participants in the intervention group reported a significantly higher level of health status ($\Delta = 0.49$, $P < 0.0001$).

Finally, the mean A1C among participants with A1C data available ($n = 47$) was not significantly different before and after the intervention ($\Delta = 0.15$, $P = 0.46$). Among participants with a baseline A1C $\geq 8\%$ ($n = 9$), the average A1C decreased by more than 1 percentage point ($\Delta = -1.18$, $P = 0.12$).

Discussion

Preliminary findings reveal that the "Wisdom, Power, Control" program significantly improved participants' behavioral and psychosocial outcomes, lending support to the benefits of DSME for African

Americans, and particularly those in rural communities. This investigation also demonstrates the feasibility and acceptability of implementing culturally targeted DSME in African-American communities. Community-based settings serve as culturally relevant infrastructures where family and religious networks can provide strong sources of social support, especially in the context of diabetes management (13,27,28).

Congruent with previous studies, researchers observed diabetes knowledge gains among participants completing the intervention (12,29). Although the acquisition of knowledge does not necessarily lead to behavior change or better-controlled diabetes, it does facilitate decision-making and informed choices about health. This is especially important in diabetes self-management, which requires understanding of complex behaviors (e.g., following a dietary plan, complying with a medication regimen, and performing self-care tasks) to prevent long-term complications. Improvement in diabetes knowledge has been cited as a prerequisite to self-efficacy enhancement and behavior change (29).

Our findings reveal that the intervention favorably influenced participants' self-efficacy, which agrees with observations of Utz et al. (9), in which group and individual DSME consisting of problem-solving and hands-on activities were compared. Their findings suggested that incorporating skill-building exercises into weekly lessons will contribute to participants' increased confidence to manage their illness. Likewise, the "Wisdom, Power, Control" program used this method to empower and equip participants to better manage their diabetes. Documentation of an empowerment-based DSME program has shown that this approach positively influences post-intervention outcomes, including greater frequency of performing self-care practices (12).

TABLE 5. Changes in Key Outcome Variables in the Intervention Group

	<i>n</i>	Pre- Intervention	Post- Intervention	Change	
Diabetes knowledge					
		Mean (SD)	Mean (SD)	Mean (SD)	<i>P</i> ^a
Percentage of correctly answered diabetes knowledge questions (overall)	83	77.2 (17.9)	86.3 (13.6)	9.2 (16.6)	<0.0001
Percentage of correctly answered diabetes knowledge questions (individual questions)					
		%	%	%	
Frequency of eye exam	87	95.4	97.7	2.3	0.63 ^b
What is a normal A1C?	75	70.7	94.7	24.0	0.0001 ^b
Normal fasting blood glucose range	79	84.8	96.2	11.4	0.01 ^b
Symptoms of low blood glucose	82	75.6	82.9	7.3	0.29 ^b
Symptoms of high blood glucose	81	46.9	42.0	-4.9	0.61 ^b
Frequency of foot check	81	67.9	90.1	22.2	0.000 ^b
What can treat low blood glucose?	78	84.6	94.9	10.3	0.04 ^b
Change in blood glucose when exercising	77	72.7	79.2	6.5	0.36 ^b
Food to raise blood glucose the most	77	77.9	92.2	14.3	0.01 ^b
Complication of diabetes	78	93.6	97.4	3.8	0.45 ^b
Self-efficacy					
		Mean (SD)	Mean (SD)	Mean (SD)	<i>P</i> ^a
Self-efficacy overall score	84	2.77 (0.69)	3.36 (0.62)	0.60 (0.73)	<0.0001
Self-efficacy individual question scores					
Control diabetes so does not interfere	84	3.01 (0.94)	3.50 (0.78)	0.49 (1.01)	<0.0001
Prevent low glucose during exercise	82	2.43 (1.20)	3.55 (0.80)	1.12 (1.31)	<0.0001
Choose good food when hungry	80	2.75 (0.99)	3.39 (0.75)	0.64 (1.14)	<0.0001
Exercise 15–30 minutes 4-5 times a week	80	2.78 (1.12)	3.01 (1.08)	0.24 (1.22)	0.09
Follow diet when cooking for others	83	2.72 (1.00)	3.31 (0.88)	0.59 (1.23)	<0.0001
Judge changes in illness and when to go to doctor	80	3.13 (1.07)	3.51 (0.84)	0.39 (1.13)	0.003
Know if blood glucose is too low or high	81	2.72 (1.18)	3.59 (0.74)	0.88 (1.19)	<0.0001
Eat meal every 4–5 hours	80	2.73 (1.14)	3.19 (1.01)	0.46 (1.31)	0.0023
Self-care					
		Mean (SD)	Mean (SD)	Mean (SD)	<i>P</i> ^a
Self-Care overall score	86	2.35 (0.51)	2.83 (0.45)	0.48 (0.55)	<0.0001
Self-care individual question scores					
Followed eating plan in the past week	85	2.34 (0.82)	2.86 (0.66)	0.52 (1.00)	<0.0001
Checked blood glucose as often as should	79	2.39 (1.23)	3.11 (1.01)	0.72 (1.21)	<0.0001
Followed eating plan in the past month	83	2.25 (0.70)	2.83 (0.62)	0.58 (0.81)	<0.0001
Participated in 30 minutes of physical activity	85	2.06 (0.92)	2.68 (0.86)	0.62 (1.02)	<0.0001
Had 5 or more servings of fruits and vegetables	84	2.31 (0.94)	2.55 (0.91)	0.24 (1.03)	0.0363
Inspected inside of shoes	73	2.10 (1.22)	2.73 (1.12)	0.63 (1.29)	<0.0001
Participated in specific exercise session	86	1.88 (0.90)	2.53 (0.99)	0.65 (1.07)	<0.0001
Spaced out carbohydrates during day	80	2.05 (0.91)	2.66 (0.83)	0.61 (1.16)	<0.0001
Frequency of checking blood glucose	86	2.84 (1.19)	3.43 (0.86)	0.59 (1.14)	<0.0001
Frequency of eating high-fat food	84	2.99 (0.61)	2.83 (0.71)	-0.15 (0.78)	0.0740

TABLE CONTINUED ON P. 113 →

TABLE 5. Changes in Key Outcome Variables in the Intervention Group, continued from p. 112

Self-care		Mean (SD)	Mean (SD)	Mean (SD)	P ^a
Frequency of foot checking	78	2.76 (1.13)	3.05 (1.06)	0.29 (1.19)	0.0310
Smoked cigarettes	79	3.85 (0.60)	3.71 (0.82)	-0.14 (0.76)	0.1091
Distress		Mean (SD)	Mean (SD)	Mean (SD)	P ^a
Distress overall score	75	1.61 (0.69)	1.46 (0.58)	-0.15 (0.65)	0.0546
Distress individual question scores					
Felt nothing could cheer you up	74	1.62 (0.95)	1.35 (0.71)	-0.27 (0.82)	0.0057
Felt hopeless	71	1.34 (0.72)	1.18 (0.49)	-0.15 (0.67)	0.0549
Felt restless or fidgety	73	1.77 (0.98)	1.62 (0.81)	-0.15 (0.92)	0.1674
Felt everything was an effort	73	1.86 (0.92)	1.67 (0.88)	-0.19 (1.14)	0.1544
Felt worthless	72	1.35 (0.73)	1.21 (0.58)	-0.14 (0.63)	0.0675
Felt nervous	76	1.71 (0.91)	1.63 (0.85)	-0.08 (1.00)	0.4949
Health status		Mean (SD)	Mean (SD)	Mean (SD)	P ^a
Health status overall score	79	3.22 (0.78)	2.72 (0.68)	0.49 (0.89)	<0.0001
A1C					
All participants with A1C reported	47	7.31 (1.81)	7.46 (1.48)	0.15 (1.40)	0.46
A1C among those with baseline A1C ≥8%	9	10.59 (1.44)	9.41 (1.76)	-1.18 (2.01)	0.12

^aP for paired t test unless otherwise noted.

^bP for McNemar's test.

With the exception of eating high-fat foods, this study supports earlier reports that African Americans attending DSME classes are likely to experience positive changes in self-care habits such as blood glucose monitoring, carbohydrate spacing, exercising regularly, following a healthy eating plan, and practicing recommended foot care (8,12). Improvements in diabetes knowledge and self-efficacy are possible explanations for this occurrence. This conclusion is consistent with a cross-sectional study that identified self-efficacy and diabetes knowledge as factors associated with self-care activities in African Americans with diabetes (30). Moreover, in vulnerable populations, self-efficacy has been shown to positively affect diabetes self-management (31).

Our findings further concur with other longitudinal studies that did not observe significant gains in African Americans' psychological well-being after attending a DSME program (32,33). However, the marginally significant improvement we

found in participants' post-intervention distress levels was encouraging. We could speculate that a combination of social support received in the program, increases in self-efficacy, and a feeling of being empowered with new knowledge may have elevated participants' mood.

Although we failed to show significant positive changes in A1C, intervention group participants who started the study with an A1C ≥8% had a mean A1C reduction of >1 percentage point after the intervention. In the seminal U.K. Prospective Diabetes Study (34), a 0.50 percentage-point reduction in A1C was associated with significant reductions in microvascular complications. It can be inferred that the A1C reduction experienced by those with higher baseline A1C levels is indicative of greater glycemic control and a lower risk for disease-related problems.

Retention rates were favorable in the intervention group for post-intervention assessment (83% completion rate) and comparable to other studies involving community-based

DSME programs that range in length from 4 to 12 weeks (12,35). Participants who were employed were less likely to complete the course, which is not surprising given the challenge employed people face in committing to extra activities while struggling to maintain a work-life balance. Because the intervention cohort had an average age of 63 years and were mostly unemployed, most of them attended five of the six education sessions.

Lessons Learned

This study yielded three valuable lessons with respect to translational research in disseminating DSME programs for minority groups. First, having a wait-listed control group in a community-based study is problematic because, as was the case in this study, participants were not willing to wait 3 months to receive the intervention. Feedback from African-American community stakeholders revealed that members of their community distrust researchers. Based on their advice, we called our study a "survey" rather than "research."

Nonetheless, the wait-list period proved to be a deterrent to recruiting participants, which resulted in a very low number of control subjects. Challenges in recruiting control subjects have been a typical limitation in DSME trials involving African Americans (12,29,36).

A second lesson was the value and importance of having a project champion, who typically should be a key opinion leader in the community. Identifying a well-respected, influential community leader as a project champion is crucial to establishing trust and credibility. Steinhardt et al. (33) found that the recruiting efforts of a champion—a church nurse—proved to be most effective in communicating about the intervention to area churches, securing a classroom, and getting the church pastor's support. In our study, the authors also found that these individuals functioned as advisors regarding how best to work within the community. These individuals also were valuable in recruiting intervention participants.

A final lesson learned was that the involvement of black churches should be central in all aspects of the implementation and sustainability of DSME programs for African Americans. A plethora of previous studies have demonstrated that churches are the best place to recruit and deliver DSME programs for African Americans, particularly when pastors encourage participants to attend (12,28,31,32). Collins-McNeil et al. (32) noted that, when designing interventions for African Americans, it is important to draw on natural points of connection and sources of social support such as their churches (32).

Limitations

The findings of this study need to be examined in light of several limitations. First, the authors were not able to attract a large enough number of wait-listed control participants in the study timeframe to examine intervention effects relative to com-

parison group effects. Future efforts should consider the feasibility of different research designs in community translational research. Second, the generalizability of our data is limited because of the composition of the participants in terms of sex (mostly women). Further study is needed to determine whether the findings can be replicated with a larger sample and with a higher proportion of male participants. Also, conducting research on dissemination mechanisms to bring the program to scale is an important next step to test determining the generalizability of this study. Third, the study was a 1-year pilot project with a narrow timeframe to follow participants and boost recruitment when initial attempts were not optimal. Although the pilot program gave us an opportunity to explore mechanisms for collecting A1Cs, it is likely the follow-up period was too short to see the full impact of the intervention on such clinical changes. Future larger-scale studies with a longer recruitment and follow-up period are needed to extend our findings.

Conclusion

This exploratory study of the “Wisdom, Power, Control” program advances our understanding of effective approaches to delivering culturally meaningful DSME interventions for African Americans. This study confirmed how such a program (which includes a manual for replication in other communities) can help to alleviate the dearth of evidence-based DSME interventions for minority populations. Real-world observations from the research team bring to the forefront the importance of establishing relationships with communities for this type of translational project. Developing such relationships could be a slow process that requires patience and time. To this end, the authors propose that, once a foundation of trust is established, opportunities for research can prosper, which will ultimately benefit the communities. This must be a corner-

stone in the effort to promote health equity and improve health outcomes for African Americans.

Duality of Interest

No potential conflicts of interest relevant to this article were reported.

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References

- Centers for Disease Control and Prevention. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, Ga., U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011
- Centers for Disease Control and Prevention. Percentage of civilian, non-institutionalized population with diagnosed diabetes, blacks, by age, United States, 1980–2011. Available from <http://www.cdc.gov/diabetes/statistics/prev/national/tprevbage.htm>. Accessed 27 May 2013
- Kochanek KD, Xu J, Murphy SL, Miniño AM, Kung HC. Deaths: final data for 2009. *Natl Vital Stat Rep* 2011;60:1–116
- Agency for Healthcare Research and Quality. National Healthcare Disparities Report, 2012. Rockville, Md., Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services, 2013 (Publ. No. AHRQ No. 13-0003)
- U.S. Department of Health and Human Services, Office of Minority Health. Diabetes and African Americans. Available from <http://minorityhealth.hhs.gov/templates/content.aspx?lvl=3&lvlID=5&ID=3017>. Accessed 27 May 2013
- Funnell MM, Brown TL, Childs BP, et al. National standards for diabetes self-management education. *Diabetes Care* 2011;34(Suppl. 1):S89–S96
- Centers for Disease Control and Prevention: Percentage of adults aged 18 years or older with diagnosed diabetes ever attending a diabetes self-management class, by race/ethnicity, United States, 2000–2010. Available from <http://www.cdc.gov/diabetes/statistics/preventive/tNewDEduRace.htm>. Accessed 27 May 2013
- Anderson-Loftin W, Barnett S, Bunn P, Sullivan P, Hussey J, Tavakoli A. Soul food

- light: culturally competent diabetes education. *Diabetes Educ* 2005;31:555–563
9. Utz SW, Williams IC, Jones R, et al. Culturally tailored intervention for rural African Americans with type 2 diabetes. *Diabetes Educ* 2008;38:854–865
 10. Reaves PY, Weaver R, Gaines F, et al. Culturally sensitive wellness challenge interventions in predominantly African American adults in the southern region of Florida: an observational study. *Internet J Health* 2009;8:1–35
 11. Tang TS, Funnell MM, Brown MB, Kurlander JE. Self-management support in “real-world” settings: an empowerment-based intervention. *Patient Educ Couns* 2010;79:178–184
 12. Samuel-Hodge CD, Keyserling TC, Park S, Johnston LF, Gizlice Z, Bangdiwala SI. A randomized trial of a church-based diabetes self-management program for African Americans with type 2 diabetes. *Diabetes Educ* 2009;35:439–454
 13. Tang TS, Gillard ML, Funnell MM, et al. Developing a new generation of ongoing diabetes self-management support interventions: a preliminary report. *Diabetes Educ* 2005;31:91–97
 14. Peña-Purcell N, Boggess M, Jimenez N. An empowerment-based diabetes self-management education program for Hispanic/Latinos: a quasi-experimental pilot study. *Diabetes Educ* 2011;37:770–779
 15. Texas Department of State Health Services, Office of Surveillance, Evaluation, and Research. The burden of diabetes in Texas 2013. Available from <http://www.dshs.state.tx.us/diabetes/tdcdata.shtm>. Accessed 23 June 2013
 16. U.S. Census Bureau. Growth in urban population outpaces rest of nation, Census Bureau reports. Available from http://www.census.gov/newsroom/releases/archives/2010_census/cb12-50.html. Accessed 29 August 2013
 17. Texas Department of State Health Services. 2009 health facts profiles for Texas: Brazos, Cass, Grimes, Jasper, Jefferson, Harrison, Orange, Smith, Waller counties. Available from <http://www.dshs.state.tx.us/chs/cfs/2009/2009-Health-Facts-Profiles-for-Texas>. Accessed 28 August 2013
 18. U.S. Census Bureau. Median income in the past 12 months: 2006–2010 American Community Survey 5-year estimates: Cass, Harrison, Grimes, Jefferson, Smith, and Waller counties, Texas. Available from <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>. Accessed 18 April 2012
 19. U.S. Census Bureau. Poverty status in the past 12 months: 2006–2010 American Community Survey 5-year estimates: Cass, Harrison, Grimes, Jefferson, Smith, and Waller counties, Texas. Available from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>. Accessed 18 April 2012
 20. Stanford Patient Education Research Center: Spanish Diabetes Self-Efficacy Scale. Available from: <http://patienteducation.stanford.edu/research/sediabetesesp.pdf>. Accessed 29 July 2013
 21. Toobert DJ, Hampson SE, Glasgow RE. The Summary of Diabetes Self-Care Activities measure. *Diabetes Care* 2000;23:943–950
 22. Kessler R, Andrews G, Colpe L, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med* 2002;32:959–976
 23. Centers for Disease Control and Prevention. Health-related quality of life. Available from http://www.cdc.gov/hrqol/hrqol14_measure.htm. Accessed 29 August 2013
 24. Lozano LM, García-Cueto E, Muñoz J. Effect of the number of response categories on the reliability and validity of rating scales. *Methodol* 2008;4:73–79
 25. Bernal H, Wooley S, Schensul JJ. The challenge of using Likert-type scales with low-literate ethnic populations. *Nurs Res* 1997;46:179–181
 26. Rothman RL, Malone R, Bryant B, et al. The Spoken Knowledge in Low Literacy Diabetes Scale: a diabetes knowledge scale for vulnerable populations. *Diabetes Educ* 2005;31:215–224
 27. Cagle CS, Appel S, Skelly AH, Carter-Edwards L. Mid-life African-American women with type 2 diabetes: influence on work and the multicaregiver role. *Ethn Dis* 2002;23:928–933
 28. Samuel-Hodge CD, Headen SW, Skelly AH, et al. Influences on day-to-day self-management of type 2 diabetes among African American women: spirituality, the multi-caregiver role, and other social context factors. *Diabetes Care* 2000;23:928–933
 29. Walker EA, Stevens KA, Persaud S. Promoting diabetes self-management among African Americans: an educational intervention. *J Health Care Poor Underserved* 2010;21:169–186
 30. McCleary-Jones V. Health literacy and its association with diabetes knowledge, self-efficacy, and disease self-management among African Americans with diabetes mellitus. *ABNF J* 2011;22:25–32
 31. Sakar U, Fisher, L, Schillinger D. Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy? *Diabetes Care* 2006;29:823–829
 32. Collins-McNeil J, Edwards CL, Batch BC, Benbow D, McDougald CS, Sharpe D. A culturally targeted self-management program for African Americans with type 2 diabetes. *Can J Nurs Res* 2012;44:126–141
 33. Steinhart MA, Mamerow MM, Brown SA, Jolly CA. A resilience intervention in African American adults with type 2 diabetes: a pilot study of efficacy. *Diabetes Educ* 2009;35:274–284
 34. DCCT Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993;329:977–986
 35. Anderson-Loftin W, Barnett S, Sullivan P, Bunn PS, Tavakoli A. Culturally competent dietary education for southern rural African Americans with diabetes. *Diabetes Educ* 2002;28:245–257
 36. Lorig K, Ritter PL, Ory MG, Whitelaw N. Effectiveness of a generic chronic disease self-management program for people with type 2 diabetes: a translation study. *Diabetes Educ* 2013;39:655–663