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The Effects of a Culturally Sensitive, Empowerment-Focused, Community-Based Health Promotion Program on Health Outcomes of Adults with Type 2 Diabetes

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Abstract: The purpose of the present study was to test the effects of a culturally sensitive, health empowerment-focused, community-based health promotion program tailored to adult patients with type 2 diabetes on these patients' body mass index (BMI), blood pressure, and self-reported blood glucose levels, treatment adherence, and stress levels. Study participants (N = 130) consisted mostly of African Americans (70%) and Hispanic/Latinos (22.3%) who were divided almost evenly between an intervention group and wait-list control group. The tested health promotion program is informed by Health Self-Empowerment Theory. At post-test, program participants in the intervention group as compared to those in the control group demonstrated significantly lower levels of BMI, diastolic blood pressure, and physical stress. Implications of these study findings for future similar programs and research are discussed.

Key words: Cultural sensitivity, empowerment, community-based, health promotion, type 2 diabetes, health outcomes.

Type 2 diabetes is an increasingly common disease among the general population and is projected to affect three-hundred million people by the year 2025.[1] This increase in the prevalence of diabetes presents a serious challenge for the U.S. health care system.[2] Furthermore, the prevalence of type 2 diabetes has been documented

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to be much higher for people from racial/ethnic minority backgrounds than for their counterparts from non-Hispanic White backgrounds. People from minority backgrounds also generally demonstrate higher levels of blood glucose, blood pressure, and weight than do people from non-Hispanic White backgrounds.[3,4] Furthermore, in 2005, African American and American Indian/Alaskan Native individuals were twice as likely as non-Hispanic White individuals to die from type 2 diabetes, and Hispanic people were 1.6 times more likely than non-Hispanic White people to die from type 2 diabetes.[5]

People with type 2 diabetes who do not control their blood glucose levels are at risk for a host of health problems that include stroke and death. The network of health outcome variables that are affected by type 2 diabetes goes beyond blood glucose levels to include levels of blood pressure, weight, and overall stress. For example, by maintaining adequate levels of blood pressure, adults with type 2 diabetes can reduce their risk of cardiovascular disease by 33% to 50% and reduce their risk of other diabetes-related health complications.[6] Despite this, according to the CDC's (Centers for Disease Control and Prevention) 2005 national estimate, about 73% of adults with type 2 diabetes have blood pressure levels greater than or equal to 130/80 mm (Hg).

In addition, adults with type 2 diabetes are more likely to gain weight and to be obese, both of which increase the risk of additional health complications such as coronary artery disease.[2] Obesity is highly comorbid among people who have type 2 diabetes, and reducing the level of body mass index (BMI) among these individuals is often a key component of treatment of the disease.[7] Levels of stress and anxiety have also been shown to be positively associated with the presence of type 2 diabetes among adults, yet these psychosocial variables are often neglected in treatment regimens for adults with this disease.[8] Treatment regimens to promote the health and wellbeing of adults with type 2 diabetes typically include engaging in physical activity (e.g., walking daily, lifting weights, aerobic exercise), consuming a healthy diet, and taking prescribed medications to control blood glucose levels.[9]

Because adults with type 2 diabetes from racial/ethnic minority backgrounds are often more likely to be uninsured, they face financial barriers that hinder their ability to engage in the recommended treatment regimens.[10] Furthermore, although access to care and socioeconomic status have been shown to be significant barriers to successful diabetes treatment and management, Saydah and colleagues[4] found that differences in blood glucose control still existed between people with type 2 diabetes from racial/ethnic minority backgrounds and those from non-Hispanic White backgrounds even after controlling for socioeconomic status. These findings highlight the unique challenges that people from minority backgrounds face and that limit their ability to live healthy lifestyles with type 2 diabetes. The fact that many of the social and environmental barriers to living healthy with type 2 diabetes are intractable necessitates health promotion and health care interventions that are culturally sensitive, and include an emphasis on empowering these individuals to take control of their health by engaging in health promoting behaviors despite adverse living conditions.

Culturally sensitive health care has been defined as care that is responsive to the values, beliefs, and practices of individuals who share a cultural and linguistic heritage and/or other identifying characteristics such as religion, race, and socioeconomic status.[11]

Other researchers have defined culturally sensitive health care as care that conveys knowledge, awareness, experience, and skills to serve culturally diverse patients and conveys these competencies in ways that enable patients to feel comfortable with, trusting of, and respected by their health care providers.[12,13] Karter and colleagues[10] have called for targeted, culturally sensitive approaches to the treatment of type 2 diabetes among people from racial/ethnic minority backgrounds, and there has been some empirical support for such approaches. For example, Melkus and colleagues[14] demonstrated that a culturally competent intervention for African American women with type 2 diabetes was effective in significantly reducing these women's levels of weight, blood glucose, and stress. Similarly, Keyserling and colleagues[15] demonstrated that a culturally sensitive community-based intervention was effective in increasing physical activity in adults with type 2 diabetes.

The majority of studies that have examined the effects of interventions aimed at improving the health outcomes of adults with type 2 diabetes have included mostly non-Hispanic White samples. In addition, a review of these studies indicated that few of them measured psychosocial variables such as stress, and even fewer were controlled intervention trials involving both men and women of different racial/ethnic minority backgrounds.[16] Yet, such research is needed given the increasing rates of type 2 diabetes and the many challenges involved in treating this disease, particularly among racial/ethnic minority adults.

The culturally sensitive health promotion program that was tested in the present study was tailored to positively affect the health outcomes of adult patients with type 2 diabetes as informed by Health Self-Empowerment (HSE) Theory.[17,18,19] This theory recognizes the influence of cultural, economic, social, and environmental factors (e.g., poverty and peer influences) on a wide range of health-related behaviors (e.g., healthy eating and physical activity) that affect health outcomes/statuses (e.g., levels of perceived stress, blood glucose, and blood pressure). This theory asserts that such factors must be targeted when designing interventions to improve health, health outcomes, and health status of people from racial/ethnic minority backgrounds. However, HSE Theory also asserts that given the intractable nature of these factors, individuals must be empowered with cognitive behavioral skills and strategies for engaging in health-promoting behaviors and eliminating health risk behaviors under whatever cultural, economic, social and environmental conditions exist. These cognitive-behavioral skills and strategies include promoting health motivation, health self-efficacy, self-praise of one's health promoting behaviors, health knowledge and responsibility, and coping skills for managing emotions such as stress and depression—emotions that often lead to over-eating and other health risk behaviors. HSE Theory has been tested and found to be effective in predicting a significant amount of variance in the levels of engagement in a health-promoting lifestyle among a sample of 96 mothers from African American and non-Hispanic White backgrounds.[17]

The program that was tested in the present study is responsive to national calls for patient-centered culturally sensitive health care—i.e., care that can contribute to reducing health disparities.[20] Among the characteristics of such care are (a) provider behaviors that culturally diverse patients view as indicators of respect for their culture and that enable these patients to feel comfortable with, trusting of, and respected by

their health care providers and office staff; (b) viewing the patient-provider relationship as a partnership that emerges from patient centeredness; and (c) patient empowerment.[21]

Thus, the health promotion program tested in the present study focused on empowering culturally diverse patients with type 2 diabetes with the motivational information, knowledge, and cognitive-behavior management skills and strategies for (a) consistently engaging in healthy eating and physical activities; (b) managing stress, anxiety, and depression; and (c) obtaining desired behaviors from providers. The health outcomes of interest were participants' levels of BMI, systolic and diastolic blood pressure, and self-reported levels of blood glucose, treatment adherence, overall stress, physical stress, cognitive stress, and behavioral stress. It was hypothesized that the patients with type 2 diabetes who participated in the intervention program (i.e., the Intervention Group) would demonstrate improvements in health outcome variables, and that these improvements would be significantly higher than any among the patients who did not participate in the program (the Control Group).

Methods

Participants. The participants in this study were 130 adults who self-reported having been previously diagnosed with type 2 diabetes. The participation inclusion (eligibility) criteria were: (a) age 18 or older, (b) able to understand and speak English, (c) self-reported having a pre-existing diagnosis of type 2 diabetes, (d) having no apparent cognitive impairments, (e) having no medical impairments/conditions that would prevent walking for exercise, and (f) self-reported not being pregnant.

Study participants were assigned to either the Intervention Group or a wait-list control group (Control Group) using a stratified random sampling approach, stratifying on gender and race. The Intervention Group consisted of 64 participants (17 males, 44 females, 3 unreported), 67% of whom identified as African American ($n = 43$), 25% of whom identified as non-Hispanic White ($n = 16$), and 3% of whom identified as Native American ($n = 2$). The Control Group consisted of 66 participants (16 males, 47 females, 3 unreported), 72% of whom identified as African American ($n = 48$), 20% of whom identified as non-Hispanic White ($n = 13$), 2% of whom identified as Hispanic ($n = 1$), and 3% of whom identified as Native American ($n = 2$). Six participants did not report their gender, and four did not report their ethnicity. Chi-square analyses confirmed that the intervention and control groups did not differ by ethnicity or gender.

Participants were recruited from predominantly low-income areas in North Central Florida and were paid $60 for their research participation. Regarding attrition, 35 of the 130 participants failed to complete participation, resulting in a 27% attrition rate for the overall sample. Participants in the Control Group demonstrated an attrition rate of 35% while participants in the Intervention group demonstrated an attrition rate of 19%; this difference in attrition rate was significant, $\chi2 (1) = 4.28$, $p < .05$.

Measures. *The Patient Demographic and Medical Information Questionnaire (Patient DMIQ)*. The DMIQ is a 28-item self-report questionnaire that was constructed by the principal investigator and her research team to obtain demographic data on each participant's age, race, marital status, education, economic status, self-report of her/his

blood glucose level, and length of time that had elapsed since her/his initial diagnosis of type 2 diabetes.

Adherence to Treatment Measure[22] (DMT). The DMT is a five-item psychometric measure that was used to assess participants' self-reported adherence to their treatment regimen for type 2 diabetes. Specifically, using a four-point scale ranging from 1 = None of the time to 4 = All of the time, participants rate how often they have difficulty following the treatment recommendations of their health care providers. The internal consistency reliability of the scale has been found to be acceptable.[19] The test-retest reliability for this sample was also adequate $r = .5$, $p < .001$.

The Strain Questionnaire[23] (SQ). The SQ is a psychometric instrument used to assess patients' level of overall health-related stress as well as their behavioral stress, cognitive stress, and physical stress during the past week. This questionnaire consists of 48 indicators of stress and has been reported by its creators to have good internal consistency as well as high concurrent validity[20]. Using a rating scale ranging from 1 = Not at all to 5 = Everyday, participants rate how often they experience each stress indicator listed on the SQ. The test-re-test for the overall measure and respective subscales are as follows: $r = .73$, $p < .001$; $r = .67$, $p < .001$; $r = .71$, $p < .001$, and $r = .67$, $p < .001$.

Procedure. All study-related materials, interventions, and the study's research design were approved by the Institutional Review Board at the University of Florida. This study was conducted by a large, ethnically diverse research team (called the Behavioral Medicine Research Team) at a large university in the Southeast U.S. The Behavioral Medicine Research Team includes research faculty members, community member consultants, community health care providers, graduate research assistants, and undergraduate research assistants. All of these individuals came from diverse racial and ethnic backgrounds and had been trained in culturally sensitive health care and health promotion.

The Behavioral Medicine Research Team that conducted this study engaged in a multimodal strategy to recruit participants for this study. This strategy included having research team members attend community outreach events (e.g., arts festivals) and local church services for the purpose of recruiting participants for this study. At these events, our research team members distributed flyers about the study that described the nature of the research participation requirements and encouraged individuals to refer to our research their family members and friends who have type 2 diabetes. Research team members were also available at these events to explain the research study to people who expressed interest in participating. In addition, research team members posted these flyers at food stores, laundromats, barbershops, and hair salons in lower-income communities. The flyers included the following information: (a) the purpose of the study (i.e., to determine the impact on participants' health and well-being of participating in a series of three one-day health promotion workshops), (b) the participation inclusion criteria, (c) the payment amount ($10 per workshop) for completing questionnaires to determine participation eligibility, (d) the number to call to be screened to participate in the study, and (e) the total amount of payment ($50) that participants were eligible to receive. The snowball technique was also used in that participants were asked to give copies of these recruitment flyers to friends and family members who might also be interested in this research participation opportunity.

Adults with type 2 diabetes who expressed interest in participating in our research at one of these events or *via* telephone contact were asked to attend a preliminary data collection session that took place two weeks prior to the beginning of the intervention program workshop series (these workshops are described below). These data collection sessions were held at a local health care clinic. At this data collection session, participants completed a pre-test assessment battery that included the previously-described questionnaires; and their height, weight, BMI, and blood pressure readings were recorded by registered nurses. The assessment battery was administered to participants by members of the research team responsible for conducting this research. Participants completed the assessment battery in one sitting, and members of the research team who were responsible for conducting this research were available to answer participants' questions throughout the entire time that participants completed the assessment battery. Participants who could not attend one of the scheduled data collection sessions attended individual data collection appointments in a research lab for the Behavioral Medicine Research Team (located on the campus of a large Southeastern university). Following this data collection session, participants were randomly assigned to either the Intervention Group or the Control Group using a stratified random sampling procedure, stratifying on race and gender. This group assignment procedure was used given the much larger number of African Americans and females compared with the number of White Americans and males, respectively.

The health promotion program that was tested in the present study was implemented by the principal investigator and her previously-mentioned culturally diverse, interdisciplinary Behavioral Medicine Research Team. This program involved implementing a workshop series that consisted of two six-hour workshops that took place two weeks apart. Each workshop was approximately six hours long, and all individuals who presented material to research participants had a degree and specific training in psychology, medicine, or another health-related field. Study participants who were assigned to the Intervention Group participated in the program's workshop series first, while the Control Group served as a wait-list control group. After the last data collection session at the conclusion of the program, the Control Group participated in the intervention program workshop series in order to receive its beneficial effects.

The health promotion program for patient with type 2 diabetes focused on teaching these program participants health-promoting behaviors (i.e. healthy eating and physical activity behaviors), cognitive-behavior skills and strategies to facilitate health promoting behaviors, and strategies to promote positive interactions between participants and their health care providers. The ultimate goal of this program was to empower participants to lead a healthier life with type 2 diabetes.

The health promotion workshops that were administered in this program were tailored to meet the needs of participants, as described below. Workshop 1 of the health promotion program consisted of (a) didactic presentations by research team members, community leaders, nutritionists, and nurses to teach participants health promoting behaviors and how to use self-praise to sustain these behaviors; (b) demonstrations by a nutritionist on how to read and understand nutrition labels; (c) demonstrations on how to shop for and prepare desired culture-related meals in a healthier way without sacrificing taste; (d) small group sessions with psychologists and psychology graduate

students in which the research team members and participants shared practical and culturally sensitive strategies for engaging in health promoting behaviors and overcoming barriers to engaging in health-promoting behaviors and strategies for reducing stress and depression—emotions that are often contributors to and consequences of unhealthy eating and inactivity.

In accordance with the previously described culturally sensitive Health Self-Empowerment Theory,[17,18,19] the strategies shared in the small group sessions were deemed culturally sensitive and self-empowerment oriented in that they were or could be modified to be useful for individuals with different values and beliefs about eating and physical activity and they were aimed at promoting participating patients' health motivation, health self-efficacy, health knowledge/responsibility, and coping skills for emotions such as stress that often derail health promoting behaviors. An example of such a strategy is having group dancing for physical exercise in a selected community setting with diverse music reflective of group members' different cultural backgrounds. Another strategy was to have participants brainstorm how strategies shared by the psychologists and other professionals for engaging in health promoting behaviors could be tailored to fit each participant's lifestyle and preferences.

In addition, in Workshop 1, two culturally diverse panels answered participants' questions about diabetes and living with this disease. To make the workshop still more culturally sensitive, all participants were given the option of asking their questions publicly or writing their questions and submitting them to be read by student researchers so that the writers of the questions would be completely anonymous. One of the two panels consisted of health care providers (i.e., physicians who specialized in type 2 diabetes, and nurses experienced in working with patients who have type 2 diabetes), and counseling/clinical health psychologists. The other panel consisted of health promotion experts (i.e., physical fitness trainers, nutritionists, and dietitians).

Near the end of Workshop 1, participants were given time to write specific individualized personal goals related to (a) engaging in health promoting behaviors to improve their health with type 2 diabetes and (b) using strategies for overcoming perceived barriers to health promoting behaviors. Participants were made aware of their individual perceived barriers to and motivators of engaging in health-promoting behaviors by completing the Motivators of and Barriers to Health-Smart Behaviors Inventory[20] at the beginning of Workshop 1. This inventory consists of statements that assess participants' self-reported motivators of and barriers to the following health-promoting behaviors: eating a healthy breakfast, eating healthy foods and snacks, drinking water and low/no sugar beverages, and engaging in physical activity daily for exercise. Participants rated their agreement on these items using a 4-point Likert scale. This questionnaire was used in this workshop to help participants recognize their top motivators of and barriers to these behaviors.

The Motivators of and Barriers to Health-Smart Behaviors Inventory for each patient was computer scored by research team members during the workshop to identify the top five barriers to and the top five motivators of each health promoting behavior on the inventory. This inventory was not used for data collection purposes. Feedback from this computer scoring was provided to participants in small-groups of six participants that were co-lead by a psychology faculty members and graduated students in psy-

chology with experience conducing psychological interventions and assessments. In these groups, participants were taught strategies for overcoming their specific barriers to these health promoting behaviors—strategies that have been shown to be effective ways of improving diabetes management.[24] These small groups allowed participants to discuss their identified motivators and barriers and explore their intended strategies for overcoming these barriers by incorporating skills and knowledge they acquired during this workshop.

The focus of Workshop 2 of the health promotion program was on training participants to use cognitive-behavioral skills and specific behaviors and strategies in order to obtain desired health care behaviors from their providers and other health care staff (e.g., front desk staff). The research team members conducted this training using Meichenbaum's[25] cognitive modeling and self-instruction training approach. This step-by-step training approach enables trainees to easily learn what is taught at the workshop(s) and to practice the lessons at home. Examples include how to use positive self-talk to build confidence prior to engaging in conversations with health care providers and how to use contingent verbal reinforcement to increase the occurrence of desired behaviors among health care providers.

Additionally, participants in Workshop 2 were trained in assertiveness, anger and depression management, and stress/anxiety management using didactic presentations, role-plays and demonstrations. The scenarios used in the role-plays and demonstrations were commonly experienced in real life by African Americans, Hispanics, and individuals with low incomes, thus making these scenarios culturally and individually relevant, which is consistent with what has been reported in previous focus-group research.[26] Participants were also taught strategies for use in patient-provider interactions to ensure they obtained needed information from providers (e.g., having a list of prepared questions and having a family member take notes). Near the end of Workshop 2, participants were given time to write specific individualized personal goals related to managing their emotions (e.g., stress and anger), including when interacting with their health care providers and others (e.g., family members, friends, and co-workers). These goals were based on what was learned in both Workshops 1 and 2.

During the two months following the end of Workshop 2, research team members made follow-up booster telephone calls to participants in the Intervention Group on two occasions, three weeks apart. The purpose of these booster calls was to encourage participants to continue working on achieving their health promotion goals and to brainstorm new ways to overcome any barriers to achieving those goals. When making these booster calls, research team members utilized each participant's individualized personal goals that were formulated at the end of Workshop 2. Following the two-month booster calling period, all participants attended a post-test data collection session that involved the same data collection measures and methodology as those used in the previously described pre-test data collection. Following the post-test data collection sessions, participants in the Control Group had the opportunity to experience the same health promotion workshop series that was delivered to participants in the Intervention Group. No additional booster calling or data collection occurred following implementation of the health promotion workshop series with the Control Group.

Results

Data analyses were conducted to test the effects of participating in the health promotion program on program participants' (a) levels of systolic blood pressure, diastolic blood pressure, body mass index, and (b) self-reported levels of blood glucose, treatment adherence, overall stress, physical stress, cognitive stress, and behavioral stress. Data screening was conducted on the variables to assess program effects to ensure that the data were normally distributed. A small number of cases ($n = 2$) considered extreme outliers (i.e., cases with values more than three standard deviations from the mean) were removed. Skewness and kurtosis values for the above listed variables of interest were evaluated by examining the absolute values of their coefficients. Variables with skewness and kurtosis values in excess of an absolute value of 1 were considered worthy of further attention given that the data for these variables were not normally distributed. Pre-post measures for the Cognitive Stress subscale of the Strain Questionnaire had skewness and/or kurtosis values in excess of an absolute value of 1, and were normalized using a logarithmic transformation. Due to substantial differences in several variables of interest at baseline between the Intervention Group and the Control Group and within each of these groups (i.e., individual differences in the variables of interest), ANCOVAs were applied to assess the effects of the health promotion program on the variables of interest. In each ANCOVA the post-test data on the variable of interest was the dependent variable, the baseline data for that variable was the covariate, and the independent variable was group assignment (Intervention Group or Control Group). The Levene's tests for the equality of error variances were not significant for these analyses, indicating the homogeneity of variance assumption had been met.

The results for the ANCOVA that included diastolic blood pressure as the dependent variable indicated a significant between group treatment effect, $F (1, 77) = 4.75$, $p < .05$, partial eta squared = 0.06. In addition, the results for the ANCOVA that included physical stress as the dependent variable indicated a significant between group treatment effect, $F(1, 82) = 4.25$, $p < .05$, partial eta squared = 0.05. These results indicate that after controlling for pre-test (baseline) individual and group differences, there were significant group differences at post-test (post-program intervention) in residualized change for diastolic blood pressure and physical stress among participants in the Intervention Group compared to those in the Control Group. The remaining ANCOVAs for systolic blood pressure and body mass index as well as for self-reported blood glucose levels, treatment adherence, overall stress, cognitive stress, and behavioral stress did not reveal any significant between group differences at post-test. The covariate adjusted post-test means for the dependent variables are provided in Table 1.

A chi-square analysis was conducted in which participants were categorized as to whether they demonstrated a BMI change of 0.5 or greater by group membership. For this analysis only, participants with a BMI less than 25 (n = 9) were removed from the sample given that these individuals already demonstrated healthy BMI levels and may have found losing weight to be unhealthy. This analysis indicated that 20.0% of participants in the Control Group demonstrated a BMI change of 0.5 or greater while 37.7% of participants in the Intervention Group demonstrated this change, and that

Table 1.

SUMMARY OF THE ESTIMATED MARGINAL MEANS FOR DEPENDENT VARIABLES IN ANCOVA ANALYSES

		Covariate Adjusted Post-Test Means (Standard Error)
Systolic Blood Pressure	Control	136.90 (2.50)
	Experimental	131.23 (2.11)
Diastolic Blood Pressure[a]	Control	79.63 (1.90)
	Experimental	74.22 (1.59)
Blood Glucose	Control	2.11 (0.02)
	Experimental	2.10 (0.01)
body mass index	Control	36.17 (0.30)
	Experimental	36.12 (0.25)
Treatment Adherence	Control	3.03 (0.08)
	Experimental	2.98 (0.07)
Overall Stress	Control	90.80 (2.77)
	Experimental	85.42 (2.58)
Physical Stress[a]	Control	58.72 (2.00)
	Experimental	53.05 (1.89)
Cognitive Stress	Control	1.02 (0.01)
	Experimental	1.01 (0.01)
Behavioral Stress	Control	22.13 (0.73)
	Experimental	21.35 (0.70)

[a]significant differences are denoted.

this difference in percentage of BMI change between groups was significant χ^2 (1, n = 113) = 4.36, $p<$ .05.

Discussion

This study examined the impact of a culturally sensitive health empowerment-focused community-based health promotion program tailored for culturally diverse patients with type 2 diabetes on participating patients systolic and diastolic blood pressure and BMI as well as on their self-reported levels of blood glucose, treatment adherence, overall stress, physical stress, cognitive stress, and behavioral stress. It was hypothesized that individuals in the Intervention Group would experience improvements in these health outcomes that would be significantly greater than any improvements found in the Control Group.

The findings of this study provide some support for the stated hypothesis. One of these findings is that participants in the Intervention Group evidenced significantly lower levels of diastolic blood pressure and physical stress at the two-month post program data collection than the participants in the Control Group, after controlling for group differences at baseline. In addition, it was found that at the two-month post-program data collection, a larger percentage of participants in the Intervention Group (37%) demonstrated a significant decrease in BMI of 0.5 points or greater when compared to the percentage of participants in the Control Group that demonstrated a significant decrease in BMI of 0.5 or greater. Given the high comorbidity of obesity amongst people with type 2 diabetes,[7] the present findings provide support for implementing health promotion programs for adults with type 2 diabetes that are not just singularly focused on addressing diabetes-specific behaviors, but rather focus on promoting a range of health promoting behaviors, skills, and strategies for promoting physical and mental health and obtaining desired health care. The health promotion program tested in the present study is such a program.

Given the links among blood pressure, physical stress,[26] and obesity and the evidence in the present study that all three of these variables changed significantly more among the Intervention Group than among the Control Group, support is also provided for focusing health promotion programs on psychosocial and emotional aspects of diseases such as type 2 diabetes. In the investigated health promotion program, participants were taught how to manage emotions such as stress, depression, and anger and how to assertively obtain the health care behaviors and information desired from health care providers. Yet, stress and anxiety interventions to improve the health outcomes for adults with type 2 diabetes are not currently a regular component of diabetes care.[8]

It is noteworthy that no statistically significant group differences were found at post-intervention for participants' systolic blood pressure and their self-reported levels of blood glucose, treatment adherence, overall stress, cognitive stress, and behavioral stress. One of the limitations of this study may have contributed to these non-significant findings. This limitation is a small sample size, which likely resulted in limited statistical power for detecting the effects of the tested health promotion intervention program on the variables of interest. It is also possible that whereas physical stress indicators such as headaches and backaches are easy to quantify and self-report, the other self-report

variables (e.g., cognitive stress) are less easy to quantify and thus may not be reliable measures of the effects of the health promotion program tested in the present study. It is not known why systolic blood pressure did not significantly change in association with participation in the investigated health promotion program whereas diastolic blood pressure did change in association with participation in this program. It is possible that the substantially greater variance in systolic blood pressure than in diastolic blood pressure explains the differences in program effects on these variables.

The finding of no significant effects of the tested program on self-reported blood glucose level is likely due to the fact that these self-reports may have been unreliable. Some participants forgot to record their blood glucose, and several others acknowledged simply estimating it. The lack of significant changes in treatment adherence is likely because many participants may not have seen their health care providers using the skills for getting their questions answered by their doctors. Yet the relationship with one's provider is a major influence in patients' treatment adherence.[27]

Another limitation in the present study is that participants in the Control Group demonstrated a slightly higher attrition rate than those in the Intervention Group. Those who dropped out of the study anecdotally reported that they were unable to attend research participation events because of schedule conflicts with or they lacked transportation to research-related events. Many of the patients in the Intervention Group got to know each other and thus often offered transportation to other group members who did not have transportation. Furthermore, because this study implemented a wait-list control design, many of the participants in the Control Group did not get to experience the intervention immediately after signing up for participation, and thus some of these participants may have lost interest in being a part of this research. Participants also anecdotally reported difficulty balancing research participation commitments with multiple employment responsibilities and family commitments. It is important to reiterate that this group related difference in attrition rates suggest that the results of this study should be interpreted with caution.

The gender composition of the study participants also suggests that the results of this study should be interpreted with caution. Specifically, there were many more female than male study participants. However, this gender imbalance is consistent with the gender composition of the patients served at the health care clinics in the communities where the participants in the present study receive their health care. Furthermore, females as compared to males are nationally more likely to use health care clinics and private practices.[28,29]

Finally, a limitation of this study is the small number of study participants in some of the racial/ethnic groups except the African American group. Furthermore, the study participants are volunteers rather than randomly selected participants from low-income communities, and thus the findings in this study cannot be generalized to other low income communities. However, the results in the present study do support the need for future similar research that tests the investigated health promotion program but with larger, representative samples of individuals with type 2 diabetes from low-income and/or racial/ethnic communities—individuals who often feel powerless over their health and health care and in other aspects of their lives. Given the findings of the present study, it is possible that such individuals may benefit from culturally sensitive,

empowerment-oriented, community-based health promotion programs such as the one investigated in the present study.

Despite the limitations mentioned earlier, this study has several strengths that make it important. One strength is its inclusion of racial/ethnic minority adults with type 2 diabetes who live in low-income communities—adults with the demographic characteristics associated with limited engagement in health promoting behaviors and thus at increased risk for the negative consequences of type 2 diabetes because of not consistently engaging in these behaviors. Because such adults typically have social, psychological, economical, environmental, and cultural characteristics that may impede engaging in health promoting behaviors (and that may be intractable to change) there is a need for health promotion programs that empower such adults to engage in healthpromoting behaviors. The investigated health promotion program is such a program and is responsive to the national calls for patient-centered, culturally sensitive health promotion and health care to promote health among racial/ethnic minorities and individuals with low incomes who live in the U.S., as these groups are most negatively affected by health disparities.

The investigated health promotion program itself is one of the strengths of the present study in that the program is practical and community-based in addition to being culturally sensitive and participant centered. Specifically, the investigated program consists of two workshops in which the target participants (i.e., the adults with type 2 diabetes) played major roles in contributing, such as conducting several peer sharing components of these workshops. Furthermore, the step-by-step training approach[23] used in the investigated health promotion program to teach participants cognitive-behavioral skills, knowledge, and strategies for engaging in health promoting behaviors and for obtaining the behaviors desired in interactions with health care providers can easily be taught to community members so that the program can be sustained. Support for the sustainability of this health promotion program are that it was community-based, community members were part of the research team that developed and implemented this program, and the health care professionals who constituted the health panels that answered the questions of the program participants were recruited from within the community.

A major strength of the present study is its use of Health-Self Empowerment Theory[17,18,19] to inform the health promotion program used with the racially/ethnically diverse adults with type 2 diabetes who participated in this study. This theory asserts that to engage in health promoting behaviors or a health promoting lifestyle, one must have related self-motivation, self-efficacy, and self-responsibility and knowledge, use self-praise of efforts and achievement of the target behaviors/lifestyle, and use coping skills for managing stress and depression. The content of the workshops in the tested health promotion program targeted the elements of this theory with attention to respecting the culture of the program participants and enabling them to feel comfortable, respected, and trusting of the workshop leaders. These feeling were promoted, for example, through group discussions of ways to engage in health promoting behaviors when living with type 2 diabetes that empowered all participants to be teachers as well as learners. Health promotion research studies similar to the present study have typically not been anchored in a culturally sensitive theory such as HSE Theory.

Another major strength of the present study is its novel use of an inventory (i.e., the Motivators of and Barrier to Health-Smart Behaviors Inventory) to assess each program participant's motivators of and barriers to health promoting behaviors. The motivators for each participant were used to foster self-motivation to engage in health promoting behaviors. The barriers for each participant were used to foster goal setting to increase health promoting behaviors. An individual's goals foster her/his self-motivation. Individual assessment of the motivators of and barriers to health promoting behaviors was informed by the fact that self-motivation to be healthy is an important aspect of HSE Theory.

The present study has clear implications for future research to foster health promoting behaviors among adults with type 2 diabetes. One implication is that HSE Theory holds potential for informing these programs and should be used in future similar studies with larger and random samples of racial/ethnic minorities and individuals with low incomes who have type 2 diabetes. Given this study's findings of reduced levels of physical stress among participants who received the intervention, another implication is that more attention needs to be given to stress management in health promotion programs that target adults like those in the present study. Additionally in future similar research, measures of the degree to which participants actually learned and engaged in health promoting behaviors should be obtained. Finally, in future similar research, it may be important for the tested health promotion program to be evaluated for more than a two-month program period, as many of the participants in the present study may not have even had a chance to see their health care providers within the two months prior to assessing program effects.

Clearly the findings in the present study suggest that the tested culturally sensitive, empowerment focused, community-based health promotion program holds much potential for improving health outcomes among racial/ethnic minority and low-income adults with type 2 diabetes. If future research with larger samples of racial/ethnic minority and/or low-income adults provides support for the tested program, support will be provided for using this program to empower adults with type 2 diabetes to take control of their health under whatever conditions that exist in their lives. Such empowerment may be an important strategy for eliminating type 2 diabetes and related health disparities that negatively affect the health and health-related quality of life of racial/ethnic minorities and individuals with low incomes.

Acknowledgments

Notes

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