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ORIGINAL PAPER

Perceptions and Practices of Diabetes Prevention Among African Americans Participating in a Faith-Based Community Health Program

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Abstract

Black churches are instrumental in reducing chronic diseases, yet there is a paucity of literature regarding the association of Black churches and pre-diabetes among African Americans. The purpose of this study was to examine the diabetes prevention perceptions and practices of African Americans with pre-diabetes who participated in a larger intervention study (the Hosea Project). Interviews and focus groups ($n=51$) were conducted 2 months following the intervention. A thematic analysis was performed to identify six emergent themes: general understanding of pre-diabetes and diabetes, diabetes prevention knowledge, program benefits, program barriers, lack of participation from men, and behavioral changes after program participation. This study illustrates how Black churches should serve as an intervention setting to increase pre-diabetes health behavior and education. Tailored and culturally appropriate programs can be beneficial in helping African Americans implement strategies to prevent diabetes.

Keywords Black churches · Pre-diabetes · African Americans · Diabetes · Qualitative research

Introduction

African Americans in the United States are disproportionately affected by diabetes, specifically type 2 diabetes (T2D) [1–3]. Diabetes can result in heart disease, blindness, kidney failure, and limb amputations [1, 4, 5]. By modifying an individual's behavioral habits (including increasing physical activity, eating healthy, and limiting alcohol intake), T2D can be preventable [6]. Due to the prevalence of T2D and the high rates of mortality, morbidity, and economic costs, much attention has been given to preventative efforts. These efforts have resulted in an emphasis on decreasing the incidence rate of pre-diabetes.

The American Diabetes Association [7] defines pre-diabetes as a blood sugar level higher than normal, but not high enough to be diagnosed as diabetic. Approximately 15–30% of pre-diabetics develop T2D within 5 years [8]. Many risk factors are associated with pre-diabetes, including age, being overweight or obese, a family history of diabetes, and race/ethnicity [8]. To address the health disparity of pre-diabetes among African Americans, program planners, public health practitioners, researchers, and policy makers should seek partnerships with African American churches to increase health education and promotion activities.

Diabetes is the fourth leading cause of death for African Americans in North Carolina [9]. It is estimated that more than 2.5 million individuals (one in three) residing in North Carolina may have pre-diabetes [10]. However, national trends indicate that approximately 10% of the individuals with pre-diabetes are aware of their condition [11]. Nearly 780,000 individuals in North Carolina report being diagnosed with pre-diabetes by a healthcare professional [11].

Forsyth County, North Carolina, has a pre-diabetes self-reported prevalence rate of 8.4–8.7%. Despite the impact of T2D on the African American community, there continues to be a lack of research on the effectiveness of prevention strategies, particularly those that involve health education interventions [12]. Thus, prevention strategies are needed to increase research, awareness, and best practices, specifically as they relate to this priority population.

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Faith-based organizations, including churches, have become partners in reducing health disparities and health inequities in communities because of their credibility [13]. Historically, Black churches (i.e., those serving primarily African Americans) have gone beyond their role of worship and addressed health, social, economic, and political welfare issues of their congregants and the community at large [14, 15]. Many faith-based organizations include health within their mission via support groups and health ministries [16–18]. Today, Black churches remain a prominent institution for the African American community and play a major role in developing and reinforcing heath behaviors, thereby making them ideal for health information dissemination, screenings, and educational programs.

Prior studies have demonstrated the benefits of religious affiliation and church attendance on improving the physical and psychological health of individuals [19–21]. Furthermore, there is substantial evidence that integrating faith into community-based research exerts positive effects on social networks and support on the individual [22]. Studies focusing on diabetes prevention in faith settings have shown promise in terms of effectiveness. Boltri et al. [23] conducted an intervention with individuals participating in a church-based diabetes prevention program. The intervention reported decreases in fasting glucose and weight. In a similar study, participants lost an average of 2.34 kg from baseline to 16-week follow-up [24]. Additionally, Williams et al. [25] conducted an intervention in 20 Black churches among 604 African Americans who lost an average of 2.62 kg at 12 weeks post intervention.

The aforementioned studies show the potential of faith-based health programs to improve diabetes risk factors among African Americans. However, most of these studies were not culturally adapted, the intervention was costly, and the intervention solely focused on individual behaviors rather than the church environment and practices. Additionally, challenges remain in regard to ways to broaden the intersection between the faith-based and public health sectors. To address these gaps, the HOSEA Project was developed. The purpose of this study was to explore the diabetes prevention perceptions and practices of pre-diabetic African Americans who participated in the HOSEA Project.

Methods

Description of Intervention

The HOSEA Project: Training, Equipping, and Empowering Churches to Prevent Diabetes was designed to examine the efficacy of an evidence-based diabetes prevention program implemented in a community and faith-based format. The project used the Centers for Disease Control and Prevention (CDC), National Diabetes Prevention Program (National DPP) curriculum, modified for a faith-based setting. The name "HOSEA" was selected to remind participants of the Bible scripture Hosea 4:6, which states, "My people are destroyed by a lack of knowledge." In this study, knowledge was referred to as diabetes prevention knowledge.

As a mixed-methods educational intervention study, HOSEA was designed to educate and empower lifestyle changes among African Americans who were at risk for diabetes. A total of 20 churches were recruited to participate in the intervention and were randomly assigned into the National DPP modified curriculum group (MC group) or nutrition education group (NE group). The NE group served as the comparison group. Randomization occurred at the church level, with 10 churches assigned to each group. The MC group received a curriculum based on the CDC National DPP linked with devotionals to reinforce the lesson learned. The NE group received a general nutrition-based intervention that consisted of four general nutrition lessons with a focus on diabetes prevention. Participants in the NE group were given memberships to exercise facilities, whereas the MC group was provided with 12 instructor-led exercise sessions (e.g., aerobic dance, kickboxing, praise craze) at their church.

Study Design

The current study used a qualitative design that included focus groups and semi-structured interviews. Both methodologies were employed to understand the perceptions that underlined and influenced participants' behaviors and generate ideas for intervention improvement. This study was approved by the Winston-Salem State University's Institutional Review Board (IRB).

Recruitment

A convenience sample of participants was recruited through various methods including direct contact through church visits, bulletins, announcements, and emails. Eligible participants included African Americans with pre-diabetes who were 21 years of age or older, a member of a HOSEA partner church, and a participant in the HOSEA Project. Participants received $25 as an incentive to take part in the focus groups or interviews.

Data Collection

Data were collected via focus groups and semi-structured interviews occurring over a 2-month period. Interviews occurred with individuals from each subgroup who were not able to attend the focus group. Both sources allowed the researchers to create a forum for discussion and

conduct in-depth probing regarding participants' experiences, perceptions on programing, and recommendations for future interventions. Data collection occurred immediately after the HOSEA intervention concluded. Focus groups and interviews were conducted in the evenings in a university conference room to allow for uninterrupted discussion and discretion. For both the interviews and focus groups, a moderator used semi-structured guides consisting of 15 questions with sub-questions (see Table 1). Seven focus groups ($n=47$) and four individual interviews ($n=4$) were conducted. In an attempt to obtain a high participation rate, recruitment occurred with all possible subsets of participants (i.e., participants who completed the intervention, dropped participants, men, couples, pastors, and participants reaching weight loss goals).

Focus groups lasted approximately 90 min, and interviews lasted approximately 60 min. Written informed consent was obtained by the moderator prior to the beginning of each focus group discussion. The moderator summarized responses to each question, and focus group participants had an opportunity to interact with each another. Toward the end of each session, a brief demographic questionnaire was administered. In addition to audio recording, two note-takers captured conversational context, interpersonal interactions, nonverbal reactions, and group dynamics. A debriefing was conducted after each session to note emergent themes. Field notes were taken during each focus group, and summaries were provided during debriefing. This process assisted in confirming emergent themes. Data were collected until saturation [26].

Data Analysis

Interviews and focus groups were audiotaped and transcribed verbatim. The authors utilized a thematic analysis approach to the qualitative data [27]. A team of three investigators experienced in diabetes prevention and management, physical education, public health, and health education independently reviewed and coded the first transcript. Codes were then discussed and uniform coding guidelines were created. This codebook was developed using an iterative process where modifications were made to codes and categories. Subsequently, each transcript was independently coded, and then the team met to discuss the transcript to address and resolve discrepancies. The transcripts were coded a second time, and the team met again to discuss the final themes.

Results

Participant Characteristics

The sample consisted of 51 participants: 37 from the MC group and 14 from the NE group (see Table 2). Participants included a majority of women (75%), five pastors of partnering churches, and mostly individuals with at least some college education (86%).

Themes and Subthemes

Six themes and four subthemes emerged, as described below. Table 3 provides sample participant quotes that illustrate the themes and subthemes.

Table 1 Semi-structured focus group and interview guide questions

Focus area	Question
General understanding	1. Prior to your participation in the HOSEA Project, what was your understanding of the term pre-diabetes?
	2. What are your thoughts on your ability to prevent diabetes?
	3. What are the important lessons you have learned in preventing diabetes?
Program	1. Tell us your thoughts about the education classes you attended for the program
	2. Think about the person who provided instruction at your site. Provide us some feedback.
	3. For the men in the CWG/FBG, what were the benefits of exercising at Winston Lake Family YMCA?
	4. For the men in the CWG/FBG, what were the challenges of exercising at Winston Lake Family YMCA?
	5. How did you feel about getting weighed each session?
	6. What were the benefits of having the program conducted at your church?
	7. What were the cons of having the program conducted at a church?
Behavioral changes	1. What are some of the changes you made in your eating habits because of your participation in the program?
	2. What are some of the changes you made in your physical activity habits because of your participating in the program?
Participation	1. The majority of the HOSEA participants have been women. That is a trend in most studies among the African American community. Why do you think men do not participate in these types of program?
	2. What types of support can we offer men so that they will participate in future programs?
	3. What changes could we make to the program to make the faith component stronger?

Table 2 Participant characteristics

Characteristic	Number	Percentage
Gender		
Male	12	23%
Female	39	77%
Racial background		
African American	51	100%
Level of education		
Some high school	1	2%
High school graduate or GED	6	12%
Some college, no degree	12	22%
Associate's degree	1	2%
Bachelor's degree	17	33%
Master's degree	11	21%
Professional degree	2	4%
Doctoral degree	1	2%
Marital status		
Married or living as married	25	49%
Separated	2	4%
Divorced	9	18%
Widowed	4	8%
Single, never married	11	21%
Group affiliation		
Modified curriculum group	37	73%
Nutrition education group	14	27%

General Understanding of Pre-diabetes and Diabetes

The majority of participants had knowledge of diabetes, stating that they understood the term *pre-diabetes*, and were able to provide their interpretation of the term. Interestingly, knowledge was acquired through multiple methods. Some participants discussed being diagnosed as a pre-diabetic by their doctor or when screened for the HOSEA Project. Others stated that family members being diagnosed with diabetes provided a trusted information source.

Diabetes Prevention Knowledge

The HOSEA Project was built on the concept of increasing knowledge and awareness of diabetes prevention. Participants in both groups cited knowledge gained about prevention strategies as useful. Most discussed education as the primary prevention strategy. Likewise, they noted that behavioral habits such as sleeping patterns, physical activity, and healthy eating played a vital role in diabetes prevention. Interviewees also identified their faith as a prevention strategy. The majority of participants in both groups stated that the HOSEA educational classes were extremely helpful and enlightening, particularly the nutrition components of the classes.

Program Benefits

Participants found various aspects of the program beneficial. Those components included instructors, fitness membership and exercise program, accountability, and the faith component.

Instructors

All the instructors received favorable reviews. Participants liked that instructors were structured in their delivery yet engaging. Participants in the MC group cited appreciation for the instructors being able to modify activity for the varying fitness levels. Overall, the instructors were described as knowledgeable, structured, and passionate.

Fitness Membership and Exercise Program

As part of the program, participants in the MC group were provided with a weekly exercise component on site at the church. While some participants, primarily males, felt the group exercise program was not challenging or enjoyable, most found it convenient and enjoyable. Participants in the NE group were provided fitness memberships at partnering facilities—the men at the YMCA and the women at a women's fitness facility. The male participants in particular saw the fitness membership as a benefit.

Accountability

Accountability emerged as a program benefit subtheme in terms of both weight tracking and group activities. Measuring participants' weight status each week served as a form of accountability, thereby increasing their motivation to change behavioral habits such as exercising and eating during the week. Weight tracking also created an awareness of weight gain and loss. While most felt that being weighed each week was a good part of the program, the weekly weigh-ins discouraged several people because they felt that their weight was not indicative of their overall progress. Similarly, attending sessions in their church with other members contributed to the accountability for participation and provided additional motivation.

Faith Component

Several topics emerged within the faith component subtheme, including connecting faith and health, social support, and pastoral engagement and support. In the MC group, several participants talked about the impact of the weekly

Table 3 Themes, subthemes, and participant quotes

Themes and subthemes	Participant quotes
General Understanding of Pre-diabetes and Diabetes	"I heard of it (pre-diabetes) last year,… when I went for my yearly physical, and my doctor told me that my sugar levels were in the pre-diabetic range. So that was the first time that I'd ever really heard the term pre-diabetes."
	"My mother is pre-diabetic, my stepfather died from complications of diabetes. So, pretty familiar. I've been around people with diabetes, and eating and drinking a certain way for most of my life."
	"The initial examination I had prior to coming into the HOSEA Project did indicate that I was predisposed. I felt a little bit of unease about it, and my next visit to the doctor—he ran the tests on me, and he allayed my ill feelings that I had towards it. At that time, my levels were good, so I wasn't concerned about it anymore after that. That was about two weeks later that I went to my own primary care doctor."
	"You know, sometimes you can be in denial of your situation. Pre-diabetic: you don't want to believe it. How can I be? I'm in good shape, I'm not overweight. But sometimes you can be in denial. But the thing is that you eat—it tells a story."
	"But since I really know that I'm in that pre-diabetic stage, I am so much more serious about, okay, lay off the—anything sugary and not try to say, oh, it's okay. I can have a little bit. I'm trying to do better in the sugar category and drinking a lot of water, more water than I've been drinking. I love water, but I've really been trying to flush my system and try to drink more water than ever now."
Diabetes prevention knowledge	"My thoughts are, especially with knowledge, it is something that we could have a large play into it because it's us, and our ability to prevent it would be based pretty much on what we know about it. The more we do know about it, I think we are very well capable of preventing it from becoming a part of our existence and we're able to live a normal, healthy life, free of diabetes, now at the beginning if we apply it. So, I think we're very capable of being in control of that."
	"I agree that the nutrition classes were vital. I didn't know what starches were. I'm a Southerner; I grew up on red beans and rice, potatoes and macaroni, double starches, triple starches. And now I'm realizing that I could eat a whole meal of starches, and you can't do that."
	"The education part was actually the—what really surprised me more about getting into the program. I was thinking it was more going to be more about just getting exercise. But it really showed me how to count calories, how to make a log, your daily log every day. And it also helped me about—and this is the biggest thing I've always had problems with—was my sugar intake. I would actually, you know, pick up any kind of thing that had a lot of sugar in it. But now, I can even sit down and drink a tea without any sugar at all, or coffee."
	"For me, it was very educational. Once she showed the demonstration of the salt, that was a real eye-opener on how much sugar and salt foods contain."
Program benefits	"I had the opportunity to sit under three different educators. I had the one that at [name of location]. I went to the one, one time that was assigned to [name of location]. And I went to [name of location] one time. And what impressed me, they were all on the same page. They all had the same enthusiasm for the program."
	"We had [name of facililtator], and she was excellent with her presentation, the way she explained things, the way she gave examples."
Fitness membership	"My challenge was to go way out there on XXXX Road. If I went home, I wouldn't make it on [name of road] Road, so I would have to leave work, which is [00:34:44 unintelligible], and then being bogged in that traffic. The first day I went, I told [name of facilitator], I said, I turned around. I said, forget this, I'm going home."
Accountability	"But it keeps you aware. You think, you're going to weigh in a couple more days, you know, and I don't want to disappoint myself, you know, just because I just decided not to do it right."
	"Sometimes I was disappointed in myself, and motivated I want to do better … sometimes I saw I wasn't moving, you know. I moved—when we got started I had got down to 236, and then I moved down to 234, lost two pounds, and then I got down to 232, then I got down to 231. I hung there for a while. But that last week that I know… the 12 weeks is up, that week I said, I'm determined I'm going to be out of the 30 s, into the 20 s. And you talk about jubilation?"

Table 3 (continued)

Themes and subthemes	Participant quotes
	"I welcomed the weigh-in, because it helped keep me conscientious of what I was doing, to the point I went and bought me a great pair of scales, so that I can continue to weigh-in."
	"It was a sign of accountability. So, it helped me try to stay on track. Because I knew, you know, that Saturday morning I was going to be weighed."
	"But just the accountability helped me. It just really made me, you know, stop falling off of the wagon and get serious about it. You know, I know when they looked at the paper was like, oh, she ate that, you know. But, just the accountability was the biggest thing for me."
	"And I think putting this program in the church has helped a lot of people who have been struggling for years, a lot of people who needed some support or some accountability."
Faith component	"I think the devotionals brings a sense of God's approval out of his Word. It's not something that the HOSEA project is grabbing out on their own, but they're basically taking it back to show us how God ordained for us to take care (of our bodies)… people have a tendency not to think that the Bible literally deals with the physical components of our body and how we should care for our physical bodies."
	"One of the things that really helped me was on those sheets that they read to us that have scriptures, you know, those scriptures were pertaining to the weight loss and stuff like that. Well, I would write those scriptures down, and I would quote them constantly, just go over it as I'm walking, just quote them and quote them."
	"In order for it to go over as well as it did, I needed to make sure that I prayed about this situation of what I ate, and, you know, my exercise. To start off with that prayer in the morning because it's serious. And I couldn't do it by myself. I just couldn't."
	"God wants us to take care of ourselves, our body, the whole body. And it's not enough to be spiritually invested, but you must be physically, mentally—all the areas of your body—because our body should be like a holy temple. And if we don't take good care of our body, that makes us poor stewards, because God has given us this body to take care of, and if you are dealing with health problems, you cannot be of service to the Lord, because you have to take care of yourself, and it takes precedence over it. So, by being physically able, etc., and mentally alert, this goes for a better servant for the Lord."
	"It needs to start with the household of faith. Because we realize that we can't do this without God, at least that's what this program kind of points you right back into. You need His direction at the beginning and you're going to need His direction when it's over with. But, He lets us know that we can do this, we can really do this.
	"By having it in the church, you are actually with people who pray with you at the end, and we truly tried to stay focused on how they came together as a group."
	"Historically, the African-American church is a source of information for the community… I just think that it creates a setting, so you may not come to a recreation center or some other community gathering, but you can—you have a core group of folks within the church that can spread the message."
	"I think having the Hosea project at your church was just awesome. It brought about a comradery that— Our church is very family oriented, we're very close anyway, but it just added to it…. And so, it just added a more wholesomeness to the relationships that were there."
Pastoral support	"He (the pastor) is very, very supportive. Not only did he just support us, but he took part in the program. And he was serious about it. I mean, you know, I think his numbers changed. We talked. He and I talked about it. And, you know, he already exercised. But I think, you know, he became even more intentional about it. And he was concerned about, you know, all of us. He was a part of it. He was very supportive and he was present, you know, in all conversations. He was there. He joined. So he exercise, and he's still talking about it. He talked about it on Sunday at church. He has exercised more now since he's been in that program. So I think it affect all of us."
Program barriers	"Could of been a little more in depth, but she shared a lot of personal experiences with us, so I enjoyed it. I still learned things from her."
	"Probably giving us a little bit more breakdown on different things because I know we had some concerns about certain areas. And I know he was supposed to have been getting back—checking on it and getting back with us, but just a little more informative. But he was good, though."

Table 3 (continued)

Themes and subthemes	Participant quotes
	"I think there's a little more substance that could be put into the nutrition class and kind of—encompasses that. You don't need a "Joe Clark" instructor, but you need a little more than what's there. So—and that's not a knock against the instructor, I just think that there's more information that could have been given."
	"Hate it! Let's go back to the cons of this! Getting weighed! I hated it, I hated it. I understand why, but I just did not like it, because even though you know what you're doing, sometimes the scale doesn't always reflect that. You know, my waist is [], my clothes are fitting a lot looser—but this number! I need it to move! It was not going anywhere! And then, being at church. You know, it was a very private, it was nothing that was done out in the public, but I think it was just my own insecurities about the scale. And then, you all were outsiders to me. I didn't know y'all!"
	"…the unfriendliness of the church visiting because I could not make (home church) most of the time. So I felt like, I would say, if they have something Friday night, I would go. Saturday morning, I would go. But then the persons, they was just so unfriendly."
	"I felt like some of the churches that I attended, the people were not friendly…. And I kind of looked at that as a turnoff, because I said, this is a program, and if you invite us into your church, you should be at least friendly when we come into your church."
Lack of participation from men	"But I believe there's a barrier when it does come down to men sometimes wanting to get in and wanting to do what's right. There's a position of sometimes we got to come from the macho image to understand, I got to do what's right. And to do what's right, we got to get where they are."
	"I don't know. Well, we had—we had a good group of men, but the women still outnumbered us. That was myself, my son-in-law, two other elders, I think—and we had a young brother, he's just 21. I think we had five men, and some of them dropped out."
Behavioral changes after program participation	"Portions. Eating what I want to eat but in moderation. I don't sit down and eat a big plate of food, I eat more of small meals throughout the day."
	"Because for me, I have cut out—pretty much I'm chicken and fish now. That's pretty much what I do because I'm dealing with the cholesterol and then the pre-diabetic, and it's not going anywhere."
	"And for one thing about the program is that it made me more conscious of my food choices…. I think the fat element is what really did it for me, because I've always counted calories. I've always looked at carbohydrates. I've always looked at protein. But I never paid any attention to the fat element."
	"With the HOSEA Project it has made me mindful of the things I am eating. I need more water, I need a balanced diet, I need vegetables and I need my five servings of fruit every day. It's helped me with that."
	"If I don't do Zumba twice a week, I walk. I walk for hours, and I try to do—sometimes I try to do at least one to two hours of walking and Zumba to try and keep my weight down."

devotionals that were incorporated into the lessons, noting that the devotionals helped to keep them focused. Other participants cited their faith as the reason for taking care of their bodies. In fact, even though the NE group did not have a faith-modified curriculum, many NE members thought they were in the intervention group because of the environment. Generally, the environment was a beneficial factor for most participants because having the program at their church was key in providing social support in the form of a network of people working toward the same goal. However, these benefits were more likely to be cited by participants who were members at a particular church, versus those who were visiting the church as an alternative program site. Support of the pastor, especially in terms of participation in the program, was equally important and seemed to provide an extra layer of support for participants. When asked to describe their pastor's role, participants in both groups repeatedly emphasized the related impact on their continued participation.

Program Barriers In terms of program barriers, several participants in both groups cited a lack of details or the content being "basic," which for some created boredom. In addition, although women participants saw the gym membership as a benefit, they noted that traveling to the location was a challenge to many and a barrier to some. Travel distance to the fitness facility was cited as a barrier by participants not living or working in close proximity to their designated facility.

While having the program in their church was cited as a benefit by many participants, this same component was

listed as a barrier by others, particularly those who dropped from the program. Participants were allowed to attend the intervention lessons at other churches to avoid time conflicts or as a means to make up lessons. However, while they seemed to enjoy a different instructor, a perception of not feeling welcomed by other participants emerged as a barrier. Thus, some participants who withdrew cited "unfriendly church members" as a barrier to participation.

Lack of Participation from Men

Lack of participation from men emerged as a theme because interviewees provided multiple reasons why they felt men do not participate in physical activity projects such as the HOSEA Project and suggested types of support that should be offered to increase male participation in future physical activity research programs. For example, some interviewees recommended having interpersonal support from spouses and family members to encourage participation. Others believed the current exercises in the program were not challenging enough and more intense activity would be needed. Finally, interviewees noted the importance of educating men on chronic diseases, thereby attracting them to physical activity projects.

Behavioral Changes After Program Participation

During the focus groups, participants discussed changing their behavioral habits while participating in the HOSEA Project. The behavioral changes were related to eating healthier foods; controlling portions; understanding the difference between carbohydrates, starches, and fats; and understanding the role of physical activity. Likewise, most participants discussed increasing their physical activity habits after the project, but one participant reported not performing any physical activity after participation.

Discussion

Some evidence exists to suggest that lifestyle interventions implemented in community settings can reduce the risk of diabetes [28]. However, African Americans are underrepresented in such studies. To effectively address health disparities and close the diabetes prevention gap, community- and faith-based interventions are needed to identify optimal approaches for African American communities [15, 29]. The current study examined diabetes prevention perceptions and practices of pre-diabetic African Americans who participated in a faith-based diabetes prevention project. Our findings are consistent with the literature in that participants' knowledge about diabetes was based on experiences with family members who had complications from the disease [30–32]. Interestingly, most of what participants recalled as diabetes knowledge was based on a family history of diabetes related to health complications (i.e., amputations). This finding supports Shaw [30] in that a primary source for learning about diabetes for African American women tends to be family, friends, co-workers, and church family. Moreover, in the HOSEA Project, most participants were aware of the condition of pre-diabetes because they were diagnosed by their doctor. This may confirm other research that shows that physician referrals provide powerful encouragement for behavior change [33].

Also consistent with the literature, participants credited the program with helping them make "small" lifestyle changes that they felt improved their health and contributed to their state of wellbeing and feeling of accomplishment. Additionally, knowledge or awareness was a key component that participants cited as critical to the change process, including behavioral changes related to diet (e.g., reading labels, limiting unhealthy food) and physical activity (walking more). Thus, this study confirmed that participation in diabetes prevention programs is beneficial in terms of health management and lifestyle changes that aid in preventing diabetes [33].

For African Americans, spirituality has been identified as an important aspect in general health and disease management [23]. In the current study, faith was a significant component of the program and was seen as beneficial for several reasons, including the social aspect, such as feeling a sense of belonging and accountability. Additionally, participants indicated that having the program in their church provided a sense of comfort and familiarity, in line with previous research [34] that found that tailoring to location creates a safe, comfortable environment, thereby increasing convenience because the location is familiar to participants. Most significantly, those making the connection between their spiritual faith and their health cited "being able to do God's work" as a motivator to improve their health, indicating that including faith concepts can enhance diabetes prevention interventions.

Strengths and Limitations

This study provided context on utilizing the social support of Black churches for health interventions. The current study serves to add to the body of knowledge about the effectiveness of community-based, and specifically faith-integrated, interventions for racial and ethnic minorities. Despite the study strengths, limitations should be noted. Because our study was confined to one county in a southeastern U.S. state, it may not be representative of all African Americans who are diagnosed as pre-diabetic. Likewise, over half of the sample was comprised of female participants, and the majority of the participants had some college education.

Thus, the sample is not diverse in terms of gender identity and socioeconomic status. Additionally, the study is subjected to sample bias because only participants who wanted to increase their diabetes prevention knowledge and habits participated in the study.

Practice Implications

Prior and current literature demonstrates that diabetes is a continuous public health issue among African Americans. Churches are in a position to impact diabetes risk factors through increasing diabetes knowledge and awareness, as well as providing support and resources to reinforce prevention strategies. Our study indicates that practitioners are needed to engage churches to assist their congregation in creating and sustaining healthy lifestyles. Utilizing churches will increase involvement in diabetes efforts while providing current resources that may promote behavioral capability and self-efficacy among African Americans. Before implementing a program or intervention in the church setting, examining the availability of resources in the church, such as wellness programs, and assessing the church readiness for change would be an important predictor of program success.

Future Research

For future research, spousal support should become a component of interventions because it may provide a different perspective and allow role modeling of behavior to occur. Likewise, future researchers should objectively measure behavioral habits to obtain better insight into the determinants that influence individuals diagnosed with pre-diabetes. Also, conducting a comparison study among African Americans in different parts of the country would help to generalize the results. Additional research is recommended to include a range of demographics defined by gender identity, socioeconomic status, and geography (rural). Finally, some participants in this study discussed program barriers such as weekly weigh-ins, distance to travel to exercise facilities, lack of male participation, and unfriendliness of non-home church members that can be addressed in future research.

Conclusion

A key strategy in preventing diabetes in the African American community is providing evidence-based programs that are modified for community settings. Our findings indicate that a tailored, culturally appropriate program can be an effective approach to diabetes prevention education and awareness. Because of their central and significant role in the lives of many African Americans, churches and other faith-based institutions can play a significant part in reducing health disparities in this population.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. American Diabetes Association. (2014). *Treatment and care for African Americans*. Retrieved from http://www.diabetes.org/living-with-diabetes/treatment-and-care/high-risk-populations/treatment-african-americans.html.
2. Centers for Disease Control and Prevention. (2013). *Diabetes public health resource: Age-adjusted percentage of adults aged 18 years or older with diagnosed diabetes reporting visual impairment, by race/ethnicity, United States, 1997–2011*. Retrieved from http://www.cdc.gov/diabetes/statistics/visual/fig 5.htm.
3. Centers for Disease Control and Prevention. (2015). *Summary health statistics: National Health Interview Survey, 2014*. Retrieved from http://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2014_SHS_Table_A-4.pdf..
4. Forbes, J. M., & Cooper, M. E. (2013). Mechanisms of diabetic complications. *Physiology Review, 93,* 137–189.
5. National Institutes of Diabetes and Digestive and Kidney Diseases. (2013). *Diabetes, heart disease, and stroke*. Retrieved from http://www.niddk.nih.gov/health-information/health-topics/Diabetes/diabetes-heart-disease-stroke/Pages/index.aspx.
6. Slawson, D. L., Fitzgerald, N., & Morgan, K. T. (2013). Position of the academy of nutrition and dietetics: The role of nutrition in health promotion and chronic disease prevention. *Journal of the Academy of Nutrition and Dietetics, 113,* 972–979.
7. American Diabetes Association. (2015). *Diagnosing diabetes and learning about prediabetes*. Retrieved from http://www.diabetes.org/diabetes-basics/diagnosis/.
8. Centers for Disease Control and Prevention. (2015). *Prediabetes.* Retrieved from http://www.cdc.gov/diabetes/basics/prediabetes.html.
9. North Carolina Diabetes Advisory Council. (2016). *Type 2 diabetes in NC*. Retrieved from https://www.diabetesnc.com/partner_ncdac.php.
10. North Carolina Division of Public Health. (2016). *Prediabetes in North Carolina*. Retrieved from http://www.diabetesnc.com/downloads/0416/CCCPH_FactSheet_Prediabetes_FINAL_April2016.pdf.
11. North Carolina Division of Public Health. (2017). *Prediabetes in North Carolina*. Retrieved from https://www.diabetesnc.com/wp-content/themes/dnc/assets/downloads/CCCPH_FactSheet_Prediabetes_FINAL_April2017.pdf.
12. Spears, E. C., Foster, M. J., & Bonner, T. J. (2018). Diabetes prevention for African-Americans: A scoping review. *Journal of Racial Ethnic Health Disparities, 5,* 947–965.
13. Levin, J. (2014). Faith-based initiative in health promotion: History, challenges and current partnerships. *American Journal of Health Promotion, 28,* 139–141. https://doi.org/10.4278/ajhp.130403-CIT-149.

14. Harman, B. E., Kim, S. H., Blake, C. E., & Herbert, J. R. (2014). Health care information in African American churches. *Journal of Health Care for the Poor and Underserved, 25*(1), 242–256.
15. Coughlin, S. S., & Smith, S. A. (2017). Community-based participatory research to promote healthy diet and nutrition and prevent and control obesity among African Americans: A literature review. *Journal of Racial and Ethnic Health Disparities, 4,* 259–268.
16. Berkley-Patton, J., Thompson, C. B., Martinez, D. A., et al. (2012). Examining church capacity to develop and disseminate a religiously appropriate HIV tool kit with African American churches. *Journal of Urban Health, 90,* 482–499.
17. Carter-Edwards, L., Jallay, Y. B., Goldmon, M. V., Roberson, J. T., & Hoyo, C. (2006). Key attributes of health ministries in African American churches: An exploratory survey. *North Carolina Medical Journal, 67,* 345–350.
18. Lasater, T. M., Becker, D. M., Hill, M. N., & Gans, K. M. (1997). Synthesis of findings and issues from religious-based cardiovascular disease prevention trials. *Annals of Epidemiology, S7,* S46–S53.
19. Allen, J. D., Perez, J. E., Tom, L., Leyva, B., Diaz, D., & Idali Torres, M. (2014). A pilot test of a church-based intervention to promote multiple cancer-screening behaviors among Latinas. *Journal of Cancer Education, 29,* 136–143.
20. Newlin, K., Dyess, S. M., Allard, E., Chase, S., & Melkus, G. D. (2012). A methodological review of faith-based health promotion literature: Advancing the science to expand delivery of diabetes education to Black Americans. *Journal of Religious Health, 51,* 1075.
21. Wilcox, S., Parrott, A., Baruth, M., et al. (2013). The faith, activity, and nutrition program: A randomized controlled trial in African-American churches. *American Journal of Preventive Medicine, 4*(22), 122–131.
22. Debnam, K., Holt, C. L., Clark, E. M., Roth, D. L., & Southward, P. (2012). Relationship between religious social support and general support with health behaviors in a national sample of African Americans. *Journal of Behavioral Medicine, 35,* 179–189.
23. Boltri, J. M., Davis-Smith, M., Okosun, I. S., Seale, J. P., & Foster, B. (2011). Translation of the National Institutes of Health diabetes prevention program in African American churches. *Journal of National Medical Association, 103*(3), 194–202.
24. Yeary, K. H., Cornell, C., Turner, J., et al. (2011). Feasibility of an evidence-based weight loss intervention for a faith-based, rural African American population. *Preventing Chronic Disease, 8*(6), 1–11.
25. Williams, L. B., Sattin, R. W., Dias, J., et al. (2013). Design of a cluster-randomized controlled trial of a diabetes prevention program within African American churches: The Fit Body and Soul study. *Contemporary Clinical Trials, 34,* 336–347.
26. Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine.
27. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.
28. Chou, C., Burnet, D. L., Meltzer, D. O., & Huang, E. S. (2015). *Policy brief: The effectiveness of community-based diabetes prevention programs.* Retrieved from the NYS Health Foundation website https://nyshealthfoundation.org/wp-content/uploads/2017/11/report-diabetes-prevention-in-community-settings.pdf.
29. Sattin, R. W., Williams, L. B., Dias, J., et al. (2016). Community trial of a faith-based lifestyle intervention to prevent diabetes among African-Americans. *Journal of Community Health, 41*(1), 87–96.
30. Shaw, M. (2006). Perceptions and beliefs about type 2 diabetes among non-diabetic black women. *DePaul Journal of Health Care Law, 10,* 51.
31. Ziegahn, L., Styne, D., Askia, J., Roberts, T., Lewis, E. T., & Edwards, W. (2013). Strategies to prevent and reduce diabetes and obesity in Sacramento, California: The African American Leadership Coalition and University of California,Davis. *Prevention of Chronic Disease, 14*(10), 187. https://doi.org/10.5888/pcd10.130074.
32. Balls-Berry, J., Watson, C., Kadimpati, S., et al. (2015). *Black men's perceptions and knowledge of diabetes: A church-affiliated barbershop focus group study*. Retrieved from https://asu.pure.elsevier.com/en/publications/black-mens-perceptions-and-knowledge-of-diabetes-a-church-affilia.
33. Johnson, N., & Melton, S. T. (2016). Perceived benefits and barriers to the diabetes prevention program. *People Living with and Inspired by Diabetes Journal*. https://doi.org/10.17125/plaid.2016.65.
34. Lagisetty, P. A., Pryadarshini, S., Terrell, S., Hamait, M., Ladgraf, J. V., & Heisler, M. (2017). Culturally targeted strategies for diabetes prevention in minority populations: A systematic review and framework. *Diabetes Educator, 43*(1), 54–77.