



Application of the PEN-3 Model in a Diabetes Prevention Intervention

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ABSTRACT

More effective strategies for addressing health issues in African American communities are needed. As part of a three year NIH funded Project Export grant, this community-campus partnership used community-based participatory research principles and the PEN-3 Cultural Framework to develop a culturally specific, locally relevant intervention to prevent Diabetes among African-Americans. A comprehensive needs assessment which included 13 elicitation interviews, 3 focus groups, and 217 surveys resulted in identifying major themes including overall lack of knowledge regarding Diabetes, issues of denial and stigma, sense of inevitability, influence of family on perceptions and behaviors, communication issues with health care providers, and lack of culturally sensitive materials. Community partners provided input into the assessment strategies, materials and intervention development, as well as recruitment and information dissemination strategies which in conjunction with the Pen-3 framework, allowed us to develop a culturally relevant strategy for reducing Diabetes related health disparities in our community.

Key Words: PEN-3, Diabetes, African-American Adults

INTRODUCTION

Despite ever increasing efforts to address the disparities in diabetes rates among racial and ethnic minorities in the United States, prevalence and mortality rates continued to be alarmingly high. Currently 14.7 percent of all non-Hispanic Blacks ages 20 years and older are estimated to have diabetes compared to 9.8 percent of non-Hispanic Whites (NIDDK, 2008). In the State of Michigan the diabetes prevalence is significantly higher than in the rest of the nation with Michigan having the 13th highest prevalence rate in the country (MDCH, 2009). Diabetes prevalence is significantly highest among Blacks in Michigan as compared to Whites and Other Races (MDCH, 2009). Although diabetes is the sixth leading cause of death in Michigan overall, it is the fourth leading cause of death for African Americans (MDCH, 2002).

The past decade has seen a growing emphasis on community based approaches to eliminating health disparities with varying success. In a meta-analysis of community based diabetes prevention

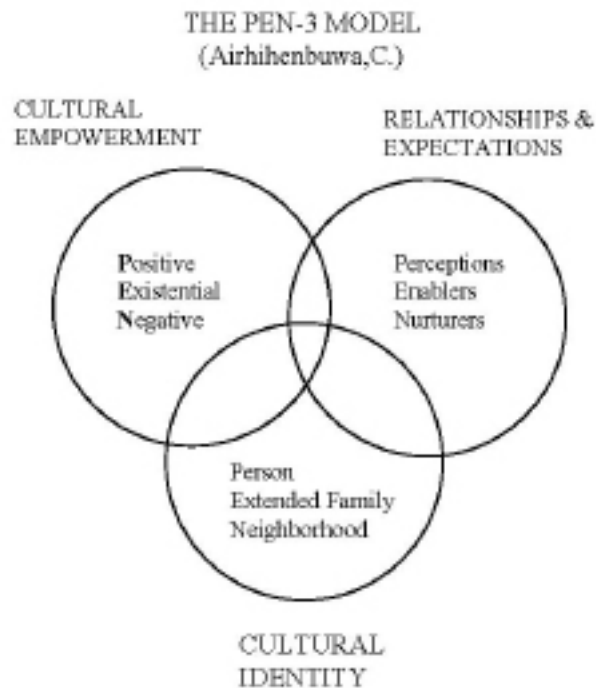
interventions, commonalities of approaches were identified. Many of the interventions incorporated culturally relevant materials and strategies often focused on diet and physical activity, as well as using participatory approaches in the planning and implementation of the programs (Satterfield et al., 2003). While many studies have shown positive results of culturally relevant, community based interventions, limitations in the sustainability of such efforts exist (Rimmer, Silverman, Braunschweig, Quinn, & Liu, 2002; Keyserling et al., 2002; Two Feathers et al., 2005). And while these programs tend to be rated highly by the participants (Williams et al., 2006) the overall reach has been limited. Issues surrounding participation and attendance rates attributed to barriers to participation such as time and resource commitments have made transferability difficult to achieve. This in addition to the reliance on trained staff whether they be professional or lay volunteers makes many of these approaches too resource dependent for many communities.

As researchers and practitioners continue to strive for success in the elimination of health disparities, the need to test and apply innovative approaches increases. It is imperative that we build on the successes of past community based, culturally relevant interventions while simultaneously reducing the barriers to broader, community level dissemination and implementation. Given the recognition of the importance of community based participatory research principles (CBPR) in efforts to address disparities in minority communities it is imperative that health promotion intervention approaches build on these concepts. To that end this project attempts to demonstrate how to integrate principles of CBPR with the application of the PEN-3 cultural framework to develop a sustainable and effective diabetes prevention intervention in an African-American Community.

The Pen-3 Model

The PEN-3 model was developed to situate culture at the center of determinants of health behavior in health promotion and disease prevention interventions (Airhihenbuwa, 1995; Airhihenbuwa, 1999). Use of the PEN-3 cultural framework for intervention development provides valuable guidelines for ensuring the intervention is culturally specific by identifying and organizing a community's cultural components as part of the planning process. The PEN 3 model was developed as a framework for health promotion and disease prevention in African countries (Airhihenbuwa, 1989). As the emphasis on cultural relevance and community based interventions has increased, the model has begun to be applied to health promotion efforts in the United States (Fitzgibbon & Beech, 2009; Kannan, et al., 2009; Ka'opua, 2008). Strategies that only emphasize individual change neglect an important aspect of ethnic populations, collectivism. Therefore, using more mainstream messages without addressing significant influences of the ethnic culture such as heritage, life experiences and cultural beliefs may act as a disincentive in disease prevention (Airhihenbuwa & Pineiro, 1988; Airhihenbuwa, 1992). Focusing on cultural influences and the integration of cultural beliefs and experiences along with providing culturally sensitive messages by culturally competent educators may prove to be a more effective strategy for addressing minority health issues, particularly among minority populations.

This model removes itself from traditional health promotion models and addresses health promotion as a three dimensional model that addresses not only risk behaviors but also protective factors such as social networks like family and the environment and the role that each play in decision making and health of African Americans. This model addresses the health behavior, the cultural appropriateness of those behaviors assessing both positive and negative factors and education of not only the individual but also the family and others within the environment (Airhihenbuwa, 1992; Airhihenbuwa, 1995).

Figure 1. The PEN-3 Model**Project EXPORT**

This community-based research project was designed and implemented within a larger three year grant initiative from the National Institutes of Health (NIH) National Center on Minority Health and Health Disparities to decrease health disparities in the Flint, Michigan community (Project Export, 2003 - 2006). Flint, Michigan is a post-industrial Midwestern urban city with a population of approximately 125,000. The city is comprised of 34 square miles with a population density of 3700 per square mile. Within the population, African Americans comprise 53.3% of the residents and Caucasians 41.4%. The median household income is \$28,000 per year with twenty-four percent of Flint residents earning less than \$15,000 per year. The unemployment rate is 41.5% and over 26% of the population lives below the poverty level, greatly exceeding the National average of 11.9% (U.S. Census Bureau, 2000). Concurrent with the economic challenges facing the residents of Flint is a disproportionate burden of disease and illness. Compelling evidence of the disparate health status of Flint's racial and ethnic minority populations and economically disadvantaged is documented in the shorter life expectancies and higher rates of cancer, birth defects, infant mortality, asthma, Diabetes Mellitus, Cardiovascular disease, and stroke (Agho, A., 2002).

The purpose of this award was to develop an infrastructure and identify gaps to refine and expand the community-campus health model. One of the primary aims of this project was to implement, conduct and evaluate a pilot research effort in Diabetes, one of two health issues previously identified by the community. Research objectives included: (1) To develop and pilot test a culturally appropriate research interventions to reduce racial health disparities in the area of Diabetes, (2) To test culturally appropriate recruitment, communication, and dissemination strategies, and (3) To develop and validate culturally appropriate materials to be used in the pilot interventions. Because of the community focus of the project and the importance of culture in the target population, the PEN-3 Framework was selected as the basis for the development of the intervention strategies.

Principles of Community-Based Research

The guiding framework for health disparities research are the principles of community-based participatory research (CBPR) that have consistently demonstrated the most success when conducting effective community-based research aimed at improving the public's health (Schultz et al., 1998). Included in these principles is the need to facilitate collaborative partnerships in all phases of the research, and to create a cyclical, iterative research process that includes partnership development and maintenance, community assessment, development of research methodology, dissemination of results, and establishment of mechanisms for sustainability.

This framework moves away from the provider-consumer dichotomy, instead advocating an active community role in which all participants from the university and community are agents of the research program itself (Stewart, 1993). This project utilized the CBPR principles to develop and implement the comprehensive needs assessment in collaboration with community partners. The results were then verified using community dialogues. The PEN-3 model was subsequently used to frame the needs assessment results to ensure that the cultural components of the community were central to the resulting intervention. This paper describes this process through the initial stages of intervention development. The principles of CBPR were applied throughout by involving the community in the development of research protocols and instruments, as intervention participants, consumers of intervention research findings, and informants into the development of the full-scale community based intervention to prevent Diabetes among African Americans.

METHODS

Needs Assessment Process

One of the initial efforts of the research pilot was to plan and implement a comprehensive multiple component needs assessment of the Flint African American community. This consisted of a four-step process. All procedures were approved by the University of Michigan Institutional Review Board and the Human Subjects Committee of the University of Michigan, Flint.

Step 1. Pre-existing Data

The assessment began with a review of existing epidemiological data to better understand local trends and health issues. These results were used to develop elicitation interview questions with key community members.

Step 2. Elicitation Interviews

The second step of the needs assessment consisted of a series of elicitation interviews with key individuals in the community who were identified by our community liaisons and through the Greater Flint Health Coalition Diabetes Task Force. These individuals were all involved in some aspect of providing either social or medical services related to Diabetes management or prevention. The interviews were designed to identify the type and scope of existing services, populations targeted and reached by existing agencies and organizations, gaps in service, issues that need to be addressed in this community, and barriers and constraints that they've experienced. Additionally, individuals who were directly involved with the target population were solicited for participation in upcoming focus groups and as a recruitment site for survey distribution. The interviews were conducted by members of the research team and consisted of a set of predetermined questions that all individuals would be asked in addition to providing the flexibility to obtain information specific to their roles and responsibilities. The interviewers took notes during the interview process, which were subsequently compiled with the responses of the other completed interviews and organized by question. Fifteen individuals were initially identified and contacted. Of those, eight completed the face-to-face semi-structured interviews conducted by project researchers. Scheduling difficulties were the primary

reason that not all initial contacts were interviewed however one M.D. refused due to lack of available compensation.

Step 3. Focus Groups

The third step included a series of focus groups conducted with community members and local health care providers. Recruitment of focus group participants occurred within the organizations of our community partners, which included both health care and social service agencies. Fliers and word of mouth recruitment strategies were employed. Participants for the community member focus groups were recruited based on whether or not they had been diagnosed with diabetes, were at risk for diabetes, or were a family member or caregiver for someone with diabetes. The purpose of the focus groups was to identify factors that lead to the differences in the numbers of individuals affected by Diabetes Mellitus (Diabetes) in the community, and ways to reduce these disparities including: preferences and methods for obtaining health information, approaches to health communication; typical health services available, and the role that cultural components play in both patient-provider interactions and in the educational materials available regarding Diabetes care and prevention. Three focus groups were conducted; two with community members and one with health care providers. All participants completed an informed consent and individuals received \$20.00 for their participation. For government reporting purposes participants were asked to complete an anonymous demographic questionnaire however no other personally identifiable information was collected. Participants were assigned a speaker letter which was used during the discussions and in the transcription and analysis. Focus group data was analyzed using inductive analysis techniques. The focus group recordings were first transcribed and summarized then reviewed by multiple team researchers to identify dominant themes. These were then presented for validation, to several of our community partners on the project and to an open forum of interested community members and participants as part of the community dialogue process.

Step 4. Survey

The fourth and final step of the needs assessment process consisted of the development and distribution of a 27-closed item paper-pencil survey that was administered to 217 community members. Major constructs were identified in part through the elicitation interviews and included health information seeking behavior, Diabetes knowledge and risk, self-efficacy regarding Diabetes prevention including communication with health care providers, dietary and physical activity behaviors, preferences regarding program logistics, and demographics. Volunteers were recruited from various community events such as health fairs, local activities, health centers and local community agencies, and were asked to complete the 27 item survey. Eligibility requirements included volunteers be 18 years of age and older living in the County. African American residents were recruited more heavily to participate in the survey. Informed consent was acquired and participants received a \$10 gift card upon completing the survey.

RESULTS

Results of the review of existing epidemiological data confirmed the extent (prevalence and incidence) of the Diabetes problem in the community (CDC, 2001; Agho, 2002; MDCH, 2002). Given the disproportionately high rates of Diabetes in these areas, researchers were further able to isolate specific zip code regions within the community as the targets for the research pilot.

Interviews

The elicitation interviews (EIs) were semi-structured so that consistent questions were asked of all respondents but because of the varied nature of the types of professionals interviewed, open dialogue was also facilitated. Elicitation interview results were summarized by question based on the research notes taken during the interview process. Elicitation interviews with key community health and service providers revealed multiple common themes. In general, professionals were

concerned about the lack of Diabetes prevention activities for both youth and at risk adults. This included Diabetes screening efforts and education efforts aimed at lifestyle behaviors such as nutrition and exercise in addition to education regarding proper management of Diabetes and related complications. Barriers to successful Diabetes education and prevention included a lack of classes and the number of classes covered by insurance. Lack of social support was identified, for example, providers reported that walking groups were available, but their clients were hesitant to join without family or friends. Also, interviewees indicated that interventions continue to focus on traditional individual level strategies in spite of the recognition of cultural and environmental contributing factors to the Diabetes problem. Interview participants also felt that there were many services available to the community but that barriers exist in getting people to use them. Reasons included issues of cost, transportation, and general lack of coordination between health and service care facilities. Summarized findings were subsequently presented to and reviewed by community partners on the project and also a community based diabetes coalition that included several EI participants.

Focus Groups

A total of three focus groups were conducted. Two consisted of community members who were representative of potential intervention participants while the third group consisted of health care providers. The provider group consisted of six total participants, five of whom were female and four of whom were African-American. The Community member groups included a total of 21 participants with 66.7% of them being female and 90.5% African-American. Participants were intentionally not asked to disclose their diabetes status although over the course of the discussion several did. The goal of recruiting members from the at-risk community that were impacted by diabetes, whether directly or indirectly, was achieved.

In an attempt to demonstrate how focus group results are integrated into the intervention planning process using the PEN-3 model, a sample of identified themes is provided. Themes identified in the provider group included a general agreement that clients relate more to terminology such as “sugar” rather than using the term “diabetes” to describe their condition with one participant stating:

I personally think they respond better to sugar than diabetes. You know when you say sugar, they have a better relation to what we're talking about with what's going on with hem. Blood sugar is what they call diabetes. (Female, Health Care Provider)

However, providers were concerned that this is indicative of the level of understanding that clients have of the disease with one participant remarking that:

When they say sugar, I don't really think they understand that they actually have a disease process going on that is more comprehensive than just the term sugar. We have to help them understand that it's more than just sugar we're talking about. (Female, Health Care Provider)

Clients tend to perceive blood sugar levels as a temporary state that is to be addressed and managed without acknowledging the more extensive and comprehensive effects of Diabetes on health and potential complications and co-morbidities. This leads clients to perceive treatment as a quick fix once they begin to feel better and that more education is needed regarding long-term management of both risk and disease. Providers cited referrals to nurse practitioners to assist clients in proper food choices and testing glucose levels. However, providers were clear to communicate that they felt that ultimately the responsibility for taking care of their health resided with the clients themselves. Providers were asked if they incorporate their clients' cultural background into the provision of services and if so, how. In general, the providers stated that cultural sensitivity was not provided in the educational materials they distributed however they unanimously cited a need for culturally relevant materials, particularly cookbooks. The providers did not believe that doctors

and other health care providers are culturally sensitive and that for physicians this is something that should be introduced into the medical school curriculum. It was their belief that the medical assistants seemed to be more sensitive and were able to establish a better rapport with patients:

I think you are going to get different responses. I personally feel that sometimes doctors don't want to believe that they are culturally insensitive in a sense—that this is medicine. It works. I think in reality, sometimes it's more the nurses, the medical assistants who are really pretty more sensitive to the patient and providing that rapport to the patient. (Female, Health Care Provider)

General themes identified in the two community member groups included an overall lack of knowledge about Diabetes, a sense of stigma and denial with regards to being diagnosed with a disease versus having a temporary blood sugar condition, the importance of family influence on perception, attitudes beliefs, and behaviors, and the need for cultural competence and trustful communication with health care providers (see Table 1). Many of the themes that were identified in these groups are consistent with previously reported research (Boltri et al., 2006; Skelly et al., 2006; Gazmararian et al., 2009). For example, Boltri et al. (2006) identified issues related to participants' feelings of inevitable destiny and stigma associated with a diabetes diagnosis. In focus groups conducted to explore barriers to diabetes management, Gazmararian, Ziemer, and Barnes (2009) identified denial as the key factor that inhibited adherence to healthy lifestyle choices. Previous research has also identified a lack of knowledge regarding the condition and subsequent consequences of not adequately managing the disease as is illustrated in comments such as "something isn't regulating the blood sugar level in the body" and "It's in your blood....diabetes goes from one generation to the next" (Boltri et al., 2006). Skelly et al. (2006), in a study to better understand how community members view diabetes identified common recurring themes regarding the causes of diabetes as eating too much sugar diabetes "running in families", and not taking care of oneself. Similar statements were made in our groups as is illustrated in the following examples. Regarding general knowledge of diabetes participants stated:

My mother had—she died as a diabetic, but to me, I guess it is another cancer. It just eats you up on the inside, piece by piece, or whatever. I really—it just got the best of my mom. I don't what it was, how could I help her. (Female, Community Member)

My idea is it's some kind of insufficiency in your blood and what some other part I can't name here, is taking over one count and your blood is producing more than what you need. (Male, Community Member)

One participant communicated a sense of denial regarding a diabetes diagnosis as follows:

When I was first diagnosed, then I got in control, it was more or less that I knew how to cheat and get away with it....I never claimed to the extent that it was something like a, for lack of better words, a true diabetic where mine was like a weight issue. If I could lose X number of pounds and maintain it, then I wouldn't be considered diabetic anymore...Mine is more a health conscious thing where if I was to exercise and watch what I ate, I wouldn't be classified as one (diabetic). (Female, Community Member)

Although the issue of stigma and denial was identified as a major theme that emerged from the focus groups this was an area of great debate and discussion among the researchers. Initially reluctant to label this as denial even though that was the general impression that a series of similar statements gave, subsequent discussions with health care providers and members of the community who had been diagnosed with Diabetes confirmed that there was a general stigma attached with accepting and acknowledging a diagnosis of Diabetes. Patients were more likely to focus on a particular symptom or condition (i.e. blood sugar) and deny that they had actually been diagnosed with Diabetes. Multiple participants communicated their discomfort with being labeled as a

Diabetic.

Focus group participants also expressed interest in participating in research interventions. They identified the following factors as critical to their participation: incentives, clearly engaged marketing materials, convenient location and time of day, and availability of transportation. Participants suggested the use of flyers at bus stations and on buses, in schools, in liquor stores and on telephone poles. The use of commercial time on radio was emphasized. Most of the participants were in favor of an interactive group setting similar to the focus groups. Participants wanted to support and learn from each other and even volunteer to help get people to the sessions.

Surveys

A cross sectional survey using a sample of convenience was utilized for the final step in the needs assessment process. Based on the results from the review of existing epidemiological data, the sampling frame for the needs assessment surveys was defined as African-American adults residing in any of the three previously identified high-risk zip code areas. Due to the distribution methods employed, all of the surveys distributed were completed and returned. Demographic results confirmed that the target audience was reached with over 60% of the sample coming from the targeted zip code areas. Furthermore, seventy one percent of the sample was female with the majority of respondents describing themselves as African American (70.8%) with 14.4% European American and 10.8% describing themselves as Latino or Hispanic. The average age of respondents was 43 years with a range of 18 to 81 years. Over half of the sample reported having a high school diploma or college/technical school (34.2% and 29.1% respectively). Twenty-four percent of the sample reported an Associate's degree or higher and 12.8% of the respondents reported less than a high school diploma.

Seventy-five percent of respondents identified their physician as their primary source of health information with family and friends and other sources (T.V., web, etc.) being identified by 25-30% of respondents. When asked who they trust for health information, respondents continued to identify physicians (74%) however 47% of respondents identified family members as a trusted source of information indicating a greater reliance on family. Family was also identified as the primary influence on dietary habits and was also influential in exercise habits. For the purposes of illustrating how results were integrated into the subsequent intervention, a summary of survey results that were integral to the development and focus of the intervention are presented below (see Table 2).

Table 1. Focus Groups Themes

Overall lack of knowledge	Knowledge is based more on personal and family experiences than from professional sources. Define diabetes only in terms of "sugar". Little awareness of larger disease process. Need nutrition and food preparation skills.
Sense of denial/stigma	Reluctance to admit they have or are at risk for a disease. Using the term "sugar" rather than diabetes. Cheating on eating (sweets) and adjusting meds accordingly. Not addressing risk factors or prevention methods (weight management, management of co-morbidities etc.). Sense of impending diagnosis (Diabetes is inevitable).
Family influence on perception, attitudes, beliefs, behaviors	Family history is a strong influence on attitudes and beliefs particularly as it relates to perceived risk. Strong sense of inevitability for becoming diabetic. Understanding of disease comes primarily from observing family members' experiences with diabetes and the health consequences (including blindness, amputation etc.). Perception of risk is strongly related to family history (more so than individual behaviors/risk factors). Includes perception of risks for children.
Family support in maintaining healthy behaviors	Support from family members and friends regarding importance of healthy behaviors (i.e. diet and/or exercise) and also discouraging unhealthy behaviors (i.e. sneaking diabetic sweets).
Patient-Physician communication/trust	Trend is toward passive communication styles. Patients only provide information that health care providers request. Not asking for DM testing and Dr.'s not checking. Problem with late diagnosis. Not recognizing early symptoms/risk factors. Most participants said they would go to the Doctor for information regarding DM although there appeared to be a disconnect between this response and where they actually got their information (family & friends). Other sources that were mentioned were newspaper, TV, churches, senior centers, schools.
Cultural competency of health care professionals	Identified need for cultural competence for M.D.'s and other health care providers re: listening to clients, establishing trusting relationships etc.
Cultural relevance of health education materials	Need for culturally sensitive materials beyond "ethnic" cookbooks and recipes.

Table 2. Selected Results of the Diabetes Prevention Needs Assessment Survey.

Item	Percentage
Where would you like Health Information to be available?	
Church	43.3%
Health fair	41.5%
School	37.8%
Work	35.9%
Health Clinic	34.6%
Who or what influences you the most in terms of what you eat?	
Parents	36.3%
Physician	30.8%
Having very little time	29.4%
Traditional ethnic cooking	24.4%
Person who prepares the meal	19.4%
Friends	18.9%
What motivates you to exercise?	
Exercising with a friend	60.7%
Participating in an enjoyable activity	29.4%
Family support	27.4%
Walking trails	23.9%
What makes it difficult to exercise on a regular basis?	
Having very little time	61.2%
Family obligations	28.9%
Cost of exercise facilities	26.4%
Fatigue	22.4%
Health problems	20.9%
What factors do you believe might increase a person's chances for having diabetes (high sugar)?	
Biological parent with diabetes	76.1%
Being overweight	72.6%
Having high blood pressure	53.7%
Being African American, Hispanic/Latino, Native American	49.8%
Biological sister or brother with diabetes	48.8%
Have you been tested for diabetes in the past year?	
Yes	63%
No	37%

Community Dialogue

Once the needs assessment results were compiled and summarized by the researchers a community dialogue session was held. The goal of this session was to verify the results of the needs assessment with community members. Participation in the dialogue was open to all members of the community in addition to the needs assessment participants. During the focus groups participants had been very vocal regarding wanting to be informed of the project results. The community dialogue was conducted similar to a nominal group process. The needs assessment results were presented to session participants by one of the researchers using a PowerPoint demonstration. This was then followed by an informal question and discussion session with team members facilitating small group discussions. The participants were asked to verify or refute the interpretation of the needs assessment findings that had been presented by the research team. This allowed participants to provide more insight into findings. As the discussion transpired, themes were identified and written on large sheets of paper located around the room. These themes were then organized and condensed into what the participants and researchers collaboratively agreed were the five primary themes. The overarching theme was the role of family in the participants lives and how family influenced health habits. Family was identified as the foundation of their lives and it was felt that that family history is what connects folks. Secondly, it was felt that interventions should educate meal preparers because these are the individuals who influence food choices. Demonstrations and healthy cooking contests could be effective intervention strategies. Family gatherings were identified as potential educational opportunities. Third, for families living with Diabetes or those at risk, knowledge should be the focus of intervention. This could include signs and symptoms, insulin and hunger, side effects of medications, and nutrition information (i.e. exchange list, family interventions to promote healthy eating for all). The fourth theme indicated early treatment and getting tested was important to session participants. Finally, physical activity was identified as the fifth theme and included components such as activities to fit in everyday life, exercise groups, buddy system, and types of activities that community members enjoy such as African Dance, Line Dancing, Jazzercise, and Pilates.

Intervention Development

The next step in the process was to develop a culturally appropriate Diabetes prevention intervention by placing the verified results from the needs assessment within the framework of the PEN-3 model. The model makes use of three domains: Cultural Empowerment, Relationships & Expectations and Cultural Identity (see Figure 1). The Cultural Empowerment and Relationships and Expectation domains are integral to the needs assessment process while the cultural identity domain is used to identify the points of entry for the intervention. These include (1) Person: child, parent, professional, spouse, leader, etc., (2) Extended Family: marital circle, parents and children, parents and grandparents, etc., (3) Neighborhood: geographic area, ethnic group, gendered group in area, leaders in area, racial group, etc.

In order to organize factors identified during the needs assessment process, a 3 by 3 matrix is created using the two domains of Cultural Empowerment and Relationships and Expectations (see Table 3). The Cultural Empowerment domain is used to categorize factors into three categories. Perceptions include elements such as knowledge, attitudes, values, and beliefs. Enablers consist of cultural, societal, systematic, and structural forces that affect change. Nurturers refer to the degree to which attitudes, beliefs, and actions are influenced, mediated, and nurtured by extended family, friends, peers and community. Factors within these categories are further identified as having either a positive, existential, or negative influence on health and health behavior.

Once the needs assessment results were summarized, researchers and community members came together to review the results and place the themes and findings into the appropriate cells

within the PEN-3 matrix. Subsequently, intervention targets were identified (see Table 3, in italics). Multiple challenges were experienced over the course of this exercise. Maintaining clarity in the meaning of results was essential despite the tendency by researchers to interpret findings based on their perspective and experience. A continuous effort was employed to focus on elements as they existed in the community rather than how they could be targeted for change in the subsequent intervention.

Table 3: Application of PEN-3: Needs Assessment Results

The Domains	Positive	Existential	Negative
<p>Perceptions Knowledge, attitudes, values, beliefs, affecting personal, family, community motivation to change behavior</p>	<p><i>Concern for youth (DM prevention)</i></p>		<p><i>Lack of knowledge Misconceptions Denial Communication issues w/MD Family History / influence</i></p>
<p>Enablers Cultural, societal, systematic, structural forces affecting change</p>	<p>Availability & location of resources</p> <p>Open to participation in research</p>	<p><i>Sense of inevitability for developing DM</i></p> <p>Traditional healing & spirituality</p>	<p><i>Lack of cultural competence w/ in health care system & health ed. materials</i></p> <p>Patient/Provider relationship</p> <p>Stigma</p>
<p>Nurturers Degree to which attitudes, beliefs, & actions are influenced, mediated, and nurtured by extended family, kin, friends, peers, & community.</p>	<p><i>Family/Friends influence</i></p> <p>Location of resources</p>	<p>Faith leaders as sources of support</p>	<p>Patient /Provider relationship</p> <p><i>Active/passive contribution to behavior</i></p>

Pilot research

Once the primary intervention targets were identified the pilot intervention was planned and developed. Again, the principles of CBPR were applied in the development of content, study materials, implementation strategies, and participant recruitment. An iterative review and approval process utilizing community representatives on the project team and community advisors was employed for all study materials ensuring that components were culturally appropriate. Primary objectives of the resulting intervention included the assessment and evaluation of the effectiveness of a targeted, culturally appropriate toolkit on Diabetes prevention related behaviors including Testing, Dietary habits (food choices, preparation), and Physical Activity. The development phase resulted in a final product consisting of a tool kit that included culturally relevant information on Diabetes knowledge, testing, physical activity, nutrition, and meal-makeover suggestions. Based on findings from the needs assessment regarding the importance of family, the intervention point of entry was chosen to be the individual and the extended family with the focus of the tool kit on provision of the information and skills necessary for the participant to create a meal for guests of his/her choosing following the guidelines provided in the kit. The overarching approach of the intervention is to utilize the positive and nurturing influence of family and friends to share knowledge and support behavior change. In addition to ensuring cultural relevance, Toolkit components were selected and designed based on findings from the various needs assessment strategies. For example, because needs assessment participants cited the need to include family in healthy dietary changes the toolkit included a meal makeover booklet to help the meal preparer to prepare healthy meals as well as invitations to send to friends and family inviting them to share the meal. A disposable camera was included in the toolkit so that participants could take pictures at the meal makeover, which the project team developed and returned. The idea was to create an atmosphere where families could share healthy food options and educate each other on making healthy dietary choices in an environment of sharing and celebration. Other toolkit components included as a result of the needs assessment focused on identified barriers to behavior change such as a handout on hair care tips for African American women that would make it easier to be physically active. Outcome measures include diabetes risk factors, intention to change dietary and physical activity behaviors, Diabetes knowledge, testing behaviors and communication with Physicians, and self-efficacy regarding diet and physical activity as a result of the toolkit.

DISCUSSION

In summary, the main findings from this study indicated that Diabetes is a significant health concern among both health care providers and community members. Key issues identified were accurate knowledge regarding Diabetes risk and prevention and the utilization of culturally appropriate education and intervention strategies. Based on these findings the resulting pilot project was focused on prevention strategies that could be disseminated in a manner consistent with how members of the community naturally receive and disseminate information particularly within family and social networks.

Given the continued focus on health disparities at both the state and national level there are multiple directives that should continue to be pursued. The issues surrounding health disparities are varied and complex as are the recommended solutions. Only through a concerted, multi-level approach that includes research, economics, community and government involvement, in addition to the health care system, can these issues be addressed. A continued effort at both the federal and state level for the collection of accurate and comprehensive data is essential in order to track the extent of disparities in addition to the success of initiatives aimed at eliminating them. Continued recognition of and funding for community based efforts both in research and prevention is vital. The State of Michigan has for over two decades supported a Coordinated Community Planning initiative which involves the formation of community collaboratives. Currently every county in the state is

affiliated with a collaborative group that provides for community planning, sharing of information, managing state funding, and linking with other community collaborative groups. In light of the potential and acknowledged advantages of community based approaches to eliminating health disparities it is imperative that initiative such as this continued to be supported and encouraged.

At the individual level, this project has reinforced that the education of community members on disease prevention and health promotion is crucial. In addition, an emphasis on health literacy, communication with health care providers, and understanding the information seeking behaviors of the target population is imperative to producing effective community based interventions. And finally, recognition of the importance of culture and cultural competency in the access and delivery of health services will continue to play a pivotal role in interventions designed to eliminate health disparities in our communities.

Limitations

Although ultimately this process proved to be invaluable, it was not without limitations and challenges. For example, because of the community based nature of the research it was imperative to both the researchers and the community members that no one be excluded from participating in the project. This resulted in a small percentage of participants coming from outside of our targeted area. Involving community members in the oversight of research from inception to completion requires a great deal of dedication and communication from all involved. It is vital that expectations involving responsibilities and time frames for completion of tasks be clearly communicated and agreed upon early on in the process. Team members must understand that there are role dependent priorities and commit to working to meet and accomplish priorities that they themselves don't share. For community based participatory research to be successful all team members must understand and commit to the process so that the project can continue to move forward rather than becoming encumbered by nonparticipation or a lack of essential input. Further limitations exist in both the qualitative and quantitative data collection. Because of the participatory nature of the project it was difficult to conduct data collection using traditional research methodologies. As a result, convenience samples were employed. This most likely resulted in a limited representation of the community's collective voices. By relying on partnerships with existing community agencies to help in the recruitment of participants the sample is subsequently restricted to the members of the community that have contact with those agencies.

CONCLUSION

The application of a community based participatory approach in conjunction with the PEN-3 model, in the development of a Diabetes prevention intervention, provided many valuable lessons. Involving the population of interest in the solution to the problem of health disparities provided researchers with an opportunity to not only learn from the community but to also verify needs assessment results with community members. This process led to conclusions and targets for the subsequent intervention that would not have been identified were the researchers to interpret the results alone. Consequently, it is the aim of the resultant intervention to provide a solution that is salient for the population thereby increasing its adoption and sustainability.

Our community partners provided input into the needs assessment strategies, materials and intervention development, as well as recruitment and information dissemination strategies. This in conjunction with the Pen-3 framework guided us in developing a culturally relevant strategy for reducing Diabetes related health disparities in our community.

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