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project: A strategy to reduce health disparities**

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**EVALUATING A COMMUNITY HEALTH CENTER'S DIABETES PROJECT:
A STRATEGY TO REDUCE HEALTH DISPARITIES**

A Dissertation by

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Master of Arts, Wichita State University, 2008

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**Submitted to the College of Liberal Arts and Sciences
and the faculty of the Graduate School of
Wichita State University
in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy**

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EVALUATING A COMMUNITY HEALTH CENTER'S DIABETES PROJECT:
A STRATEGY TO REDUCE HEALTH DISPARITIES

The following faculty members have examined the final copy of this dissertation for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Doctor of Philosophy with a major in Community Psychology.

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DEDICATION

To my husband, who has provided unconditional support to me
throughout this long journey towards reaching
my dreams and aspirations

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First and foremost, to my advisor and mentor, Dr. Rhonda Lewis-Moss, words cannot express my gratitude to you for your guidance, support, encouragement, enthusiasm, and ability to inspire me not only through your words but also through your actions. You have truly made it possible for me to reach this amazing goal. Thank you from the bottom of my heart.

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ABSTRACT

Diabetes is a serious health problem in the African American community. African Americans experience significantly higher rates of diabetes, diabetes complications, and premature mortality compared to Caucasians. The current study examined a Diabetes Project implemented by a local community health care center that serves predominantly low income and underserved populations. The goal of this research was to determine the usefulness, feasibility, and potential effectiveness of the Diabetes Project. There were 216 participants (147 females and 69 males) of mean age 53.56 (SD = 14.71) consisting of 143 (66.2%) African Americans, 55 (25.5%) Caucasians, and 18 (8.3%) Other. The average time patients were enrolled in the Diabetes Project was 2.59 years. The HbA1c (blood glucose), blood pressure (BP) -- systolic and diastolic, LDL cholesterol, and body mass index (BMI) was measured at baseline and at the date of the last visit. Three of the five pairwise comparisons were significant – HbA1c, and BP (systolic and diastolic). Although there were no statistically significant differences between gender, race/ethnic groups, and age, there were several statistically significant within group differences. An unexpected finding was the significant improvements in self-management behaviors of patients at the CHW. Limitations included the fact that this research was not developed at the time of implementing the Diabetes Project. As such, the available data was limited and lacking in details. Recommendations include more effective record keeping and conducting process and impact evaluations on a regular basis. Overall, the results were promising and it appeared that African Americans benefitted the most from the Diabetes Project, which may be serving as a strategy to reduce health disparities.

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CHAPTER 1

INTRODUCTION

Although the past two decades has witnessed an improvement in the overall health of the U.S. population, there are still significant disparities in the health outcomes and mortality rates in racial and ethnic minorities (Two Feathers, Kieffer, Palmisano, Anderson, Sinco, Janz, Heisler, Spencer, Guzman, Thompson, Wisdom, & James, 2005). When comparing the premature mortality rates of the U.S. population, the U.S. Department of Health and Human Services [USDHHS] (2004a) reported that African Americans, American Indians, and Alaskan natives have the highest overall rates of premature mortality than any other population group in the U.S. (Gance-Cleveland, 2006). One of the overarching goals of *Healthy People 2010* is to eliminate the existing health disparities for racial and ethnic minorities by the year 2010 (USDHHS, 2000). In the quest to reduce health disparities by the year 2010, the former Surgeon General, Dr. David Satcher, identified six core areas in need of special attention -- diabetes was identified as one of the top six priority health problems (USDHHS, 1998). Diabetes is a disease that is associated with high blood glucose levels as a result of problems with insulin production or resistance that causes sugar to build up in the body contributing to serious complications if left unchecked (CDC, 2008). Thus the focus of this research will be on a community-based agency's effort to evaluate their diabetes project that treats low income and underserved populations.

Despite the increasing scientific knowledge about diabetes, The Centers for Disease Control and Prevention [CDC] (2008) reported that the prevalence of diabetes has continued to rise in the 21st century. During the past two years there has been an increase of more than three million new cases of diagnosed diabetes. The number of Americans with diabetes from 1980 through 2007 has increased from 5.6 million to 23.6 million. This represents nearly 8 percent of

“This dramatic increase in the number of people with diabetes highlights the increasing burden of diabetes across the country,” says Karen Kirtland, CDC's Division of Diabetes Translation (2008).

The rates of type 2 diabetes have now reached epidemic proportions (Gregg, Cadwell, Cheng, Cowie, Williams, Geiss, Engelgau, & Venicor, 2004). Type 1 diabetes is usually diagnosed in children and young adults, and was previously known as juvenile diabetes. In type 1 diabetes, the body does not produce insulin and patients are insulin-dependent. Type 2 diabetes, formerly referred to as adult onset diabetes, is the most common form of diabetes and accounts for about 90% to 95% of all diagnosed cases of diabetes. In type 2 diabetes, the body either does not produce enough insulin or the body loses its ability to effectively use the insulin produced resulting in elevated blood glucose levels (American Diabetes Association, 2008). A major concern with diabetes is that if left uncontrolled, it can result in end-organ damages and premature death. Diabetes is a major cause of end-organ damages, such as heart disease and stroke, kidney failure, lower limb extremity amputations, and blindness (CDC, 2008). The CDC (2008) reports that every 24 hours approximately 200 diabetes sufferers will require a non-traumatic lower-limb amputation, around 130 diabetes sufferers will develop kidney failure, and nearly 50 adults will become blind.

Furthermore, it is estimated that between 33% to 50% of the population that suffers from type 2 diabetes are undiagnosed (CDC, 2008). Consequently, by the time they seek medical attention they will already be experiencing early complications from this disease (Baptiste-Roberts, Gary, Beckles, Gregg, Owens, Porterfield, & Engelau, 2007). At least 57 million Americans have a condition known as prediabetes, which means they have a high risk for

developing type 2 diabetes if not controlled. People with prediabetes have blood glucose levels that are higher than normal, but not high enough to be classified as diabetes (CDC, 2008).

Costs of Diabetes

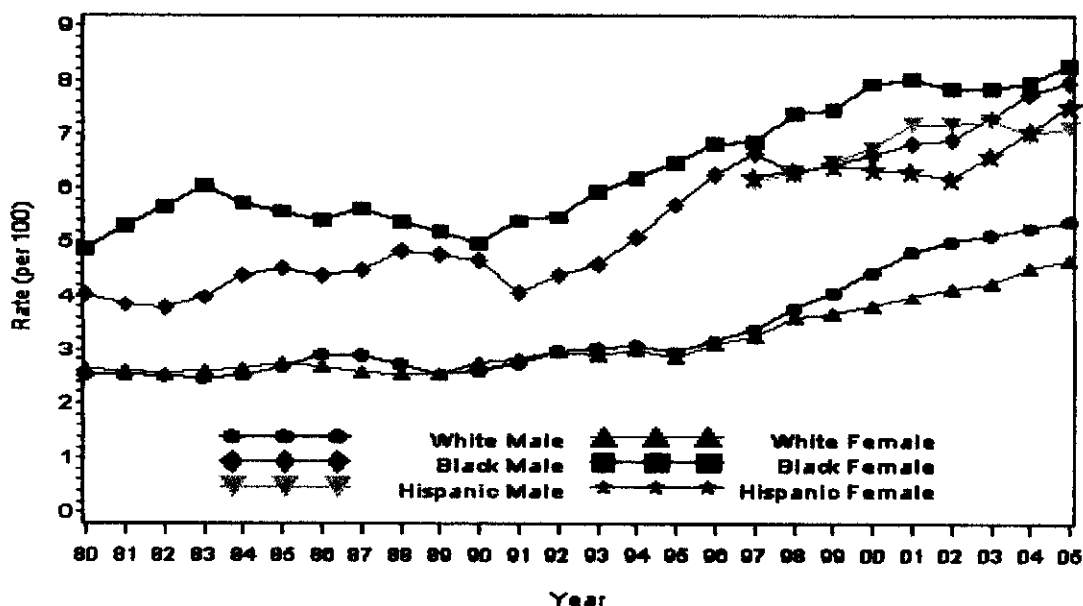
Another serious consequence of diabetes is the huge financial burden that it is placing on the individual as well as society. Diabetes is one of the most common, complex, and costly chronic health conditions in the United States. For example, diabetes sufferers have higher rates of using hospital and outpatient care, emergency room visits, health care provider office visits, nursing facility stays, and home health visits compared to nondiabetic patients (Dall, Mann, Zhang, Martin, & Chen, 2008). There are substantial direct and indirect costs that are contributing to significant increases in health care and social costs for the general public. According to the American Diabetes Association (2008) the estimated total costs of diabetes in the United States in 2007 were \$174 billion. Of this amount, \$116 billion can be attributed to direct medical costs, and \$58 billion to indirect costs (disability, work loss, premature death). It is estimated that one in every five health care dollars is spent on taking care of a diabetes sufferer. Diabetes drugs are becoming increasingly more costly and prices have almost doubled over the past 6 years. It is estimated that Americans spent \$12.5 billion on diabetes drugs in 2007 (Dall et al., 2008).

Disparities in Diabetes

The evidence of health disparities is particularly significant in diabetes regarding both the health outcomes and quality of care among racial and ethnic minorities. African Americans have a greater prevalence of diabetes with an estimated 50 to 100% higher rates of diabetes when compared to Caucasians (Gance-Cleveland, 2006; CDC, 2004; Engelgau, Narayan et al., 1998). It is estimated that approximately 3.7 million African Americans over 20 years of age have diabetes, which represents 14.7% of this group, while in African American women over 55

years, the incidence is one in every four (Samuel-Hodge, Walkings, Rowell, & Hooten, 2008; National Institute of Diabetes and Digestive and Kidney Diseases, 2005). (See Figure 1). The prevalence of diabetes in Kansas has risen from 81,000 people in 1994 to 134,000 in 2005. Of this amount, 8% of African Americans suffer from diabetes as compared to 5% of the general population (CDC, 2008).

Figure 1: Age-Adjusted Prevalence of Diagnosed Diabetes in the U.S. by Race/Ethnicity and Gender in 2007 (CDC, 2007)



The rates of diabetes complications also occur at disproportionately higher rates in minority communities (Gary, Hill-Briggs, Batts-Turner, & Brancati, 2005). For example, African Americans are twice as likely to experience blindness as a result of diabetes when compared to Caucasians. African Americans also exhibit higher rates of kidney disease and lower-extremity amputations as a result of diabetes complications (Two Feathers et al., 2005; Gance-Cleveland, 2006; Engelgau, Narayan et al., 1998). African Americans are two to five times more likely to undergo lower limb amputations and four times more likely to experience kidney disease than Caucasians (Samuel-Hodge et al, 2008; Two Feathers et al., 2005). The Secretary of Health and

Human Services' Task Force on Black and Minority Health (1985) determined that diabetes was a major contributor to mortality among minorities in the U.S. (Engelgau, Narayan et al., 1998).

Risk and Protective Factors

There are a number of risk and protective factors associated with diabetes. Having a family history of diabetes can be a useful tool to identifying individuals who may be at risk of developing type 2 diabetes, especially as they age. With a family history of diabetes, one needs to consider not only a possible genetic predisposition but also the shared environmental factors, e.g. culture, preferences, attitudes, beliefs, and behaviors regarding lifestyle, diet and physical activity (Baptiste-Roberts et al., 2007). Thus, engaging in proactive behaviors, such as undergoing diabetes screenings, maintaining a healthy weight, exercising regularly, and monitoring one's glucose levels can be effective in delaying the onset of diabetes. Baptiste-Roberts et al. (2007) reported that African Americans who were aware of a family history of diabetes were more conscious of diabetes risk factors and were more likely to attempt to implement protective behaviors, (e.g. undergo screenings, eat healthier diets, and exercise more). Thus, it is imperative to encourage individuals with a family history of diabetes to be proactive rather than reactive regarding their health.

Obesity and sedentary lifestyles are two main risk factors associated with type 2 diabetes, both of which are modifiable and preventable risk factors (CDC, 2007). The past two decades have witnessed an enormous increase in obesity and there is currently an obesity epidemic in the U.S with an estimated 65 percent of adults being either overweight or obese (CDC, 2007). Thus, as the population continues to gain weight, the prevalence of diabetes continues to rise.

Nutritional diets have for many years been associated with reducing preventable and chronic diseases, (e.g. heart disease and type 2 diabetes), as well as reducing the risks for premature

deaths (Robinson, 2008). There have been numerous studies reporting on the beneficial value of consuming a balanced diet that includes the recommended 5 daily servings of fruit and vegetables (Yeh, Ickes, Lowenstein, Shuval, Ammerman, Farris, & Katz, 2008). The USDHHS (2004a) confirmed a link between health and diet and identified four of the ten leading causes of death as being correlated with dietary factors.

There is supporting evidence (Gable & Lutz, 2000; Morrissette et al., 2002) that the obesity observed in adults mostly developed during their early childhood years where the family environment played a key role in their health behaviors. Studies have found that once a pattern of overeating and little physical activity has been established, it is difficult for an obese child to lose weight, and there is evidence that overweight children lead to overweight adults who will continually struggle with their excess weight (Gable & Lutz, 2000; Wadden et al., 2002; Goran, 2001). A study by Lewis-Moss, Paschal, Redmond, Green, & Carmack (2008) supported these findings as they found that African American adolescents had poor eating and exercise habits and recommended the need to target children from an early age in order to instill healthy behaviors and attitudes that will persist into adulthood. Yeh et al. (2008) reported that African Americans adults believed that one of the barriers to eating healthier diets was a lack of health education and that communal settings would help to educate the population. Research reports that although African Americans and low income individuals are likely to suffer disproportionately from chronic diseases, they are the least likely to adhere to the recommended diet and food guidelines (Casagrande, Wang, Anderson, & Gary, 2007; Robinson, 2008). There is thus a need to educate adults on the importance of eating more nutritious diets not only for themselves but to model healthier lifestyles to their children. A clinic- and community-based diabetes intervention in older African American women with type 2 diabetes found that

culturally relevant diabetes management programs can be effective in changing dietary intake and increasing physical activity levels. This intervention included baseline data and a 6-month follow-up (Keyserling, Ammerman, Samuel-Hodge, et al., 2000). There is a need, however, to have longer follow-ups to determine if participants are maintaining these behaviors.

Other risk factors include a lack of regular medical check-ups that include eye and foot exams and blood work to monitor blood pressure, cholesterol, and glucose levels. Research has shown that African Americans, Hispanics, and Asians have lower rates than Caucasians with regards to receiving regular healthcare or dental checkups during the year previous to this research (Gance-Cleveland, 2006). Monitoring these levels on a regular basis can significantly prevent or delay the onset of end-stage diabetes complications of renal disease, blindness and lower limb amputations (CDC, 2008). Unhealthy behaviors, (e.g. smoking and alcohol consumption), are also risk factors that are correlated with type 2 diabetes. Smoking is associated with elevated levels of blood glucose and microalbuminuria, insulin resistance, and microvascular complications. Diabetic sufferers are already at risk for cardiovascular disease, kidney failure, stroke and premature mortality, and these complications are greatly exacerbated by smoking. Research reports that even when diabetic sufferers quit smoking the detrimental effects can persist for many years (Karter, Stevens, Gregg et al., 2008). A study by Karter et al. (2008) reported a higher incidence of smoking in young diabetic adults of low educational and socioeconomic status, which places them at a higher risk of experiencing further diabetic complications. Karter et al. (2008) recommended the need for more public health interventions to educate the public on the dangers of smoking as it relates to diabetes.

This disproportionate health disparity among African Americans is not inevitable (Engelgau, Narayan et al., 1998). Research has demonstrated that it is possible to reduce the risk factors of

diabetic complications by implementing a strict control of monitoring one's blood glucose levels as well as having regular foot care and eye examinations. There is also increasing research reinforcing that implementing changes in one's dietary habits and physical activities can have a positive impact on reducing the risk of diabetes complications and in delaying the onset of type 2 diabetes (Gary, et al, 2005; Two Feathers et al., 2005; Engelgau et al., 1998; National Institute of Diabetes and Digestive and Kidney Diseases, 2008).

Dr. David Satcher, former Surgeon General, believed that it is a combination of lifestyle, problems with early access to care, and early detection of problems that are contributing to these health disparities in racial and ethnic minorities. "For example, in the case of diabetes, we know that by changing lifestyles, we can prevent the onset of 50 percent to 60 percent of Type II diabetes, which is over 90 percent of the diabetes we see in this country" (Mayo Foundation, 1999, p.838).

Although there is clearly a need to focus our efforts on ways to address type 2 diabetes, current health interventions have not had the desired impact on racial/ethnic minorities. As a result, more interventions that target particularly African Americans are needed in order to manage diabetes and reduce health disparities.

Guiding Frameworks

In order to address the above issue, a number of strategies have been used as the guiding framework for this research. The outreach worker strategy, the Self Management model (Holman & Lorig, 2004), and Bandura's (1977) Self-Efficacy model served as explanatory frameworks in understanding some of the processes associated with health-related behaviors.

Outreach Worker Strategy

Based upon the literature, it was decided to use the outreach worker strategy because an increasing number of studies have reported that incorporating lay workers from the community can play an important role in health promotion and disease prevention, especially in underserved communities (Kubajda, Cornell, Brownstein, Littleton, Stalker, Bittner, Lewis, & Raczynski, 2006). Many studies have reported on the impact that outreach workers have made in community settings that have resulted in better health outcomes compared to services provided in traditional medical settings (Love, Gardner, & Legion, 1997). The concept of community outreach health workers has been in existence for a long time and is not a novel idea (Pérez & Martinez, 2008). As far back as the 17th century, outreach workers played a vital role in Russia, who was confronted with a shortage of doctors, by providing the military with basic life sustaining services (Pérez & Martinez, 2008). Since then, outreach workers have continued to respond to critical health crises whenever they occurred and have been effective in improving health outcomes and in reducing health disparities (Chin, Walters, Cook, & Huang, 2007). In the 1960s, in response to the Great Society domestic programs in the U.S. that were dealing with issues such as poverty, unequal health services and education opportunities, the federal government recognized the need to sponsor outreach programs to attend to the needs of the disenfranchised (Pérez & Martinez, 2008).

Outreach workers are viewed as being the connectors between the underserved or vulnerable communities to health care services. These outreach workers usually share the same cultural or ethnic characteristics as the community members and are able to provide social and emotional support to the community members through their community outreach efforts (Rhodes, Foley, Zometa, & Bloom, 2007). Having the outreach worker matched with the

community can contribute to a more positive relationship between the health care services and the community. “Because they are trusted, they can serve as effective conduits of information, resources, services, and advice on how to access those services” (Love, Gardner, & Legion, 1997, p. 511). Another advantage of having matched outreach workers from the community is that they have knowledge of both the cultural context for health and illness as well as the community’s history of interactions with the health care services (Parker, Israel, Robins, Mentz, et al., 2008). Outreach workers can be effective in reducing racial and ethnic health disparities as they are able to impact the causal social etiologies that often results in health disparities (Rhodes, Foley, Zometa, & Bloom, 2007).

Pérez and Martinez (2008) refer to outreach workers as being “natural researchers” (p.11) because they are immersed in the community and are able to observe the needs and deficits of the community firsthand. In this way, the outreach workers can influence public health policies by communicating the community’s needs to public officials. Another way of thinking of outreach workers is as treatment advocates for the patients as well as the community as a whole. Although the outreach workers typically have no formal medical training or degree they are able to provide the necessary emotional and social support to the patient through the diverse roles that they perform, such as conducting community screenings, providing referrals, appointment assistance and reminders, as well as assisting in resolving any barriers to obtaining the necessary health care services.

The World Health Organization defined health promotion as “the process of enabling people to increase control over and to improve their health” (1986, p. iii). Outreach workers empower the patients by providing knowledge and the skills to engage in responsible health behaviors. Thus, empowering the grassroots population to take charge of their lives is crucial

when striving for healthy communities as a strategy to reducing health disparities. The increasing success of utilizing community health workers to motivate and encourage community members to be more proactive in their health behaviors can contribute to better health outcomes.

There have been studies that evaluated the roles of community outreach workers. Rhodes, Foley, Zometa, & Bloom (2007) evaluated the roles of community workers in Hispanic/Latino populations and concluded that community workers can have a positive impact on promoting health outcomes and preventing disease but recommended that there was a need to conduct more rigorous studies on minority populations. Parker et al. (2008) evaluated a community-based participatory research that focused on a community health worker intervention with ethnic minority children of low income households residing in an urban area who suffered from asthma. The results found that community workers can be effective in contributing to improved health outcomes although there are multiple pathways needed for the desired health outcome. The Pine Apple Heart Disease and Stroke Project (Kubajda et al., 2006) investigated the effectiveness of incorporating and training community health workers in an underserved rural Alabama community where the rates of heart disease and stroke were very significant for African American women. The findings were optimistic about the beneficial roles that community workers can play in improving health outcomes, and recommended further investigations in urban cities as well as with mixed genders. A qualitative study examining the community health worker model to assist with diabetes management found that one of the most important roles of the outreach workers was in educating the community. However, an important lesson learned was that it is important to have the community buy-in to a community project in order to be successful. Also, it is recommended that more evaluations of outreach worker models are needed (Cherrington, Ayala, Amick, Allison, Corbie-Smith, & Scarinci, 2008).

Self-Management Model

Until the middle of the 20th century, acute diseases posed the greatest health challenges in the U.S. However, the face of disease has now changed from acute infectious diseases to one of chronic diseases, and currently, chronic disease is the major cause of disability as well as being responsible for the majority of physician consultations and health care expenditures (Holman & Lorig, 2004). In order to more effectively enhance the treatment of the increasing number of the population afflicted with chronic diseases, health care providers are recognizing the need to adopt new health care models to accommodate the rise in chronic diseases. As such, health care providers are moving towards the application of the self-management model (Holman & Lorig, 2004) that embraces a greater level of patient/physician collaboration in dealing with the disease.

Self-management of an illness refers to the involvement of the patient in all aspects of his/her illness on a daily basis in order to control or reduce the impact of the disease (Katz, 2005). Thus, a key element in the concept of self-management of a chronic disease is the active role of the patient who is responsible for engaging in the prescribed health behaviors. Greater responsibility is placed on patients to self-manage their disorder, such as responsible adherence to medication specifications, identifying triggers, following healthier lifestyles, and monitoring vital signs and health outcomes as specified. The self-management model has been successfully applied to the treatment and maintenance of chronic diseases, e.g. asthma, epilepsy, arthritis, and diabetes (O'Connor et al., 2008).

This model focuses on teaching patients the necessary skills to optimize their health outcomes under the supervision of the health care professional. Effective self-management of any chronic disease is a complex and multifactorial process that is influenced by patients'

attitudes and beliefs, their perceived ability to self-manage their illness, and their perceptions of a supportive healthcare provider (Battersby, Ask, Reece, Markwick, & Collins, 2004).

The strength of this model is that it incorporates the important role of the patient in the self-management of his/her chronic disease and strives to empower the patient by providing process skills that result in the desired behavior change, e.g. knowledge about his/her condition, the importance of regular monitoring of blood glucose levels, lifestyle options, as well as providing supportive feedback (Smith, Bosnic-Anticevich, Mitchell, Saini, Krass and Armour, 2007). In this model, the patient is seen as an active participant in the management of his/her chronic disease as opposed to the traditional bio-medical model where the healthcare professional assumes the major responsibility for the disease and the patient plays a more passive role. This top-down approach may obstruct rather than facilitate self-management practices (Daiki, 2008). In the view of Anderson and Funnell (2005), this new paradigm shift of patient empowerment requires health care professionals to “feel responsible *to* rather than *for* patients” (p. 155).

Relationships between patients and healthcare providers have been found to be significant for improved outcomes and patient satisfaction. In a pilot study on nurse-patient relationships on English-speaking adults in England, Callaghan and Williams (1994) reported on how the role of healthcare professionals was significantly related to successful outcomes and patient satisfaction. The study found that patients’ outcomes were affected by their perceptions of not only the expertise of the healthcare professional but also when they, as patients, were seen as people with needs, concerns, and opinions.

Smith et al. (2007) conducted a study within an Australian community pharmacy healthcare setting that focused specifically on adults with asthma. The guiding framework was

the self-management model and the healthcare providers adopted a patient-centered approach. The patients were helped to identify problem areas of asthma control, instructed on how to set goals to address these problematic issues, and encouraged to devise strategies that would assist in maintaining these health behaviors. The healthcare providers were able to provide feedback and support through regular contact. The study concluded that providing the necessary skills and guidance to self-manage a chronic disease is crucial for attaining lifelong effective control of one's chronic disease

Thompson, Horton and Flores (2007) conducted a pilot study in an urban community health center in California on Mexican Americans adults with type 2 diabetes to study the effectiveness of health promoters providing diabetes management education. The study reported significant decreases in HbA1C levels. The authors concluded that having a supportive health care provider and peers was essential for implementing self-management behaviors to control one's diabetes and can be an effective strategy to reduce health disparities.

A cross-sectional study on adults with diabetes in Texas (Nwasuruba et al., 2009) found that lower socioeconomic status was related with poorer access to care and that there were significant racial/ethnic differences in self-management practices. This study was based on self-reports and did not include any clinical outcome measures.

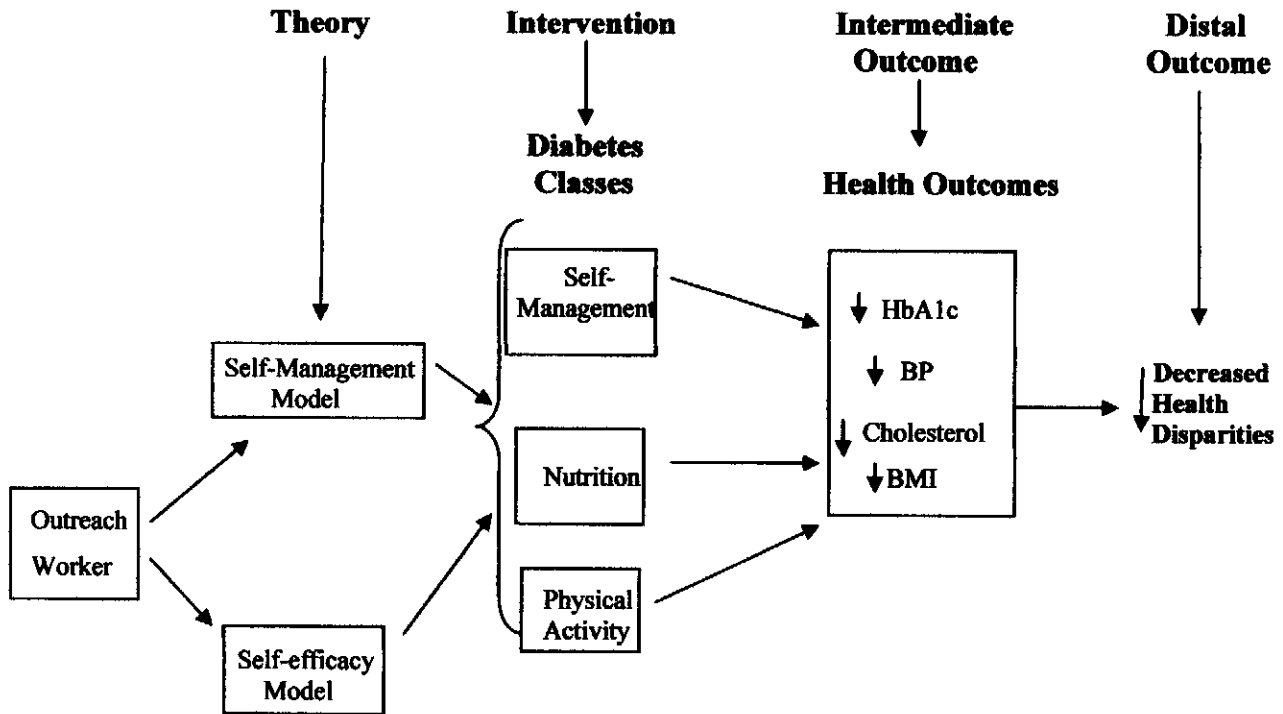
Self-management of diabetes provides complex challenges for both the healthcare professional as well as the patient. To reduce the prevalence of diabetes complications as well as reduce health disparities, it is crucial that patients be encouraged as well as supported by healthcare providers to engage in self-management behaviors.

Self-Efficacy Model

With the incidence of Type 2 diabetes being particularly significant among those of low socioeconomic status, Brown et al. (2004) reported that healthcare professionals often assumed that patients of low socioeconomic status were less educated and intelligent than those with higher incomes. This resulted in a more top-down approach that did not encourage patient participation or inclusion in the treatment or decision-making regarding their illness. Consequently, patients reported more dissatisfaction with their providers as well as obtaining less than optimal improvements in the health outcomes whereas patients that were made to feel capable of managing and controlling their disease had better health outcomes. Thus, the concept of self-efficacy is an important component to be incorporated into the self-management of one's illness.

Bandura's (1977) social-cognitive theory of self-efficacy refers to the individual's beliefs in his/her capabilities to perform a behavior that is required to produce the desired outcome. Research has found that the levels of self-efficacy are a strong predictor of behavior change (Wangberg, 2008). For this intervention, this component is necessary in order for patients to increase the self-management of their diabetes and to actively engage in health promoting behaviors, such as having regular medical check-ups. The outreach worker can play an important role in contributing to increased levels of self-efficacy by encouraging the patient to engage in these health behaviors (See Figure 2).

Figure 2: Guiding Frameworks and Strategies



Community Focus

Healthy People 2010 highlight the fact that there is a reciprocal relationship between the individual and the environment in which he/she resides and that a healthy community leads to healthy individuals. As such, one of the underlying premises of *Healthy People 2010* is “that the health of the individual is almost inseparable from the health of the larger community ...” One of the recommended tools to achieving a healthy community is through community partnerships (USDHHS, 2000). Studies have reported that community programs that focus on disease management have been effective in improving health outcomes, and it is the general view that diabetes self-management education interventions are the most promising avenue to further explore (Love et al., 1997).

Community partnerships can play a vital role in promoting more favorable health outcomes and in reducing the racial and ethnic health disparities (Pérez & Martinez, 2008). Community centers that advocate protective lifestyle behaviors can lead to a reduction in diabetes complications and an enhanced quality of life. Research on the effectiveness of diabetes education interventions has yielded mostly positive results (Two Feathers et al., 2005; Peek, Cargill, & Huang, 2007). However, a limitation of this research is that the majority of the evaluated interventions have not included racial and ethnic minorities.

Faith-based organizations (FBOs) have for many years played an active role in health promotion and disease prevention. FBOs have hosted health promotion programs, such as health education, screenings for blood pressure and diabetes, weight loss and smoking cessation programs, and cancer prevention and awareness. DeHaven, Hunter, Wilder, Walton, and Berry (2004) conducted a systematic qualitative review of faith-based organizations and the effectiveness of their health programs to maintaining and improving the overall health of the individuals in the respective communities. This study concluded that faith-based organizations can have a positive impact on health outcomes and recommended that such programs need to be more frequently evaluated and the results need to be more effectively disseminated. This study reinforces the need to focus on community settings to educate individuals about the need to practice healthier behaviors.

Context and Background

The Center for Health and Wellness (CHW) is located in northeast Wichita, Kansas and was founded in July 1998. No state or federal monies were received to create the CHW as it was funded locally. The guiding framework for the CHW is community-based and consists of community partnership between businesses, hospitals, religious communities, city and county

government, universities, and area residents. The CHW is a community-based clinic formed to provide primary health care to all the community members, especially the traditionally underserved predominantly African American population of northeast Wichita, who have few or no alternatives for affordable health care. Since its inception in 1998, the CHW has served over 50,000 patients. The mission of the CHW is to provide quality healthcare to all family members as well as placing a strong emphasis on the need for prevention and wellness education. As such, the CHW has organized over 2,000 events in their education center that have been attended by more than 17,000 community members who participated in their programs on prevention and wellness education, video conferencing and community health screenings.

The CHW represents a paradigm shift from the traditional health care approach, which relies on the use of emergency room or low-income clinics that focuses on tertiary prevention and treatment of illnesses, to an approach that focuses on primary and secondary prevention. The patients of the CHW are predominantly low income African Americans who have higher rates of diabetes compared to their white counterparts. Thus, the need for focusing on prevention of such chronic diseases is a high priority of the CHW and monthly screenings for hypertension, diabetes and other chronic diseases are offered to the community at no cost.

Outreach workers play a vital role in the functioning of the CHW. There are currently six female outreach workers at the CHW. These outreach workers initially undergo an 8-week training session from Via Christi Hospital under the supervision of an advanced nurse practitioner. This initial didactic training provides the necessary knowledge about health disease as well as providing the skills needed to carry out their duties. Each year, the outreach workers continue to undergo booster and refresher courses, such as “Train the Trainer” offered by Kansas Department of Health Education, and an intensive diabetes training from Via Christi in order to

Department of Health Education, and an intensive diabetes training from Via Christi in order to further develop their skills and levels of expertise. The outreach workers are responsible for inputting the information obtained from the patient's entry form as well as updating information after each visit with the doctor into the database. There is an assigned outreach worker that is dedicated to routinely checking the data entries for any errors. Well aware of the need to promote the importance of responsible self-care behaviors in order to reduce the possible complications from diabetes, the CHW encourages regular checkups for blood pressure, cholesterol, glucose, eye, and foot exams. The outreach worker is responsible for calling the patients the day before their scheduled visit to remind them of the next visit. The outreach workers make weekly home visits to high risk patients in order to ensure that they are managing their diabetes. The outreach workers also play an important role in community outreach by participating in health fairs in organizations and churches, conducting education classes, and distributing health-related materials. There is evidence that by providing education and health screenings for community members, diabetes care has been effectively addressed (Pérez & Martinez, 2008).

Community-University Partnership

A partnership was formed between the CHW and Wichita State University's (WSU) psychology department when the CHW first opened in 1998. Researchers at WSU have collaborated on a number of projects, e.g. *Activities for Life* project, *Prescription for Prevention*, and the Asthma project. The CHW also incorporated a Diabetes Project into their programs due to the fact that the majority of their patients are African Americans who suffer a disproportionate burden of diabetes. Data has been collected over the past ten years and the CHW was interested in determining the effectiveness of their Diabetes project. To assist in this endeavor, researchers from the psychology department once again assisted the CHW in evaluating their Diabetes

Project. The guiding framework for this collaboration was a contextual and interactive model that addresses the multidimensional complexities that are necessary in order to develop and sustain a community-university partnership. Not only is it important to be aware of the different needs of the organization, the community, and the university partner, but it is also necessary to have an interactional relationship that starts with building trust and mutual respect in order to develop positive and sustainable relationships with both partners. This model highlights the reciprocal interrelationship of such a partnership (Suarez-Balcazar, Harper, & Lewis, 2005).

Rationale for this Evaluation

The literature reviewed provides the following rationale for this present evaluation. First, there is a clear need to focus on improving the health status of all the citizens of the U.S. and to eliminate health and disease disparities among racial/ethnic minorities. In order to close the gap in diabetes-related health disparities, it is crucial to have community programs that connect health care providers and the community members (Roe & Thomas, 2002 as cited in CDC, 2007). Consequently, more health programs are looking to community health care centers and outreach workers to bridge this gap (Love et al., 1997). The National Diabetes Advisory Board (1987) called for evaluations of the effectiveness of community-based interventions (Engelgau, Narayan et al., 1998).

Second, there needs to be a stronger emphasis on prevention. There is ample evidence that many health problems and premature death rates are caused mostly by chronic conditions and unhealthy and risky behaviors that are preventable. The need for early detection of chronic illnesses, such as diabetes, is greatly stressed in order to reduce the serious diabetes-related complications. Diabetes prevention and management can be more successful through the efforts of programs that provide social support, encourage consistent follow-up visits, and provide

education and preventive care rather than relying on available modern technology. Due to the fact that African Americans have higher rates of diabetes with the resulting morbidities and mortality, it is important to investigate effective avenues to assist this population with not only coping with this chronic disease but to also highlight the importance of reducing the risk factors and emphasizing the protective factors to prevent the onset of diabetes (Samuel-Hodge et al., 2008). The CDC (2007) asserts that by implementing regular blood pressure checks on a person with type 2 diabetes can cut health care costs by \$1,200 over their lifetime as well as extend their life by six months. Regular blood pressure checks can also reduce the risk of heart disease and stroke among people with diabetes by 33%–50%, and the risk of eye, kidney, and nerve diseases by about 33%. By following a comprehensive foot care program can save \$1, 200 in just 5 years in health care costs for a person with diabetes who had foot ulcers, and this could prevent up to 85% of diabetes-related amputations. By receiving training on how to effectively self-manage their diabetes, expensive hospitalization costs can be prevented.

Conceivably, a community intervention strategy using outreach workers can be beneficial not only to detect people at risk for diabetes through raising awareness and contributing to a behavior change to be more proactive, but a community intervention can also have a positive impact on people already diagnosed with diabetes by encouraging the need for strict self-management, lifestyle changes, and regular medical check-ups. It is also important to determine whether community interventions are able to encourage sustained behavior changes. To date, the majority of the research does not have extended follow-up data (DeHaven et al., 2004; Peek, Cargill, & Huang, 2007).

Therefore, the purpose of this research was to evaluate the effectiveness of a community-based health clinic's diabetes project and determine who benefitted the most from their efforts.

Research Questions

In order to gain a deeper understanding about the effectiveness of the Diabetes Project as well as to determine who benefitted the most by participating in the Diabetes Project, the following research questions were explored:

Research Question One

The evaluation examined whether there were statistically significant differences in the outcome levels (blood sugar [HbA1c], blood pressure, cholesterol, and BMI) of patients from baseline to date of their last visit.

- 1a.** Were there gender differences in outcome levels (blood sugar, blood pressure, cholesterol, and BMI) from baseline to date of their last visit?
- 1b.** Were there differences between the racial/ethnic groups (African American, Caucasian, and Other) in the outcome levels (blood sugar, blood pressure, cholesterol, and BMI) from baseline to date of their last visit?
- 1c.** Were there any differences between the three age groups (19 – 44, 45 – 64, and 65 and older) in the outcome levels from baseline to date of their last visit?

Research Question Two

An important component of the CHW is their focus on prevention and wellness education and, as such, the CHW offers three diabetes specialty classes (diabetes self-management, nutrition, and physical activity). The evaluation explored whether there was a difference in the outcome levels of patients who attended these classes compared to patients who did not attend these classes.

CHAPTER II

METHODOLOGY

Participants

Participants in this evaluation were obtained from archival data collected at the Center for Health and Wellness (CHW) from patients who attended the CHW's Diabetes Project and were diagnosed as suffering from diabetes during the period January 1, 1998 – June 30, 2008. Participants provided their age, sex, race/ethnicity, height and weight at the time of the initial consultation. The total number of participants was 216 of which 147 were females (68.1%) and 69 were males (31.9%). Their ages ranged from 19 to 101 ($M = 53.56$, $SD = 14.71$). There were 8 minors under 18 years of age that were excluded from the original data. The ethnicity of the participants consisted of 143 (66.2%) African Americans, 55 (25.5%) Caucasians, and 18 (8.3%) Other (which includes Hispanic/Latino, Asian American, and American Indian). The health insurance status of the participants was 78 (36.1%) had Medicaid, 56 (25.9%) had Medicare, 35 (16.2%) had a commercial health insurance, 40 (18.5%) were self-paying, and 6 (2.8%) had no insurance.

Of the participants, 21 (9.7%) had type 1 diabetes, and 195 (90.3%) had type 2 diabetes. Body Mass Index (BMI) values were computed by dividing the patient's weight by their height squared (Kg/M^2). BMI values are commonly used as a global indicator of physical health, with healthy values typically ranging from 18.5 to 24.5 (CDC, 2004). Eighteen (8.3%) of the participants had normal BMI values, 33 (15.3%) were overweight, 142 (65.75%) were obese, and 1 (.5%) was underweight. One hundred and seventy two participants (79.6%) were diagnosed as hypertensive and 43 (19.9%) had normal blood pressure levels. Thirty two participants (14.8%) reported that they had intentions of practicing self-management (SM) goals, 136 (63%) reported that they had no SM goals, and 48 (22.2%) participants chose not to answer the question. (See

Table 1). Participants were recruited from Sedgwick County in northeast Wichita, Kansas. The population in Sedgwick County is 476,026 according to the 2000 Census (U.S. Department of Commerce, 2007).

Table 1: Demographics and Health Outcome Measures at Baseline

Participant Demographics		Health Outcomes	
Age (Mean, SD)	53.5 (14.71)	*HbA1c (%)	
		Normal	33.8
Gender (%)		High	51.4
Females	68.1	*LDL Cholesterol (%)	
Males	31.9	Normal	27.8
Ethnicity (%)		Moderate risk	41.7
African Am.	66.6	High risk	1.9
Caucasian	25.5	*BP (%)	
Other	8.3	Normal	34.7
SM Goals (%)		High	49.5
Yes	13.9	Very high	15.3
No	63	*BMI (%)	
Blank	23.1	Normal = 18.5 - 24.9	6.1
Diabetes (%)		Overweight = 25 -29.9	12.9
Type 1	9.7	Obese = ≥ 30	72.8
Type 2	90.3	Underweight = < 18.5	0.7

* Missing Data

HbA1c (N = 184)

LDL cholesterol (N = 154)

BP (N = 215)

BMI (N = 194)

Setting

The Center for Health and Wellness (CHW) is located in northeast Wichita, Kansas. The CHW is a community-based clinic that provides primary health care to all the community

members, regardless of whether they have the means to pay for the services or not. The CHW consists of six examination rooms, a treatment and procedure room, laboratory services, an education center as well as a children's courtyard. The CHW is currently staffed by a Family Practice Physician, OB-GYN Resident Doctors, a Physician Assistant, a Registered Nurse, certified Medical Assistants, medical records technicians, Masters prepared Addictions specialist, Outreach coordinators, clinical specialist, and laboratory support staff. The CHW also offers various community-based outreach programs: diabetes screenings and treatment; kidney screenings and treatment; hypertension screenings and treatment; substance abuse treatment; anger management classes, breast and cervical cancer education; Social and Rehabilitation Services (SRS) assistance and project access; and physical activity classes – *Activities for Life* (women only) and *Life Fit* (men only).

Recruitment

Recruitment of patients for the CHW follows a multifaceted approach. A large lettered billboard advertising the CHW is strategically placed on the exterior of the CHW property. Newspaper advertisements are placed in the local newspaper, *The Wichita Eagle*, on a regular basis with updates about the monthly schedules for the free health screenings of diabetes and kidney disease as well as the various health education and physical activity classes. Flyers containing the schedules and education classes are distributed to local organizations and churches. The attending physician assistant at the CHW encourages patients to attend the screenings and classes as well as to bring family members and friends to the CHW. Word of mouth publicity from patients who have attended the CHW is also an effective method of recruitment. The CHW also holds Health Fairs at various organizations in order to promote a *Prescription for Healthy Living* that is offered at the Center. For example, such Health Fairs have

taken place in local businesses and organizations, e.g. Raytheon, Bank of America, T-Mobile, The Boys & Girls Club, and various community churches. To date, the CHW has served over 50,000 people patients with more than 17,000 people having participated in prevention and wellness education programs, video conferencing and community health screenings.

Procedures

This study was approved by the Institutional Review Board at Wichita State University. The WSU researchers signed Statements of Confidentiality. As depicted in Figure 3, patients can access the CHW either by scheduling an appointment at the clinic or by attending the monthly free community health screenings. At the community health screenings, the clinical outcome measures of blood pressure, cholesterol, HbA1c, and microalbumin are taken by the respective outreach workers and volunteer nurses. A nurse reviews the results with the patient and explains the implications of the results. If the clinical outcomes are high, then the nurse will recommend that the patient schedule an appointment with the clinic as well as recommending that the patient attend the various specialty classes of diabetes management, nutrition, and physical activity. Should the clinical outcome measures be within the normal limits, the patient is recommended to take another screening in six months. If access to the clinic is by having scheduled an appointment, the patient will first be required to complete the patient history and health assessment forms. The resident healthcare provider will examine the patient as well as having the patient's clinical outcome measures taken. If the clinical outcomes are high, the patient will receive medical instructions and medications, if needed, as well as recommendations to attend the various specialty classes of diabetes management, nutrition, and physical activity. Should the clinical outcome measures be within the normal limits, the patient is recommended to reschedule another appointment within the year.

Access to the CHW by appointment

When patients have an initial scheduled visit, they complete a consent form regarding the purposes of treatment, payment, and health care options. Then a comprehensive patient history form and family medical history is completed by the patient. This includes insurance information and other demographic information such as income level, living arrangements, alcohol and tobacco use, how often he/she attends church, and form of transportation. There is also a comprehensive Patient Questionnaire Form enquiring about any problems that he/she may have experienced in the last 6 months in one of the following areas: *constitutional, eyes, ears/nose/throat (ENT), cardiovascular, respiratory, gastrointestinal, musculoskeletal, psychiatric, genitourinary, skin, neurological, endocrine, and hematological/lymphatic*. Each section has specific areas of focus, e.g. **Constitutional** – good general health lately; recent weight change; fever; fatigue; headaches. The patient has the choice of answering: *No; Yes; Date*. The patient also needs to list all current medications that are being taken. After completing these forms, the patient's information is put in the general Chronic Disease Electronic Management System (CDEMS) database by the front desk receptionist. CDEMS is a Microsoft Access database application designed to assist medical providers in tracking patients with chronic health conditions (CDEMS, 2008).

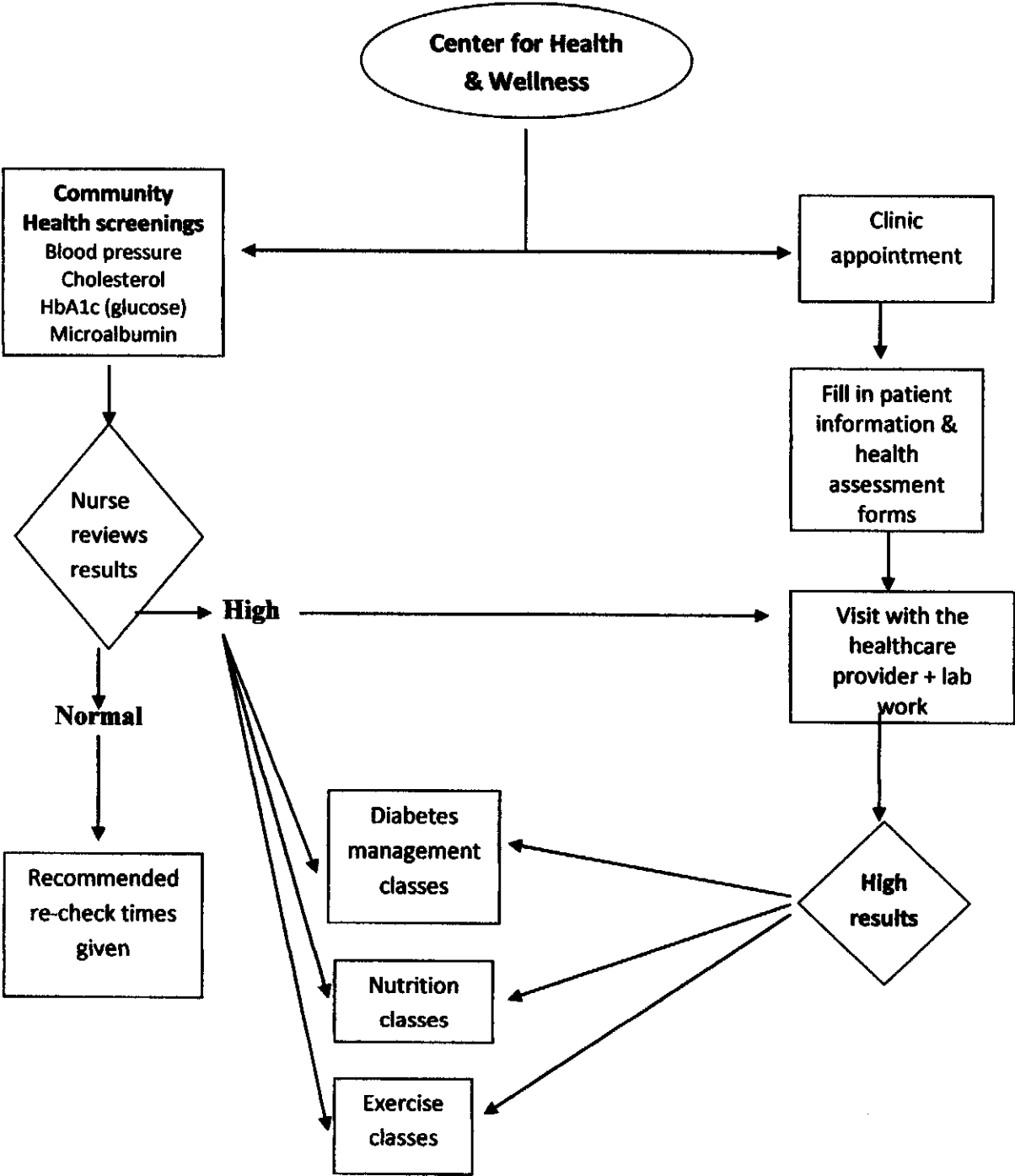
After the consultation with the healthcare provider and the clinical outcomes have been obtained, if the patient has been identified as being diabetic, the patient's information is passed on to the Diabetes Outreach Worker at the CHW where the information is entered into the diabetes database that allows for electronic management of the patient. If the patient has any elevated results, the patient is strongly urged to regularly attend the CHW for further medical attention. Brochures on "*Prescription for a Healthy Community*" are given to the patients who

are encouraged to attend these specialty care classes that include diabetes self-management, nutrition and exercise classes. These classes are offered on a regular basis at the CHW at no cost where instruction on self-management techniques of the diabetes, which includes providing them with a blood monitoring device that is necessary to track their daily blood glucose levels. (See Table 2).

Access to the CHW by community health screenings

Once monthly screenings are offered to the community at no cost to the patients (funding is provided by grants). On arrival, the patient signs in and is handed a Health Screening Registration Form. The patient then has his/her blood pressure taken by the Hypertension Outreach Worker who records the results on the Health Screening Form. The patient then proceeds to the table where another outreach worker will take their blood sugar and cholesterol levels using a blood sugar monitor that pricks the finger. The results are recorded on the patient's Health Screening Form. The patient is then asked to provide a urine specimen. Using a urine dip stick, the Outreach Worker tests the micro-albumin levels in the urine to test for kidney or urologic disease. This takes one minute to obtain the results, which are recorded on the form provided by the National Kidney Foundation. The patient then proceeds to the final table where a volunteer retired nurse discusses all the results with the patient as well as enquires about their overall health behaviors, which include smoking, alcohol, diet and food preferences and physical activity levels. If the patient has any elevated results, the patient is strongly urged to attend the CHW for further medical attention as well as attend the specialty care programs. (See Figure 3).

Figure 3: Flow chart of patient entry process into Center for Health & Wellness



Intervention

At the health screenings, patients also receive educational materials on prevention of diabetes, diabetic complications, and high blood pressure and information on health and wellness. A brochure *“Prescription for a Healthy Community”* containing the schedules of all the community education classes offered at the CHW during the next forthcoming three months is handed to patients. (See Table 2). These include **Activities for Life**, which is a physical activity class at no cost for women 18 years and older taught by a female physical education instructor. This activity takes place 3 times weekly – Tuesdays, Thursdays and Fridays from 6 – 7 PM. There is a physical activity class at no cost for men 18 years and older called **Life Fit**, which is taught by a male Registered Physical Therapist (RPT) offered on Tuesdays and Thursdays from 7 – 8 PM. Monthly classes are offered on Mondays from 12 – 1PM on **Diabetes Self Management**, which is offered under the guidance of a registered Licensed Practical Nurse (LPN), focuses on educating about diabetic complications that can be avoided through regular and responsible self-management of blood sugar levels. **Nutrition Awareness** classes, facilitated by the Sedgwick County Extension Service, are offered monthly on Wednesdays from 12 – 1PM. These classes provide education on ways to make healthier eating choices as well as practicing healthier lifestyles. There are sign-in sheets for individuals who attend any of these classes. Once patients attend the classes, this information is entered into a database that documents the patient’s body mass index, blood pressure, cholesterol and blood sugar levels.

Table 2: Prescription for a Healthy Community

Program	Target Population	Content
<i>Activities for Life</i> 3 times weekly from 6 – 7 PM	Women 18 years and older	Exercise class designed to reduce risk factors for cardiovascular disease and to boost energy
<i>Life Fit</i> 2 times weekly from 7 – 8 PM	Men 18 years and older	Exercise class designed to increase flexibility, range of motion, and cardiovascular endurance
<i>Diabetes & Kidney screenings</i> Monthly from 3 – 7PM	All community members	Blood sugar, cholesterol, blood pressure and micro-albumin levels checked. Early detection and treatment of diabetes is crucial to prevent long-term complications
<i>Diabetes Self Management</i> Monthly from 12 – 1PM	All community members	Methods of self-management of blood sugar levels are taught to prevent diabetic complications
<i>Nutrition Awareness</i> Monthly from 12 – 1PM	All community members	A self-management program to increase knowledge about nutrition, food choices, and healthy lifestyles

CHAPTER III

RESULTS

Statistical analyses were conducted using SPSS (version 16). The data was examined for accuracy of data entry and missing values. This involved using SPSS programs for frequencies, descriptive and boxplots. All five of the outcome variables had missing data which was replaced with the series mean of the values.

Descriptive Statistics

There were a total of 216 participants (147 females and 69 males). The average time that patients participated in the Diabetes Project was 2.59 years. The mean Body Mass Index (BMI) of the female participants at the date of their last visit was 26.8 (SD = .64), which is considered overweight. The mean BMI of the male participants at the date of their last visit was 24.2 (SD = .75), which is just within the normal range. As shown in Table 3, there was an improvement in normal BMI levels for females (6.6% to 8.7%) and a reduction in obesity levels (78.8% to 74.6%) from baseline to date of last visit. This reduction resulted in the increase in overweight BMI levels for females (13.9% to 15.7%) but this shows that females are reducing their body weight towards normal levels. For males, there was a reduction in obese BMI levels (60.3% to 57.7%), which resulted in an increase in overweight levels (24.1% to 26.9%) and shows that males are also moving towards normal body weight levels.

Table 3. BMI (%) for females and males

	Females		Males	
	Base (N = 137)	Last (N = 127)	Base (N = 58)	Last (N = 52)
Normal	6.6	8.7	15.5	15.4
Overweight	13.9	15.7	24.1	26.9
Obese	78.8	74.6	60.3	57.7
Underweight	0.7	0.7		

Primary Findings

Threats to Statistical Conclusion Validities

As a result of having multiple dependent variables and conducting multiple pairwise-comparisons in the statistical analyses, to control for the probability of committing a Type 1 error and fishing and experiment-wise error rate problems, all tests were conducted at the $\alpha = .01$ significance level (Cook & Campbell, 1979).

Research Question 1

To determine if the Diabetes Project had resulted in changes in outcome measures of the patients, paired-samples *t* tests were conducted to assess differences between baseline and date of the last visit on four clinical outcomes: HbA1c; blood pressure (systolic and diastolic); LDL cholesterol; and BMI. The results indicated that three of the outcomes were significant, controlling for familywise error rate at the .01 level, using the Holm's sequential Bonferroni procedure. The mean HbA1c at last visit ($M = 7.70$, $SD = 1.90$) was significantly lower than at baseline measure ($M = 8.15$, $SD = 2.26$), $t(215) = 3.33$, $p < .01$, the standardized effect size

baseline measure ($M = 135.66$, $SD = 21.98$), $t(215) = 3.58$, $p < .01$, the standardized effect size index, $d = .24$. The 99% confidence levels for the mean differences was 1.47 to 9.24. The mean diastolic blood pressure at last visit ($M = 79.14$, $SD = 12.32$) was significantly lower than at baseline measure ($M = 83.37$, $SD = 13.84$), $t(215) = 4.70$, $p < .01$, the standardized effect size index, $d = .32$. The 99% confidence levels for the mean differences was 1.90 to 6.57.

No statistically significant results were found for LDL cholesterol, $t(215) = 1.73$, $p = .09$, and BMI, $t(215) = 1.18$, $p = .24$.

Table 4 shows the within-group mean changes of the health outcomes from base measures to last visit, classified by gender, race, and age group. The bold numbers highlight the statistically significant changes at $\alpha = .01$. Females significantly reduced the HbA1c, systolic and diastolic blood pressure measures, while males obtained significant reductions in all health outcomes except for BMI. African Americans, overall, had the most improvements in outcome measures with significant reductions in HbA1c, systolic and diastolic blood pressure measures with Caucasians only showing a significant improvement in LDL measures. There were no statistically significant changes in Other measures. Age group 19-44 years showed a significant reduction in LDL, systolic and diastolic blood pressure measures; 45-64 years age group significantly improved HbA1c and diastolic blood pressure measures; while the 65 and older age group significantly improved the systolic and diastolic blood pressure measures.

Table 4. Within-Group Mean Changes from Base and Last Measures in Health Outcomes by Gender, Race, and Age

	HbA1c ^a		LDL ^b		BP Systolic ^c		BP Diastolic ^d		BMI ^e	
	Base	Last	Base	Last	Base	Last	Base	Last	Base	Last
Gender										
Female	8.09	7.66*	111.70	110.40	136.29	132.32	83.62	79.70*	36.51	36.33
Male	8.25	7.76	114.94	105.70*	134.29	126.00*	82.82	77.90*	35.17	32.05
Race										
AA	8.22	7.67*	112.13	109.75	140.32	132.85*	84.70	79.48*	35.34	34.83
White	7.63	7.53	115.17	105.66	126.40	124.52	79.60	78.00	36.65	35.89
Other	9.08	8.38	110.08	112.02	126.83	127.66	84.27	79.88	30.87	30.83
Age										
19-44	8.02	7.70	115.53	105.42	131.34	123.09*	86.36	79.77*	39.40	39.75
45-64	8.30	7.72*	111.65	110.18	134.22	132.44	82.71	79.88	34.44	33.94
>65	7.83	7.60	112.37	109.55	145.79	133.25	81.38	76.00	32.06	31.15
Total	8.15	7.70*	112.74	108.90	135.66	130.30*	83.37	79.14*	35.31	34.77

Note: Bold numbers indicate significant changes in outcome levels; * $p < .01$

a. <7 optimal; > 7 high

b. < 100 optimal; 100 – 159 borderline high; 160 – 189 high; > 190 very high

c. ≤ 120 normal; 120 – 159 high; > 160 very high

d. ≤ 80 normal; 80 – 99 high; > 100 very high

e. 18-25 normal; 25 – 29.9 overweight; > 30 obese

Table 5 shows the within-group mean changes of the health outcomes from base measures to last visit, stratified by gender, to reflect differences by race and age group. Although there were only a few statistically significant results, it can be observed in Table 5 that there were moderate reductions in most of the outcome measures for all groups.

Overall, African American females had the most statistically significant changes with African American females aged 19-44 years showing a statistically significant reduction in systolic blood pressure measure, those in the 45-64 age group showing statistically significant

Although the males reported moderate reductions in most of the outcomes except for BMI, African American males, in all age groups, seemed to have the most reductions in the outcome measures.

Table 5. Comparison of Means of Base and Last Measures in Health Outcomes Stratified by Gender, Race, and Age

Gender	Age	Race	HbA1C ^a		LDL ^b		BP Systolic ^c		BP Diastolic ^d		BMI ^e	
			Base	Last	Base	Last	Base	Last	Base	Last	Base	Last
F	19-44	AA (n = 22)	7.74	7.68	112.90	104.58	131.91	123.09*	85.00	80.82	36.57	39.67
		White (n = 10)	7.41	7.37	123.92	108.61	131.60	125.40	84.80	81.20	34.50	40.10
		Other (n = 4)	7.74	7.62	96.69	103.45	119.00	119.50	90.00	79.50	37.50	36.48
45-64	AA (n = 57)	8.64	7.67*	109.45	114.06	140.07	137.54	86.00	80.77	37.46	36.93	
	White (n = 22)	7.37	7.81	111.55	102.20	128.00	128.31	79.64	79.77	38.07	36.42	
	Other (n = 4)	9.50	9.12	105.18	105.70	112.50	117.00	73.00	80.00	31.67	32.13	
≥ 65	AA (n = 22)	7.71	7.62	111.92	113.06	145.08	136.36*	79.33	75.27	34.41	31.45	
	White (n = 3)	8.27	7.90	119.33	130.00	145.67	140.00	90.00	85.33	44.43	33.42	
	Other (n = 3)	10.93	8.17	126.00	126.00	153.33	153.00	84.67	72.68	25.46	31.58	
M	19-44	AA (n = 8)	8.26	7.51	116.56	106.80	153.50	134.00	95.50	81.00	37.11	41.76
		White (n = 7)	9.21	7.57	136.78	107.36	117.14	113.43	78.27	73.14	32.43	38.35
		Other (n = 2)	9.57	11.05	62.00	90.45	109.50	109.00	94.50	80.00	37.14	27.28
45-64	AA (n = 23)	8.61	7.93	117.67	109.02	135.35	132.43	83.13	80.43	33.74	29.18	
	White (n = 12)	7.33	7.05	103.48	104.29	122.33	120.00	74.50	72.90	34.99	29.91	
	Other (n = 5)	9.50	9.12	134.40	124.20	135.60	134.80	84.40	84.00	36.20	29.41	
≥ 65	AA (n = 11)	7.25	7.31	110.25	94.81	149.82	121.09*	83.64	75.45	38.16	31.10	
	White (n = 1)	6.50	7.70	84.00	84.00	92.00	118.00	66.00	80.00	31.90	34.97	

* p < .01

a. < 7 optimal; > 7 high

b. < 100 optimal; 100 - 159 borderline high; 160 - 189 high; > 190 very high

c. Systolic: ≤ 120 normal; 120 - 159 high; > 160 very high

d. Diastolic: ≤ 80 normal; 80 - 99 high; > 100 very high

e. 18-25 normal; 25 - 29.9 overweight; > 30 obese

Research Question 1a

To assess research question 1a of whether there were gender differences in outcome measures at the date of last visit, a one-way analysis of covariance (ANCOVA) was conducted. The independent variable was gender, the dependent variables were HbA1c, blood pressure (systolic and diastolic), LDL, and BMI measures at the last visit, and the covariates were HbA1c, blood pressure (systolic and diastolic), LDL, and BMI at baseline measures. A preliminary analysis evaluating the homogeneity-of-slopes assumption for dependent variables was met. The ANCOVA was significant on BMI measures [$F(1, 213) = 8.94$, $MSE = 100.32$, $p < .01$, $\eta^2 = .04$]. The strength of the relationship between gender and BMI was small, as assessed by a partial η^2 , with gender accounting for 4% of the variance, holding constant the baseline BMI measures.

Nonsignificant differences were found for HbA1c [$F(1, 213) = .02$, $MSE = 2.50$, $p = .90$, $\eta^2 = .00$]; systolic blood pressure [$F(1, 213) = 4.42$, $MSE = 318.56$, $p = .04$, $\eta^2 = .02$]; diastolic blood pressure [$F(1, 213) = .83$, $MSE = 115.34$, $p = .36$, $\eta^2 = .004$]; and LDL cholesterol [$F(1, 213) = 2.43$, $MSE = 716.47$, $p = .12$, $\eta^2 = .01$].

Paired-sample *t*-tests were conducted to further investigate for within-group differences between females and males. As shown in Table 6, both females and males showed a significant decrease in HbA1c, systolic and diastolic measures, while males also showed a significant decrease in LDL levels. Females reported a statistically significant reduction in mean HbA1c levels from 8.10 to 7.66 (.44, $p < .01$) and diastolic blood pressure from 83.63 to 79.71 (3.92, $p < .01$). Males reported statistically significant reductions in mean systolic blood pressure levels from 134.29 to 126.00 (8.29, $p < .01$); diastolic blood pressure from 82.83 to 77.93 (4.9, $p < .01$); and LDL from 114.94 to 105.71 (9.23, $p < .01$). Females had a nonsignificant reduction in mean systolic blood pressure from 136.29 to 132.32 (3.97, $p < .05$), LDL cholesterol from 111.70 to

and LDL from 114.94 to 105.71 (9.23, $p < .01$). Females had a nonsignificant reduction in mean systolic blood pressure from 136.29 to 132.32 (3.97, $p < .05$), LDL cholesterol from 111.70 to 110.40 (1.31, $p = .63$), and BMI from 36.51 to 36.34 (.17, $p = .87$). Males had a nonsignificant decrease in HbA1c from 8.25 to 7.76 (.48, $p = .04$) and in BMI from 35.17 to 32.05 (3.12, $p = .09$).

Table 6. Comparison of Mean Changes in Health Outcomes from Baseline to Last Visit in Females and Males

	HbA1c	Systolic	Diastolic	LDL	BMI
Females (n = 147)					
Baseline	8.10	136.30	83.63	111.71	36.51
Last Visit	7.66*	132.32	79.71*	110.40	36.33
Males (n = 69)					
Baseline	8.25	134.29	82.83	114.94	35.17
Last Visit	7.77	126.00*	77.93*	105.71*	32.05

* $p < .01$

Research Question 1b

To assess research question 1b of whether there were racial/ethnic differences in outcome measures at the date of last visit, a one-way analysis of covariance (ANCOVA) was conducted. The independent variable was racial/ethnic group, the dependent variables were HbA1c, blood pressure (systolic and diastolic), LDL, and BMI measures at the last visit, and the covariates were HbA1c, blood pressure (systolic and diastolic), LDL, and BMI at baseline measures. A

preliminary analysis evaluating the homogeneity-of-slopes assumption for dependent variables was met. The ANCOVA reported nonsignificant differences for HbA1c [F(1, 212) = .40, MSE = 2.50, $p = .67$, $\eta^2 = .004$]; systolic blood pressure [F(1, 212) = .42, MSE = 325.42, $p = .70$, $\eta^2 = .004$]; diastolic blood pressure [F(1, 212) = .11, MSE = 116.21, $p = .89$, $\eta^2 = .001$]; LDL cholesterol [F(1, 212) = 1.05, MSE = 720.91, $p = .35$, $\eta^2 = .01$], and BMI [F(2, 212) = 1.16, MSE = 103.89, $p = .32$, $\eta^2 = .01$].

Paired-sample *t*-tests were conducted to further investigate for within-group differences between racial/ethnic groups. As shown in Table 7, African Americans (N = 143) reported significant reductions in HbA1c from 8.22 to 7.67 (.55, $p < .01$, CI = .10 to .99); systolic blood pressure from 140.32 to 132.85 (7.47, $p < .01$, CI = 2.35 to 12.60); and diastolic blood pressure from 84.70 to 79.48 (5.23, $p < .01$, CI = 2.26 to 8.19). There were no statistically significant reductions in any of the outcome measures for Caucasians and Other.

Table 7. Comparison of Mean Changes in Health Outcomes from Baseline to Last Visit Within Racial/Ethnic Groups

Race	HbA1c		LDL		Systolic		Diastolic		BMI	
	Base	Last	Base	Last	Base	Last	Base	Last	Base	Last
AA (n = 143)	8.22	7.67*	112.13	109.75	140.32	132.85*	84.70	79.48*	35.34	34.83
White (n = 55)	7.63	7.53	115.17	105.66*	126.40	124.52	79.60	78.00	36.65	35.89
Other (n = 18)	9.08	8.38	110.08	112.02	126.83	127.66	84.27	79.88	30.87	30.83

* $p < .01$

Research Question 1c

To assess research question 1c of whether there were age group differences in outcome measures at the date of last visit, a one-way analysis of covariance (ANCOVA) was conducted. The independent variable was age group, the dependent variables were HbA1c, blood pressure

(systolic and diastolic), LDL, and BMI measures at the last visit, and the covariates were HbA1c, blood pressure (systolic and diastolic), LDL, and BMI at baseline measures. A preliminary analysis evaluating the homogeneity-of-slopes assumption for dependent variables was met.

The ANCOVA was significant for BMI measures [$F(1, 212) = 7.45$, $MSE = 98.13$, $p < .01$, $\eta^2 = .07$]. The strength of the relationship between age group and BMI was small, as assessed by a partial η^2 , with gender accounting for 7% of the variance, holding constant the baseline BMI measures. The means of the BMI measures adjusted for initial differences were 19-44 age group ($M = 39.17$), 45-64 age group ($M = 34.26$), and >65 age group (31.56). Follow-up tests were conducted to evaluate pairwise differences among these adjusted means using the Holm's sequential Bonferroni procedure. There were significant differences in the adjusted means between the 19-44 and >65 age groups, but no significant difference between the 45-64 and >65 age groups. (See Table 8).

Table 8. 99% Confidence Intervals in BMI in Age Groups

Dependent Variable: BMI at last visit

Agegrp	Mean	Std. Error	99% Confidence Interval	
			Lower Bound	Upper Bound
19-44	39.172^a	1.361	35.635	42.709
45-64	34.261 ^a	.894	31.939	36.583
>65	31.565^a	1.567	27.492	35.638

^a Covariates appearing in the model are evaluated at the following values: BaseBMI = 36.0826.

The ANCOVA reported nonsignificant differences for HbA1c [$F(2, 212) = .12$, $MSE = 2.5$, $p = .89$, $\eta^2 = .001$]; systolic blood pressure [$F(2, 212) = 4.03$, $MSE = 314.72$, $p = .02$, $\eta^2 = .04$]; diastolic blood pressure [$F(2, 212) = .11$, $MSE = 114.21$, $p = .89$, $\eta^2 = .001$]; LDL cholesterol [$F(1, 212) = 1.09$, $MSE = 720.66$, $p = .34$, $\eta^2 = .01$].

Research question 2

Research question #2 was concerned with determining if attendance at the specialty classes (diabetes self-management, nutrition, and physical activity) had an impact on the clinical outcomes.

Descriptive Statistics

Twenty three (10.6%) participants attended all three of the classes, 41 (19%) attended two of the three classes, while 152 (70.4%) did not attend any of the classes. As Table 9 shows, 72.1% females and 66.7% males did not attend any of the classes. A total of 27.9% females attended all or some of the classes compared to 33.3% males who attended all or some of the classes.

Table 9. Attendance to Specialty Classes by Gender

	Females (N = 147)	Males (N = 69)
Never	106 (72.1%)	46 (66.7%)
Some	22 (15.0%)	19 (27.5%)
All	19 (12.9%)	4 (5.8%)

Table 10 displays the data of those who attended each specific specialty class by gender. Female attendance to the Diabetes Self-Management and Nutrition classes was attended equally

(21.1%) with slightly fewer (19.7%) attending the Exercise class. Males also had an equal attendance to the Diabetes Self-Management and Nutrition classes (21.7%) with 17.4% attending the Exercise class. Thus, of those who attended the Exercise classes, more females than males attended (19.7% compared to 17.4%).

Table 10. Attendance to each Specialty Class by Gender

	Diabetes SM	Nutrition	Exercise
Females (N = 42)	31 (21.1%)	31 (21.1%)	29 (19.7%)
Males (N = 24)	15 (21.7%)	15 (21.7%)	12 (17.4%)

*Note: Attendance to the classes is not mutually exclusive

Table 11 further describes the data of those who attended the classes stratified by gender, age, and race. It can be seen that African American females, 45-64 years, had the highest attendance (43.8%) to the classes while Caucasian females, of all three age groups, had a very low attendance to the classes. African American males, 45-64 years, had the highest attendance (43.5%) to the classes while Caucasian males, of all three age groups, had a very low attendance.

Table 11. Attendance to the Three Specialty Classes (Diabetes Self-management, Nutrition, and Physical Activity) Stratified by Gender, Race, and Age

			Never	Some	All
			n (%)	n (%)	n (%)
Female	19-44	AA (n = 22)	15 (68.2)	4 (18.2)	3 (13.6)
		White (n = 10)	9 (90)	1 (10)	0
		Other (n = 4)	4 (100)		
	45-64	AA (n = 57)	32 (56.1)	15 (26.3)	10 (17.5)
		White (n = 22)	20 (90.9)		2 (9.1)
		Other (n = 4)	3 (75)		1 (25)
	≥ 65	AA (n = 22)	18 (81.1)	1 (4.5)	3 (13.6)
		White (n = 3)	3 (100)		
		Other (n = 3)	2 (66.7)	1 (33.3)	
Male	19-44	AA (n = 8)	7 (87.5)	1 (12.5)	
		White (n = 7)	5 (71.4)	2 (28.6)	
		Other (n = 2)	1 (50)	1 (50)	
	45-64	AA (n = 23)	13 (56.5)	6 (26.1)	4 (17.4)
		White (n = 12)	11 (91.7)	1 (8.3)	
		Other (n = 5)	3 (60)	2 (40)	
	≥ 65	AA (n = 11)	5 (45.5)	6 (54.5)	
		White (n = 1)	1 (100)		
	Total (N = 216)			152 (70.4)	41 (19)

Statistical Analysis

A linear regression analysis was conducted to evaluate the prediction of attending the specialty classes and improvements in the four clinical outcomes. Dummy variables were created for attendance (0 = never, 1 = some, and 2 = all). The regression equation was not significant, $R^2 = .001$, adjusted $R^2 = -.003$, $F(1, 214) = .28$, $p = .60$. Attendance accounted for less than 1% percent of the variance in changes in the clinical outcome variables.

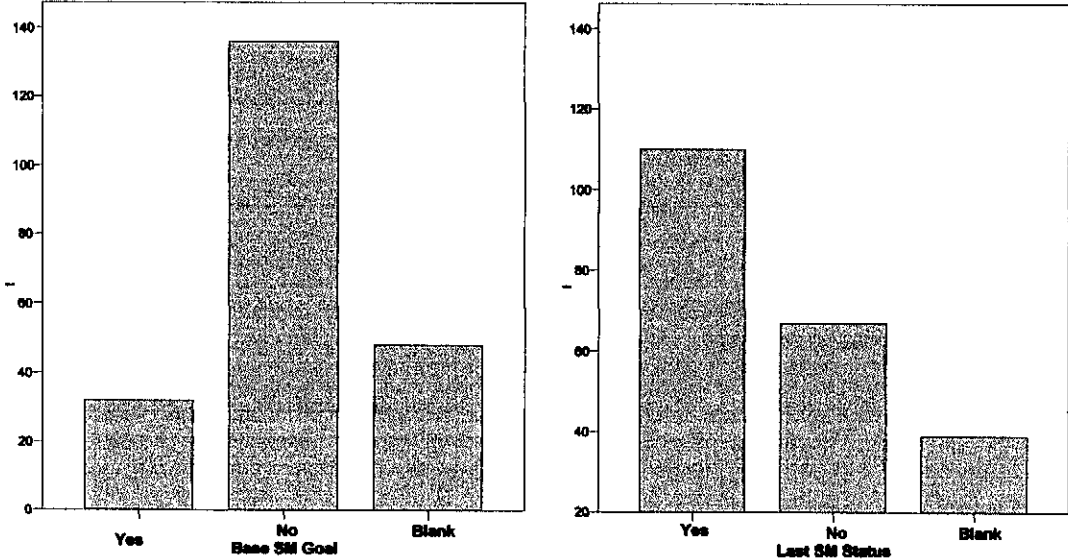
Based on the above results, it appears that the intervention did not account for changes in the outcome measures because there was a low attendance to the classes. Therefore, changes in the outcome levels cannot be attributed to the classes.

Secondary Findings

Self-Management

As shown in Figure 4, at baseline measurement, 30 (13.9%) participants reported that they intended to practice self-management (SM) of their diabetes, 136 (63%) reported they had no intentions of self-managing their diabetes, and 50 (23.1%) chose not to answer the question. At the date of the last visit, 110 (50.9%) participants were self-managing their diabetes, 67 (31%) were not engaging in SM, and 39 (18%) were not recorded. This information was recorded by the healthcare providers. A paired *t*-test comparing mean differences from SM base measures to SM last measures was significant, $t(215) = 10.72$, $p < .01$. There was a significant increase in self-management practices from 13.9% to 51.4%.

Figure 4. Self-Management (SM) Goals at Base and Last Measures.



A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of engaging in self-management behaviors or not on the four outcome measures (HbA1c, blood pressure –systolic and diastolic, LDL, and body weight). Nonsignificant differences were found on the outcome measures, Wilks’s $\lambda = .97$, $F(5, 210) = 1.24$, $p = .29$. The multivariate η^2 was .03, and self-management practices accounted for less than 3% percent of the variance in changes in the clinical outcome variables.

CHAPTER 1V

DISCUSSION

General Findings

The main purpose of this research was to determine the usefulness, feasibility, and potential effectiveness of the Diabetes Project implemented at a community-centered clinic, assisted by outreach workers, as a strategy to eliminate health disparities.

With the incidence of type 2 reaching epidemic proportions and especially affecting racial and ethnic minorities of a lower income, there is an urgent need to close the gap in these health disparities. Many of the participants in this study had limited financial resources with only 16.2% having a private insurance and the rest (83.3%) had either Medicaid/Medicare or no insurance and had to self-pay a small fee to the CHW. Studies (Weinick et al., 2004) report that often individuals of limited resources may either avoid or delay having medical visitations or check-ups or adhering to treatment regimens as there are more pressing concerns they have to deal with on a daily basis, such as feeding their families or paying the rent. As such, issues of health or prevention are not of a high priority unless they become seriously ill.

It is, therefore, important to target low income and underserved populations and provide accessible primary care facilities. However, there have been limited studies on high-risk racial/ethnic minorities in community settings. Some of the studies conducted on racial/ethnic minorities include Thompson et al. (2007) who conducted a pilot study on 142 Mexican American male and female adults in California suffering from type 2 diabetes and reported significant reductions in HbA1c levels. Project Sugar conducted two large-scale trials on urban African Americans and concluded that community health models focusing on diabetes care and management need to be pursued (Gary et al., 2005). Likewise, the current study was also able to

demonstrate a reduction of blood sugar levels and blood pressure among patients. These results were promising and seem to indicate that the Diabetes Project is having some impact in reducing health disparities. Although the changes cannot directly be attributed to engaging in the specialty classes, it appears other factors are involved in changing the behaviors of clients at the Center for Health and Wellness, such as more active self-management behaviors of their diabetes and other unknown factors.

Research Question 1

The results showed that during the ten-year period, there was an overall improvement in the hemoglobin A1c (HbA1c) and systolic and diastolic blood pressure measures. The HbA1c test determines how well one's blood sugar has been controlled over the last two or three months, and is a good indicator of how well the diabetes is being managed. The goal for people with diabetes is an HbA1c of less than 7%, and the higher the HbA1c, the higher the risks of developing serious diabetes-related complications. Studies have demonstrated that diabetic complications can be delayed or prevented if the HbA1c level can be kept close to 7% (American Diabetes Association, 2008). High blood pressure increases the risk of heart disease and stroke and is especially serious in diabetic patients. Consequently, lowering blood pressure is important in diabetic patients. It was, therefore, encouraging to report that the Diabetes Project was able to achieve a significant decrease in both blood glucose and blood pressure, which are two important risk factors that need to be controlled in order to avoid end-organ damage and other serious diabetes-related complications.

Although there were no statistically significant reductions with the other two outcome measures of LDL cholesterol or BMI, this was not unexpected and other studies (Thompson et al., 2007) have confirmed similar findings. Regarding the failure to significantly decrease body

weight, or to even experience a slight weight gain, there are various factors that could attribute to this factor. Thompson et al. (2007) reported studies have found that weight gain has been experienced in diabetes patients that could be attributed to either the improved HbA1c levels and diabetes medications. Our results did report improved HbA1c levels and therefore, this could be accounting for the failure to decrease body weight.

Another factor that needs to be considered is that the mean age of the participants in our evaluation was 53. A natural part of the aging process is that one's metabolism slows down due to the fact that as one ages, the body needs fewer calories, especially if one is not very active (CDC, 2004). Taking these factors into consideration, it makes it more difficult to lose weight, especially for older adults. Additionally, the majority of the patients were considerably overweight or obese at baseline measures, which has resulted from years of overeating and inactivity. Changing one's health habits is difficult, takes time to achieve, and relapses often occur (Wadden, Brownell, & Foster, 2002). It should be noted, however, that although there were not significant decreases in BMI, in many instances, there were some decreases in body weight although the person was still classified as overweight or obese. For example, females showed a reduction in obese levels from 78.8% to 74.6%, and females within the normal range increased from 6.6% to 8.7%. For the males, there was a reduction in obese levels from 60.3% to 57.7%. It also needs to be acknowledged that although the physical activity might not have been of an intensity that resulted in significant weight loss, exercise is beneficial for the internal organs of the individual as well as contributing to improved moods, psychological well-being, and cognitive functioning (CDC, 2004).

Research Question 1a

Research question 1a was concerned about determining whether there were any gender differences in the outcome measures. Although there were no significant differences between females and males, there were, however, significant within-group reductions in HbA1c, systolic and diastolic blood pressure measures. Furthermore, males also showed a significant decrease in LDL levels while females showed very little change in LDL levels. From these results, it appears that males benefitted the most from the Diabetes Project.

Research Question 1b

Research question 1b was concerned about determining any differences between racial/ethnic groups in the outcome measures. The purpose was not to make generalizations to the racial/ethnic groups at large but to compare subgroups of racial/ethnic groups experiencing similar demographic variables. Although there were no significant differences between the three groups, there were significant within-group differences. Of the three groups, Caucasians showed the greatest decrease in LDL levels reporting a significant reduction, while African Americans reported significant reductions in HbA1c, systolic and diastolic levels. Overall, African Americans did obtain decreases in all of the outcome measures and it appears that African Americans benefitted the most from the Diabetes Project. This could be attributed to the fact that the outreach workers and the majority of the staff at the CHW are also African Americans. This could be leading to increased feelings of rapport and trust. Other group experienced a decrease in only two measures, namely HbA1c and diastolic levels but the sample size was much smaller than the other two groups and it is difficult to generalize. The lack of any significant difference between the groups was interesting especially in light of the fact that there were 66.6% African Americans compared to 25.5% Caucasians and 8.3% Other. Having a larger African American

sample, however, is not unexpected due to the fact that the area served by the CHW is predominantly African American and is thus a representative sample of this area. Another factor that could have contributed to African Americans having overall the most reductions in the outcome measures could be related to the sample size of African Americans (66.6%) compared to Caucasians (25.5%) and Other (8.3%).

Research Question 1c

Research question 1c was concerned about determining any differences between the three age groups, namely 19-44, 45-64, and ≥ 65 , in the outcome measures. There was a significant difference in BMI measures between the 19-44 and 65 and over age groups with the younger age group having higher BMI levels than the 65 and older group. This is disturbing and supports the concerns over the obesity epidemic that is afflicting the U.S. This problem requires urgent addressing especially in light of the associated morbidities that are associated with obesity and the rising rates of type 2 diabetes. The CHW needs to address this issue and find ways of encouraging patients to decrease body weight.

Studies report that after the age of 45, there are various changes in the body composition and it is estimated that the average individual loses around 10% of their muscle mass per decade. These changes in body composition account for the vast majority of the decline in one's metabolism rates (Janssen & Ross, 2005). It was, therefore, interesting to note that the 65 and older age group, with the resulting slower metabolism rates, existing chronic diseases, and lowered activity levels, were still able to report reductions in all of the outcome measures even though they were not statistically significant.

Examining the results by outcome measures, stratified by gender, race, and age, the following results are noteworthy:

HbA1c from baseline to last measure

Females in all age groups, except White females aged 45-64, reported decreases in HbA1c levels. African American females aged 19-44 and 45-65 had the greatest decrease in HbA1c levels while Other females 65 and older reported the greatest decrease.

African American males aged 45-65 and over 65 had the greatest decrease in HbA1c levels while White males aged 19-44 reported the greatest decrease in sugar levels.

Systolic Blood Pressure from baseline to last measure

African American females aged 19-44 and over 65, and African American males aged 19-44 and 45-64 had the greatest decreases.

Diastolic Blood Pressure from baseline to last measure

Other females aged 19-44 and over 65 had the greatest decreases in diastolic outcomes, while African American males in all of the age groups reported the greatest decreases as well as and Other males aged 19-44.

LDL from baseline to last measure

White females aged 19-44 and 45-64 had the greatest decrease in LDL levels. White males aged 19-44 had the greatest decrease in LDL levels. African American males aged 45-64 and Other reported the greatest decrease in LDL levels from baseline to last measure. In the age group over 65 only African American males had a notable decrease. African American and White females over 65 reported increases in LDL levels.

Body Weight

African American women, in all three age groups, were able to decrease their body weight. For the males, only White men, aged 19-44, and African American men, aged over 65 years, reported slight decreases in body weight with all the other age groups and race/ethnicity groups reporting increased body weight. The fact that African American men aged 19-44 were

markedly obese is reflective of the serious public health concern of the current obesity epidemic affecting the United States. Being overweight is an important risk factor for developing type 2 diabetes and more effective strategies need to be developed to reduce or prevent this increase in body weight.

Some factors that may have contributed to the above results could be that the patients were adults, with a mean age of 53, who bring years of lifestyle choices that now need to be changed. This takes time to change and one of the functions of community centers, such as the CHW, is to persevere and attempt to make in-roads into establishing healthier behaviors and decreasing health disparities not only for the current patients but for future generations. Another important factor that needs to be considered is socioeconomic (SES) status. The patients of the CHW are predominantly of low SES. Healthy and nutritious foods are often more expensive than cheaper foods that consist of higher caloric, fat or carbohydrate contents. This makes it difficult to eat healthier foods that can contribute to weight loss. Also, many of the patients do not readily have access in their neighborhood to supermarkets where they can purchase fruits and vegetables. Many of the patients also do not have transportation to go to the nearest supermarket. Thus, such environmental factors may be contributing to a failure to obtain improved outcomes.

Another objective of this research was to establish who, within the sample base, benefitted the most from the Diabetes Project. Overall, it seems that African American males benefitted the most from the Diabetes Project reporting reductions, many statistically significant, on all of the outcome measures except for BMI levels. For the females, it seems that African American females, aged 19-44 benefitted the most from the program.

Research Question 2

Attendance at the specialty classes was not statistically significant. The desired impact of the specialty classes of diabetes self-management, nutrition, and physical activity were not as optimal as expected. However, firstly, the author believes that the available data was not a true reflection of the actual attendance of the patients as the record keeping of the specialty classes is not as efficient as desired. More effective record keeping strategies need to be implemented to assist in evaluating the program in the future. The frequency of participation in the programs and classes needs to be recorded in the patient's chart after each session. Secondly, Keyserling et al. (2000) reported a similar finding in a diabetes management program with 200 African American women with type 2 diabetes in central North Carolina with only 28% of the participants attending diabetes nutrition and dietary counseling during the year. Low attendance to specialty classes is an important barrier that needs to be surmounted because there is extensive evidence that behavioral modifications can result in improved clinical outcomes, such as blood glucose and BMI levels. It, therefore, remains an important goal to develop effective strategies to encourage attendance to diabetes education classes in order to improve diabetes care.

Evaluating the existing data, the results showed that African American females, aged 45-64 had the best attendance to the classes while Caucasians and Other had a poor showing. A contributing factor could be that the outreach workers are females. For the males, African American males, aged 45-64 had the best attendance to the classes while Caucasians did not attend. This could be because of a lack of affinity with the outreach workers and staff who are mostly African Americans. Given these results, focus groups and/or surveys need to be undertaken in order to determine the reasons for non-attendance to the classes by males and Caucasians in general. The CHW may consider including more diversity in their staff, especially

in the specialty classes to encourage a higher attendance. CHW needs to also develop more effective strategies to increase attendance in these classes.

Further examination of the attendance results showed that similar percentage of females and males attended the diabetes and nutrition classes, and a slighter higher percentage of females attended the physical activity classes. It was interesting to observe that males did attend the nutrition classes and it would be valuable to determine if these males were actively involved in their food choices and preparation or if their significant others continued to prepare their meals.

Other possible reasons for low attendance of these classes can be attributed to the times that the classes were offered. The physical activity classes have been offered during the week at 6 p.m. for females and 7 p.m. for males. This time can be difficult to attend as families are getting ready to have dinner and meals need to be prepared. Also, people are often tired after working all day and may not have the energy to attend a physical activity class. The CHW has subsequently added physical activity classes on Saturday mornings and a future evaluation of class attendance will be important to assess.

Surprising Findings

An unexpected finding was the self management component as a factor in behavioral changes resulting in improved clinical outcomes. Patient self-management is an important component for controlling chronic diseases resulting in improved clinical outcomes, reduced health care costs as well as improved psychosocial outcomes for the patient. Previous research on self-management practices include asthma and intermittent allergic rhinitis, which were conducted on Australian adults using a community pharmacy-delivered self-management intervention (Smith et al., 2007; O'Connor et al., 2008). Results indicated that there were significant improvements in both clinical and psychosocial outcomes for the patients. Katz

(2005) conducted a study to assess the extent to which self-management practices mediated improved coping skills with rheumatoid arthritis. Results showed that self-management behaviors can have a beneficial impact on improving one's quality of life and clinical outcomes.

Project Direct (1993, 2004), a comprehensive diabetes-prevention program, focused on African Americans adults (mean age = 55.3, SD = 13) in Raleigh, North Carolina, a high-risk community for developing type 2 diabetes. The study found that the HbA1c levels did not change despite an increased number of tests at health care providers per year. The results suggested that improved outcome measures are not necessarily associated with improved amounts of visits to the community center and that the patient component of self-management and self-efficacy needs to be reinforced (Din-Dzietham et al., 2004).

Thus, in the current study, the results on significant improvements in self-management behaviors of patients at the CHW were most encouraging reinforcing the effectiveness of the self-management and self efficacy models. Successful self-management of any chronic disease is a complex and multifactorial process that is influenced by patients' attitudes and beliefs, their perceived ability to self-manage their illness, and their perceptions of a supportive healthcare provider. Outreach workers play an important role in the functioning of the CHW. Sharing similar cultural and ethnic characteristics as the community members, the outreach workers are able to build rapport and trust with the patients. In this way, they can provide emotional support as well as encouragement and instruction on the necessary skills to self-manage their disease. Patients feel comfortable to contact the outreach worker if any questions arise or if there are malfunctions in their self-monitoring devices. This evaluation reinforces the concept that interventions using community outreach workers can have an impact on improving health outcomes, especially with traditionally underserved communities.

Although the documented changes in the outcome measures, especially HbA1c and systolic and diastolic levels, cannot be attributed to attendance at the specialty classes, perhaps just raising awareness of the patients health outcomes, such as at the health screenings and initial physician's visit and receiving encouragement from the outreach workers to self-manage their diabetes, contributed to reducing these levels.

Recommendations

Effective record keeping is vital for conducting evaluations that will empower and assist the CHW in gaining insight about the effectiveness of the programs and whether changes need to be implemented as well as assisting the organization in obtaining future grants.

It is recommended that the CHW consider hiring a program evaluator to conduct program evaluations on a regular basis. It is recommended that ongoing assessments of process outcomes be conducted in order for the CHW to determine if their objectives are being met, if the services and programs are reaching the target population, if the patients are satisfied with the services, and if any changes need to be implemented. Some suggested strategies might include implementing satisfaction surveys on a regular basis to the patients in order to obtain feedback on the services and make mid-course corrections if necessary. Occasional focus groups would also be beneficial to obtain insight into the effectiveness of the program. It would also be valuable to include in these focus groups the patients understanding of self-management behaviors. In this way, the CHW can determine if the patients understand what exactly is meant when the outreach workers and health practitioners refer to self-management behaviors.

More frequent impact assessments should also be conducted as it is crucial to determine if the Diabetes Project is meeting its intended objectives of reducing the severity of diabetes and

diabetes-related complications as a strategy to reducing health disparities. This evaluation is the first formal impact assessment that has been conducted on the Diabetes Project at the CHW.

In order to facilitate more efficient record keeping, the sign-in sheets from the specialty classes should be kept for at least five years. The lack of available data from sign-in sheets from earlier years hindered the evaluation's ability to determine the effectiveness of the intervention. Storage of paper work is often problematic due to a shortage of space, therefore, to accommodate for storage problems, the sign-in sheets should be scanned into the computer and stored on CDs thus eliminating the storage of paper. The nurses and healthcare providers need to question the patients at each visit about attendance at these classes and recommend more consistent attendance. Although the outreach workers do attempt to encourage the patients to attend, reinforcement from the medical staff would be beneficial.

The low attendance to the specialty classes may be attributed to the fact that the CHW adopts a more passive approach towards attending these specialty classes. It is, therefore, recommended that the CHW adopt a more "aggressive" approach to encouraging class attendance. For example, incentives could be offered, such as if a certain amount of classes are attended in a two month period, a food voucher at the local supermarket will be awarded. Another option could also be inviting Farmers Market to have a community market at the CHW providing the opportunity to community members to buy fresh produce. Vouchers could also be offered based on class attendance.

Another recommendation concerning the nutrition classes is that the classes focus on the individual with the disease. This micro approach does not incorporate a macro approach, which should include the context within which the individual lives. For example, Hepworth (1999) found that most women with diabetes continued to provide food preferences for their families

rather than follow the recommended dietary changes for themselves. This is due to the fact that the women see themselves as the caregivers and their personal needs are secondary. Thus, a recommendation for CHW is to incorporate family sessions into the nutritional classes that will provide the necessary support for the woman as well as beneficial nutritional awareness to the whole family.

Limitations

There are a number of limitations noted in this research. First, this research was not developed at the beginning of the implementation of the Diabetes Project. Consequently, the available data from the CHW was limited and lacking in details that would have provided a more insightful evaluation, such as the dosage and intensity of the specialty classes.

Second, there are various factors that need to be considered that may have jeopardized the internal validity of this research (Campbell & Stanley, 1963). The history of events between baseline measures and date of the last visit may have influenced changes in the outcome measures, which were extraneous to the actual Diabetes Project. Patients spent on average 2.59 years in the Diabetes Project and as such, maturation of the patients, such as psychological changes, may have occurred and influenced the outcomes. The sample used in this evaluation was a convenient sample and is thus subject to selection bias and limitations on attributing causality. Statistical regression may have occurred when the scores of patients that were very high or very low tended to regress towards the mean during retesting.

There are also limitations to the external validity of this research as these results cannot be considered generalizable to all African American, Caucasian, and Other population groups in Wichita, Kansas. However, these results are representative of the population in the immediate

area surrounding the CHW, which is predominantly African American and of low socioeconomic status who have high rates of diabetes and blood pressure.

Third, the sample sizes between the groups varied considerably and may have affected some of the results. Fourth, as a result of staff turnover, this may have interfered with how data was collected and reported resulting in rater inconsistencies. Thus, there was not the desired consistency in the record keeping, for example, with regards to the classification of the types of diabetes, for example, in some instances, a patient was first classified as type 2 by a nurse, and then later as type 1 by another nurse.

Future Research

Future research in this area should consider having control groups in order to be able to make conclusions about the effectiveness of these specialty classes. It would also be important to have more equal groups regarding gender, race/ethnicity, and age. To maximize the benefits of health programs, it would also be beneficial to determine the current stage of the target population's intention to modify their health behaviors by using a theoretical health model. The Transtheoretical model (TTM) of behavior change (Prochaska & DiClemente, 1997) has been successfully used in a number of health behaviors, e.g. smoking cessation, unprotected sex, substance abuse, physical activity, and eating habits (Samuel-Hodge et al., 2008) and highlights the fact that a behavior modification does not take place all at once but rather that people progress through different stages. By identifying the stage in which the person finds him/herself, will assist in maximizing the desired behavior change by having an appropriate intervention that corresponds to the person's current stage. A *Stages of Change Scale* measurement would need to be conducted initially to assess the patient's current stage of behavior change as well as readministered periodically to assess their stage.

The inclusion of focus groups (i.e. a qualitative approach) would provide more in-depth and insightful information about the needs and concerns of the population and assist in implementing any changes if deemed necessary. It would also be interesting to include demographic information about participant's marital status. This would be of interest, for example, to know if males are single and responsible for providing their food or if they have a spouse who prepares their food. At present, the nutrition class targets the individual with diabetes, but if he/she does not prepare the food, then this may result in a failure to implement the healthier food recommendations. In this case, it may be necessary to have family involvement in the nutrition classes.

It would be most worthwhile to be able to track the participants over time in order to assess the sustainability of their health behaviors. It would also be meaningful to be able to measure the end organ damage of the patients to determine if their organs have deteriorated or have remained at the initial levels. For example, it would be valuable to track the end organ damage, such as blindness, lower limb amputations, coronary heart disease, and kidney failure in the patients who have received the education classes compared to groups who have not received any education classes. Thus a more comprehensive approach is warranted and recommended.

Implications for Practice

There is a clear need to address and eliminate health disparities in the U.S. Community health care centers, such as the CHW, have been identified as an important avenue to attaining this goal (USHHS, 2000; Two Feathers et al., 2005). Moreover, the role of outreach workers functioning in collaboration with community health care providers is increasingly gaining in acceptance as a method to promoting health and preventing diseases, especially among populations that are underserved (Rhodes et al., 2007; Parket et al., 2008). However, one needs

to acknowledge that very often community centers are not research-oriented and often lack the understanding, knowledge, and skills required to conduct program evaluation research. The outreach workers must be encouraged to maintain records of the patients and be educated on the need to document all interactions rather than rely on memory. Thus, it is important to conduct collaborative participatory research between universities and community-based agencies in order to assess the effectiveness of community-based agencies. Universities can make valuable contributions by providing the knowledge and expertise in evaluations to guide and empower the community agencies to function as effectively as possible. The CHW can learn whether the programs they are implementing are effective or whether mid-corrections are needed to improve the health of the population they serve.

Conclusions

Overall, the results were promising and the research was able to document reductions in health outcomes although these cannot be attributed to the intervention as outlined. Perhaps creating awareness of a program and encouraging self-management behaviors, community-based centers can use their assets to build capacity and reduce health disparities more strategically, particularly among African Americans. More evaluations and interventions are needed to address the still existing health disparities in African Americans.

REFERENCES

LIST OF REFERENCES

- American Diabetes Association. (2008). *All about diabetes*. Retrieved on November 2, 2008 from <http://www.diabetes.org>
- Anderson, R.M., & Funnell, M.M. (2005). Patient empowerment: reflections on the challenge of fostering the adoption of a new paradigm. *Patient Education and Counseling*, 57(2), 153-157.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Baptiste-Roberts, K., Gary, T., Beckles, G.L., Gregg, E.W., Owens, M., Porterfield, D., & Engellau, M.M. (2007). Family history of diabetes, awareness of risk factors, and health behaviors among African Americans. *American Journal of Public Health*, 97(5), 907-912.
- Battersby, M.W., Ask, A., Reece, M., Markwick, M.J., & Collins, J.P. (2003). The development and psychometric properties of a generic assessment scale for chronic condition self-management. *Australian Journal of Primary Health*, 9, 41-52.
- Brown, A.F., Ettner, S.J., Piette, J., Weinberger, M., Gregg, E., Shapiro, M.F., Karter, A.J., Safford, M., Waitzfelder, B., Prata, P.A., & Beckles, G.L. (2004). Socioeconomic position and health among persons with diabetes mellitus: a conceptual framework and review of the literature. *Epidemiologic Reviews*, 26, 63-77.
- Callaghan, D., & Williams, A. (1994). Living with diabetes: issues for nursing practice. *Journal of Advanced Nursing*, 20 (1), 132-139.
- Campbell, D.T., & Stanley, J.C. (1963). Experimental and quasi-experimental designs for research on teaching. In N. L. Gage (Ed.), *Handbook of research on teaching* (pp. 171-246). Chicago, IL: Rand McNally.
- Casagrande, S.S., Wang, Y., Anderson, T., & Gary, T.L. (2007). Have Americans increased their fruit and vegetable intake? The trends between 1988 and 2002. *American Journal of Preventive Medicine*, 32(4), 257-263.
- Center for Disease Control & Prevention. (2008). Diabetes Data and Trends. Retrieved on October 20, 2008 from http://www.cdc.gov/diabetes/statistics/prevalence_national.htm
- Center for Disease Control & Prevention. (2008). *New cases of diabetes on the rise*. Retrieved on November 2, 2008 from <http://www.cdc.gov/media/pressrel/2008/r081030.htm>.
- Cherrington, A., Ayala, G.X., Amick, H., Allison, J., Corbie-Smith, G., & Scarinci, I. (2008). Implementing the community health worker model within diabetes management. *The Diabetes Educator*, 34(5), 824-833.
- Chin, M.H., Walters, A.E., Cook, S.C., & Huang, E.S. (2007). Interventions to reduce racial and ethnic disparities in health care. *Medical Care Research and Review*, 64(5), 7S-28S.

- Chronic Disease Electronic Management System. (2008). The CDEMS User Network. Retrieved on November 2, 2008 from <http://www.cdems.com/>
- Cook, T.D., & Campbell, D.T. (1979). *Quasi-experimentation: Design and analysis for field studies*. Skokie, IL: Rand McNally.
- Dall, T., Edge Mann, S., Zhang, Y., Martin, J., & Chen, Y. (2008). Economic costs of diabetes in the U.S. *Diabetes Care*, 31(3), 596-615.
- Daiski, I. (2008). An expanded model of diabetes care based in an analysis and critique of current approaches. *Journal of Clinical Nursing*, 17, 310-317.
- DeHaven, M.J., Hunter, I.B., Wilder, L., Walton, J.W., & Berry, J. (2004). Health programs in faith-based organization: Are they effective? *American Journal of Public Health*, 94(6), 1030-1036.
- Din-Dzietham, R., Porterfield, D.S., Cohen, S.J., Reaves, J., Burrus, B., & Lamb, B.M. (2004). Quality care improvement program in a community-based participatory research project: Example of Project Direct. *Journal of the National Medical Association*, 96(10), 1310-1321.
- Engelgau, M.M., Narayan, V., Geiss, L.S., Thompson, T.J., Beckles, G.L.A., Lopez, L., Hartwell, T., Visscher, W., & Liburd, L. (1998). A project to reduce the burden of diabetes in the African American community: Project Direct. *Journal of the National Medical Association*, 90(10), 605-613.
- Gable, S., & Lutz, S. (2000). Household, parent, and child contributions to childhood obesity. *Family Relations: Interdisciplinary Journal of Applied Family Studies*, 49(3), 293-300.
- Gance-Cleveland, B. (2006). Family-centered care. *Journal for Specialists in Pediatric Nursing*, 11(1), 72-76.
- Gary, T.L., Hill-Briggs, F., Batts-Turner, M., & Brancati, F.L. (2005). Translational research principles of an effectiveness trial for diabetes care in an urban African American population. *The Diabetes Educator*, 31(6), 880-889.
- Goran, M.I. (2001). Metabolic precursors and effects of obesity in children: a decade of progress, 1990-1999. *The American Journal of Clinical Nutrition*, 2, 158-171.
- Gregg, E.W., Cadwell, B.L., Cheng, Y.J., Cowie, C.C., Williams, D.E., Geiss, L., Engelgau, M.M., & Venicor, F. (2004). Trends in the prevalence and ratio of diagnosed to undiagnosed diabetes according to obesity levels in the U.S. *Diabetes Care*, 27(12), 2806-2812.
- Hepworth, J. (1999). Gender and the capacity of women with NIDDM to implement medical advice. *Scandinavian Journal of Public Health*, 27(4), 260-266.

- Holman, H., & Lorig, K. (2004) Patient self-management: A key to effectiveness and efficiency in care of chronic disease. *Public Health Reports*, 119 (3), 239 – 243.
- Janssen, I., & Ross, R. (2005). Linking age-related changes in skeletal muscle mass and composition with metabolism and disease. *Journal of Nutrition & Health Aging*, 9(6), 408-19.
- Karter, A.J., Stevens, M.R., Gregg, E.W., Brown, A.F., Tseng, C., Marrero, D.G., Duru, K., Gary, T.L., Piette, J.D., Waltzfelder, B., Herman, W.H., Beckles, G.L., Safford, M.M., & Ettner, S.L. (2008). Educational disparities in rates of smoking among diabetic adults: The translating research into action for diabetes study. *Research and Practice*, 98(2), 365-372.
- Katz, P.P. (2005). Use of self-management behaviors to cope with rheumatoid arthritis stressors. *Arthritis Care & Research*, 53(6), 939-949.
- Keyserling, T.C., Ammerman, A.C., Samuel-Hodge, C.D., Ingram, A.F., Skelly, A.H., Elasy, T.A., Johnston, L.F., Cole, A.S., & Henriquez-Roldan, C.F. (2000). A diabetes management program for African American women with type 2 diabetes. *The Diabetes Educator*, 26(5), 796-805.
- Kubajda, M.C., Cornell, C.E., Nell Brownstein, J., Littleton, M.A., Stalker, V.G., Bittner, V.A., Lewis, C.E., & Raczynski, J.M. (2006). Training community health workers to reduce health disparities in Alabama's Black Belt. *Family & Community Health*, 29(2), 89-102.
- Lewis-Moss, R.K., Paschal, A., Redmond, M., Lee Green, B., & Carmack, C. (2008). Health attitudes and behaviors of African American adolescents. *Journal of Community Health*, 33, 351-356.
- Love, M. B., Gardner, K., & Legion, V. (1997). Community health workers: Who they are and what they do. *Health Education and Behavior*, 24(4), 510-522.
- Mayo Foundation for Medical Education and Research. (1999). Eliminating disparities, promoting partnerships. *Mayo Clinic Practice*, 74, 838-840.
- Morrisette, P.J., Brandon, U., Brandon, M.B., & Taylor, D. (2002). Family counseling and childhood obesity: A review of approaches. *Family Journal-Counseling & Therapy for Couples & Families*, 10(1), 19-26.
- National Institute of Diabetes and Digestive and Kidney Diseases. (2008). *The Diabetes Epidemic among African Americans*. Retrieved on October 26, 2008 from <http://www.diabetes.niddk.nih.gov/dm/pubs/statistics/>.
- Nwasuruba, C., Osuagwu, C., Bae, S., Singh, K.P., & Egede, L.E (2009). Racial differences in diabetes self-management and quality of care in Texas. *Journal of Diabetes and Its Complications*, 23, 112-118.

- O'Connor, J., Seeto, C., Saini, B., Bosnic-Anticevich, S., Krass, I., Armour, C., & Smith, L. (2008). Healthcare professional versus patient goal setting in intermittent allergic rhinitis. *Patient Education and Counseling*, 70, 111-117.
- Parker, E.A., Israel, B.A., Robins, T.G., Mentz, G., Lin, X., Brakefield-Caldwell, W., Ramirez, E., Edgren, K.K., Salinas, M., & Lewis, T.C. (2008). Evaluation of community action against asthma: A community health worker intervention to improve children's asthma-related health by reducing household environmental triggers for asthma. *Health Education & Behavior*, 35(3), 376-395.
- Peek, M.E., Cargill, A., & Huang, E.S. (2007). Diabetes health disparities. *Medical Care Research and Review*, 64(5), 101S-156S.
- Pérez, L.M. & Martinez, J. (2008). Community health workers: Social justice and policy advocates for community health and well-being. *American Journal of Public Health*, 98(1), 11-14.
- Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion*, 12, 38-48.
- Robinson, T. (2008). Applying the socio-ecological model to improving fruit and vegetable intake among low-income African Americans. *Journal of Community Health*, 33, 395-406.
- Rhodes, S.D., Long Foley, K., Zometa, C.S., & Bloom, F.R. (2007). Lay health advisor interventions among Hispanics/Latinos. *American Journal of Preventive Medicine*, 33(5), 418-427.
- Samuel-Hodge, C.D., Watkins, D.C., Rowell, K.L., & Hooten, E.G. (2008). Coping styles, well-being, and self-care behaviors among African Americans with type 2 diabetes. *The Diabetes Educator*, 34(3), 501-511.
- Smith, L., Bosnic-Anticevich, S.Z., Mitchell, B., Saini, B., Krass, & Armour, C. (2007). Treating asthma with a self-management model of illness behaviour in an Australian community pharmacy setting. *Social Science & Medicine*, 64 (7), 1501-1511.
- Suarez-Balcazar, Y., Harper, G.W., & Lewis, R. (2005). An interactive and contextual model of community-university collaborations for research and action. *Health Education & Behaviors*, 32(1), 84-101.
- Thompson, J.R., Horton, C., & Flores, C. (2007). Advancing diabetes self-management in the Mexican American community. *The Diabetes Educator*, 33 (6), 159S-165S.
- Two Feathers, J., Kieffer, E.D., Palmisano, G., Anderson, M., Sinco, B., Janz, N., Heisler, M., Spencer, M., Guzman, R., Thompson, J., Kimberlydawn, W., & Sherman, J. (2005). Racial and ethnic approaches to community Health (REACH) Detroit partnership: Improving diabetes-related outcomes among African American and Latino adults. *American Journal of Public Health*, 95(9), 1552-1560.

- U.S. Department of Commerce. (2007). Bureau of the Census. Census Data Center (2000). Retrieved on November 13, 2008 at <http://www.census.gov/>.
- United States Department of Health and Human Services, (1998). *Dr. David Satcher: The Surgeon General who Listens*. Retrieved on October 15, 2008 at odphp.osophs.dhhs.gov/pubs/prevrpt/sum98pr/98sumfoc.htm.
- United States Department of Health and Human Services, (2000). *HealthyPeople2010*. Retrieved on October 15, 2008 at <http://www.healthypeople.gov/>.
- United States Department of Health and Human Services, (200). *Overweight Trends Among Children and Adolescents – change!!*. Retrieved on , 2008 at <http://www.hhs.gov/>.
- Wadden, T. A., Brownell, K. D., & Foster, G.D. (2002). Obesity: Responding to the global epidemic. *Journal of Consulting and Clinical Psychology*, 70(3), 510-525.
- Wangberg, S.C. (2008). An internet-based diabetes self-care intervention tailored to self-efficacy. *Health Education Research*, 23(1), 170-179.
- Weinick, R.M., Jacobs, E. A., Stone, L.C., Ortega, A.N., Burstin, H. (2004). Hispanic Healthcare Disparities: Challenging the Myth of a Monolithic Hispanic Population. *Medical Care*, 42(4), 313-320.
- World Health Organization (1986). Health promotion in developing countries: The report of a workshop. *Health Promotion*, 1(4), 461-462.
- Yeh, M., Ickes, S.B., Lowenstein, L.M., Shuval, K., Ammerman, A.S., Farris, R., & Katz, D.L. (2008). Understanding barriers and facilitators of fruit and vegetable consumption among a diverse multi-ethnic population in the USA. *Health Promotion International*, 23(1), 42-51.