ABSTRACT

BANKS, ERIN RASHEEDAH. Being Healthy Counts To H.I.M.: An Examination of Health Behavior Among Participants in a Diabetes Prevention and Health Promotion Program (Under the direction of Dr. Craig C. Brookins).

This study employed a non-random, quasi-experimental design to assess the impact of a diabetes prevention and health promotion program on the health behavior of older African American adults in a church setting. Social Cognitive Theory (SCT) (Bandura, 1986, 1977) and Socio-ecological (McLeroy et al., 1988) and PRECEDE- PROCEEDE Planning (Green & Kreuter, 1999) models were utilized as guiding frameworks. A modified curriculum from the Lifestyle Balance: Healthy Eating and Being Active Diabetes Prevention program was used. Significant decreases were found in fasting blood sugar over the eight-week period for both program participants and the comparison group. However, there was not an increase in diabetes knowledge, daily moderate-vigorous exercise levels or self-efficacy for physical activity for individuals who participated in the program from Time 1 to Time 2. The findings are discussed relative to their contributions to health-related research and interventions with African Americans and the role of African-American churches as a conduit for health messages and behavior change.
Being Healthy Counts To H.I.M.: An Examination of Health Behavior Among Participants in a Diabetes Prevention and Health Promotion Program

by

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DEDICATION

I would like to dedicate my dissertation to my Mother and Father, Mr and Mrs. Calvin and Fredricka Banks for all of their hard work, unwavering support and belief in me.
Erin Rasheedah Banks was born in Miami, FL. She lived in Miami for the first 17 years of her life. She attended Florida Agricultural & Mechanical University (FAMU) from 1997-2001 where she graduated with a Bachelor’s of Arts in Public Relations. Immediately upon graduating, Erin continued her studies and pursued a Masters of Science in Community Psychology from FAMU. She graduated in 2003 with her Masters degree in Community Psychology. In 2003, Erin entered the Psychology of Public Interest Program at North Carolina State University to pursue her doctoral degree. In 2009, Erin earned her Ph.D. in the Psychology of Public Interest Program at North Carolina State University.

Erin has always had a passion and a commitment to helping others. During her work with her dissertation she partnered with African-American churches and numerous individuals in the community to identify ways to improve the state of health of African-American communities. Erin is committed to continuing her work in the community while also working with minority students to obtain doctorate degrees in the areas of biomedical and behavioral sciences.
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CHAPTER 1

Introduction

Diabetes mellitus is one of the leading causes of death in the United States (U.S.). With an increase in sedentary lifestyles, obesity and an older population, diabetes is a major health concern in the U.S. The morbidity and mortality rates of diabetes are especially critical among African-American adults. Morbidity is defined as the rate of disease or proportion of disease in a given locality or nation. Mortality is defined as the incidence of death. African Americans are suffering at a disproportionate rate from diabetes and related complications. According to the American Diabetes Association, 3.7 million Non-Hispanic Blacks have diabetes (ADA, 2007). Diabetes predisposes individuals to numerous health complications related to cardiovascular disease (e.g., coronary heart disease, hypertension, and stroke) and compounds other health concerns, hence increasing chances of death.

In addition to the negative health factors associated with diabetes, there is also a financial burden associated with this disease. According to the American Diabetes Association (ADA, 2005), the total annual economic costs of diabetes in 2002 was estimated to be around $132 billion. This includes $91.8 billion in direct medical and treatment costs and $39.8 billion for indirect costs attributed to disability and mortality. One out of every 10 health care dollars is spent on diabetes and its complications. According to the Health profile of 2007 for North Carolinians, diabetes was directly responsible for almost 15,000 hospitalizations in 2005 and contributed to or complicated 181,000 hospitalizations. Also, diabetes was frequently mentioned as contributing to hospitalizations. The total hospital
charge associated with diabetes and the related health problems associated with this disease was more than $3.1 billion (Health Profile, 2007).

As documented in the Alamance County Community Assessment 2007, in 2006, 6.7% of diabetic adults in Alamance County reported having had a hospitalization or emergency visits due to diabetes within the past year. Also, between 1990 and 2002, reports of diabetes listed as the main cause of hospitalization among patients in this county increased along with the cost of care for these patients.

It is evident that diabetes and its complications place a heavy burden on the individuals suffering from this disease, their family and the economy. It is imperative that programs are developed that assess the factors that contribute to this disease. Risk factors such as physical activity and eating habits or access to resources, financial and time constraints (e.g., multiple jobs, family obligations, etc) are examples of topics that should be addressed in health prevention and intervention programs. Although there are a wealth of studies being conducted in the area of diabetes and related cardiovascular diseases, a large number of studies have not included African-American participants and factors that influence individuals in this community. Consequently, there is a need for studies that increase our understanding of the psychosocial and environmental factors that increase adherence to a healthier lifestyle among African-Americans, older African-Americans specifically (Belgrave & Allison, 2006).
Types of Diabetes and Related Risk Factors

When addressing the factors leading to the morbidity and mortality rates of diabetes and other complications, it is important to distinguish between the various types of diabetes. There are three main types of diabetes. The three types consist of type 1 diabetes, type 2 diabetes, and gestational diabetes. Type 1 diabetes was previously called insulin-dependent diabetes mellitus or juvenile-onset diabetes. Type 1 diabetes develops when the body’s immune system destroys pancreatic beta cells, the only cells in the body that make the hormone insulin that regulates blood glucose. This form of diabetes usually strikes children and young adults, although the onset of the disease can occur at any age. Type 1 diabetes may account for 5% to 10% of all diagnosed cases of diabetes. Risk factors for type 1 diabetes may include autoimmune, genetic and environmental factors (CDC, 2006).

Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus or adult-onset diabetes. Type 2 diabetes may account for about 90% to 95% of all cases of diabetes. It usually begins as insulin resistance, a disorder in which cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce insulin. Type 2 diabetes is associated with older age, obesity, family history of diabetes, history of gestational diabetes, impaired glucose metabolism, physical inactivity, and race/ethnicity (Zlot et al., 2009). African Americans, Hispanic/Latino Americans, American Indians, and some Asian Americans and Native Hawaiians or other Pacific Islanders are at particularly high risk for type 2 diabetes. Type 2 diabetes is increasingly being diagnosed in children and adults (CDC, 2006). Due to the overwhelming rates of type 2 diabetes in
comparison to other types of diabetes, this study embarked upon reducing the onset and
diagnosis of these cases.

Furthermore, gestational diabetes is a form of glucose intolerance that is diagnosed in
some women during pregnancy. Gestational diabetes occurs more frequently among African
Americans, Hispanic/Latino Americans, and American Indians. It is also more common
among obese women and women with a family history of diabetes. During pregnancy,
gestational diabetes requires treatment to normalize maternal blood glucose levels to avoid
complications in the infant. After pregnancy, 5% to 10% of women with gestational diabetes
are found to have type 2 diabetes. Women who have had gestational diabetes have a 20% to
50% chance of developing diabetes in the next 5-10 years. Other specific types of diabetes
result from specific genetic conditions (e.g., maturity-onset diabetes of youth), surgery,
drugs, malnutrition, infections, and other illness. Such types of diabetes may account for 1%
to 5% of all diagnosed cases of diabetes (CDC, 2006).

With various types of diabetes and the risk factors associated with them, it is
necessary for health programs to be tailored to the specific needs of the community. For
example, health programs which address preventable risk factors (i.e., physical inactivity and
unhealthy eating) which contribute to the onset of the various forms of diabetes, particularly
type 2 diabetes, are needed. According to the American Diabetes Association, individuals
should engage in at least 30 min of moderate to vigorous exercise five times a week and
consume five or more fruits and vegetables per day. These are risk factors that are directly
dependent on an individual’s lifestyle. For example, physical activity decreases the risk of
type 2 diabetes; with more exercise providing more risk reduction (ADA, 2005). In the *Diabetes Prevention Program*, a study sponsored by the National Institutes of Health, found that people with an increased risk for type 2 diabetes can prevent or delay the onset of diabetes by losing 5-7% of their body weight through increased physical activity and a reduced body weight (ADA, 2005). The benefits are even greater for those individuals who are overweight.

Furthermore, adhering to healthy eating practices is also shown to provide more risk reduction to diabetes. Unhealthy eating contributes to obesity, which is a major risk factor for diabetes. Obesity is defined as having a body mass index (BMI) of 30 kg/m² or greater. Approximately 50% of men and 70% of women with type 2 diabetes are obese (ADA, 2005). Obese individuals are three to five times more likely to develop type 2 diabetes compared to normal weight individuals. The longer one is obese, the greater the risk of being diagnosed with diabetes (ADA, 2005).

As discussed in this section, there are three main types of diabetes: type 1, type 2, and gestational. All forms of diabetes are associated with various risk factors (e.g., genetic, social, psychological, environmental) with some being preventable and others unpreventable. With an overwhelming number of cases of type 2 diabetes, increasing adherence to preventable lifestyle changes such as physical activity and health eating, will help to reduce the onset of diabetes and related complications.
Incidence and Prevalence of Diabetes

Diabetes was the sixth leading cause of death listed on the U.S. death certificates in 2002. According to the Centers for Disease Control and Prevention (CDC) and the ADA, diabetes mellitus is a group of diseases characterized by high levels of blood glucose resulting from a defect in insulin production, insulin action, or both (CDC, 2006; ADA, 2005). Diabetes leads to several health complications. Among the complications are: heart disease and stroke, higher blood pressure, blindness, kidney disease, nervous system disease, amputations, dental disease, complications of pregnancy and other complications. Diabetes can be associated with serious complications and premature death.

According to the CDC and the ADA, approximately 20.8 million people have diabetes nationally, which is 7.0% of the population. Within this staggering statistic, 14.6 million people have diagnosed diabetes and 6.2 million people have undiagnosed diabetes. In addition, about 176,000 people aged 20 years or younger have diabetes, which represents 0.22% of all people in this age group. Over 20 million people aged 20 years and older have diabetes, which represents 9.6% of all people in this age group who have diabetes. Slightly over 10 million people aged 60 years or older have diabetes, which accounts for 20.9% of all people in this age group that have diabetes. Men account for more cases of diabetes (i.e., 10.9 million) than women (i.e., 9.7 million) for people aged 20 years or older who have diabetes. Non-Hispanic blacks account for 13.3% of all non-Hispanic blacks aged 20 years or older who have diabetes. After adjusting for population age differences, non-Hispanic blacks are 1.8 times as likely to have diabetes as non-Hispanic Whites (CDC, 2006).
According to the Behavioral Risk Factors and Surveillance System (BRFSS) for North Carolina, diabetes is among the leading causes of death, with 2,255 deaths in 2005. The rates of diabetes are extremely high among African Americans, 13.3%, and Native Americans, 11.7% in comparison to other groups (i.e., White, Asian and other minorities). Overall, adults age 25 and older account for a large number of reported cases of diabetes in North Carolina. In terms of weight categories, more than half of the individuals in North Carolina are either overweight, 36.7%, or obese, 25.9%. However, findings from the 2005 BRFSS indicate that a majority, 74.4%, of those surveyed stated that other than at their regular job, they have engaged in regular physical activity and exercise such as running calisthenics, golf, gardening, or walking during the past month. Despite this finding, there are still many North Carolinians who engage in sedentary lifestyles. In terms of fruit and vegetable consumption, the majority, 77.5%, of those surveyed reported that they consumed less than five or more fruits and vegetables per day.

On a local level, in Alamance County, the rate of patients being told they have diabetes is higher, 9.6%, than the rate for the entire state (BRFSS, 2005). According to the Alamance Community Assessment 2007, diabetes rates in this county have shown an overall increasing trend, with some decline over the last several years. There has also been an increase in diabetes mortality rates in Alamance County. Levels of physical activity and fruit and vegetable consumption, which are two risk factors associated with diabetes, are similar to that of the state. According to the Alamance County Assessment 2007, residents in Alamance County are less likely to engage in activities to prevent and/or monitor diabetes.
For example, county residents are less likely than other parts of the state to: 1) have an A1C test performed by a health care provider at least twice a year, have regular examinations of the feet and the eyes, self-monitor blood glucose and participate in diabetes education classes.

As evident in national and local health statistics, individuals are continuing to suffer from diabetes. A statewide survey of North Carolina residents indicate that North Carolinians are not engaging in the recommended health behaviors and are suffering from high rates of overweight and obesity, unhealthy eating and lack of daily physical activity. It is critical that these risk factors are addressed to help reduce the onset of type 2 diabetes.

Health in African-American Communities

Many people fail to realize that the social problems plaguing African-American communities are symptomatic of a more general societal problem that emanates from generations of oppression. Over the past twenty years, the health of African Americans has worsened. With a lack of exercise and physical activity, increased consumption of junk foods and other unhealthy foods, the health of African-Americans is in a crisis state (Walker & Singelton, 2005). In addition, African Americans are often faced with structural conditions (e.g., living in dilapidated housing conditions, inadequate health care treatment, and limited educational and job opportunities) that impede their efforts to stay healthy (Appel, Harrell, & Deng, 2002). “The prohibitive costs and limited availability of fresh foods and lack of quality fruits and vegetables in grocery stores in middle class southern
African-American neighborhoods were perceived as major barriers to eating a heart-healthy diet…” (Appel et al., 2002, p. 142).

According to Mc Leroy, Bibeau, Steckler and Glanz (1988), those individuals who lack resources and who are uneducated are often times underserved and lack the power to change their environments and their outcomes.

… those with the most severe health problems within a community are often those with the least access to sources of community power. They are the poor, the minorities, the rural, the uneducated, the unemployed or the underemployed, the homeless, the handicapped, and those with socially derided health conditions such as AIDS, mental illness, and alcoholism. Such groups are often left out of the process of defining problems and developing programmatic solutions. Such groups are often labeled perjoratively as the “hard to reach”. They are hard to reach because their individual problems are so severe that they have little time, energy, or resources for participating in larger community structures and activities (p. 364-365).

Consequently, these conditions produce a type of stress that gnaws away at family life, interpersonal relationships, self-esteem, and eventually the physical health of Black people (Brown-Reid & Harrell, 2002). Stoller and Gibson (1999) state that “correlates of health disparities such as socioeconomic position, gender, age, and race/ethnicity create interlocking systems of privilege and disadvantage, a social context in which behavior occurs” (as cited in Emmons, Barbeau, Gutheil, Stryker, & Stoddard, 2007).
Due to the compounding effects of internal and external factors, the morbidity and mortality rates of diabetes continue to increase within the African-American community. As noted by previous researchers, there are multiple factors that influence the mortality and morbidity rates of African Americans (e.g., genetic, socioeconomic, environmental, and social). Examples of genetic factors are: metabolic syndrome, type 1 diabetes, family history of diabetes and hypertension. In terms of the current study, family history of diabetes was used to assess the influence it has on participant’s health behavior. Examples of socioeconomic factors are: income, education/literacy, access to and availability of resources. This study examined income and education, which comprises the socioeconomic status, to assess the influence it has on participant’s health behavior. Examples of social factors are: historical events, cultural beliefs and values. Factors such as physical inactivity, unhealthy eating habits/lack of nutrition, and stress are also important and more likely to be controlled by individual behavior (Belgrave & Allison, 2006; LaVeist, 2005; Walker & Singleton, 2005; Young et al., 2003; Appel et al., 2002; Lanzt, et al., 2001; Braithwaite & Taylor, 1992). Specifically, this study examined physical activity as a risk factor that has been proven to positively influence health outcomes. Again, many of the risk factors mentioned above are preventable (e.g., the ability to engage in some form of physical activity), the genetic/heredity factors are not (Walker & Singleton, 2005). For instance, African Americans who are born with an impaired glucose metabolism and have a high prevalence of diabetes and/or related risk factors, which contribute to cardiovascular disease in their family, are at higher risks for being diagnosed with diabetes.
Social factors. Cultural beliefs, social norms and attitudes toward health and the public health system are social factors that influence the health of African Americans. Some of the cultural beliefs held by African Americans influence their health outcomes. For example, Meshreki and Hansen (2004) found that African-American women are more likely to be satisfied with a larger body size than White women and African-American girls reported greater body satisfaction. According to Belgrave and Allison (2006) while a more favorable body image may reduce the incidence of eating disorders in African-American females, the acceptance of larger body size may also contribute to less exercise and excess food consumption.

Studies have also shown that African-American men tend to prefer larger body sizes than their White counterparts (Meshreki & Hansen, 2004). The belief that larger body sizes exemplify beauty has been suggested to influence the rates of obesity and physical inactivity among African Americans (Meshreki & Hansen, 2004). The continued misconceptions of health among African Americans are one of the many factors contributing to the increase of African Americans being diagnosed with diabetes and other diseases.

In addition, not only are cultural beliefs influencing the health outcomes for African Americans, historical events such as the Tuskegee Syphilis Experiment have impacted the level of trust that African Americans have for the public health system (Belgrave & Allison, 2006; LaVeist, 2005; Braithwaite & Taylor, 1992). Many African Americans do not trust public health officials and tend not to seek help or adhere to regimens provided by medical professionals.
Actions such as these that have been passed on through generations regarding the mistreatment of African Americans by public health officials in the past, are contributing to the health disparities gap. All of these factors are affecting the overall health of African-Americans. Social-cultural norms such as religiosity, spirituality, communalism and reciprocity, on the other hand appear to have a positive influence of the health of the African-American community (Belgrave & Allison, 2006).

In light of the many factors influencing the health of African Americans, researchers must take a systematic and ecological approach to address this issue. An ecological and systematic approach will enable researchers to adequately address the factors that are prohibiting African Americans from achieving better health outcomes, especially low income and older African Americans.

*An Ecological Theoretical Framework*

In an effort to address health behaviors among African-American men and women, and the multiple risk factors that are affecting health in Black communities; systematic, comprehensive, ecologically grounded theoretical frameworks and models are needed. The Social Cognitive Theory (SCT) (Bandura, 1986, 1977), Socio-ecological (McLeroy et al., 1988) and PRECEDE-PROCEED Planning models (Green & Kreuter, 1999) was used in this study. Although it is important to use a systematic approach to assess individuals within the levels that contribute to their overall life and health outcomes, this study only looked at the individual in the context of their church.
Individuals are influenced by and embedded within complex and multilevel environments (Haughton, 2006). With various determinants for health outcomes (e.g., genetic, cultural, economical, etc) and with multiple levels of influence (e.g., intrapersonal, interpersonal, environmental, institutional, community, etc) sole reliance on an individual level theoretical approach would not capture the root of the problems affecting the health behavior of African Americans (Zlot et al., 2009). According to Mc Leroy et al. (1988) “….prevention strategies that focus on individual behavioral changes should remain secondary to environmental approaches, including changes in the physical and social environment”. In this study, the SCT, Socio-ecological, and PRECEDE-PROCEED Planning models, while comprehensive in their approach, served as a guide to understand the factors that influence health behaviors amongst participants.

According to Glanz, Rimer, & Lewis (2002) the ecological perspective, as it has evolved in behavioral sciences and public health, focuses on the nature of people’s transactions with their physical and sociocultural surroundings. The ecological perspective is comprised of two basic ideas: 1) behavior is viewed as being affected by, and affecting, multiple levels of influence 2) the idea of reciprocal determinism between individuals and their environments (Glanz et al., 2002; Mc Leroy et al., 1988). More specifically, the ecological perspective allows researchers to examine individuals in their environment and identify ways at which the environment influences their behavior.

An ecological perspective allows researchers to observe individuals in the context of their family, community, job, and larger society and how each level influences the other and
the overall health of the individual. For example, if an individual is provided social support by members of their family for engaging in healthy eating choices and regular physical activity, the individual will be more likely to continue these preventive behaviors. It is assumed that these individuals will in turn reciprocate social support by being supportive of other family members, friends, or even co-workers who choose to engage in these positive behaviors.

In addition, researchers have expanded examination of the interaction of the personal and environmental to include specific cultural and value systems of African Americans to help understand their health behavior (Braithwaite & Taylor, 1992; Thompson & Chambers, 2000; Belgrave, 1998). For example, Airihenbuwa (1989a, 1989b, 1990, 1991) developed the PEN-3 model to be used as a framework for health promotion and disease prevention in several African countries. The PEN-3 model represents the person, extended family, neighborhood, perceptions, enablers, nurturers, positive behaviors, existential behaviors, and negative behaviors that contribute to health outcomes. This model takes an ecological approach by using three dimensions of health beliefs and behavior that are dynamically interrelated and interdependent: health education, educational diagnosis of health behavior, and cultural appropriateness of health behavior (as cited in Braithwaite & Taylor, 1992). This model has been successfully applied with child survival interventions in African countries. Thompson and Chambers (2000) examined cultural consciousness as a meaningful health variable. The researchers investigated the relationships between African self-consciousness, health consciousness, and health behaviors. According to Baldwin
African-self consciousness (ASC) is a prerequisite for optimal health among African Americans. The ASC is the conscious-level organizing principle that drives behavior. It was proposed that African Americans with a healthy ASC will engage in health promoting behaviors (Thompson & Chambers, 2000). In terms of health consciousness, it is defined by Gould (2000) as the degree to which individuals focus on their health through states of attention of self-relevant cues that are reflected in both cognition and affect (as cited in Thompson & Chambers, 2000).

A study by Thompson and Chambers (2000) utilized African American college students from a historically African-American university. Eighty participants volunteered to participate in this study. Participant’s ages ranged from 18 to 25 and included first year students, sophomores, juniors and seniors. This study found that ASC and health consciousness contributed to participant’s health promotion behaviors. Both ASC and health consciousness contributed uniquely to health promoting behaviors. Participants who reported a high ASC engaged in significantly more health promoting behaviors than individuals with a low ASC. This finding supports the importance of including cultural factors when attempting to promote positive health behaviors among African Americans. Also, this study found that an increase in health consciousness positively influenced participant’s health behaviors.

Also, other researchers evaluated the cultural dimensions of African American life, particularly spirituality and religion. Belgrave (1998) suggested that researchers utilize the
cultural aspect of religion and faith in relation to social and environmental factors to assess the effect they have on the health behaviors of African Americans.

*The Socio-Ecological Model.* The Socio-Ecological Model assumes that appropriate changes in the social environment will produce changes in individuals, and that the support of individuals in the population is essential for implementing environmental changes (McLeroy et al., 1988). There are five main components to this model. The components consist of: 1) intrapersonal factors, 2) interpersonal factors and primary group, 3) institutional factors, 4) community factors and 5) public policy (Haughton, 2006; McLeroy et al., 1988).

First, intrapersonal factors are comprised of characteristics of the individual such as knowledge, attitudes, behavior, self-concept, and skills. This is in essence the history of development of the individual. Second, interpersonal processes and primary groups encompass formal and informal societal networks and social support systems. Third, institutional factors consist of social institutions with organizational characteristics. Fourth, community factors consist of relationships among organizations, institutions, and informal networks with defined boundaries. Lastly, public policy includes local, state and national laws and policies (McLeroy et al., 1988).

An implicit assumption of these levels of analysis is that health promotion interventions are based on our beliefs, understandings, and theories of the determinants of behavior, and that these five levels of analysis reflect the range of strategies currently available for health promotion programming (p. 355).
This model is beneficial when addressing health behavior change because it assesses the interactions within and across each of the levels and its influence on the health of the individual and the community in which they reside (Haughton, 2006).

In a study conducted by Naar-King, Podoloski, Ellis, Frey, and Templin (2006) tested a sociological model of illness management that simultaneously assessed the contributions of multiple systems (i.e., child, family, peer, and a medical treatment team) among high-risk, urban adolescents with type 1 diabetes in poor metabolic control. This study found that higher externalizing symptoms, poorer family relationships, lower satisfaction with providers, and greater age contributed to the changes in illness management. This study illustrates the need to develop interventions that not only target the individual and their family, but the interaction of external systems (e.g., medical systems, community systems, etc) in order to assess the influence they have on health behaviors and health outcomes (Naar-King et al., 2006).

In an effort to evaluate health behaviors, the social ecological model represents a delicate balancing act between focusing on individual responsibility and environmental influences. Although the ultimate goal is to change individual behavior, explicit attention in this model is given to environments that promote and hinder those changes. As indicated by the literature, there is a need to create interventions that consider the multiple levels of influence that effect health behavior. Specifically, when working with the African-American community, the use of an individualistic approach will neglect to consider the pertinent environmental and social factors that compound issues of health.
The PRECEDE- PROCEED Planning Model. In an effort to address health behaviors among African-American men and women and specific risk factors that are affecting health in Black communities, components from the PRECEDE-PROCEED planning process model (Green & Kreuter, 1999) was used. This model takes a systematic approach in identifying specific guidelines for priority setting. Specifically this model was used to identify predictor and outcomes variables that were assessed in this study. According to Glanz, Rimer and Lewis (2002), this model provides structure to identify ways to address problems of the target population. This model takes a community participatory approach by engaging the target population in identifying problems, related key factors and the necessary strategies that are needed to be implemented.

The acronym PRECEDE stands for predisposing, reinforcing, and enabling constructs in Educational/Environmental Diagnosis and Evaluation (Glanz et al., 2002, pp. 403-436). The PRECEDE section of this model assumes that researchers must first diagnose the problem in order to develop a plan in which to address and/or solve the problem. The acronym PROCEED stands for policy, regulatory, and organizational constructs in educational and environmental development. The PROCEED component of this model was added to recognize the importance of environmental factors and the role they have on health behavior. This model is organized into nine steps. The nine-step planning process begins at the end, focusing on the health-related outcomes of interest and working backward to diagnose which combination of intervention strategies will best achieve the objectives (Glanz et al., 2002, pp. 409-436).
Although all components of the PRECEDE-PROCEED Planning model are useful in health interventions, only specific sections of this model were used in the current study. This study utilized step 4, which is known as the Educational and Ecological Assessment section of this planning process model. This step identifies antecedent and reinforcing factors that must be in place to initiate and sustain the change process (as cited in Glanz et al., 2002, p. 417). The factors are classified as predisposing, reinforcing and enabling, which collectively influence the likelihood that behavioral and environmental changes will occur.

“Predisposing factors are antecedents to behavior that provide the rationale or motivation for the behavior” (as cited in Green & Kreuter, 1999, p. 153). The predisposing factors assessed in this study are: gender, age, income, education, diabetes diagnoses, diabetes knowledge, family history, fasting blood sugar and self-efficacy for physical activity. Diabetes knowledge, fasting blood sugar, daily moderate-vigorous exercise and self-efficacy for physical activity are outcome variables that were expected to be changed after participation in the Being Healthy Counts to H.I.M. diabetes prevention and health promotion program. “Reinforcing factors are those factors following a behavior that provide continuing reward or incentive for the persistence or repetition of the behavior” (as cited in Green & Kreuter, 1999, p. 153). Reinforcing factors that were assessed in this study are: Lay health advisor (LHA) support and peer group support. These factors are the crux of the Being Healthy Counts to H.I.M. program. The presence and support of LHAs and enthusiastic peers in the program are expected to bolster participant’s adherence to positive behavior changes.
Lastly, enabling factors are a vital component to this study. “Enabling factors are antecedents to behavior that allow a motivation to be realized” (as cited in Green & Kreuter, 1999, p. 153). Enabling factors can affect behavior through environmental factors (e.g., programs, services, resources, etc). The enabling factor assessed in this study is the Being Healthy Counts to H.I.M. diabetes prevention program (i.e., diabetes knowledge). The dosage of the program was measured to assess the influence it has on participant’s health outcomes.

Chang, Baumann, Nitzke, and Brown (2005) used the PRECEDE-PROCEED Planning model when conducting a study to determine whether predictors of fat intake behavior were the same for normal-weight and obese WIC (Women Infant and Child) mothers. The authors aimed to identify predictors of each group. The study found that predictors of fat-intake were different for both groups. It was found that obese women reported cost of food as being more important in their decision-making in comparison to normal weight women. Obese women also tended to report a less optimal health status and more health problems than women of normal weight. The study also found that predisposing factors did not explain food choices made between the two groups. However, there was an association between enabling factors and fat intake among obese women, but not among normal-weight women. Lastly this study found that reinforcing factors predicted fat intake behavior in both groups. Findings from this study support the need to identify and understand the predisposing, enabling, and reinforcing factors affecting individual’s health. It also
exemplifies the need to understand the specific group that you are working with in order to develop programs that meet their specific needs.

The Social Cognitive Theory. Bandura’s (1977, 1986) Social Cognitive Theory (SCT) states that it is important to view behavior in the context of the environmental events and personal factors that influence it and are, in turn, influenced by the behavior (as cited in Raczynski & Diclemente, 1999). The SCT addresses both the psychosocial dynamics influencing health behavior and methods for promoting behavioral changes. Within SCT, human behavior is explained in terms of a triadic, dynamic, and reciprocal model in which behavior, personal factors (including cognitions), and environmental influences all interact. Given the framework of reciprocal determinism, SCT focuses on personal and environmental factors that influence behavior. The basic premise of the SCT, similar to the basic principles found in the socio-ecological model and other ecological frameworks, is to understand the individual in the context of their environment and the interplay of the environment and the actions/behaviors of the individual. For example, this theory takes into consideration personal factors (e.g., self-efficacy) in the context of one’s environment and examines how they influence behavior (i.e. preventive health behavior). Among the crucial personal factors are 1) the individual’s capabilities to symbolize behavior, 2) to anticipate the outcomes of behavior, 3) to learn by observing others, 4) to have confidence in performing a behavior (including overcoming the problems in performing the behavior), 5) to self-determine or self-regulate behavior and 6) to reflect on and analyze experience (as cited in Glanz et al., 2002, pp. 410-412).
Moreover, the SCT is often applied to the development of programs that promote health behavior change. Behavior change includes two processes: acquisition of knowledge about the new behavior and adoption of the new behavior (Raczynski & Diclemente, 1999). The SCT consists of 11 major concepts (i.e., environment, situation, behavioral capability, outcome expectations, outcome expectancies, self-control/self-regulation, observational learning, reinforcements, self-efficacy, emotional coping resources and reciprocal determinism). These concepts are useful when taking an ecological approach to health and when attempting to acknowledge the multiple levels of influences on health behavior. Specifically, among the major concepts within the SCT, self-efficacy and outcome expectations have been found to be major determinants of behavior (Raczynski & Diclemente, 1999). Bandura argued that perceived self-efficacy influences all aspects of behavior, including the acquisition of new behaviors (e.g., a sexually active young adult learning how to use a particular contraceptive device), inhibition of existing behaviors (e.g., decreasing or discontinuing cigarette smoking), and disinhibition of behaviors (e.g., resuming sexual activity after a myocardial infarction) (as cited in Schumaker, Schron, Ockene, & Mc Bee, 1998).

The SCT has been used mostly in applied studies in areas such as nutrition, physical activity, cigarette smoking and sexual activity among youth. Using SCT in an applied setting is most useful because it enables researchers to assess the factors affecting the health behaviors and outcomes of individuals in their social and environmental setting. It also
allows researchers to gather information from multiple areas of the problem, rather than collecting data and information solely from the individual.

For example, in a study focused on improving nutrition for school aged children, researchers were able to identify the environmental, personal and behavioral factors that influenced their lack of fruit juice and vegetable consumption by analyzing factors external to the child. The researchers identified the influence these factors had on increasing fruit and vegetable consumption (Glanz et al., 2002). Because the SCT is very complex in its assessment of the dynamic interaction of the person, environment and behavior, it is impossible to test or even use the SCT in its entirety in a single study (Glanz et al., 2002; Raczynski & Diclemente, 1999). Self-efficacy was assessed in this study in terms of individuals ability to engage in daily moderate-vigorous exercise.

Operating under the conceptual framework of the SCT, Socio-Ecological Model and the PRECEDE-PROCEED Planning model, this study assessed the influence that a diabetes prevention program has on participant’s self-efficacy for physical activity and adherence to healthier lifestyle changes.
CHAPTER 2

Review of the literature

The purpose of this research study was to determine if a church-based diabetes prevention program had a positive effect on the health behavior and health outcomes of African-American adult participants (i.e., self-efficacy for physical activity, daily moderate-vigorous exercise and fasting blood sugar levels). This section discusses health related intervention research that has been conducted with African Americans and the risk factors that were examined in this research study.

Predictors identified in past studies include demographic, psychosocial and behavioral variables. Among the demographic variables typically assessed in studies include age, gender, income, education level, and race. The psychosocial variables used in past research studies consist of self-efficacy, social support, perceived benefits of physical activity, perceived barriers to physical activity enjoyment, and levels of depression. Also, social support from family and friends has also been found to be critical when working with African Americans (Bopp et al., 2006). The behavioral factors measured in past studies have consisted of self-regulating behaviors, self-reported health and fitness, and physical inactivity and unhealthy eating.

Although these predictors have been analyzed in several research studies, their influence on African-American adults have not been extensively studied. It is essential, especially in the wake of the widening health disparities gap, to identify predictors that influence health outcomes of older African Americans adults.
Health-related intervention research

It is apparent from health statistics that there is a health crisis in the African-American community. In an effort to adequately address the health problems affecting African-Americans, research studies have attempted to partner with community organizations (e.g., African American churches), community leaders and community lay health advisors (LHAs). It is anticipated that attempts such as the aforementioned will increase cultural competence and an understanding of the various factors affecting the health of African-American adults. “Because issues of access, trust, economics, and lack of racial/cultural sensitivity impose barriers to participation in traditional health promotion efforts, programs that proactively reach out to and partner with members of specific target populations are essential” (Linnan, Kim, Wasilewski, Lee, Yang et al., 2001, p. 606).

Wierenga (1994) conducted a study to describe the relationship among factors associated with lifestyle modification such as diabetes knowledge, social support, health practices, and weight measured as BMI. The study also attempted to examine the effect these factors had on health status and the effectiveness of a 5 week community-based lifestyle modification program for weight control. The study consisted of 66 people with non-insulin dependent diabetes who were randomly assigned to a control or treatment group. Ages of participants ranged from 30 to 86 years. Subjects were primarily White and fairly educated with at least a high school degree and some college. Upon enrollment in the study, individuals were required to have participated in a diabetes education program within one year prior to the study.
Results of this study found that there was a relationship between social support, diabetes knowledge and health practices. It was found that these factors contributed to changes in health status amongst individuals who participated in the intervention. Although social support and diabetes knowledge were significantly related, health practices contributed the most to health status (Wierenga, 1994). It is clear that diabetes education is important, but other factors such as health practices and social support are just as important to achieve adherence.

The study by Wierenga (1994) supports the relationship between health practices and psychosocial factors with adherence to healthy lifestyle changes. Although findings of this study are similar to previous studies conducted in the health behavior literature, there is a need to assess the influence these factors have on adherence of healthy behaviors among adults in minority communities; specifically African Americans and individuals with lower education and income levels.

According to Linnan et al. (2001), women are transmitters of health information and have a tremendous influence on health behaviors that are practiced in homes. This study proposed targeting women in innovative settings such as beauty salons and using cosmetologist to spread health messages throughout the community and into households. The sample used in the study consisted of volunteers from 49 licensed salons located in a small rural town of North Carolina. It was found that cosmetologists discussed an array of health topics with their clients. The topics ranged from healthy eating, physical activity and exercise, stress, high blood pressure, mammography, sun exposure and smoking. As
illustrated by the range of topics discussed, it appears that utilizing innovating community settings such as a beauty salon is effective in promoting positive health messages.

Keyserling et al. (2002) conducted a study to determine whether a culturally appropriate community based intervention designed for African-American women with type 2 diabetes will increase moderate intensity physical activity. The study was conducted at primary care practices in central North Carolina. Participants in the study consisted of 200 African-American women who were 40 years of age and older with type 2 diabetes. The mean age of the sample was 59 years. Participants in the study had been diagnosed with diabetes an average of 10 years and their annual income was less than $10,000.

The intervention used in this study was comprised of several components: physical activity, dietary, and diabetes care. The participants were randomized to one of three treatment conditions: clinic and community (group A), clinic only (group B), or minimal intervention (group C). The clinic-based groups consisted of four monthly visits with a nutritionist who provided counseling to enhance physical activity and dietary intake that was tailored to participant’s baseline scores. The community-based intervention group consisted of three group sessions and 12 monthly phone calls from a peer counselor and was designed to provide social support and reinforce behavior change goals. The minimal intervention group consisted of educational pamphlets mailed to participants.

This study found non-significant results. There was not a significant difference in participant’s physical activity scores from baseline to subsequent follow-ups (i.e., 6 month and 12 month). There were also non-significant differences found between the groups at
follow-up; although some of the findings approached levels of significance. Even though findings from this study were non-significant, it is important to note that the group that received the clinical and community component reported higher diabetes knowledge at follow-up compared to the other groups. This provides further insight on the importance of providing diabetes education through interventions and using an ecological approach in interventions. Additionally, despite non-significant results, it is suggested that the inclusion of psychosocial components and culturally-relevant factors may help to influence individual’s adherence to health practices over time (Keyserling et al., 2002).

Mayer-Davis et al. (2004) conducted a study to develop, implement and evaluate a one year primary care-based lifestyle intervention for weight management that was designed to improve metabolic control with individuals that have type 2 diabetes and who live in rural medically underserved communities. The study consisted of a 12 month randomized clinical trial. Two primary health centers were involved and chosen based on the large number of patient visits for diabetes care. Participants were chosen from a diabetes registry at each of the two health centers. Participants had to be 45 years of age or older, having had a clinical diagnoses of diabetes, and a BMI of 25kg or greater during the previous calendar year. Potential participants were given an introductory letter, followed by a phone call, and then a screening. Following the screening, baseline data was collected and individuals were randomly assigned to three groups.

A randomized design was utilized in this study. Of the 664 potential participants contacted, 143 participants were assigned to one of three groups following baseline. Another
53 were recruited based on fliers and posters. Of the 53 that were recruited, 46 were randomized into the groups. A total of 187 individuals participated in this study. Two were eliminated due to health problems. The three groups in the study consisted of: 1) intensive lifestyle intervention, 2) reimbursable-lifestyle intervention, 3) or usual care. The main focus for all of the groups was weight loss. The intensive group consisted of a 16-week core curriculum composed of behavioral strategies for weight loss and physical activity.

Furthermore, participants met weekly with nutritionist for delivery of the first 4 months of the core curriculum, every other week for over a 2-month period and once a month for the remaining 6-months. The reimbursable-lifestyle group was a condensed version of the intense-lifestyle group. The key elements of this group were delivered in 4-1hr sessions over the course of the 12-month study and included three group sessions and one individual session. Total time allotted was determined by approximate number of hours reimbursed annually by Medicare for diabetes education. The usual care was delivered in one individual session by a study nutritionist at the beginning of the 12-month period.

Data was collected at baseline, which is where the subjects were randomized into the groups at 3-month, 6-month, and 12-month. The primary outcome measure of the study was weight loss and the secondary outcome measure was HbA1c, lipid profile, and blood pressure. Of 187 participants, 152 were retained through the 12-month study. Eighty percent were women, 82% were black, the average age was 60 years and the average BMI was 36.7 kg. Forty-eight percent of the participants had less than a high school education or equivalent and the average duration of diabetes was 11 years. The study found that groups
did not differ significantly based on education, gender, or age. Among the three groups, the intensive group lost more weight than the reimbursable group and the usual care group. The differences were statistically significant at the 6-month and 12-month time periods ($p < .0001$). There was not a statistical difference in blood pressure. The mean weight loss for individuals who attended at least 50% of the sessions in the intensive group was significantly higher than the high attendees in the usual care group ($p < .001$).

Although findings from this study exemplified the importance of longitudinal studies and the influence of diabetes interventions, there is information that was missing in order to assess the generalizability of this study’s findings. For example, the study did not provide the characteristics of the individuals delivering the sessions. The demographics of the individual delivering the information for the session might affect the internal validity of the study. Also, SES was not investigated as a possible factor that influenced health outcomes. As indicated by other health behavior studies, socioeconomic factors are important determinants of health behavior (Cox et al., 2004).

There have also been studies conducted that examine the racial/ethnic differences in self-care behavior adherence related to diabetes. For example, in a study conducted by Nwasuruba et al. (2007) the authors assessed racial/ethnic differences in multiple diabetes self-care behaviors using data from the 2003 BRFSS, which consisted of 264,684 adults. The BRFSS is a state based, random-digit dialing telephone survey of the U.S. population that is sponsored by the CDC. Results indicated that there are significant racial/ethnic differences by age, sex, education, income, marital status, employment, perceived health
status, insurance, access to care, BMI and insulin use among the sample. The study found that Blacks were more likely to attend diabetes education classes, yet less likely to adhere to the recommended levels of physical activity/exercise and consume the recommended daily serving of fruits and vegetables (Nwasuruba et al., 2007). Overall, it was found that among adults with diabetes, few engaged in multiple self-care behaviors at recommended levels, regardless of their race/ethnicity. Findings in this study support similar trends found in previous studies conducted in the area of diabetes.

Feathers et al. (2005) assessed whether the Racial and Ethnic Approaches to Community Health (REACH) Detroit community-based diabetes lifestyle intervention delivered by trained community residents to African Americans and Latinos with type 2 diabetes resulted in significant diabetes-related knowledge, behavioral changes, and glycemic control.

One-hundred and fifty one participants were recruited through two hospitals with specialty clinics and one community-based health center. Individuals who were 18 years of age and older, who had insurance or received care from a federally qualified health center, were mentally able, and lived in one of the six REACH Detroit zip codes were eligible to participate in the study. This study utilized a culturally tailored, community-based participatory approach at multiple levels to reduce risk factors for type 2 diabetes and its complications among African Americans and Latinos residing in low resource neighborhoods of east and southwest Detroit. Trained community residents were used in an effort to improve response rates and sustainability of the program.
Results from the study revealed slight improvements in dietary knowledge, exercise knowledge, consumption of unhealthy foods and physical activity; although they were non-significant. However, there were significant increases in the average vegetable consumption \( (p=.001) \), and consumption of whole grain bread \( (p=.004) \). There was also a decrease in consumption of regular soda or fruit-flavored beverages \( (p<.0001) \). Results also indicated increases in adherence to a healthy eating plan \( (p=.004) \) and improvements in blood sugar monitoring as recommended by their doctor \( (p<.0001) \) for REACH participants. The study also found that women, African Americans and participants aged 18 to 59 years improved more than other groups (Feathers et al., 2005).

While some of the findings in this study were non-significant, this study illustrated the importance of developing a culturally-tailored community intervention to address health behaviors in minority communities. This study also reinforces the belief that interventions using community health workers can result in improved knowledge and health practices (Feathers et al., 2005). Findings from this study are consistent with prior studies showing the positive role diabetes lifestyle interventions have on improving individuals’ health outcomes (Feathers et al., 2005).

Cox et al., (2004) conducted a study to identify the characteristics that influence low income adults’ self-management of type 2 diabetes. This study also assessed the influence of the diabetes education that was provided and the extent to which recommendations were being followed. A cross-sectional survey design was used, which involved face-to face, individual and small group interviews with subjects. The population consisted of low-income
adults who had type 2 diabetes and were enrolled in the Virginia Food Stamp Nutrition Education Program (FSNP). A sample of 196 low-income subjects (i.e., 163 females and 33 males) having type 2 diabetes participated in this study. The Diabetes Care Profile, which is a self-administered instrument consisting of 10 scales that measure social, psychological, health, dietary, and physical activity factors related to diabetes management was used (Cox et al., 2004).

The study found non-significant differences among African Americans and White American adults in terms of physical activity and adherence to meal plan recommendations (Cox et al., 2004). The non-significant findings can be attributed to the study’s focus on low income older adults in a FNEP and lack of significant racial differences between the groups. It is likely that both Whites and Blacks in this sample face similar barriers (e.g., access to health care and low SES) that may influence their health behavior. Socioeconomic factors may be more of an indicator to adherence and self-management than an individual’s race.

On the other hand, significant correlations were found among perceived health status, perceived knowledge of diabetes, attitudes towards diabetes, meal-plan adherence, perceived barriers to physical activity, and reported diabetes control (p ≤ 0.0001) (Cox et al., 2004).

It is interesting to note that some of the findings of this study are contrary to previous findings comparing adherence to healthy lifestyle changes among African-American and White-American adults, specifically in the area of physical activity and eating habits. Although this study attempted to identify characteristics that influence self-management of type 2 diabetes among low income African American and White adults, it failed to
adequately assess levels of physical activity, current diabetes knowledge and current eating habits.

Furthermore, Satterfield et al. (2003) conducted a literature review of community-based interventions that intended to prevent or delay type 2 diabetes. A search of databases for publications in 1990-2001 identified reports on community-based interventions designed to prevent or modify risk factors for type 2 diabetes. This search investigated 16 published interventions, eight of which were conducted in the U.S. These studies involved populations disproportionately burdened by diabetes (e.g., American Indians, Native Hawaiians, Mexican Americans, and African Americans).

Following the review of the literature, it was found that the majority of studies reported using a quasi-experimental design and a pre-post test methodology. Studies reported a range of sample sizes and durations of interventions. Also, many of the interventions included nutrition and exercise components. The nutrition education component included cooking and food preparation demonstrations, grocery store tours and recipe exchanges which is similar to the Being Healthy Counts to H.I.M. program curriculum used in the current study. Exercise components included residential walking programs, creation of walking facilities, gentle exercise classes and running clubs. It is interesting to note, that of the studies reviewed, many of them appeared to consider the culture of the community, spirituality, mental and emotional stability, and physical dimensions. This is a definite shift in perspectives than the traditional-individualistic approach used in other studies (Belgrave & Allison, 2006).
Of the studies conducted with youth, it was reported that there were post-test improvements in intervention groups in knowledge, preventive behaviors, and self-esteem. Among studies conducted with adults, most reported improvements in intervention groups in knowledge or adoption of regular physical activity.

Overall, Satterfield et al. (2003) found that more community-based studies are needed that examine proximal outcomes (i.e. self-reports or measured reports of physical activity like pedometers), documentation of weight loss, as well as clinical outcomes. This article suggested that using an experimental design may be culturally unacceptable in interventions targeting minority communities. It was also recommended to combine community-based participatory approaches and rigorous research designs when working with diverse communities. It is evident that researchers are beginning to recognize the need to take a more comprehensive-ecological approach when conducting health behavior interventions (Brofenbrenner, 1979).

As indicated by the literature, there have been numerous health behavior studies conducted to address the growing problem of diabetes and related risk factors in the U.S. However, few studies have focused specifically on African-American adults. It is evident that there is a need for further research in the area of diabetes and related risk factors in the African-American community. The following section will focus on studies relating to physical activity and the role it has on health outcomes.

*Research on physical activity.* According to Belgrave and Allison (2006) physical health is a function of biological, psychological, social and environmental factors. Whether
you have diabetes or not, regular physical activity improves your overall health and helps protect your body against cardiovascular and related diseases (Bopp et al., 2006; ADA, 2005). Part of the rise in obesity has been attributed to sedentary lifestyle. Research data, national and local statistics on health behavior (ADA, 2007; CDC, 2007; BRFSS, 2005) indicate that most residents of the United States do not engage in the recommended levels of physical activity (Lavie, Kuruvanka, Milani, Prasad, & Ventura, 2004).

As previously mentioned, the recommended amount of exercise is 30 min of moderate-intensity physical activity on most, preferably all, days of the week (www.diabetes.org, www.cdc.org). According to the BRFSS (2005) only 42.1% of North Carolinians reported meeting the physical activity recommendations. In Alamance County, 36% reported meeting the physical activity recommendations. Similarly, only 20.6% of individuals who self-identified as other or non-White reported meeting the physical activity recommendation; which is less than half of which was reported for the entire state.

There have been numerous studies conducted to understand the factors associated with physical activity. Many research efforts have assessed physical activity adherence and fruit and vegetable consumption simultaneously. Combing these risk factors is primarily due to the fact that both are associated with cardiovascular and related diseases (i.e., diabetes).

For example, Emmons (2007) found similar factors that were associated with physical activity and consumption of fruits and vegetables. This study found several demographic variables to be associated with physical activity (i.e., gender, age, racial/ethnic group, education level, job status, and place of birth). Participation in moderate to vigorous physical
activity (2.5 hours per week) was more likely among men, younger adults, Whites, individuals with college education, managers and among those born in the United States (Emmons et al., 2007).

Wilcox et al. (2009) conducted a study to evaluate whether individuals who participated in targeted interventions (Active Choices and Active Living Every Day) would improve exercise levels following the intervention. This study utilized the SCT and the Transtheoretical Model to guide its research. That is, this study took into account the reciprocal nature of the person, environment and behavior. Participants (n=1963) from nine community-based organizations took part in a 6-month telephone based or a 20-week group-based behavioral physical activity program and completed pretest and posttest surveys. This longitudinal study recruited adults aged 50 years and older and those who were underactive in physical activity to participate in the study. Information regarding demographic, cardiovascular health, psychosocial factors and level of physical activity was collected in the study. Results from this study found that pretest indicators (i.e. age, gender, cardiovascular – health status, psychosocial factors and current level of physical activity) influenced posttest levels of physical activity. That is, younger participants, participants with higher social support and physical activity had higher physical activity levels following the Active Choices intervention. As it relates to the Active Living Every Day intervention, younger participants, women, Latino participants, participants with higher BMI scores and health conditions, and who reported lower physical activity showed greater increased in physical activity. Findings
from this study suggest that demographic, health and psychosocial factors and health
behaviors influence health outcomes.

Moreover, Bopp et al. (2006) conducted a study to assess the factors associated with
physical activity among African-American men and women using the Socio-Ecological
Model and SCT. These models provided a framework to examine the multiple levels of
predictors on physical activity. Subjects for this study consisted of adult members of an
African Methodist Episcopal congregation who agreed to participate in a baseline telephone
survey. Participants had to be 18 years and older, report attending church at least twice per
month, and provided verbal consent.

A total of 572 telephone surveys were completed (i.e., 407 women and 165 men). The
average age of the sample was 53.88 years. The average BMI of the sample was 29.07, which
is within the obese range. The majority of the sample reported being married, having an
income greater than $25,000 and having greater than a high school education. Compared to
men, women had a higher BMI (p=0.005), were more likely to be attempting to lose weight
(p<0.001), were less likely to be married (p<0.001) and had lower household incomes
(p=.0002) (Bopp et al., 2006).

In terms of men’s physical activity adherence in the study, meeting moderate to
vigorous physical activity recommendations was associated with higher physical activity
self-efficacy, more positive ratings of health, and higher physical activity enjoyment (Bopp et
al., 2006). Among women, meeting the moderate to vigorous physical activity
recommendations was associated with younger age, being employed, greater servings of
fruits and vegetable consumption, positive ratings of health, current weight loss attempts, higher physical activity self-efficacy and having a physical activity program at their church.

Furthermore, in a study conducted by Lavie et al. (2004) exercise capacity was analyzed among African American and White men and women. Exercise capacity was estimated in metabolic equivalents using standard formulas based on maximal treadmill speed and incline (Lavie et al., 2004). The authors addressed the factors associated with exercise capacity among African-American men and women and compared these factors to their White counterparts.

In comparing African-American men and White men, African-American men were on average, three years younger (p<0.001), had higher baseline BMI (p<0.001), and a higher prevalence of obesity (p<0.001) and severe obesity (p<0.001). Similar results were found when comparing African-American women and White women.

Findings indicated that African Americans were on average, four years younger (p<0.001), had higher BMI’s (p<0.001), a higher prevalence of obesity (p<0.001) and severe obesity (p<0.001) compared to White women. Older White women were found to have a slightly higher exercise capacity than African-American women (Lavie et al., 2004). Overall, White men and women had higher exercise capacity than their African-American counterparts.

As evident by the findings in this study, there are demographic, psychosocial, and environmental factors that influence physical activity adherence among African-American adults. In light of this, it would be prudent to consider these factors and its relation to culture.
and the influence they have on adherence to physical activity among African-American adults.

Nonetheless, explanations for differences in physical inactivity between racial/ethnic groups are still unclear; however research suggests that cultural attitudes, body image, and environmental factors are influencing factors (Marshall et al., 2007). Marshall et al. (2007) conducted a study to assess the prevalence of leisure-time physical inactivity in a nationally representative sample of non-Hispanic White, non-Hispanic Black and Hispanic men and women. A sample of 9,806 individuals was drawn from non-institutionalized U.S. adults residing in telephone-equipped locations. Results from this study found that men and women, non-Hispanic Blacks and Hispanics had similar levels of inactivity and both groups were less active than their White counterpart. White men were more likely to engage in leisure-time physical activity. Hispanic women reported the highest prevalence of physical inactivity in the sample (Marshall et al., 2007). It was also found that the highest levels of inactivity was among individuals 65 years and older. Results also indicated that non-Hispanic Black men who were college graduates were less likely to be physically active in comparison to all racial/ethnic and social class groups, including Whites or Hispanics with the same level of education. Non-Hispanic Black women and Hispanic women had a higher prevalence of inactivity in comparison to White women overall. Non-Hispanic Black women with higher education were also found to have higher prevalence of inactivity with White women of the same level of education (Marshall et al., 2007).
It is clear that there are disparities in physical activity levels among minority groups in comparison to their White counterparts. This disparity is increasing the prevalence of cardiovascular disease and diabetes within minority communities. It is essential for health promotion programs to address the social, cultural, environmental and economical factors that contribute to this problem.

Although studies have been conducted to assess physical activity and the social and psychological correlates that affect adherence, many studies have neglected to expand their focus to specific factors affecting African Americans. While some studies have assessed the factors that influence physical activity among African-American women and adolescent girls (Mc-Quigg, Zerwic, Dan, & Kelley, 2001; Sharma, Sargent & Stacy, 2005; Wilbur, Chandler, Dancy & Lee, 2003; Sanderson et al., 2003; Trost et al., 2002; Wilcox, Richter, Henderson, Greaney, & Ainsworth, 2002), they have failed to extend their efforts to African-American men. In addition, many correlational studies include relatively few men from ethnic minority groups (Bopp et al., 2006). The current study assessed physical activity among African-American men and women and the psychosocial correlates that influence their adherence to healthy behaviors.

As previously mentioned, this study examined the influence of physical activity levels and psychosocial constructs such as self-efficacy and the role they have in determining health outcomes. The next section will discuss the role of psychosocial factors.
Psychosocial health-related research

In an effort to assess health behavior, it is necessary to understand the role of psychosocial factors that contribute to individual’s health outcomes. Researchers suggest that health care professionals “must understand factors affecting self-management behavior, including attitudes, self-efficacy, knowledge, skills, and motivation of the patient” (Cox et al., 2004, p. 156). This section will discuss the psychosocial factors, specifically self-efficacy as it relates to health behavior outcomes.

Research on self-efficacy. The concept of self-efficacy attempts to predict and explain human behavior (Bandura 1986, 1977). According to Bandura, self-efficacy is not a global trait or a personality characteristic; but rather an indicator of an individual’s expectations across varied context and behaviors. It has been stated that health behavior and health outcomes are a function of two-beliefs, efficacy expectations and outcome expectations. An efficacy expectation or perceived self-efficacy, is one’s judgment about their capacity to be successful in performing the recommended behavior. Outcome expectations are beliefs that one’s behavior will lead to a desired outcome (Grembowski et al., 1993; Bandura, 1977, 1986).

In terms of health promotion, self-efficacy refers to the confidence that the individual has in engaging in healthy behavior in challenging situations and the ability to disengage in temptations that promote unhealthy behavior across situations (as cited in Glanz et al., 2002). Self-efficacy is a component found in the TTM. According to Raczynski and DiClemente (1999), self-efficacy is a major determinant of behavior among individuals in the area of
health behavior. It is assumed that individual’s level of confidence when embarking in a healthier lifestyle, specifically in the area of physical activity and healthy eating, will be a determining factor of whether behaviors are sustained or suspended. This concept has been useful in health promotion programs for older adults (Grembowski et al., 1993).

Research suggests that individuals with high self-efficacy are more likely to engage in healthier behaviors. It has been found that these individuals are more likely to seek preventive care, exercise more, overcome smoking addiction, and rate their health more favorably than individuals with low self-efficacy (Grembowski et al., 1993).

In a study conducted by Grembowski et al. (1993) assessing levels of self-efficacy among older adults, primarily White and female with an education beyond high school found differences between individuals with high and low self-efficacy. It was found that individuals with higher self-efficacy and outcome expectations reported better health status and fewer physician visits than those with lower self-efficacy. Also, individuals with high SES scores reported better health status and higher self-efficacy and outcome expectation scores. Overall this study found that older adults who had high efficacy expectations for engaging in healthy behaviors (i.e., adhering to exercise, weight control and dietary fat intake) are more likely to perform those behaviors and have better health outcomes than older adults with lower efficacy expectations (Grembowski et al. 1993).

Walcott-Mc Quigg (2000) explored the role of psychological factors (i.e., self-concept, self-efficacy to diet, and stress) on cardiovascular risk reduction behavior in low and middle income African-American women. The psychological variables proposed in this
study are consistent with concepts provided in the SCT. The study used the SCT as the theoretical framework. Results from this study implied that there is a need for tailoring cardiovascular risk reduction interventions, specifically when working with minority communities and populations of varying SES backgrounds.

Shannon et al. (1997) conducted a study to assess self-efficacy as a predictor of dietary change in a low SES southern adult population. Self-efficacy was measured in this intervention as a part of a randomized clinical trial to reduce cholesterol levels in rural adults. Results from this study were similar to findings from previous studies. Results indicated that self-efficacy was a predictor of dietary change at both pre and post intervention. In other words, individuals with high self-efficacy were more inclined to adhere to dietary changes that reduced their cholesterol levels (Shannon et al., 1997).

Furthermore, Anderson, Wojcik, Winett, and Williams (2006) assessed the influence of social-cognitive determinants (i.e., social support, self-efficacy, outcome expectations, and self-regulation) on physical activity among participants in a church-based health promotion study. The majority of subjects in this study were White and of higher SES. Results from this study found physical activity differences associated with demographic factors, levels of self-efficacy and self-regulation among participants. Older age was associated with lower levels of self-efficacy and physical activity. Physical activity levels were also associated with race; with African Americans reporting lower levels of physical activity than other racial groups (Anderson et al., 2006). Among the social-cognitive variables in the study, self-regulation exerted the strongest effect on physical activity. That is, individuals who
made arrangements to exercise were more physically active than those who did not. Results indicated that women were more likely to use self-regulation strategies than men and were more likely to expect positive physical outcomes from physical activity. It was also found that self-efficacy and social support from family members was associated with higher levels of physical activity (Anderson et al., 2006).

As illustrated by the literature, self-efficacy is an important component to consider when promoting health behaviors. It is important to understand individual’s level of confidence in performing the recommended behaviors. Given the other external factors (e.g., environmental, social and economical) that contribute to the health outcomes of African-Americans; self-efficacy will provide insight to understand strategies that will help increase individual’s confidence level to sustain positive health behaviors. The next section will discuss additional health-related factors that contribute to diabetes and other cardiovascular-related diseases.

Additional health-related factors. As mentioned earlier, there are numerous factors affecting the health outcomes of African Americans. For example, maintaining a healthy diet has tremendous long-term health benefits for people of all ages (ADA, 2007). A healthy diet is a way of eating that reduces risk for complications such as heart disease, stroke and diabetes. Research has shown that a diet consisting of five or more fruits and vegetables a day help to reduce the risk of cardiovascular disease (ADA, 2007). Contrary to the recommendations of fruit and vegetable consumption, reports from the BRFSS (2005) indicate that the majority of North Carolinians, 77.5%, reported consuming less than five or
more fruits and vegetables per day. Rates were also low for African Americans. Over eighty-two percent of African Americans consumed less than five or more fruits and vegetables per day, which is a higher percentage than that reported for the entire state.

Similarly, the majority of individuals in Alamance County, 75.5%, also reported consuming less than five or more fruits and vegetables per day. In the same way, 83.7% of individuals who self-identified as other or non-White reportedly consumed less than five or more fruits and vegetables per day. It is clear that individuals in North Carolina are failing to consume the recommended amounts of fruits and vegetables (BRFSS, 2005).

Although there are health benefits from eating healthy, many individuals are failing to consume the amount recommended by national health organizations. As indicated by the literature, both preventable and non preventable factors influence individual’s consumption (Glanz & Mullis, 1988). With an increase in diabetes and other cardiovascular diseases, it is imperative to understand the factors that influence adherence to these national recommendations. Being able to identify the preventable risk factors will assist researchers in addressing health disparities and also increase adherence to healthier lifestyles that will in turn decrease the onset of type 2 diabetes.

It is evident that improving individual’s nutrition and eating habits will lead to an improvement in health outcomes. As illustrated in the literature, individuals are faced with various determinants that affect their access to healthier food choices, which in turn negatively affect their overall health. Research is needed to address the socioeconomic and
psychosocial factors that may influence consumption of healthier foods among African Americans.

*The Black Church and Health*

Additionally, the environment plays a very important role in providing access to resources and support for healthier lifestyles. Access factors go beyond the financial component, but extend to the availability of health care and related services when it is needed. Various acts of discrimination also permeate the health problems faced by individuals in minority communities. For example, acts of racism and classism influence the availability of resources and healthier choices in minority communities in comparison to other communities; particularly those inhabited by upper-middle class White Americans (Belgrave & Allison, 2006). Due to the apparent barriers to access resources, utilize health care services, and consume healthier foods, the African-American church has made efforts to get involved in health promotion efforts in the Black community.

The African-American church has historically been perceived as the cornerstone of the African-American community. The African-American church has traditionally focused on physical, mental and spiritual well-being of African Americans. It is seen as a place of solace for many African Americans (Belgrave, 1998). It offers individuals from the community a sense of refuge from the realities of life. Previous studies have indicated that the African-American church, religiosity and spirituality have been found to play an active role and serve as a buffer in the health outcomes of African Americans (Brown-Reid & Harrell, 2002). It is suggested by Bandura (1977) that environments (e.g., church) are key to
adherence to physical activity and other positive health behaviors. The African-American church provides social support groups, educational and tutoring programs, and health programs (Ellison et al., 2000). Larger churches may offer programs to support community residents, including school and child care facilities, clothing and housing, support for incarcerated individuals, counseling and support for individuals affected by substance abuse and chronic and infectious diseases, and the use of LHAs. Because the African-American church provides support and guidance for African Americans, many researchers and practitioners in the field are beginning to use the church as a means to target the African-American community.

Moreover, past research involving the church focused on increasing physical activity, nutrition, breast cancer screenings, HIV/AIDS preventions, and cardiovascular disease detection and prevention. Specifically, there have been efforts to improve the health of African Americans using the church in North Carolina. Most efforts have joined with local African-American churches to help increase physical activity and nutrition, which are major contributors to chronic diseases. Other efforts have focused on specific diseases, like diabetes or cardiovascular disease. Acquiring an understanding of the role of the church, religion and spirituality, will be beneficial to use as a catalyst for health behavior change.

Empirical studies have been conducted to improve health behaviors of African Americans using the African-American church. Campbell et al. (1999) conducted a longitudinal study to assess the effects of the Black Churches United for Better Health project on increasing fruit and vegetable consumption among rural African-American church
members in North Carolina. This study utilized and ecological framework targeting activities at the individual, interpersonal, and community levels. The findings from this study indicated that tailoring messages, addressing issues that are specific to the population at hand, and working with African-American churches proves promising for promoting health behavior changes. Studies that incorporate culture and belief systems of the groups they are working with will help to improve health behaviors of African Americans, which will in turn reduce the health disparities found in the African-American community.

Due to the environmental, social, and economical barriers that are influencing the health of African Americans, it is important to utilized structures in the community that will help thwart these barriers. The African-American church is a social structure in the black community that extends its reach to African Americans of various ages, backgrounds and socioeconomic statuses. Engaging the African-American church will help to raise awareness about the prevalence of diabetes and promote healthier lifestyle changes. It will also help to promote changes in the church environment that are supportive of healthy lifestyles.

**Limitations of existing research and gaps in the literature**

It is evident by health statistics that African Americans and other minorities are suffering at disproportionate rates from diabetes and other related chronic diseases in comparison to other groups. In order to accurately assess health behavior of African Americans, researchers must take into account the personal, cultural, social, environmental and behavioral factors (Thompson & Chambers, 2000; Mc Leroy et al., 1988). An intervention that uses a theoretical framework such as the SCT and the Socio-ecological
model which considers the dynamics of the interaction between, personal, cultural, social, environmental and behavioral factors are most applicable for working with the African American community (Raczynski & Diclemente, 1999; Bopp et al., 2006). It is also important to utilize the PRECEDE-PROCEED Planning model through the lens of an ecological perspective, with attention given to the predisposing, reinforcing and enabling factors that influence behaviors. Though all of these models (i.e., the SCT, Socio-ecological model, PRECEDE-PROCEED Planning model) provide numerous dimensions in which an intervention can focus its attention; this study adhered to the basic ideas found throughout these ecological models and the predisposing, reinforcing and enabling factor that contribute to health behavior and outcomes. That is, individual behaviors should be measured in the context of their environment and the reciprocal relationship that exist between the environment and the individual (Green & Kreuter, 1999; Mc Leroy et al., 1988).

Furthermore, the studies provided in this literature review have contributed to the body of knowledge in the public health literature and to the area of health behavior, particularly diabetes prevention. However, there are limitations to the research that has been conducted in this area. Limitations found in the literature consist of small sample sizes, the absence of minority groups and individuals with low SES, lack of ecological theoretical frameworks or models, lack of cultural approaches, reliance on self-report measures, and attrition.

In addition, the issue of causality needs to be addressed. Countless research efforts have involved cross-sectional studies. These studies lacked the ability to identify causality
among the variables being studied and follow-up mechanisms needed to monitor the maintenance of health behavior changes (Ford et al., 1998). In order to adequately evaluate the factors that influence health behavior outcomes, a longitudinal design is necessary.

Moreover, there have been numerous diabetes-related studies that address the health concerns of Americans, however, very few have utilized African-American samples. Also, few studies have addressed the way in which psychosocial factors and the environment influence health outcomes of African Americans (Ford et al., 1998). “Little is known about the social and contextual correlates (e.g., social norms, environment, social networks, and organizational support) influencing the adoption and maintenance of regular physical activity and other positive health behavior changes among minority and underserved populations” (Emmons et al., 2007; Fleury & Lee, 2006). There is a need to create interventions that take into account external factors that predict and influence health outcomes among African-Americans.

Additionally, there have been studies conducted to investigate the role of psychosocial factors such as social support (Bopp et al., 2006; Bertera, 2003; Belgrave, 1998; Belgrave & Lewis, 1994), stage of change (Prochaska, 1979), and self-efficacy (Bopp et al., 2006, Bandura, 1986, 1977) on health behavior changes, but, there is paucity in the literature as it relates to the role of the church and the use of LHA’s. Although researchers suggest that there is a relationship between religiosity, spirituality and health (Ellison et al., 2000; Mattis 2000, Taylor et al., 1999), to date, few empirical studies have looked at this topic as it relates to older African-American adults.
In an effort to expand this research area, the limitations of past research studies and the gaps in the literature will need to be addressed. This study will expand the current health behavior literature by assessing the influence a church based diabetes program has on individuals psychosocial outcomes, physical activity levels, physiological outcomes and overall participation in the program.

Purpose of the study

Due to increasing rates of diabetes and other chronic diseases in the state of North Carolina, strides have been taken by state and local governments to develop programs targeted at reducing health disparities through increasing physical activity and promoting nutritional diets. There are several programs within the State that are actively working to address health disparities. For example, programs such as the African-American churches Eating Smart and Moving More: Planning and Resource Guide (http://www.eatsmartmovemorenc.com), Project DIRECT (http://www.cdc.gov/diabetes/projects/direct.htm), NC 5 a day (http://www.nc5aday.com/index.htm), Body & Soul (http://www.bodyandsoul.nih.gov/what.html), have been developed to improve physical activity and nutrition. Although studies have been conducted to address the health disparities gap, there is still an insufficient number of studies and programs that focus on African Americans in general, and African-American adults specifically. Such studies would need to focus specifically on the psychosocial, behavioral and environmental factors that influence health outcomes of African-American adults.
Although achieving adherence to healthier behaviors and practices are the end result of health behavior interventions, individual approaches alone are not sustainable (LaVeist, 2005). This research project deviated from traditional-individual level interventions. This project assessed the influence personal, environmental and behavioral factors had on health behavior changes within a church setting. It is assumed that diabetes knowledge, environmental and policy changes within the church, and high levels of self-efficacy, will help maintain healthy behaviors and practices.

The purpose of this research was to 1) identify the relationship between demographic variables on health outcomes and 2) assess the impact of a diabetes prevention and health promotion program on individual’s self-efficacy for physical activity, daily moderate-vigorous exercise and fasting blood sugar. This study assessed the influence these factors have on the health behavior and health outcomes of African-Americans adults participating in a diabetes prevention and health promotion program. The following research questions guided this study:

- **Research Question 1:** How are individual’s health-related outcomes influenced by demographic variables?
- **Research Question 2:** Does the Being Healthy Counts to H.I.M. diabetes prevention and health promotion program have a positive influence on participants’ diabetes related behaviors and attitudes (i.e., self-efficacy for physical activity) as compared to the comparison group?
• Research Question 3. How does level of participation in the Being Healthy Counts to H.I.M. diabetes and health promotion program influence health-related outcomes?

Significance of the Study

Research has shown that there are many factors that influence the health disparities found among the African-American community (Belgrave & Allison, 2006; Laviest, 2005; Paloutzian & Park, 2005; Mattis, 2000; Taylor, Mattis & Chatters, 1999). Studies have also illustrated the important role cultural factors (e.g., social support networks, religion, spirituality, etc) have played in the lives of African Americans. Therefore, this study evaluated adherence to health behaviors among older African American men and women and the influence of psychosocial factors.

This study expanded the growing body of knowledge in the health behavior field with 1) use of an ecological model to understand factors that influence health behavior, 2) explicit focus on the health of African-American adults, and 3) the implicit use of cultural dimensions such as the African-American church and the influence it has on health behavior change. Specifically, this study helped to better understand the factors that are contributing to the health disparities within the African American community.

Assumptions

The major assumption of this study was that diabetes knowledge is related to adherence and sustainability to behavioral changes (i.e., physical activity and fasting blood sugar levels). It was assumed that this relationship would be influenced with the presence of
psychosocial and environmental factors. It was also assumed that psychosocial factors and
diabetes knowledge will lead to specified health behavior of the individual.
CHAPTER 3

Method

Participants

The sample for the study consisted of 84 adults, 60 participants enrolled in the Being Healthy Counts to H.I.M. (Health Improvement Ministry) diabetes prevention and health promotion program and 24 participants in the comparison group. Participants ranged between 18-74 years of age (M=52.50, SD=13.4). Participants were recruited from two predominately African-American churches and their surrounding community in Alamance County, North Carolina. The sample’s ethnicity was approximately 98% African-American (non-Hispanic). The majority of the sample, 61.0%, reported an annual income level of less than $25,000 and 41.7% of the sample reported attending some college (see Table 1).
Table 1.
Demographics of Sample Participants Note. (N=84)

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23</td>
<td>27.4</td>
</tr>
<tr>
<td>Female</td>
<td>61</td>
<td>72.6</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>25-34</td>
<td>6</td>
<td>7.1</td>
</tr>
<tr>
<td>35-44</td>
<td>13</td>
<td>15.5</td>
</tr>
<tr>
<td>45-54</td>
<td>19</td>
<td>22.6</td>
</tr>
<tr>
<td>55-64</td>
<td>31</td>
<td>36.9</td>
</tr>
<tr>
<td>65-74</td>
<td>10</td>
<td>11.9</td>
</tr>
<tr>
<td>Over 74 yrs</td>
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<td>3.6</td>
</tr>
<tr>
<td>Ethnic Identification</td>
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<td></td>
</tr>
<tr>
<td>African–American (non-Hispanic)</td>
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<td>97.6</td>
</tr>
<tr>
<td>Afro-Caribbean (Hispanic)</td>
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<td>1.2</td>
</tr>
<tr>
<td>Other</td>
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<td>1.2</td>
</tr>
<tr>
<td>Education Level</td>
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<tr>
<td>Less than high school</td>
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<td>13.4</td>
</tr>
<tr>
<td>High school graduate or GED</td>
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<td>28.0</td>
</tr>
<tr>
<td>Some college</td>
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<td>42.7</td>
</tr>
<tr>
<td>Bachelors degree or higher</td>
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<td>15.9</td>
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<tr>
<td>Annual Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 25,000</td>
<td>50</td>
<td>61.0</td>
</tr>
<tr>
<td>25,000-49,000</td>
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</tr>
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<td>50,000-74,999</td>
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<td>8.5</td>
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<td>75,000 or more</td>
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<tr>
<td>Diabetes Diagnoses</td>
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<td></td>
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<tr>
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</tr>
<tr>
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<td>63.1</td>
</tr>
<tr>
<td>Prediabetes</td>
<td>7</td>
<td>8.3</td>
</tr>
</tbody>
</table>
Participant Attrition

Eighty-four individuals enrolled to participate in the current study, 60 in the experimental group and 24 in the comparison group. At the end of the study, 65 participants were retained representing an overall attrition rate of 22.6%. That is, 19 out of 84 participants dropped out of the study after data collection at Time 1; of which 10 (16.7%) dropped out from the experimental group and 9 (37.75%) from the comparison group (see Table 2).

Table 2.

<table>
<thead>
<tr>
<th>Group</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
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<td>50</td>
<td>16.7</td>
</tr>
<tr>
<td>Control</td>
<td>24</td>
<td>15</td>
<td>37.5</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>65</td>
<td>54.2</td>
</tr>
</tbody>
</table>

A comparison of the program completers and those who dropped-out revealed that the completers were significantly younger, \( t(10.32) = -2.72, p = .01 \). Although the differences were not significant, the completers had lower education levels, reported lower annual incomes, had lower fasting blood sugar, had lower diabetes knowledge, and reported lower daily moderate-vigorous exercise scores. Levels of self-efficacy for physical activity scores were similar between the completers and drop-outs. Overall, with the exception of age, there was not a significant difference on diabetes and program-related variables between participants who dropped out of the study and those that remained.
Design

A pre-test, post-test quasi-experimental design was used. During the pre-test, the participants were administered a health behavior survey that consisted of questions pertaining to demographics, current health behavior, current diabetes knowledge, and self-efficacy for physical activity. Fasting blood sugar was also collected during the pre-test. Following the pre-test, subjects in the experimental group began the eight-week diabetes prevention and health promotion program. Immediately following the eight-week diabetes prevention program, subjects were administered the post-test. Subjects in both the experimental and comparison group completed the pre-test and post-test. Questions in the post-test were identical to questions administered in the pre-test.

Description of the Program

This study is an evaluation of a health initiative by Healthy Alamance, a coalition of several health organizations in Alamance county North Carolina that seeks to “improve access to, and increase awareness of, preventive health services, as well as eliminate health disparities among the disadvantaged (http://www.healthyalamance.com/).” With a mission to increase awareness and eliminate health disparities, Healthy Alamance used a curriculum that was focused on diabetes and related risk factors. The Being Healthy Counts to H.I.M. curriculum focuses on diabetes prevention and adherence to healthy lifestyle changes. Due to high rates of diabetes and related risk factors among African-Americans in Alamance county and surrounding areas, a program curriculum with a diabetes focus was most appropriate. It has been found in previous research that Black churches are useful in
spreading the message to a large number of people (African Americans) in one setting (Belgrave and Allision, 2006; Ellison et al., 2000). Black churches were used as a conduit to spreading the program’s health messages as a result of the important role religiosity and spirituality (Ellison et al., 2000).

Being Healthy Counts to H.I.M. is an eight-week diabetes and health promotion program composed of components from the Lifestyle Balance: Healthy Eating and Being Active Diabetes Prevention program designed and implemented by The Diabetes Research Prevention Program Research Group (The Diabetes Prevention Program Research Group, 1999). The program was designed to promote individual-level changes amongst participants; primarily physiological risk factors associated with diabetes. Individuals who were 18 years and older were eligible to participate in the current study. Targeted efforts were made to recruit older adults, particularly those between the ages of 45-74, to participate in the study. This age group was specified due to the fact that health statistics have shown this group to be less physically active and overweight, which has proven to increase the risk of diabetes (ADA, 2007; www.ncdiabetes.org). The risk factors measured in this program include: weight, body mass index (BMI), waist-hip ratio, blood pressure, and fasting blood sugar. However, fasting blood sugar was the only risk factor assessed in the current study. This program is supported by the National Institutes of Diabetes and Digestive and Kidney Diseases and the National Institutes of Health.

The Lifestyle Balance: Healthy Eating and Being Active Diabetes Prevention program is a 16-week program that was implemented in clinical settings (Diabetes
Prevention Program Research Group, 1999). In an effort to provide the program to participants in a church setting, Healthy Alamance adapted the delivery of the program. With limited funding and resources available to facilitate the program at churches, the program coordinator for Healthy Alamance and the Faith Based Health Committee which is comprised of nurses, diabetes educators and dieticians, condensed the key components of the Lifestyle Balance: Healthy Eating and Being Active Diabetes Prevention (i.e. healthy eating and exercise) into an eight-week class program. In addition, a religiosity and spirituality component was integrated into the program (i.e. prayer, scripture references, etc). These components allowed program facilitators to connect health messages to religion when providing the program in church settings. The eight-week program consisted of eight main topical areas (i.e., Session 1: Overview, introduction, wellness goals, Session 2: Getting started losing weight and healthy eating, Session 3: Being active: a way of life. Tip the calorie balance, Session 4: Be a fat detective. Three ways to eat less fat, Session 5: Take charge of what’s around you. Making social cues work for you and problem solving, Session 6: Four keys to healthy eating out. Talk back to negative thoughts, Session 7: The slippery slope of lifestyle change: Jump start your activity plan, Session 8: You can manage stress: Ways to stay motivated). One session was covered per week. A physical activity component was added to the weekly sessions. The physical activity component began during the first week of the program. Individuals were provided 30-min of physical activity at the end of each session.
Although church attendance rates vary across the U.S., the church remains a constant thread in the efforts of communities of color to bring community members together (Belgrave & Allison, 2006, Ellison et al., 2000). Regular church attendance is particularly common in southern and rural regions of the U.S. (Anderson et al., 2006; Ellison et al., 2000). According to data from the National Survey of Black Americans, “approximately two-thirds (67.2%) of African-American adults claim official membership in a church and two in five (40%) report attending services at least once a week (as cited in Ellison et al., 2000). As a result of the church’s vital role, this setting was appropriate for hosting a diabetes prevention program. The stated purpose of the Being Healthy Counts to H.I.M. diabetes prevention and health promotion program was to provide churches with the tools to prevent diabetes and to provide their congregation and other interested participants educational information and strategies that will help them lead healthy lifestyles (Healthy Alamance, 2008).

Research has found that Lay Health Advisors (LHAs) can be effective in providing health related services in local communities. LHAs are defined as persons in communities that are respected, trustworthy and trained to provide health-related (Jackson & Parks, 2007; Earp et al., 1997; Eng et al., 1997). The LHA serves as the liaison between health professionals and the community members in communicating health messages (Jackson & Parks, 2007; Earp et al., 1997; Eng et al., 1997). The LHAs for this study were trained by licensed dieticians from Healthy Alamance. LHAs were taught how to implement the curriculum and how to convey knowledge and skills related to healthy eating and physical
activity to program participants. It was projected that the use of LHAs who were also church members would allow the program to remain viable and sustainable following the eight-week program. In addition, certified diabetes educators from Healthy Alamance periodically monitored classes to insure LHAs adherence to the curriculum.

Procedure

Churches were identified by use of fliers, word of mouth and site visits to prospective churches located in Alamance County. During the site visits, representatives from Healthy Alamance and the researcher presented the Being Healthy Counts to H.I.M. diabetes prevention and health promotion program to the church pastor and congregation to solicit their participation. After churches were identified, a representative(s) from the church (i.e. LHA) was recruited to be trained to deliver the program to their respective congregation. The LHA’s recruited for the program were required to attend the eight-week classes, prior to implementing the program at their church. They were also required to attend two LHA training classes. The purpose of this class was to familiarize the LHAs with their roles, responsibilities, and expectations. During the LHA training classes, participants learned how to conduct and facilitate training sessions at their church using the Lifestyle Balance: Healthy Eating and Being Active Diabetes Prevention program guidelines and were provided educational information on healthy eating and physical activity. The training also provided the LHA’s information concerning the logistical expectations of their role in the program (e.g. taking attendance). The LHA’s worked with program leaders to recruit members of the church and community to participate in the program. Although the church was the host site
for program activities, non-members in the surrounding communities were also welcomed to participate in the program.

Once the subjects were recruited to participate in the study, they indicated whether or not they would participate in the eight-week diabetes prevention classes. Subjects that opted not to participate in the eight-week classes were assigned to the comparison group. Subjects that selected to participate in the eight-week classes were assigned to the experimental group. During the eight-week program, trained LHA’s taught a weekly 2 hr and 30 min diabetes prevention and health promotion curriculum to class participants. At the conclusion of the eight-week sessions, follow-up data was collected.

**Data collection.** Undergraduate students from a local university, volunteer nurses, and LHAs were trained to participate in data collection. These trainings lasted approximately 1 hour and 15 min. Topics covered included: description and purpose of the program, importance of ethical treatment of participants, building rapport, and a review of the test battery. Volunteers conducted mock interviews and were trained on the precise way that weight, height, blood sugar, blood pressure, and waist-hip ratio should be measured and recorded (see Appendix B).

At the beginning of the program, participants completed an informed consent form and a form explaining the data being collected (see Appendix C). The researcher and program volunteers were available to assist participants with completing the survey forms. For example, the researcher and program volunteers read the questions aloud to participants to assist them with completing the survey. This was done to address issues pertaining to
literacy and comprehension (Saha, 2006). Participants were required to complete program surveys at baseline and follow-up immediately following the eight-week program.

Completed surveys were collected by program volunteers. Following the data collection, all information was compiled and entered by the researcher into the program database. Individuals with elevated lab results were referred to their physician for follow-up or referred to the program physician if they did not have a doctor.

Attrition. Based on a power analysis conducted prior to the start of the study, at least 30 participants were needed in the experimental group at Time 1 and Time 2 to attain a medium (.50) to large (.80) effect size (Erdfelder, Faul, & Buchner, 1996). A medium to large effect size will indicate the magnitude of the intervention on participants. To account for the expected attrition typically experienced in community-based interventions, efforts were made to recruit five churches with at least 30 participants each into the experimental group. This effort yielded two churches with 30 participants per church for the experimental group and 24 participants for the comparison group.

Incentives were also offered to encourage participant involvement and retention in the study. When participating in the program and data collection, participants were offered incentives and qualified to take part in a raffle. The raffle prize consisted of rewards such as (e.g., gift card, cook book, program T-shirt, etc). During the program, weekly incentives were offered to reduce attrition over the eight-week program period. As a result, 42% of the program participants attended at least six out of the eight classes and approximately 77% of the subjects were retained over both data collection periods.
Comparison group. Comparison group members were recruited from the participating churches via a health screening event. Attendees were screened for risk factors that contribute to the onset of diabetes including blood pressure, fasting blood sugar, weight, and waist-hip ratio measurements. An informed consent form and a health behavior survey were administered. The survey assessed a range of sociodemographic variables including indicators of health status, family history, physical activity, diabetes knowledge, and self-efficacy for physical activity.

Measures

A 9-page test battery was administered to participants at baseline and immediately following the program to assess a range of sociodemographic variables (i.e., age, gender, income, education, and ethnic identification), health status, physical activity level, diabetes knowledge, and psychosocial factors (i.e., self-efficacy for physical activity). Fasting blood sugar was also collected.

Sociodemographic variables. Questions in this section were modeled after the US Census Bureau. This section consisted of five questions concerning the issues of gender, age, ethnic identification, income, and education.

Health-related variables. Health-related variables were assessed using questions from modeled from the CDC-Core Sections of the 2005 BRFSS for North Carolina and the National Health and Nutrition Examination Survey (NHANES). Questions were selected from the following sections: diabetes and physical activity. The diabetes-related section assessed whether or not participants had been diagnosed with medical conditions that would
predispose them to having diabetes. It also assessed individuals’ previous conditions and family history that would predispose them to diabetes and whether or not they have a personal physician. The health behavior section assessed participants’ engagement in activities that are related to diabetes. It also assessed subjects’ duration and intensity of physical activity and exercise. Meeting physical activity recommendations is defined as 30 or more minutes per day for five or more days per week of moderate to vigorous activity (ADA, 2005). For this study, the key independent variables derived from this measure is diabetes diagnoses and was coded 1= no diabetes, 2= prediabetes and 3=diagnosed with diabetes. Family history of diabetes was coded 1=no family history of diabetes and 2= family history of diabetes. The key dependent variable derived from this measure is daily moderate-vigorous exercise and was coded 1=1-2 days per week, 2= 3-4 days per week, 3=5-6 days per week, 4=7 days per week, and 6= never.

**Diabetes Knowledge Test (DKT).** Diabetes knowledge was measured using the 14-item Diabetes Knowledge Test (Fitzgerald et al., 1998). This general test examines the participants’ knowledge on issues pertaining to diabetes. Participants were asked to select the answer choice that best represents their current knowledge. A sample question is “Which is the best method for testing blood glucose?” The items were summed and a total score will be calculated. This measure has been found to be reliable, with a coefficient alpha of .77.

**Self-efficacy Health Behavior Scale.** Self-efficacy was measured using the Self-efficacy Health behavior Scale (Sallis, Pinski, Grossman, Patterson & Nader, 1988). This 12-item instrument consists of a sub-scale, which was used to measure the respondents’
current efficacy to engage in exercise behavior. Responses are on a 5-point Likert scale, from “I know I cannot” to “I know I can”. A sample question is “How sure are you that you can get up early on weekends to exercise?” Construct and criterion validity has been established for the scales. Internal consistency reliability was .83 and .85 for the exercise factors.

Additional Variables

Fasting Blood Sugar. Although physical measurements on each study participant on several health-related variables are collected during this study, the key dependent variable of interest is fasting blood sugar and is calculated according to the following categories (ADA, 2005; http://www.nhlbi.nih.gov/health/dci/index.html):

1) normal (less than 100)
2) pre-diabetic (101-125)
3) already diagnosed diabetes (90-130)
4) undiagnosed diabetes (higher than 126)

Program dosage. Participation was used to determine the amount (i.e., dosage) of the intervention received. Participants were required to “sign-in” for each session they attended. A total of eight classes were offered and participants could therefore have a dosage score of between 1 and 8.

Church Site: The church program attended by each participant was coded and entered into the database. This independent variable is used to determine if there are any differences across the study variables that may be related to either church characteristics (demographics) or the delivery of the intervention.
Diabetes Knowledge Change: Diabetes knowledge change assesses the change in diabetes knowledge from Time 1 to Time 2. In order to calculate the change from Time 1 to Time 2, scores from Time 1 were subtracted from scores from Time 2. A negative score indicated a decrease in diabetes knowledge and a positive score indicated an increase in diabetes knowledge.

Self-Efficacy for Physical Activity Change: Self-efficacy for physical activity change assesses the change in self-efficacy for physical activity from Time 1 to Time 2. In order to calculate the change from Time 1 to Time 2, scores from Time 1 were subtracted from scores from Time 2. A negative score indicated a decrease in self-efficacy for physical activity and a positive score indicated an increase in self-efficacy for physical activity.

Daily Moderate-Vigorous Exercise Change: Daily moderate-vigorous exercise change assesses the change in days per week individuals participated in daily moderate-vigorous exercise from Time 1 to Time 2. In order to calculate the change from Time 1 to Time 2, scores from Time 1 were subtracted from scores from Time 2. A negative score indicated a decrease in daily moderate-vigorous exercise and a positive score indicated an increase in daily moderate-vigorous exercise.

Data Analyses

The statistical procedures used for analyzing the quantitative data are detailed at the beginning of the results section. Described below are the qualitative strategies related to a process and outcome analysis of both the intervention and study.
Fidelity of program. Process information was collected to provide insight on the procedural consistency, standardization, and fidelity of the program (see Appendix E). The researcher attended sessions every other week at each church over the eight-week period. The researcher evaluated each session using an observational rubric which assessed whether the content of the curriculum for that week was adequately covered by the LHA. This allowed the researcher to identify whether or not all participating churches and LHAs were following the curriculum and adhering to the procedures provided during the training sessions. Attendance data were also collected through weekly sign-in sheets and an observational check by the researcher. Participants who attended all eight sessions were identified as having fully completing the program.

Debriefing. At the end of the eight-week sessions, participants were debriefed on their program experience. The debriefing session took place immediately following the last session of the program via focus groups (see Appendix G). Examples of questions asked during the focus group are: What did you like about the Being Healthy Counts to H.I.M. Program? Was the information provided during the program sessions easy to understand? What does the program need to offer in order to help you improve your eating habits and physical activity? How has your church LHA helped you improve your eating habits and physical activity? Were you involved with other programs during the time you participated in the H.I.M. program? What changes have you seen around the church? What type of support was received while participating in the program? How important of a role did religion play? Would this program be different if it was offered at another place (i.e., in a non-church
setting)? If so, would you participate? Overall, the debriefing session allowed participants to express concerns or recommendations for the program and ways to help participants’ increase their adherence to their stated goals and expectations. Focus groups lasted approximately 60 minutes.
This section presents the results of a mixed-methods study examining whether the Being Healthy Counts to H.I.M. eight-week diabetes prevention and health promotion program produced benefits to the participants daily moderate-vigorous exercise, fasting blood sugar, self-efficacy for physical activity and diabetes knowledge. Both quantitative and qualitative procedures were used.

Results of the quantitative analyses are presented first. The demographic characteristics of the participants (experimental and comparison groups) are provided along with the amount of participation (dosage) across both churches in the experimental group. Subsequent analyses were guided by socio-ecological theories and the relationships among the variables found in past research (see Figure 1) and the three research questions and related hypotheses. A preliminary correlational analyses is presented examining the relationships between demographic (i.e. age, gender, education, income and church site), diabetes (i.e., family history of diabetes and diabetes diagnoses) and program-related variables (i.e. diabetes knowledge, self-efficacy for physical activity, daily moderate-vigorous exercise, and fasting blood sugar) in the study at Time 1. Next, repeated measures multivariate analysis of variance (MANOVA) are conducted for each dependent variable. In order to decompose significant interactions, repeated measure MANOVA’s were also conducted separately for each dependent variable as a follow-up when multivariate tests were significant. If evidence of an interaction was not found then focus was directed to the
between-and within-subjects main effects. Multivariate regression analyses were conducted using the Hierarchical Method to examine the influence demographic, diabetes and program-related variables had on the dependent variables (Field, 2005).

### Preliminary Analyses

This section examines the relationship between the demographic (i.e. age, gender, education, income, and church site), diabetes (i.e., diabetes diagnoses and family history of diabetes) and program-related variables (i.e., diabetes knowledge, fasting blood sugar, daily moderate-vigorous exercise and self-efficacy for physical activity). Correlational Analyses were conducted to determine the demographic, diabetes and program-related variables that were correlated at Time 1 (see Table 3) and to determine which, if any, variables may be excluded from (and therefore strengthen) the subsequent regression analyses. In terms of the demographic variables, a significantly and strong positive correlation was found between

<table>
<thead>
<tr>
<th>Sociodemographic Variables</th>
<th>Dosage of intervention</th>
<th>Fasting blood sugar</th>
<th>Daily moderate-vigorous exercise</th>
<th>Self-efficacy for physical activity</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Diabetes diagnoses</td>
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</tr>
</tbody>
</table>

**Figure 1: Theoretical Research Model**

*Preliminary Analyses*

This section examines the relationship between the demographic (i.e. age, gender, education, income, and church site), diabetes (i.e., diabetes diagnoses and family history of diabetes) and program-related variables (i.e., diabetes knowledge, fasting blood sugar, daily moderate-vigorous exercise and self-efficacy for physical activity). Correlational Analyses were conducted to determine the demographic, diabetes and program-related variables that were correlated at Time 1 (see Table 3) and to determine which, if any, variables may be excluded from (and therefore strengthen) the subsequent regression analyses. In terms of the demographic variables, a significantly and strong positive correlation was found between
education and income \( (r = .41, p \leq 01) \); as income increased, there was an increase in education. There was also a significant correlation between church site and age \( (r = .54, p \leq 01) \); that is participants at church 2 \( (X = 60.58) \) were significantly older than participants at church 1 \( (X = 46.0) \).

Table 3.
Correlations Between Demographic and Diabetes-Related Variables at Time 1

<table>
<thead>
<tr>
<th></th>
<th>GEN</th>
<th>AGE</th>
<th>EDU</th>
<th>AIL</th>
<th>CHID</th>
<th>FHD</th>
<th>DD</th>
<th>DMV</th>
<th>FBS</th>
<th>DK</th>
<th>SEEX</th>
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</tr>
<tr>
<td>AIL</td>
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<td>.04</td>
<td>.41**</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CHID</td>
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<td>.54**</td>
<td>.13</td>
<td>.19</td>
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<tr>
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<tr>
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<tr>
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<td>-.31**</td>
<td>.02</td>
<td>.04</td>
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</tr>
<tr>
<td>FBS</td>
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<td>-.05</td>
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</table>

Note: GEN=Gender, EDU=Education, AIL= Annual Income Level, CHID=Church Site, FHD=Family History of Diabetes, DD=Diabetes Diagnoses, DMV=Daily Moderate-Vigorous Exercise, FBS=Fasting Blood Sugar, DK=Diabetes, SEEX=Self-Efficacy for Exercise.

*p-value \( \leq .05 \) level; **p-value \( \leq .01 \).
In terms of correlations found between demographic and diabetes related variables, a significant negative correlation was found between diabetes diagnoses and age \((r=-.28, p<.05)\) indicating that older participants were less likely to report being diagnosed with diabetes.

Demographic, diabetes and program-related variables were examined next. A significantly negative correlation was found between daily moderate-vigorous exercise and church site \((r=-.31, p<.01)\) and between fasting blood sugar and church site \((r=-.25, p<.01)\) and a significantly positive correlation between fasting blood sugar and diabetes diagnoses \((r=.54, p<.05)\). This suggests that rates of daily moderate-vigorous exercise and fasting blood sugar varied by church site. Also, participants who reported being diagnosed with diabetes also had higher fasting blood sugar scores. Diabetes knowledge was found to be positively correlated with education \((r=.29, p<.05)\), income \((r=.23, p<.05)\) and diabetes diagnoses \((r=.29, p<.05)\). Finally, self-efficacy for physical activity was correlated with age \((r=-.23, p<.05)\) and education \((r=.36, p<.05)\).

It appears from this sample, therefore, that participants with higher diabetes knowledge had higher income and education levels. Given the high correlation between education and income, only education will be included in subsequent regression analyses in order to reduce any multicollinearity effects. In addition, since it appears that church site is related to the program-related variables, it too will be included in subsequent regressions as well as examined in more detail in a series of post hoc analyses.
Results related to the proposed research questions and hypotheses

Research Question 1: How are individual’s health-related outcomes influenced by demographic, diabetes and program-related variables?

Hypothesis 1.1. Fasting blood sugar at Time 1 will be significantly associated with gender, age, education, family history of diabetes, diabetes diagnoses, and diabetes knowledge. It was hypothesized that demographic, diabetes and program-related variables would positively influence fasting blood sugar at Time 1.

In order to examine predictors of fasting blood sugar at Time 1 in the present sample, a hierarchical regression model was conducted (see Table 4). In the first block, gender, age, and education were entered and this block explained 2.8% of the variance in fasting blood sugar at Time 1 \([F(3, 78)=.71, p=.55]\). This block was not significant. In the second block, family history of diabetes and diabetes diagnoses were entered. The model then became significant \([F(5, 78)=7.89, p<.01]\) and explained 35.1% of the variance in fasting blood sugar. Diabetes diagnosis was positively associated \((b=43.6, p<.05)\). These findings demonstrate that at Time 1 participants’ with higher fasting blood sugar scores were more likely to report being diagnosed with diabetes. In block three only diabetes knowledge was entered. At this point, the overall model remained significant \([F(6, 78)=6.50, p<.01]\) but did not contribute additional variance (35.1%) in fasting blood sugar at Time 1. Diabetes diagnoses remained significant \((b=44.3, p<.01)\) but it appears that diabetes knowledge was not predictive of fasting blood sugar scores. In summary, hypothesis 1.1 was confirmed for diabetes diagnoses and not confirmed for gender, age, education, family history of diabetes.
and diabetes knowledge. That is, diabetes diagnoses was the only variable that was associated with fasting blood sugar at Time 1.

Table 4.

Summary of Hierarchical Regression Analysis for Variables Predicting Fasting Blood Sugar at Time 1. (N=78)

<table>
<thead>
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<th>R²</th>
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<td><strong>Block 3</strong></td>
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</table>

Note. GEN=Gender, AGE=Current Age, EDU=Education Level, FHD=Family History of Diabetes, DD=Diabetes Diagnoses, DK=Diabetes Knowledge
*p≤.05.
**Hypothesis 1.2.** Daily moderate-vigorous physical activity at Time 1 will be significantly associated with gender, age, education, family history of diabetes, diabetes diagnoses, and self-efficacy for physical activity. It was hypothesized that demographic, diabetes and program-related variables would positively influence daily moderate-vigorous exercise at Time 1.

In order to examine predictors of daily moderate-vigorous exercise at Time 1 in the present sample, a hierarchical regression model was conducted that correspond with daily moderate-vigorous exercise at Time 1 (see Table 5). In the first block, gender, age, and education were entered and explained 8.0% of the variance in daily moderate-vigorous exercise at Time 1 \[F(3, 73)=2.021, p=.12\]. This block was not significant. In the second block, family history of diabetes and diabetes diagnoses were entered. This block explained 9.7% of the variance in daily moderate-vigorous exercise at Time 1 \[F(5, 73)=1.47, p=.21\]. This block was not significant. In block three only self-efficacy for physical activity was entered. This block was not significant \[F(6, 73)=1.79, p=.11\] and explained 13.9% of the variance in daily moderate-vigorous exercise at Time 1. In summary, hypothesis 1.2 was not confirmed for gender, age, education, family history of diabetes, diabetes diagnoses and self-efficacy for physical activity. That is, none of the demographic, diabetes and program-related variables were associated with daily moderate-vigorous exercise at Time 1.
Table 5.

Summary of Hierarchical Regression Analysis for Variables Predicting Daily Moderate-Vigorous Exercise at Time 1. (N=73)

<table>
<thead>
<tr>
<th>Predictor</th>
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Note. GEN=Gender, AGE=Current Age, EDU=Education, FHD=Family History of Diabetes, DD=Diabetes Diagnoses, SEEX=Self-Efficacy for Physical Activity

*p<.05.
**Hypothesis 1.3.** Self-efficacy for physical activity at Time 1 will be significantly associated with gender, age, education, family history of diabetes, diabetes diagnoses, and daily moderate-vigorous exercise. It was hypothesized that demographic, diabetes and program-related variables would positively influence self-efficacy for physical activity at Time 1.

In order to examine predictors of self-efficacy for physical activity at Time 1 in the present sample, a hierarchical regression model was conducted that correspond with self-efficacy for physical activity at Time1 (see Table 6). In the first block, gender, age, and education were entered and explained 14.4% of the variance in self-efficacy for physical activity at Time 1 \( [F(3, 73)=3.94, p<.05] \). This block was significant. Education was significantly associated with self-efficacy for physical activity \( (b=4.25, p<.05) \). In the second block, family history of diabetes and diabetes diagnoses were entered and explained 17.0% of the variance in self-efficacy for physical activity at Time 1 \( [F(5, 73)=2.79, p<.05] \). This block was significant. Education remained significantly associated with self-efficacy for physical activity \( (b=4.21, p<.01) \). In block three only daily moderate-vigorous exercise was entered. This block explained 20.8% of the variance in self-efficacy for physical activity at Time 1 \( [F(6, 73)=2.94, p<.01] \). This block was significant. Education remained significantly associated with self-efficacy for physical activity \( (b=4.22, p<.01) \). In summary, hypothesis 1.3 was confirmed for education and not confirmed for gender, age, family history of diabetes, diabetes diagnoses. That is, education was the only variable that was associated with self-efficacy for physical activity at Time 1.
Table 6.

Summary of Hierarchical Regression Analysis for Variables Predicting Self-Efficacy for Physical Activity at Time 1. (N=73)

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Note: GEN=Gender, AGE=Current Age, EDU=Education, FHD=Family History of Diabetes, DD=Diabetes Diagnoses, DMV=Daily Moderate-Vigorous Exercise
*p ≤ .05.
Research Question 2: Does the Being Healthy Counts to H.I.M. diabetes prevention and health promotion program have a positive influence on participants’ diabetes related behaviors and attitudes (i.e., self-efficacy for physical activity) as compared to the comparison group?

Hypotheses 2.1, 2.2, and 2.3 looked at the differences between the experimental and comparison group from Time 1 to Time 2 on program-related variables.

Hypothesis 2.1. The experimental group will show significantly greater decreases in blood sugar from Time 1 to Time 2. It was hypothesized that the experimental group will have significant improvements in their fasting blood sugar scores from Time 1 to Time 2 compared to the comparison group.

In order to determine if the experimental group improved fasting blood sugar, a repeated measures MANOVA was conducted using fasting blood sugar at Time 1 and Time 2 as the dependent variables. The within-subjects factor was occasion (Time 1, Time 2) and the between-subjects factor was group (experimental, comparison). A significant occasion by group interaction was not found [F(1, 60) = .71, p = .40, \( \eta^2 = .01 \)]. However, there was a significant within-subjects’ main effect for occasion [F(1, 60)=4.76, p < .05, \( \eta^2 = .07 \)] indicating that there was a difference on fasting blood sugar scores from Time 1 to Time 2. To decompose this significant multivariate main effect, follow-up repeated MANOVA’s were conducted. Specifically, there was a significant decrease in mean fasting blood sugar scores from Time 1 (M= 131.18, SD=65.43) to Time 2 (M=119.65, SD=50.73) collapsed across the two groups. From Time 1 to Time 2, there was a decrease in fasting blood sugar
for both groups, regardless of group membership (i.e., experimental or comparison group) (see Table 7). In summary, hypothesis 2.1 was not confirmed. There was not a significant difference on fasting blood sugar scores between the groups from Time 1 to Time 2. However, there was an overall decrease in fasting blood sugar for all participants.

Table 7.

RMANOVA Comparing the Mean Difference Between Groups on Fasting Blood Sugar across Time 1 and Time 2

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<tr>
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<th>Control M(SD)</th>
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<td>145.31(85.81)</td>
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<td>Time 2</td>
<td>118.31(51.70)</td>
<td>124.69(48.59)</td>
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*p-value < .05 level.

Hypothesis 2.2. The experimental group will significantly improve daily moderate-vigorous exercise levels from Time 1 to Time 2. It was hypothesized that the experimental group will have significant improvements in their daily moderate-vigorous exercise scores from Time 1 to Time 2 compared to the comparison group.

In order to determine if the intervention improved daily moderate-vigorous exercise levels, a repeated measures MANOVA was conducted using daily moderate-vigorous exercise scores at Time 1 and Time 2 as the dependent variables. The within-subjects factor was occasion (Time1, Time 2) and the between-subjects factor was group (experimental, comparison). A significant occasion by group interaction was not found [F(1, 55) = 1.28, p=.26, η²=.02] and there was not a significant within-subjects main effect for occasion [F(1,
In summary, hypothesis 2.2 was not confirmed. The experimental group’s daily moderate-vigorous exercise scores were not significantly higher than the comparison groups. Both groups decreased daily moderate-vigorous exercise scores from Time 1 to Time 2.

**Hypothesis 2.3:** The experimental group will significantly improve self-efficacy for physical activity from Time 1 to Time 2. It was hypothesized that the experimental group will have significant improvements in their self-efficacy for physical activity scores from Time 1 to Time 2 compared to the comparison group.

In order to determine if the intervention improved self-efficacy for physical activity, a repeated measures MANOVA was conducted using self-efficacy for physical activity at Time 1 and Time 2 as the dependent variables. The within-subjects factor was occasion (Time 1, Time 2) and the between subjects factor was group (experimental, comparison). A marginally significant interaction was found \[ F(1, 63) = 3.98, p = .05, \eta^2 = .06 \]. Across occasions, there was a marginally significant difference in self-efficacy for physical activity scores between experimental and comparison group. At Time 1, self-efficacy for physical activity was higher \( M = 45.96, SD = 11.63 \) for the experimental group than the comparison group \( M = 39.13, SD = 10.30 \). At Time 2, self-efficacy for physical activity scores were slightly higher for the experimental group \( M = 44.68, SD = 10.30 \) than the comparison group \( M = 44.4, SD = 10.29 \). It is important to note that the self-efficacy for physical activity scores for both groups were similar at Time 2; that is, there was a greater increase in self-efficacy for physical activity scores in the comparison group than in the experimental group (see
Scores in the experimental group were higher than the comparison group at Time 1, however at Time 2, scores from the comparison group increased while scores from the experimental group remained relatively the same. In summary, hypothesis 2.3 was not confirmed. There was not a significant difference between the experimental group and comparison group on self-efficacy for physical activity scores from Time 1 to Time 2. The scores for the experimental group remained relatively the same from Time 1 to Time 2.

![Graph showing change in self-efficacy for physical activity scores across groups from Time 1 to Time 2.](image)

**Figure 2.** Change in Self-Efficacy for Physical Activity Scores across Groups from Time 1 to Time 2

*Post Hoc Analyses*

Given the apparent impact of the church site variable, post hoc analyses were conducted to further examine the relationships among demographic, diabetes and program-related variables at Time 2. Specifically, given the significant correlation between church site
and other study variables, these analyses examined church differences among participants in the experimental group.

In order to determine if fasting blood sugar scores differed by church from Time 1 to Time 2, a repeated MANOVA was conducted. Fasting blood sugar at Time 1 and Time 2 was the dependent variable. The within-subjects factor was occasion (Time 1, Time 2) and the between-subjects factor was church site (Church 1, Church 2). A significant occasion by group interaction was not found \( F(1, 47) = 1.91, p=.17, \eta^2 =.04 \). However, there was a significant within-subjects’ main effect for occasion \( F(1, 47)=5.49, p <.05, \eta^2 =.11 \) indicating that there was a difference on fasting blood sugar scores from Time 1 to Time 2. To decompose this significant multivariate main effect, follow-up repeated MANOVA’s were conducted. Specifically, there was a significant decrease in mean fasting blood sugar scores from Time 1 (M= 127.43, SD=59.43) to Time 2 (M=118.31, SD=51.69) collapsed across both churches. From Time 1 to Time 2, there was a decrease in fasting blood sugar for both groups, regardless of their church membership. However, significant changes in fasting blood sugar only occurred within Church 1. At Time 1, Church 1 mean fasting blood sugar (M=147.00, SD=79.21) was higher than Church 2 (M=110.12, SD=24.20). At Time 2, there was a greater decrease in fasting blood sugar at Church 1 (M=131.96, SD=72.74) than at Church 2 (M=106.23, SD=122.71).

In order to determine if daily moderate-vigorous exercise scores differed by church from Time 1 to Time 2, a repeated MANOVA was conducted. Daily moderate-vigorous exercise at Time 1 and Time 2 was the dependent variables. The within-subjects factor was
occasion (Time 1, Time 2) and the between-subjects factor was church site (Church 1, Church 2). A significant occasion by group interaction was found \[ F(1, 42) = 17.33, \ p \leq .05, \ \eta^2 = .29 \]. Across occasions, there was a significant difference in daily moderate-vigorous exercise scores between Church 1 and Church 2. At Time 1, daily moderate-vigorous exercise scores was higher (M=3.90, SD=2.21) for Church 1 than Church 2 (M=2.04, SD=1.40). At Time 2, daily moderate-vigorous exercise scores were lower for Church 1 (M=1.95, SD=1.75) than Church 2 (M=2.22, SD=1.44) (see figure 3). It is important to note that daily moderate-vigorous exercise scores for Church 1 was significantly higher at Time 1 compared to Church 2, but also decreased at a greater level at Time 2 compared to Church 2.

![Figure 3. Change in Daily Moderate-Vigorous Exercise across Churches from Time 1 to Time 2](image)

In order to determine if self-efficacy for physical activity scores and diabetes knowledge differed by church from Time 1 to Time 2, repeated measures MANOVAs were
conducted. Both of these variables at Time 1 and Time 2 were used as the dependent variable for each repeated measures MANOVA conducted. The within-subjects factor was occasion (Time 1, Time 2) and the between-subjects factor was church site (Church 1, Church 2). Results indicate that there were no differences in either self-efficacy for physical activity or diabetes knowledge found across Time 1 to Time 2 between the two churches.

Next, correlational analyses were conducted with the experimental group to examine the relationship among diabetes and program-related variables at Time 2 (see Table 8). In terms of the demographic variables, a correlation was found between gender and income \((r=-.38, p<.01)\) and education and income \((r=.34, p<.01)\). There was also a correlation found between church site and gender \((r=-.47, p<.01)\) church site and age \((r=.67, p<.01)\). That is, females were more likely to have a lower income and individuals with higher education also had a higher income. Also, it was found that gender and age varied by church site.

In terms of correlations found between demographic and diabetes-related variables, a correlation was found between age and diabetes diagnoses \((r=.32, p<.05)\). That is, older adults reported being diagnosed with diabetes.

In terms of correlations found between demographic, diabetes and program-related variables, a correlation was found between participation and education \((r=.26, p<.05)\) and participation and income \((r=.27, p<.05)\). There was also a correlation between fasting blood sugar and diabetes diagnoses \((r=.44, p<.05)\), self-efficacy for physical activity and church site \((r=.32, p<.05)\) and self-efficacy for physical activity and participation. It appears, therefore, that participants with higher education attended more classes and had higher
income levels. It was also found that participants who had higher fasting blood sugar scores had higher rates of daily moderate-vigorous exercise. Self-efficacy for physical activity varied by church site and participants with higher self-efficacy for physical activity attended more classes.

Next, change scores were calculated for the program-related variables (i.e., diabetes knowledge, fasting blood sugar, daily moderate-vigorous exercise, and self-efficacy for physical activity). In order to calculate the change scores, scores from Time 2 were subtracted from scores from Time 1. Positive scores represent an increase (positive changes) from Time 1 to Time 2. Negative scores represent a decrease (negative changes) from Time 1 to Time 2. Change scores were also calculated to assess its relationship and influence it has on scores at Time 2. There was a correlation between self-efficacy for physical activity change and age ($r=-.33$, $p<.05$), self-efficacy for physical activity change and participation ($r=-.49$, $p<.05$), self-efficacy for physical activity change and fasting blood sugar ($r=-.44$, $p<.05$) and self-efficacy for physical activity change and self-efficacy for physical activity at Time 1 ($r=.41$, $p<.05$). That is, younger participants had an increase in self-efficacy for physical activity from Time 1 to Time 2 and individuals with lower participation levels had an increase in self-efficacy for physical activity from Time 1 to Time 2. It was also found that participants with lower fasting blood sugar had an increase in self-efficacy for physical activity from Time 1 to Time 2. It was also found that participants with higher self-efficacy for physical activity scores at Time 1 had greater changes in self-efficacy for physical activity from Time 1 to Time 2.
In terms of diabetes knowledge change, a correlation was found between diabetes knowledge change and diabetes diagnoses ($r=-.33$, $p \leq .05$), diabetes knowledge change and diabetes knowledge ($r=.39$, $p \leq .05$) and diabetes knowledge change and fasting blood sugar ($r=-.31$, $p \leq .05$). That is, participants who reported being diagnosed with diabetes had a decrease in diabetes knowledge from Time 1 to Time 2. It was also found that participants with higher diabetes knowledge scores at Time 2 had an increase in diabetes knowledge scores from Time 1 to Time 2 and lower fasting blood sugar scores.

There was also a correlation found between daily moderate-vigorous exercise change and participation ($r=-.36$, $p \leq .05$) and self-efficacy for exercise change ($r=.75$, $p \leq .05$). That is, participants with higher levels of participation had a decrease in daily moderate-vigorous exercise from Time 1 to Time 2. It was also found that individuals with an increase in self-efficacy for physical activity from Time 1 to Time 2 had greater increases in daily moderate-vigorous exercise from Time 1 to Time 2.
Next, regression analyses were conducted with demographic, diabetes and program-related variables that were found to be significantly correlated among the experimental group across both churches at Time 2. Income was removed from the analyses to reduce any multicollinearity effects.

In order to examine predictors of fasting blood sugar at Time 2 in the experimental group, hierarchical regression models were conducted that correspond with fasting blood sugar at Time 2 (see Table 9). Each model was conducted using a hierarchical regression

### Table 9:

Correlations Between Demographic, Diabetes and Program-Related Variables at Time 2

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*p-value ≤ .05 level; ** p-value ≤ .01.
model. Two of the three blocks were found to be significant. In the first block, gender, age, education, and church site were entered. The first block explained 6.8% of the variance in fasting blood sugar at Time 2 $[F(4, 46)=.76, p=.56]$. This block was not significant. In the second block, family history of diabetes and diabetes diagnoses were entered. The second block explained 27.3% of the variance in fasting blood sugar at Time 2 $F(6, 46)=2.50, p \leq .05]$. This model was significant. Diabetes diagnoses was positively associated with fasting blood sugar at Time 2 ($b=27.15, p \leq .05$). These findings demonstrate that participants that reported being diagnosed with diabetes also had higher fasting blood sugar. In the third block, diabetes knowledge change and self-efficacy change were entered. The third block explained 43.8% of the variance in fasting blood sugar at Time 2 $F(8, 46)=3.70, p \leq .01]$. This model was significant. Diabetes diagnoses ($b=20.56, p \leq .05$) and self-efficacy for physical activity change scores were significantly associated with fasting blood sugar ($r=-1.73, p \leq .05$). Participants that reported being diagnosed with diabetes also had higher fasting blood sugar scores and a decrease in self-efficacy scores from Time 1 to Time 2.
Table 9.

Summary of Hierarchical Regression Analysis for Variables Predicting Fasting Blood Sugar at Time 2. (N=46)

<table>
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</tbody>
</table>

Note. GEN=Gender, AGE=Current Age, EDU=Education, CHID=Church Site, Level, FHD=Family History of Diabetes, DD=Diabetes Diagnoses, DKCH=Diabetes Knowledge Change, SEECH=Self-Efficacy for Physical Activity Change
*p≤.05.
In order to examine predictors of daily moderate-vigorous exercise at Time 2 in the experimental group, hierarchical regression models were conducted that correspond with daily moderate-vigorous exercise at Time 2 (see Table 10). In the first block, gender, age, education, and church site were entered and explained 4.5% of the variance in daily moderate-vigorous exercise [$F(4, 41)=.44, p=.78$]. In the second block, family history of diabetes and diabetes diagnoses were entered and explained 7.8% of the variance in daily moderate-vigorous exercise [$F(6, 41)=.49, p=.81$]. In the third block, daily moderate-vigorous exercise was entered and explained 28.8% of the variance in daily moderate-vigorous exercise [$F(7, 41)=1.97, p=.09$]. None of the blocks were found to be significant.
Table 10.
Summary of Hierarchical Regression Analysis for Variables Predicting Daily Moderate-Vigorous Exercise at Time 2. (N=41)

<table>
<thead>
<tr>
<th>Predictor</th>
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<th>β</th>
<th>R²</th>
</tr>
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<td><strong>Block 3</strong></td>
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<tr>
<td>DMV</td>
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</tr>
</tbody>
</table>

Note. GEN=Gender, AGE=Current Age, EDU=Education, CHID=Church Site, FHD=Family History of Diabetes, DD=Diabetes Diagnoses, DMV=Daily Moderate-Vigorous Physical Activity
*p≤.05.
In order to examine predictors of self-efficacy for physical activity at Time 2 in the present sample, hierarchical regression models were conducted that correspond with self-efficacy for physical activity at Time 2 (see Table 9). One of the three blocks were found to be significant. In the first block, gender, age, education, and church site were entered. The first block explained 13.8% of the variance in self-efficacy for physical activity at Time 2 \( F(4, 47)=1.72, p=.16 \). This block was not significant. In the second block, family history of diabetes and diabetes diagnoses were entered. The second block explained 21.9% of the variance in self-efficacy for physical activity at Time 2 \( F(6, 47)=1.92, p=.10 \). This block was not significant. In the third block, level of participation and self-efficacy for physical activity at Time 1 were entered. The third block explained 38.3% of the variance in self-efficacy for physical activity at Time 2 \( F(8, 47)=3.02, p<.01 \). This model was significant. Self-efficacy for physical activity at Time 1 was significantly associated with self-efficacy for physical activity at Time 2 \( (b=.32, p<.05) \). Participants with higher self-efficacy for physical activity scores at Time 1 had higher self-efficacy for physical activity scores at Time 2.
Table 11.
Summary of Hierarchical Regression Analysis for Variables Predicting Self-Efficacy for Physical Activity at Time 2. (N=47)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
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<th>R²</th>
</tr>
</thead>
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<td>-.08</td>
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</table>

Note. GEN=Gender, AGE=Current Age, EDU=Education, CHID=Church Site, FHD=Family History of Diabetes, DD=Diabetes Diagnoses, Participation=Level of Participation, SEEX=Level of Self-Efficacy for Physical Activity

*p<.05.
Research Question 3. How does level of participation in the Being Healthy Counts to H.I.M. program influence health-related outcomes?

**Hypothesis 3.1:** Fasting blood sugar will be significantly lower for participants who attended a higher number of classes by Time 2. It was hypothesized that participants who had higher levels of participation will significantly improve fasting blood sugar scores from Time 1 to Time 2 compared to those who did not.

In order to determine if fasting blood sugar at Time 2 differed by the number of classes attended, a repeated measures MANOVA was conducted using fasting blood sugar at Time 1 and Time 2 as the dependent variables. The within-subjects factor was occasion (Time 1, Time 2) and the between-subjects factor was classes attended (6 or less, 7 classes, 8 classes). A significant occasion by class interaction was not found \[F(2, 46) = .488, p=.62, \eta^2 = .02\]. However, there was a significant within-subjects main effect for occasion \[F(1, 46) =4.87, p<.05, \eta^2 =.10\] indicating that there was a pretest to posttest difference on fasting blood sugar scores from Time 1 to Time 2. To decompose this significant multivariate main effect, follow-up repeated MANOVA’s were conducted. Specifically, there was a significant decrease in mean fasting blood sugar from Time 1 (M= 127.43, SD=59.43) to Time 2 (M=118.31, SD=51.70) collapsed across classes (see Table 10). Overall, subjects decreased their fasting blood sugar from Time 1 to Time 2 regardless of the number of classes attended. In summary, hypothesis 3.1 was not confirmed. Participants who attended a higher number of classes did not significantly improve fasting blood sugar scores compared to those who did
not. However, there was an overall decrease in fasting blood sugar scores among all participants, regardless of their level of participation.

Table 12.

RMANOVA Comparing the Mean Difference Between Level of Participation on Fasting Blood Sugar from Time 1 to Time 2

<table>
<thead>
<tr>
<th>Occasion</th>
<th>6 or less classes</th>
<th>7 classes</th>
<th>8 classes</th>
<th>F</th>
<th>P</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td>134.27(75.58)</td>
<td>111.91(23.54)</td>
<td>130.39(60.47)</td>
<td>4.87</td>
<td>.03*</td>
<td>.10</td>
</tr>
<tr>
<td>Time 2</td>
<td>119.07(58.38)</td>
<td>104.64(8.03)</td>
<td>124.35(59.16)</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

* p-value ≤ .05 level.

**Hypothesis 3.2:** Daily moderate-vigorous exercise will be positively influenced by participation in subjects who attended a higher number of classes by Time 2 than those who did not. It was hypothesized that participants who had higher levels of participation will significantly improve daily moderate-vigorous exercise scores from Time 1 to Time 2 compared to those who did not.

In order to determine if daily moderate-vigorous exercise at Time 2 differed by the number of classes attended, a repeated measures MANOVA was conducted using daily moderate-vigorous exercise at Time 1 and time 2 as the dependent variables. The within-subjects factor was occasion (Time 1, Time 2) and the between subjects factors was classes attended (6 or less classes, 7 classes, 8 classes). A significant interaction was found [$F(2, 41)=6.121$, $p<.05$, $\eta^2=.23$. Across occasion, daily moderate-vigorous exercise scores decreased from Time 1 to Time 2 among all participants, regardless of the number of classes attended (see figure 3). At Time 1, scores for participants who attended 6 or less classes
(M=3.71) was significantly higher than participants who attended 7 classes (M=3.38) and participants who attended 8 classes (M=2.27). At Time 2, scores for participants who attended 7 classes (M=3.00) was significantly higher than participants who attended 8 classes (M=2.14) and participants who attended 6 or less classes (M=1.50) (see figure 3). In summary, hypothesis 3.2 was not confirmed. Participants who attended a higher number of classes did not significantly improve daily moderate-vigorous exercise scores compared to those who attended fewer classes. However, there was an overall decrease in daily moderate-vigorous exercise scores among all participants, regardless of their level of participation.
Hypothesis 3.3: Self-efficacy for physical activity will be positively influenced by participation in subjects who attended a higher number of classes by Time 2 than participants who did not. It was hypothesized that participants who had higher levels of participation will significantly improve self-efficacy for physical activity scores from Time 1 to Time 2 compared to those who did not.

In order to determine if self-efficacy for physical activity scores at Time 2 differed by the number of classes attended, a repeated measures MANOVA was conducted using self-
efficacy for physical activity at Time 1 and time 2 as the dependent variables. The within-subjects factor was occasion (Time 1, Time 2) and the between subjects factors was classes attended (6 or less classes, 7 classes, 8 classes). A significant occasion by class interaction was not found \( [F(2, 47)=.583, p=.56, \eta^2=.02] \). There was also no main effect for occasion \( [F(1, 47)=.251, p=.62, \eta^2=.01] \). In summary, hypothesis 3.3 was not confirmed. Participants who attended a higher number of classes did not significantly improve self-efficacy for physical activity scores compared to those who attended fewer classes.

**Fidelity of program observations**

After conducting observations every other week at each church during the eight-week program, the researcher was able to identify strengths and weakness in the delivery of the program across churches and thereby assess the overall fidelity of the program.

**Observations at Church 1**

During the eight-week program, there were four trained LHA’s who alternated facilitating the weekly classes. On some occasions, the LHA’s facilitated the class together. During the first class of the program, the LHA’s facilitated the class together. The presentation covered all sections of material found in the program curriculum for week one and integrated a religious and spiritual component (i.e., referencing biblical passages and praying before beginning and ending the program). The session was very interactive with the LHA and class participants. The main topics discussed were: goal setting, weight loss, social support, healthy eating and exercise, and the history of diabetes. During this session, the LHA’s did not use any outside materials. In week three of the program, one LHA facilitated
the class. The presentation covered all sections of material found in the program curriculum for week two and integrated a religious and spiritual component. This was not an interactive session. The main topics discussed were: rate your plate, importance of physical activity and positive affects of physical activity. During this session the LHA used handouts that were not provided in the program curriculum. The handout discussed developing an exercise plan at your desk or while watching television. In week five of the program, one LHA facilitated the class. The presentation covered most of the sections of material found in the program curriculum for week five and did not integrate a religious and spiritual component. The main topics covered were: social cues and creating healthier habits. The LHA did not use any outside material. In week seven of the program, one LHA facilitated the class. The session was interactive with the LHA and class participants. The presentation covered all of the sections of material found in the program curriculum for week seven and integrated a religious and spiritual component. The session was interactive with the LHA and class participants. The main topics covered were: dealing with the slippery slope of maintaining positive health changes, getting back on track to eating healthy and exercising, and developing a plan to stay on track to a healthy lifestyle. The LHA did not use any outside material. Lastly, during week eight of the program, two LHA’s facilitated the class. The presentation highlighted some of the material covered from the curriculum for week eight and integrated a religious and spiritual component. This session was not interactive. The main topics covered were: stress and health maintenance. The LHA’s referred to a lot of
outside material during this session. The LHA brought in articles from local newspaper, research studies and websites regarding managing stress.

Overall, the LHA’s at this church provided health information pertaining to diabetes prevention. While doing so, they integrated a religious and spiritual component. However, the use of outside materials mired the LHA’s ability to follow the program curriculum. This deviation from the program’s curriculum appeared to have an affect on the fidelity and delivery of the program.

*Observations at Church 2*

During the eight-week program, there were four trained LHA’s who alternated facilitating the weekly classes. On some occasions, the LHA’s facilitated the class together. During the first class of the program, one LHA facilitated the class. The presentation covered all sections of material found in the program curriculum for week one and integrated a religious and spiritual component (i.e., referencing biblical passages and praying before beginning and ending the program). The session was very interactive with the LHA and class participants. The main topics discussed were: the history of diabetes, importance of eating healthy and the importance of physical activity. During this session, the LHA used outside material. The outside materials included handouts regarding the development of a family tree and information on cholesterol. In week two of the program, one LHA facilitated the class. The presentation covered most of the sections of material found in the program curriculum for week two and did not integrate a religious and spiritual component. The main topics covered were: eating healthy, portion control and the food pyramid. During this
session, the LHA used outside material. The outside materials included information regarding healthy eating, the food pyramid, and making sense of portion sizes. In week four of the program, one LHA facilitated the class. The session was interactive with the LHA and class participants. The presentation covered all of the sections of material found in the program curriculum for week four and integrated a religious and spiritual component. The session was interactive with the LHA and class participants. The main topics covered were: fat counting, demonstrations of food measuring, and label reading. During this session, the LHA used outside material. The outside materials included information regarding type-2 diabetes, understanding lab test, comparisons of food, and using visual aids. In week six of the program, two LHA’s facilitated the class. The session was interactive with the LHA and class participants. The main topics covered were: meal planning for eating out and healthier options for eating out. During this session, the LHA used outside material. The outside materials included information on healthy recipes. Lastly, during week eight of the program, one LHA facilitated the class. The presentation covered all of the sections of material found in the program curriculum for week eight and integrated a religious and spiritual component. This session was interactive with the LHA and class participants. The main topics covered were: how to handle stress, breathing exercises and ways to stay motivated for living a healthy life. During this session, the LHA’s used outside material. The LHA brought in articles regarding deep breathing.

Overall, the LHA’s at this church provided health information pertaining to diabetes prevention. While doing so, they integrated a religious and spiritual component. However,
similar to Church 1, the use of outside materials mired the LHA’s ability to follow the program curriculum. This deviation from the program’s curriculum also appeared to affect the fidelity and delivery of the program. Although the LHA’s deviated from the curriculum during the delivery of the program, they were able to complete the 30-minute exercise component each week at their church.

*Focus group findings*

At the conclusion of the eight-week diabetes prevention and health promotion program, two focus groups were assembled with a total of 10 individuals. There were five individuals per church in each focus group. The focus groups were designed to collect data from participants regarding their overall impression of the program. The following are themes and responses that were discovered during the focus group sessions. First, when asked what was most liked about the program, the participants stated that the program overall was “very beneficial”, “uplifting”, “very educational”, and “raised awareness”. Some also mentioned that “it (the program) can save your life”, that they were “grateful for the program” and that it made them “accountable”. The participants also felt that the information provided during the classes was easy to understand. Participants at both churches felt that the program provided a lot of support. For example, participants received support from class instructors, classmates, church pastor, and co-workers during the eight-week program. Participants also mentioned gaining important health information and learning new ways to eat and portion sizes.
Second, participants stated that in order for the program to help them improve their eating habits, it needed to be extended for a longer period of time. The issue of extending the program was prevalent among participants at both churches. Participants felt like they needed the constant support of their LHA and their peers to be successful and maintain the positive health changes. Specifically, participants stated that the use of the LHA was very important. The LHA “was very supportive” and they (participants) “saw them (the LHA) as role models”. Participants also mentioned that the LHA was “our encouragement to keep going” and “helped us learn”. Participants also said that the LHA “called to check on me” and “provided me with people to talk to when I got off track”. It is evident through the responses of the participants that the LHA was seen as a resource for the participants at their respective churches. This finding supports the importance of the LHA in the delivery of the program as well as their role in the church (Jackson & Parks, 2007; Earp et al., 1997; Eng et al., 1997).

Third, participants were asked if they participated in additional diabetes-related programs and activities while being enrolled in the program. Many participants stated that they were involved in multiple activities while in the program. Such programs included memberships at the YMCA, and the local gym. Participants also mentioned taking weight training classes, being involved with church exercise programs, softball leagues, and walking several days a week.

The last portion of the focus group addressed the specific role of the church and religion as it related to their participation in the program. Participants stated that they noticed environmental changes around their church since the start of the program (i.e., healthier food
choices, fliers for walking programs, health fairs, etc). Participants also stated that health messages were being provided from the pulpit by the pastor of the church. For example, participants quoted their pastor saying that “church members shouldn’t destroy their temple” on Sunday morning church service during the eight-week program.

Furthermore, participants acknowledged the important role religion played in participating in the program. The majority of participants stated that “religion was very important” in their participation in the program. They also stated that the program helped them to recognize that “God’s word tells us how to treat our body”. Participants also mentioned that religion was “very important because God wants us to maintain (our) temple and put good things in our body”, and “by putting things in our body and cleansing, it opened us up better to God”. Participants felt that “when we put the wrong stuff in our body, it is difficult to connect with God”. It is evident through the responses provided that the theme of health messages being linked to religious beliefs and values was pervasive throughout the delivery of the program.

Lastly, most participants stated that they would still participate in the program if it was not a church, but felt “it would be different”. They also mentioned that taking the class at the church was “convenient” and that they liked being around church members. Although all of the study’s hypothesized results were not found, it is evident from the findings and responses that participants were influenced by the Being Healthy Counts to H.I.M. program.
CHAPTER 5

Discussion

There were two main goals of the current study. The first goal was to identify the influence of demographic, diabetes and program-related variables on participants’ health behaviors in a church setting. The second goal was to assess the influence of participation on fasting blood sugar, daily moderate-vigorous exercise, and self-efficacy for physical activity in a sample of African-American adults participating in an eight-week diabetes prevention and health promotions program, and, whether these changes would be greater than in a non-randomly selected comparison group. It was hypothesized that the Being Healthy Counts to H.I.M. program would have a positive impact on participants and would motivate them to adopt healthier lifestyle practices. Moreover, this change would be greater than that experienced by a similar group of African American adults at the same churches but who had not participated in the program. To this end, the study was driven by three research questions. The sample in this study consisted of participants that exhibited risk factors for diabetes and could have been diagnosed with diabetes prior to participating in the study. It is important to note that when conducting research in the community, it is difficult to control for external factors that may influence the study.

First Goal

The first research question was focused on the first goal of the study and was more theoretically driven and designed to determine the influence that demographic and diabetes-related variables have on fasting blood sugar, daily moderate-vigorous exercise and self-
efficacy for physical activity scores on participants. It was hypothesized that these relationships would be positive and therefore provide further support for targeted interventions focused on these variables.

When assessing the demographic, diabetes and program-related variables, the findings were generally supportive of previous research and theory. With the exception of gender, the other demographic variables were found to be correlated to at least one of the diabetes-related variables of interest in the study. For example, individuals who were younger were more likely to have received a positive diabetes diagnosis and to have higher self-efficacy towards physical activity. Those who were more highly educated reported greater diabetes knowledge and higher self-efficacy towards physical activity. Interestingly, however, while education and income was highly correlated, income was similarly related to diabetes knowledge but not to self-efficacy towards physical activity, that is, those with higher incomes were not also more likely to have higher self-efficacy towards physical activity. Finally, individuals who reported having been diagnosed with diabetes were expectedly found to have higher fasting blood sugar scores as well as greater diabetes knowledge.

With the exception of diabetes diagnosis, these correlations were not subsequently held up through regression analyses that systematically looked at the predictive value of these demographic variables on the diabetes-related outcomes. The only variable that was consistently predictive of fasting blood sugar and exercise was diabetes diagnoses. That is,
individuals who were aware of their diabetes were likely to exercise more and have lower fasting blood sugar.

These findings were consistent with previous research with regards to fasting blood sugar and exercise (Zlot et al., 2009; ADA, 2007; Emmons et al., 2007; Shannon et al. 1997) but not self-efficacy for physical activity (Glanz et al., 2002; Grembowski et al., 1993); while self-efficacy for physical activity had been found to be associated with health behaviors in older adults (Grembowski et al., 1993). For example, it was suggested in the SCT that an individual’s environment, personal factors and social support will influence their behavior (Raczynski and Diclemente, 1999; Bandura, 1986, 1977). Again, this relationship was not found in the current study.

It is unclear, however, why the expected relationship between gender and diabetes-related variables was not found. Nevertheless, a continuing focus on certain demographic identifiers (i.e., age, education, income) and insuring that individuals get regularly tested for diabetes appears to be important to intervention efforts to prevent diabetes and promote better health for those who have been positively diagnosed.

Second Goal

The second research question focused on the second goal of the study and took into account the fidelity of the program, program and design inconsistencies and participant satisfaction and examined the extent to which the eight-week diabetes and health promotions program influenced participants’ fasting blood sugar, daily moderate-vigorous exercise and
self-efficacy for physical activity scores from Time 1 to Time 2 compared to those subjects who did not participate in the eight-week classes.

It is evident that the Lay Health Advisor’s (LHA) did not adhere closely to the program curriculum. As mentioned in the fidelity of the program’s observations, many of the LHAs used outside materials which prevented them from implementing the entire curriculum over the 8-week period. This deviation from the program curriculum could have influenced the impact of the program on the outcome variables; especially at Church 2 where there were not significant changes from Time 1 to Time 2 on any of the program-related variables. Also, handouts and outside materials that were used during the sessions were not consistent across churches. These factors may have been overwhelming or confusing to the participants and interfered with the program achieving its stated goals. Overall, a lack of increase in diabetes knowledge and self-efficacy for physical activity in the experimental group may be attributable to the delivery of the program.

The intervention components that appeared to have the greatest impact on the participants were the role of the LHA, the integration of biblical and spiritual references in the curriculum, and the length of the program. Participants relied heavily on the LHA to provide information and emotional support. In addition, having the curriculum delivered in a church setting appeared to have influenced the participants’ acceptance and recognition of the importance of the health messages. Finally, participants believed that they would have more fully benefited from a program of longer duration. Overall, these findings support previous research that points to the usefulness of partnering with LHAs in church settings.
Future research will have to determine the efficacy of similar programs of greater length that are delivered in church settings. Moreover, it was hypothesized that those who participated in the eight-week program would have greater (more positive) improvements than those who did not. Results found that while fasting blood sugar decreased over the eight-week period, this was the case for both those who participated in the program and those who did not. In other words, while the program may have had a positive influence on behavior relating to fasting blood sugar, this was no more of an effect than would have been the case if the participants had not been enrolled in the program. This finding was consistent with previous research (Feathers et al., 2005) where it was found that participation in a diabetes lifestyles intervention would improve blood sugar; however the current study also found positive blood sugar changes in the comparison group.

It was interesting to note that the experimental group had lower fasting blood sugar than the comparison group at Time 1. It is assumed that individuals in the experimental group had some interest or were in the process of making healthier lifestyle changes in order to reduce their fasting blood sugar scores, compared to the individuals in the comparison group who self-selected not to participate in the eight-week program. As expected, there was a significant difference between the experimental group’s fasting blood sugar from Time 1 to Time 2.

However, it is important to note that the significant changes that occurred from Time 1 to Time 2 in fasting blood sugar occurred at Church 1. There was not a significant decrease
in fasting blood sugar among participants at Church 2, although their scores decreased. Decreases in blood sugar levels over time among the experimental group can be attributed to the changes in eating and food choices. One of the main components of the diabetes prevention and health promotion program focused on healthy eating and ways to reduce caloric intake. It is possible that this decrease in fasting blood sugar can also be attributed to this component of the program. It is assumed that this portion of the program had more of an influence on fasting blood sugar scores, in comparison to physical activity, which is another major risk factor and component of the program. While the decrease in fasting blood sugar among the comparison group was an encouraging finding, it brings into question the strength of outside messages that individuals were receiving in addition to the diabetes prevention and health promotion program.

In terms of daily moderate-vigorous exercise and self-efficacy for physical activity, the scores for program participants neither improved nor were different than those of the comparison group over the eight week period. The daily moderate-vigorous exercise finding was consistent with previous research in that adoption of exercise behavior is very difficult to achieve (Feathers et al., 2005). The decreasing trend in daily moderate-vigorous exercise found in both groups was not in the anticipated direction, especially given the exercise component included in the eight-week program. However, in the study by Feathers et al. (2005), there were slight improvements in exercise levels among participants following the intervention. The exposure to exercise on a regular basis could have overwhelmed the participants in the current study. It is possible that participant’s feelings of tiredness and
soreness could have discouraged them from continuing to exercise. It is also possible that as participants’ bodies adjusted to the exercise regimen the feelings of tiredness and soreness would eventually wane and result in an increase in exercise levels. This, of course, would also support an intervention of greater length than eight weeks.

The finding of a decrease in self-efficacy for physical activity with the experimental group from Time 1 to Time 2 was not consistent with previous research (Shannon et al., 1997; Grembowski et al., 1993). It was expected that the program would provide participants with the resources and support needed to engage in healthy practices, hence, increasing self-efficacy for physical activity. Responses from the focus groups suggest that the eight-week period may have been insufficient time for participants to both digest and respond to the information provided. Participants also reported a concern that maintaining the behavior changes would have been more difficult without the continuing guidance and support of their LHA through the program.

Additionally, increases in scores found among the comparison group (i.e., self-efficacy for physical activity) could be indicative of these subjects receiving information regarding healthy practices from other sources during this eight-week period that may have positively influenced their self-efficacy for physical activity scores. It is also important to note that subjects in the comparison group were members of the participating churches and received information regarding healthy lifestyle changes from the pulpit by the pastor of the church. Hearing health messages from the pastor of the church could be more powerful in increasing levels of self-efficacy than LHA’s and peers in the diabetes prevention program.
To make further sense of these findings, post hoc analyses were conducted with the experimental group to assess whether program effectiveness varied by church site, that is, did the implementation of the program at each of the two churches have a differential impact on participant outcomes. The differences found between the churches were not expected and is assumed to be an artifact of the current study. These analyses revealed significant changes in fasting blood sugar and daily moderate-vigorous exercise only among program participants at Church 1 and were therefore associated with participants who were younger and reported being diagnosed with diabetes. This was a positive finding for fasting blood sugar and a negative one for the exercise variable. Again, no changes in the self-efficacy for physical activity scores were found regardless of where the program was implemented.

Given the differences in outcome variables found between the churches, future research using a more rigorous experimentally designed study would allow researchers to tease out intervention effects and participants’ characteristics that have greater impact on changing health behaviors.

The third research question was focused on the second goal of the study and examined the influence level of participation in the Being Healthy Counts to H.I.M. eight-week diabetes prevention and health promotion program had on fasting blood sugar, daily moderate-vigorous exercise and self-efficacy for physical activity. It was hypothesized that participants who attended more sessions would receive a greater benefit on each of the outcome variables. Results indicated that participation level appeared only to have an effect on daily moderate-vigorous exercise while none of the other outcome variables were related
to level of participation. This finding is consistent with previous research (Feathers et al., 2005). That is, exercise scores were associated with level of participation from Time 1 to Time 2. However, high participation did not represent higher levels of exercise among participants in the current study.

It was interesting to find that the number of classes (i.e. dosage) did not influence self-efficacy for physical activity scores among participants in the experimental group. It was expected that the more classes individuals participated in, the higher the dosage of healthy messages they will receive and the more likely they will feel capable of engaging in exercise. It was also interesting to find that there was no interaction between number of classes attended and occasion, but there was a main effect for occasion. That is, there was an increase in self-efficacy for physical activity among participants overall, regardless of the number of classes attended. Findings such as these suggest that further research is needed to investigate other resources and external sources that are influencing individuals. It is evident that subjects are receiving information from other sources that are positively influencing their health behaviors.

Limitations

The small sample size, length of time for the intervention, absence of long-term follow-up, use of non-random sampling and cross contamination, and lack of adherence to the delivery of intervention protocol by the LHA’s are considered limitations of the current study. The total sample consisted of 84 older adults, with even numbers in the experimental groups, church 1 (n=30), church 2 (n=30) and comparison group (n=24). It is important to
note that many of the effects in the current study while significant, were small effects such that $\eta^2$ ranged from .01 to .23.

Because of the study’s limited time and funding, only an immediate follow-up was conducted. The follow-up occurred on the last day of the program. Even though some studies have found positive results with an immediate follow-up, most studies have found better results when the follow-up took place over six or twelve month period following the intervention (Keyserling et al., 2002, Cox et al., 2004).

Also, because this study involved community participation and involvement, it was very difficult to randomly select individuals to participate in the program. Hence, the study allowed individuals to self-select in order to participate in the study and to decide whether or not they would participate in the eight-week program. Individuals who elected not to participate in the eight-week program served as the comparison group. However, these individuals were members of the church where the program was held and were friends and/or in contact with individuals that enrolled in the eight-week program. With that, it was very difficult to prevent the spread of messages from the program and exposure of health messages being communicated to the comparison group.

Furthermore, the researcher monitored the delivery of the sessions during the program at the churches over the eight-week period, it was difficult to determine how closely the curriculum was adhered to when they were not being monitored. Lay health advisors brought in guest speakers, external handouts and other information that may have affected the delivery and fidelity of the intervention. Also, the outside materials that were used during the
program were not consistent across both churches. The inconsistencies in the delivery of the program resulted in the contamination of the intervention and affected the program fidelity.

**Future Directions**

The findings from this study have answered some questions while opening the door for new concerns to be addressed. Before addressing ways to approach the new concerns and questions, it is important to attend to the present study’s limitations and how they can be remedied for future studies.

First a larger sample size is needed where there are at least five churches and two comparison churches. The churches in the experimental group would have at least 30 participants per church and the comparison churches would have at least 30 participants per church. The increase in the number of churches, though difficult to manage with minimal funding, would be helpful in increasing statistical power. Use of a comparison group at a separate church will help to prevent cross-contamination and sharing of information pertaining to the intervention. Moreover, including participants in the sample that are not associated with the churches that are participating in the diabetes program will provide a true control group. This will provide researchers with a better understanding of the fidelity, strength and influence of the program.

The lack of significant findings in daily moderate-vigorous exercise scores and the minimal increase in self-efficacy for physical activity scores suggests that the study needs to be extended for a longer period of time and include a long-term follow-up. It is likely that these variables would be significantly increased over a long period of time provided
individuals are given more one-on-one contact with local health organizations and LHA’s. It is also likely that this will lead individuals to feel more self-efficacious in their ability to maintain healthier lifestyles over a long period of time. It will be useful for future studies to identify the minimum dosage needed for participation in a diabetes prevention program in order influence positive changes in health behaviors.

Lastly, since the current study recognized that some of the LHA’s did not follow protocol when delivering the program components, specialized training will be needed prior to teaching the eight-week program.

Conclusion

Although some of the findings from the present study were not in the expected direction, they did lead to some interesting and unexpected results, particularly when examining the difference between the experimental and comparison groups on variables such as self-efficacy for physical activity and fasting blood sugar scores. For example, individuals in the comparison group had significant improvements despite not participating in the eight-week diabetes program.

This study is one of a few to use the Lifestyle Balance: Healthy Eating and Being Active Diabetes Prevention program in a church setting. Further investigations need to be conducted to determine the role healthy eating has on health outcomes over a long period of time among older African-American adults in a diabetes prevention program in a church setting. Now that this study has found some significant improvements among individuals who participated in the eight-week program, future research needs to build off these results to
determine the effects of the program over a longer period of time with a true comparison group.

Lastly, there needs to be longitudinal research studies with multiple data collections to monitor changes among participants over a long period of time. Given the small changes found in past research and in the current study, longitudinal studies will help identify the curvilinear relationships that exist in the process of adopting health behavior changes.
References


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<th>Design</th>
<th>Sample Description</th>
<th>Analysis Methods</th>
<th>Results</th>
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<tr>
<td>Campbell et al. (1999)</td>
<td>Pre and Post test with delayed intervention group</td>
<td>2519 African American adults recruited from 50 African American churches</td>
<td>Regression analysis (logistic regression), Chi-square analysis, F-tests</td>
<td>Intervention group consumed more servings of fruit and vegetables than the delayed intervention group</td>
</tr>
<tr>
<td>Feathers et al. (2005)</td>
<td>Pre and Post test with comparison group</td>
<td>151 Latino and African American adults with type 2 diabetes recruited from 3 health care centers</td>
<td>ANOVA, Chi-square analysis, Independent sample t-test, multiple regression analysis</td>
<td>Intervention group had improvement in areas of diabetes self-care knowledge, dietary behaviors and A1C levels</td>
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<td>Keyserling et al. (2002)</td>
<td>Pre and Post Test with no control</td>
<td>200 African American women with type 2 diabetes recruited from health care centers</td>
<td>Chi-square analysis and Analysis of Variance (ANOVA)</td>
<td>Intervention groups improved diabetes knowledge</td>
</tr>
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<td>Mayer-Davis et al. (2004)</td>
<td>Pre and Post Test (time series) with comparison group</td>
<td>157 African American and white adults with type 2 diabetes recruited by health centers</td>
<td>Paired t-tests, Linear regression modeling, Repeated measures regression analysis</td>
<td>Intervention groups had improvement in both weight and A1C levels</td>
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<td>Shannon et al. (1997)</td>
<td>Pre and Post Test with control</td>
<td>304 hypercholesterolemic patients recruited by 52 participating health care providers</td>
<td>Regression analysis, Analysis of Covariance, Paired t-tests</td>
<td>Intervention group showed significantly greater reduction in dietary risk. Self-efficacy was a significant predictor of dietary change.</td>
</tr>
<tr>
<td>Wierenga (1994)</td>
<td>Pre and Post Test with control</td>
<td>66 persons (primarily white) with non-insulin dependent diabetes</td>
<td>Correlational analysis, multiple regression analysis, Repeated measures (ANOVA)</td>
<td>Diabetes knowledge, social support and health practices are associated with positive health status among intervention group</td>
</tr>
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<td>Wilcox et al. (2009)</td>
<td>Pre and Post test</td>
<td>1963 participants recruited from community-based organizations</td>
<td>Repeated measures analyses of covariance (RMANOVA)</td>
<td>Age, level of activity, social support, ethnicity and health status influenced outcomes following the intervention.</td>
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Appendix B
Being Healthy Counts to H.I.M. Program
Data Collection Training

I. Introductions
   A. Volunteers
   B. Complete sign in sheet

II. Description of Program
   A. Purpose
   B. Data collection periods

III. Administration of survey
   A. Ethics, confidentiality and rapport
   B. Review content of test battery
   C. Practice administrations of survey/Role play (refer to survey administration protocol)
   D. Questions/Answers

IV. Wrap up
Appendix C
Being Healthy Counts to H.I.M. (Health Improvement Ministry)
Screening and Informed Consent Statement

Dear Participant:

This message is to request your participation in a research study investigating the effectiveness of the health program, “Being Healthy Counts to H.I.M.” in contributing to health in African Americans. This research will help us learn more about factors that contribute to healthy eating and physical activity among African Americans in a church setting. The purpose of the Being Healthy Counts to H.I.M. program is to provide churches with the tools to prevent diabetes and to provide their congregation and other interested participants educational information and strategies that will help them lead healthier lives. This program will also help you, by way of screening tests, identify risk factors that may predispose you to type 2 diabetes.

As part of the program, we will be collecting information concerning your current health knowledge and behavior. We will also collect information regarding your weight, height, blood pressure, waist-hip ratio and fasting blood sugar. In order to measure your fasting blood sugar, you will be asked to participate in a Blood glucose finger-stick test. All of the information gathered will allow us to screen for risk factors that contribute to type 2 diabetes. **After being screened, it is your responsibility to follow-up with your doctor, especially if you have abnormal results.**

The program involves potential physical and psychological risk due to the fact that it involves collecting personal and physiological information and an engagement in physical activity. The trained volunteers in this study will strive to minimize these risks and create an environment that is conducive for all participants. Further, this program is intended to benefit participants. It is designed to teach individuals techniques and skills to live healthier lives that will help to reduce the onset of diabetes. The Being Healthy Counts to H.I.M. program, participating churches and volunteers are not responsible for results regarding your screening.

If you agree to participate in the research, the information described above will be used for research purposes; to assess how well the program helped you to become healthier. Participation in the study is completely voluntary, and you may decide not to participate in the research at anytime, and still participate in the health program.
There should be no risks to you from sharing this information. The study is designed such that your responses are completely confidential. We are required to record your name, telephone number, address, and personal health. This will allow us to follow-up with you if we feel that your health is in immediate danger. Information shared will be only presented as a group. No information that identifies you specifically will be shared.

Your signature on this form will indicate your consent. Thank you in advance for your willingness to participate. It is hoped that this program will help to decrease the health disparities gap between African Americans and other racial/ethnic groups.

If you have questions at any time about the study or the procedures, you may contact the researcher, Erin Banks, at North Carolina State University, 732 Poe Hall, Raleigh, NC 27695, or at 919.272.5191. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. David Kaber, Chair of the NCSU IRB for the Use of Human Subjects in Research Committee, Box 7514, NCSU Campus (919/515-3086) or Mr. Matthew Ronning, Assistant Vice Chancellor, Research Administration, Box 7514, NCSU Campus (919/513-2148).

If you have further questions, you may contact April Durr, Healthy Alamance Coordinator at (336) 513-5590.

Thank you very much,

April Durr
Healthy Alamance Coordinator

__________________________
Print your name

__________________________
Signature

__________________________
Today’s date
Appendix D
Health Survey

Instructions: Please read all of the questions carefully and complete all sections of this survey. Place an X mark in the space provided, representing the best response for you. Only provide one response per question and do not leave any questions blank.

1. Gender
   _____ Male
   _____ Female

2. What is your date of birth? Please provide the month, date and year.
   Month ___ ___ / Day ___ ___ / Year/ ___ ___ ___ ___

3. Ethnic Identification
   _____ African American (Non Hispanic)
   _____ African American (Hispanic)
   _____ Afro-Caribbean (Non Hispanic)
   _____ Afro-Caribbean (Hispanic)
   _____ Other (Please Specify)____________________ (PRINT)

4. Highest Educational level
   _____ Less than high school education
   _____ High school graduate or GED
   _____ Some college or associates degree
   _____ Bachelors degree or higher

5. Annual Income level?
   _____ Less than 25,000
   _____ $25,000-$49,999
   _____ $50,000-$74,999
   _____ $75,000 or more
Instructions: We’d like to ask questions concerning your health care access.

6. Do you have one person that you think about as your personal doctor or health care physician? (If yes, please fill in your physician’s information below)
   ______ Yes
   ______ No

   Physician name: __________________________________________________

   Practice/Office name: ______________________________________________

   Address: __________________________________________________

   City: __________________________________________________

Instructions: Next, we’d like to ask some questions concerning your medical history.

7. Have you ever been told by a doctor or health professional that you have health conditions or a medical or family history that increases your risk for diabetes?
   ______ Yes
   ______ No
   ______ Don’t know/Not sure

8. Have you ever been told by a doctor that you have diabetes?
   ______ Yes
   ______ Yes, but told only during pregnancy
   ______ No
   ______ No, but told I have prediabetes or borderline diabetes
   ______ Don’t know/Not sure

9. Have you ever been told by a doctor or health professional that you have high blood sugar?
   ______ Yes
   ______ No
   ______ Don’t know/Not sure
**Instructions:** Next, we’d like to ask some questions concerning your physical activity levels.

10. Now thinking about the moderate physical activities you do when you are not working in a usual week, do you do moderate activities for at least 10 minutes at a time such as brisk walking, bicycling, vacuuming, gardening, or anything else that causes small increases in breathing or heart rate?
   _____ Yes
   _____ No

11. How many days a week do you at least engage in 20-30 minutes of vigorous physical activity, without stopping, in which your heart beats faster and you breathe heavier?
   _____ 1-2 days per week
   _____ 3-4 days per week
   _____ 5-6 days per week
   _____ 7 days per week
   _____ Don’t know/Not sure
   _____ Never

12. How many days a week do you engage in 30 or more minutes of moderate-vigorous physical activity, in which your breathing rate increases and you break a sweat?
   _____ 1-2 days per week
   _____ 3-4 days per week
   _____ 5-6 days per week
   _____ 7 days per week
   _____ Don’t know/Not sure
   _____ Never

**Instructions:** Next, we’d like to ask some questions concerning diabetes.

13. The diabetes diet is:
   _____ The way most American people eat
   _____ A healthy diet for most people
   _____ Too high in carbohydrate for most people
   _____ Too high in protein for most people

14. Which of the following is highest in carbohydrate?
   _____ Baked chicken
   _____ Swiss cheese
   _____ Baked potato
   _____ Peanut butter

15. Which of the following is highest in fat?
Low fat milk
Orange juice
Corn
Honey

16. Which of the following is a “free food”?
   ______ Any unsweetened food
   ______ Any dietetic food
   ______ Any food that says “sugar free” on the label
   ______ Any food that has less than 20 calories per serving

17. Glycosylated hemoglobin (Hemoglobin A1) is a test that is a measure of your average blood glucose level for the past:
   ______ Day
   ______ Week
   ______ 6-10 weeks (1 ½ -2 ½ months)
   ______ 6 months

18. Which is the best method for testing blood glucose?
   ______ Urine testing
   ______ Blood testing
   ______ Both are equally good

19. What effect does unsweetened fruit juice have on blood glucose?
   ______ Lowers it
   ______ Raises it
   ______ Has no effect

20. Which should not be used to treat low blood glucose?
    ______ 3 hard candies
    ______ ½ cup orange juice
    ______ 1 cup diet soft drink
    ______ 1 cup skim milk

21. For a person in good control, what effect does exercise have on blood glucose?
    ______ Lowers it
    ______ Raises it
    ______ Has no effect

22. Infection is likely to cause:
    ______ An increase in blood glucose
    ______ A decrease in blood glucose
23. The best way to take care of your feet is to:
   _____ Look at and wash them each day
   _____ Massage them with alcohol each day
   _____ Soak them for one hour each day
   _____ Buy shoes a size larger than usual

24. Eating foods lower in fat decreases your risk for:
   _____ Nerve disease
   _____ Kidney disease
   _____ Heart disease
   _____ Eye disease

25. Numbness and tingling may be symptoms of:
   _____ Kidney disease
   _____ Nerve disease
   _____ Eye disease
   _____ Liver disease

26. Which of the following is usually **not** associated with diabetes?
   _____ Vision problems
   _____ Kidney problems
   _____ Nerve problems
   _____ Lung problems

Below is a list of things people might do while trying to increase or continue regular exercise. We are interested in exercises like running, swimming, brisk walking, bicycle riding, or aerobic classes.

Whether you exercise or not, please rate how confident you are that you could **really motivate yourself** to do things like these consistently, *for at least six months*.

Please circle ONE number for each item:

How sure are you that you can do these things?
<p>| | | | | | | |</p>
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<tr>
<td>27. Get up early, even on weekends, to exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>28. Stick to your exercise program after a long, tiring day at work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>29. Exercise even though you are feeling depressed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>30. Set aside time for a physical activity program; that is, walking, jogging, swimming, biking, or other continuous activities for at least 30 minutes, 3 times per week.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>31. Continue to exercise with others even though they seem too fast or too slow for you.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>32. Stick to your exercise program when undergoing a stressful life change (e.g., divorce, death in the family, moving).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>33. Attend a party only after exercising.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>34. Stick to your exercise program when your family is demanding more time from you.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>35. Stick to your exercise program when you have household chores to attend to.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>36. Stick to your exercise program even when you have excessive demands at work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>37. Stick to your exercise program when social obligations are very time consuming.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>38. Read or study less in order to exercise more.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>
**Instructions:** Next, we’d like to ask some questions concerning your current health behavior lifestyle.

**Regular moderate exercise** is any planned physical activity (e.g., fast walking, aerobics, jogging, tennis, easy bicycling, volleyball, dancing, etc) performed to increase physical fitness. Such activity should be performed **5-7 times per week for at least 30 minutes per day.**

Exercise should be done at a level that **increases your breathing rate** and causes you to break a light sweat.

39. Do you engage in regular moderate physical activity according to the previous definition?
   _____ No, and I do not intend to in the next 6 months.
   _____ No, but I intend to in the next 6 months.
   _____ No, but I intend to in the next 30 days.
   _____ Yes, I have been, but for less than 6 months.
   _____ Yes, I have been, for more than 6 months.

40. How much support did the group members, who are participating in the program, provide you for exercising?
   _____ A lot of support
   _____ Some support
   _____ A little support
   _____ No support

41. How much support did the group members, who are participating in the program, provide you for healthy eating?
   _____ A lot of support
   _____ Some support
   _____ A little support
   _____ No support

42. How much support did the Lay health advisors, who are participating in the program, provide you for exercising?
   _____ A lot of support
   _____ Some support
   _____ A little support
   _____ No support
43. How much support did the Lay health advisors, who are participating in the program, provide you for healthy eating?

- A lot of support
- Some support
- A little support
- No support

44. How much support did your church family, who were not participating in the program, provide you for exercising?

- A lot of support
- Some support
- A little support
- No support

45. How much support did your church family, who were not participating in the program, provide you for healthy eating?

- A lot of support
- Some support
- A little support
- No support

46. How important is religion and spirituality to your participation in this program?

- Very important
- Fairly important
- Not too important
- Not too important at all

47. How important is religion and spirituality to your engaging in healthy eating?

- Very important
- Fairly important
- Not too important
- Not too important at all
48. How important is religion and spirituality to your engaging in exercise?

_____ Very important
_____ Fairly important
_____ Not too important
_____ Not too important at all

49. How important was the religious and spiritual component of this program?

_____ Very important
_____ Fairly important
_____ Not too important
_____ Not too important at all
Appendix E
Being Healthy Counts to H.I.M. Program
Weekly Class Observation Rubric

Location: _____________________________

Name of person(s) who delivered message:
____________________________________
____________________________________
____________________________________
____________________________________

Session Week: _________

Title of Session: _______________________________________________________

Number of participants in attendance: _______________________

1. Presentation information

   a=Presentation did not cover any of the material from the curriculum for this session
   b= Presentation highlighted some of the material covered from the curriculum for this session
   c= Presentation covered most of the material covered in the curriculum for this session
   d= Presentation covered all sections of the material found in the curriculum for this session without an integration of a religious and spiritual component
   e=Presentation covered all sections of the material found in the curriculum for this session and integrated religious and spiritual component

2. What were the main topics covered during the session?

   1. __________________________________________
   2. __________________________________________
   3. __________________________________________
   4. __________________________________________
   5. __________________________________________
3. Did the LHA use outside materials?
   a. Yes
   b. No

Names/Sources of outside material

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

4. Was this session interactive with LHA’s and participants?
   a. Yes
   b. No

5. Did the LHA complete the exercise component of the session?
   a. Yes
   b. No
Appendix F

Session 1: Overview, introduction, wellness goals
Lifestyle Balance Evaluation

Name: __________________________    Date:_________________________
Church: _________________________    Week: _________________________

Survey
This program is paid for by a grant. The grant requires us to provide feedback as to what works and what does not. Please take a few minutes to help us give them this feedback.

1) What was the most helpful part of this session?

________________________________________________________________

________________________________________________________________

2) If you could change something about this session, what would you change?

________________________________________________________________

________________________________________________________________

3) How well did this class meet your needs and expectations? Please circle one.
   Exceeded expectations       Met expectations       Below expectations

4) Comments

________________________________________________________________

________________________________________________________________

Goals for next week
Please write 2 goals you want to accomplish in the next week.

Rate how well you accomplished these goals.

Food ________________________________ 0%  25%  50%  75%  100%

Activity _______________________________ 0%  25%  50%  75%  100%

150
Appendix G
Being Healthy Counts to H.I.M. Diabetes Prevention Program
Evaluation Focus Group Protocol

# of participants: _____________________ Host: ______________________
Date: ________________ Site:____________________________________________

Purpose: The purpose of this focus group is to generate a discussion with participants of the Being Healthy Counts to H.I.M. program. This focus group will stimulate an in-depth exploration of factors that influence participant’s adherence or lack thereof to the programs guidelines and recommendations.

Objective: To identify factors that influence participant’s adherence to the Being Healthy Counts to H.I.M. program guidelines and recommendations.

Step 1: The focus group facilitator will attend the last session (i.e. session eight) of the Being Healthy Counts to H.I.M. program. During this session, the focus group facilitator will observe the implementation of the program and the dynamics of the group.

Step 2: At the conclusion of the program session, the focus group facilitator will recruit 5-7 volunteers from the Being Healthy Counts to H.I.M. program to participate in the focus group. The participants will be informed of the length of time that will be required for participation (i.e., 60-90 min.). Upon agreeing to take part in the session, participants will be provided with information pertaining to the purpose of the focus group.

Step 3: Once the group members have been identified and gathered, the focus group facilitator will initiate introductions among the group. Participants will be asked to introduce themselves to the other members of the group. The participants will be asked to provide their first names and church site.

Step 4: The focus group facilitator will explain the structure and ground rules of the focus group. The participants will be given an opportunity to ask questions, if needed, to clarify the session’s structure, ground rules and purpose.

Step 5: Begin the interviewing process by asking participants questions pertaining to the topic area.
Interview Guide

General Questions
1. What did you like about the Being Healthy Counts to H.I.M diabetes prevention Program?
2. Was the information provided during the program sessions easy to understand?
3. What was the best part of the program?
4. What was your least favorite part of the program?
5. What does the program need to offer in order to help you improve your eating habits and physical activity?
6. In addition to this program, what other activities, seminars and/or groups are you involved with that has helped you improve your eating habits and physical activity?

Specific Questions
7. What changes have you noticed in your church that are related to healthy eating and physical activity?
8. How have the changes mentioned impact your eating habits and physical activity?
9. Have you faced any obstacles with engaging in physical activity?
10. What type of obstacles did you face?
11. Have you faced any obstacles with eating healthy?
12. What type of obstacles did you face?
13. How has your church lay health advisor helped you improve your eating habits and physical activity?
14. What type of social support did you experience while in the program (instrumental, emotional, informational or appraisal)?
15. How important was religion/spirituality in your decision to participate in this program?
16. How has your involvement/site with a church influence your decision to participate in this program?
17. How has having the program in a church setting influence your decision to participate?
18. To what degree did the group members, who are participating in the program, provide you with social support for exercise?
19. To what degree did the group members, who are participating in the program, provide you with social support for healthy eating?
20. To what degree did the Lay health advisors, who are participating in the program, provide you with social support for exercise?
21. To what degree did the Lay health advisors, who are participating in the program, provide you with social support for healthy eating?
22. To what degree did your church family, who were not participating in the program, provide you with social support for exercise?
23. To what degree did your church family, who were not participating in the program, provide you with social support for healthy eating?

Probe questions

Would you explain further?
Would you give me an example of what you mean?
Would you say more?
Is there anything else?
Please describe what you mean?
Appendix H
Being Healthy Counts to H.I.M. Program
Fall class evaluation

Church Program Location: ________________________________
Name: ________________________________
Date: ________________________________

1. What did you like about the Being Healthy Counts to H.I.M. Diabetes Prevention Program?

2. Was the information provided in the 8-week sessions easy to understand?

3. What was the best part of the program?

4. What was your least favorite part of the program?

5. Since participating in the program, have you faced any obstacles with engaging in physical activity? Please circle Yes or No

6. Please list the type of obstacles you faced.

7. Since participating in the program, have you faced any obstacles with eating healthy? Please circle Yes or No

8. Please list the type of obstacles you faced.

9. What does the program need to offer in order to help you improve your eating habits and physical activity?

10. In addition to this program, what other activities, seminars and/or groups are you involved with that has helped you improve your eating habits and physical activity?