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A Descriptive Study Of The Leadership Role Of Community Health Ambassadors On Diabetes-Related Health Behaviors

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A Descriptive Study of the Leadership Role of Community Health Ambassadors on Diabetes-Related Health Behaviors

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Barbara Pullen-Smith was born and raised in Littleton, North Carolina.

She obtained her Bachelor of Science degree in Public Health (Education) from the University of North Carolina at Chapel and her Master's degree in Public Health (Administration) from Emory University, Atlanta, Georgia.

Barbara is a Public Health Educator/Administrator with more than 30 years of experience working at the state and community levels. Her career has focused on improving the health and quality of life for racial/ethnic minorities through policy development, program implementation, cultural diversity training, language access initiatives and resources dissemination.

Barbara has served on numerous national, state, and community boards.

Dedication

Philippians 4:13: " I can do all things through Christ which strengtheneth me."

To God be the Glory for this amazing journey. My faith and endurance have been tested through this process.

To my husband, Keith Smith, thank you for your unwavering support, guidance and patience through this journey. To my sons, Joshua and Daniel, young leaders in your own right. Thank you for calling and texting at the right time with words of encouragement.

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Abstract

Diabetes is a chronic disease that bears a disproportionate burden among African American populations. The lack of access to affordable, culturally appropriate health care is a key barrier to effective diabetes prevention or disease management for racial/ethnic minority populations. Living in public housing communities, with concentrated poverty, exacerbates the burden of diabetes and reduces access to screening and early detection services to prevent the onset of diabetes.

The purpose of the study was to describe the leadership role of lay health advisors, known as Community Health Ambassadors (CHAs), on diabetes-related health behaviors of African Americans living in a public housing authority (PHA) community in one city in Southeastern North Carolina. The research sample included CHAs (n = 17) and the PHA residents (clients; n = 62) participating in the pilot Community Health Ambassador Program (CHAP).

A mixed methods research design was used to describe the outreach services provided by CHAs and explore associations between outreach and diabetes-related health behaviors among the clients they served. Analyses included secondary quantitative data and primary qualitative focus group data from CHAs and clients. The results of this one sample design pilot study indicated that it is feasible to implement CHAP in public housing communities. While the study's findings suggest there is no association between CHA outreach and clients' health behaviors, the leadership roles of the CHAs are demonstrated. Preliminary data were suggestive, but not significant for key clinical outcomes and health behaviors. From the perspectives of CHAs and their clients, the CHAP was beneficial to them and their community. The study underscores the need for future research to examine the leadership roles of racial/ethnic minorities as partners in community-based programs with a focus on eliminating health disparities.

CHAPTER 1

Introduction

The Community Health Ambassador Program (CHAP) is a public health outreach strategy designed to improve awareness, prevention and management of chronic diseases, including diabetes, the emphasis for this study (Pullen-Smith, Carter-Edwards, & Leathers, 2008). Community Health Ambassadors (CHAs) were participants in a one-year pilot program based on a lay health advisor (LHA) model. The leadership role of lay health advisors, known as Community Health Ambassadors (CHAs), is being described in this study. The goal of CHAP pilot initiative was to assess the diabetes-related health behaviors of African Americans living in a public housing authority (PHA) in one city in southeastern North Carolina. Individuals (clients) reached through CHAs' social networks included those at risk of diabetes as well as those who were diagnosed with diabetes. The current study used a one-sample pre-post evaluation study design (Creswell, 2009). Therefore there was no control group in the study to compare to the intervention group. The study's aims were to describe the outreach services provided by CHAs, assess changes in health behaviors and outcomes among their clients, explore associations between CHA outreach and diabetes- related health behaviors among their clients and assess the CHAP from the perspective of CHAs and clients.

The model of leadership used by CHAs, was examined within the theoretical framework of transformational leadership. Transformational leaders are described as individuals who are effective in motivating and engaging their followers in a process of change (Burns, 1978). Frey, Kern, Snow, and Curlette (2009) define transformational leaders as ones who inspire supporters to action, build trust and assist supporters to achieve their goals and aspirations. Core characteristics of transformational leaders, include visionaries who are respected and trusted by

followers, ethical, supportive of followers, good advisors, and able to create major and sustained behavior change (Northouse, 2009). Similarly, CHAs are individuals who are indigenous to the community and already viewed as natural helpers, trustworthy, dependable and familiar with the community's unique cultural norms and social characteristics (Levin, 1984; Wiist & Flack, 1990; Thomas, Eng, Earp, & Ellis, 2001). They operate within their social networks to promote lifestyle behavior changes with a goal to improve the health outcomes of the people they serve. By promoting healthy behaviors in their social networks, where they live, work, play and pray, LHAs are in position to promote and support sustained lifestyle behavior changes over time (Giachello et al., 2003; Earp et al., 2002).

Challenge with Diabetes

The prevalence of diabetes in North Carolina poses major challenges for public health systems. One challenge lies within the public health system's capacity to implement population-based strategies to prevent the onset of the diabetes and/or prevent its complications with effective disease management. A second challenge lies in the system's ability to engage African American leaders in comprehensive, community-based approaches to eliminate the persistent disparities in diabetes morbidity and mortality rates seen between whites and African Americans.

Chronic disease. The overall burden of diabetes in the United States population is alarming. According to the American Diabetes Association (ADA) (2011), diabetes has reached epidemic proportions in the United States with an estimated 18.8 million children and adults diagnosed with the disease. Another seven million people have undiagnosed diabetes, representing about 8.3% of the population. The impact of the disease is documented at the state level. Diabetes is a major statewide public health problem with an estimated 643,130 adults diagnosed with this chronic disease. North Carolina adults ranked 17th for the highest prevalence

of diagnosed diabetes in the U.S. in 2008 (North Carolina Diabetes Prevention and Control Branch, 2010).

Diabetes is a complex disease that is linked to a number of other health- related complications, including heart disease and stroke, high blood pressure, blindness, kidney disease, nervous system disease, and amputations. For example, diabetes contributed to 231, 404 deaths in 2007 in the United States (American Diabetes Association, 2011).

Successful management of diabetes requires individuals to take a range of actions such as, taking medicines, making lifestyle changes, and preventive actions (Newman, Steed, & Mulligan, 2004). Individuals diagnosed with diabetes must follow specific guidelines to control the disease, which often requires significant and sustained changes in health behaviors. These disease management strategies include improving health behaviors in the areas of diet, exercise, and regular monitoring in order to manage the disease and maintain a healthy lifestyle (Hale, Bennett, & Probst, 2010; Newman et al., 2004). Similarly, individuals at risk for diabetes may prevent its onset through health promotion activities such as maintaining a healthy body weight, being physically active, avoiding cigarette use and drinking alcohol in moderation (Joosten et al., 2010). The CHAP implemented similar health promotion strategies with a focus diabetes awareness, prevention and management.

Disparities. Diabetes is a health disparity disease that bears a disproportionate burden among African American populations. The differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States are defined as health disparities (National Institutes of Health, 1999). The ADA 2011 Fact Sheet highlights disparities in diabetes between racial/ethnic groups at the national level. Based on a 2007-2009 survey of people diagnosed with diabetes aged 20 years

and up, approximately 13% of African Americans versus 7% of Whites in the United States had diabetes.

The state level data are equally sobering. According to the Racial and Ethnic Disparities in North Carolina Report Card 2010 (North Carolina State Center for Health Statistics, 2010), African Americans are two times more likely than Whites to die from diabetes. This is a tragic statistic that highlights the burden of this disease in the African Americans racial group. The 2010 United States Census reports that African Americans represent 12% of the population nationally and approximately 21% of North Carolina's total population. These demographic and health outcomes data bring to the forefront, the significant disparities in diabetes prevalence and mortality between the majority population and racial/ethnic minorities.

One underlying factor contributing to the diabetes disparities between these two groups is rooted in the differences in socio-economic status between these two groups. Socioeconomic factors are influenced by educational levels and income (North Carolina Institute of Medicine, 2009). According to a national report (DeNavas-Walt, Proctor, & Smith, 2011), the official poverty rate in 2010 was 15.1%. This figure represented 46.2 million people and was up from 14.3% in 2009. The disparities in poverty between African Americans and Whites are well documented. Between 2009 and 2010, the poverty rate increased for African Americans from 25.8% to 27.4%. These figures compare to an increase in poverty rates for Whites from 9.4% to 9.9% during that same period. The pattern of disparities in poverty is apparent in North Carolina as well. African American families in North Carolina are three times more likely to live in poverty than White families (North Carolina State Center for Health Statistics, 2010).

It is important to note this socio-economic indicator because poverty is a major contributing factor to poor health status (North Carolina Institute of Medicine, 2009**)**. Several

access barriers are associated with living in poverty. Carrillo et al. (2011) grouped these health care access barriers into three frameworks, financial (having adequate funds to cover the costs associated with medical care), structural (available health care providers) and cognitive (health literacy of the populations).

The lack of access to affordable, culturally appropriate health care is a key barrier to effective diabetes prevention and/or disease management for racial/ethnic minority populations (Norris et al., 2006). Poor health outcomes and resulting disparities are linked to health-related lifestyle behaviors such as fewer early detection screening services, limited access to preventive services, low health literacy, cultural challenges, and inadequate disease management and treatment (Bach, Cramer, Warren, & Colin, 1999; Cunningham et al., 2005; DeVoe et al., 2007; Ramirez et al., 2000). Community-based models to eliminate health disparities must be designed to address the unique social, cultural and economic characteristics of the community (Liburd, Jack, Williams, & Tucker, 2005).

Why Public Housing Communities?

A recent study suggests that health is a bigger problem for public housing residents than is lack of employment (Manjarrez, Popkin, & Guernsey, 2007). The majority of public housing residents are racial/ethnic minority women, who represent the group that is driving health disparities in the United States (Ruel, Oakley, Wilson, & Maddox, 2010). In a study designed to explore barriers prohibiting African American residents in public housing communities from participating in healthy lifestyle behaviors, researchers engaged 22 residents in a structured interview process (Eugeni, Baxter, Mama, & Lee, 2011). The participants, 50% of whom were females, were on average 43 years old, overweight, had normal blood pressure, and slightly elevated resting heart rate which suggested lower fitness and physical activity rates. Findings

suggest that public housing residents in that study engaged in lower rates of leisure physical activity.

The sample population in the current study was made up of residents of a public housing community in one city in North Carolina. According to the U.S. Department of Housing and Urban Development (2012), public housing programs are limited to low-income families and individuals. In North Carolina, for example, a family of four with a median income of $28,900 meets the low income threshold**.** Income requirements for the PHA in this study meet federal guidelines. According to the North Carolina Housing Finance Agency's (2013) county level report on income limits, a family of four with an annual salary of $27,000 or less met the income requirements for housing assistance.

The Public Housing Authority (PHA) in this study was founded more than 50 years ago and consists of six communities, with properties designated for the elderly, families, and Section 8 programs (see Appendix A). Of a total of 1225 units, approximately100 are designed for elderly residents, while the remaining 1,125 are public housing units for families. Ninety percent of the 2,632 residents are African American while the remaining (10%) are White and Hispanic. Seventy percent of residents were ages 0-17 years and 30% were adults 18 years and older.

Research suggests that public housing residents have extremely poor health (Ruel et al., 2010). Living in public housing communities, with concentrated poverty, exacerbates the burden of diabetes and reduces access to screening and early detection services to prevent the onset of diabetes. Disparities in poverty and diabetes as well as in access to health care prevention and treatment services for low income populations are driving forces for the current study of African Americans residing in public housing communities in Southeastern North Carolina**.**

Why Lay Health Advisor Models?

The disparities in diabetes mortality and poverty rates between Whites and African Americans in North Carolina pose a challenge for clinic-based models of health care. Frequently, clinic-based models fail to adequately address the cultural and social support systems needed to promote and sustain healthy lifestyles among populations at highest risk for diabetes and other chronic conditions. According to the Institute of Medicine Report (Smedley, Stith, & Nelson 2003), racial and ethnic minorities experience a range of barriers to accessing healthcare, including language, geography and cultural familiarity. Health care providers must develop the skills, tools and organizational structures to bridge the cultural gaps by providing culturally relevant services to meet the demands of a diverse society (Toms, Schanche-Hodge, & Pullen-Smith, 1997). Establishing models of care which reflect an understanding of the influence of culture on health beliefs and practices will require health care agencies to move beyond the walls of the clinics to engage racial/ethnic minority leaders in community settings. Katz, Murimi, Gonzalez, Njike, and Green (2011), document that lifestyle is influenced by the family and community. They submit that "the 'power center' is the patient, not the clinician, and the clinic is not the primary community portal, but rather the homes, workplaces, schools, churches, and recreational areas." Lay health advisors approaches are based on the assumption that an individual's behavior is influenced by the social groups to which they belong, and from which they derive their social identity (Eng & Young, 1992).

Lay health advisor programs are community-based and implemented in partnership with community members. Local leaders, who work almost exclusively in community settings, serve as connectors between health care consumers and providers to promote health among groups that have traditionally lacked access to adequate health care (Witmer, Seifer, Finocchio, Leslie, &

O'Neil, 1995). LHAs for example, implement public health interventions by communicating information to promote healthy lifestyles and identify local resources. These individuals increase access to services, are culturally sensitive and resonate with the populations at risk for chronic diseases like diabetes (Eng & Smith, 1995; Hurd, Muti, Erwin, & Womack, 2003). By promoting healthy behaviors in their social networks, where they live, work, play and pray, LHAs are in position to promote and support sustained lifestyle behavior changes over time (Earp et al., 2002; Giachello et al., 2003).

Research suggests that lay health advisor services are beneficial to low income, racial/ethnic minority populations. Eng and Smith's (1995) study reports expanded health resources, through LHAs, have been particularly useful in underserved, African American communities. Benefits of LHA programs are documented by other researchers as well. In one lay health advisor model, called Community Health Workers (CHW), the authors suggest that "CHW are indigenous to the communities they serve and bring valuable knowledge to the outreach program regarding the social, political and environmental factors that influence the well being of the people they serve" (Boutin-Foster, George, Samuel, Fraser-White, & Brown, 2008, p. 63). LHA programs are community-based approaches that incorporate ongoing support systems from both the medical community and social networks including family, friends, co-workers, and church members (Hurd et al., 2003).

In summary, research suggests that essential elements must be in place to effectively prevent and control diabetes and related health behaviors. Diabetes risk factors are affected by diet, physical activity, clinical screenings, self-monitoring, and social support mechanisms (Venditti & Kramer, 2012; Zubaida et al., 2010). Many people with diabetes do not receive the recommended preventive services or achieve optimal glycemic control (Harris, Eastman, Cowie,

Flegal, & Eberhart, 1999). Diabetes is a complex chronic disease. Management of most chronic illnesses, including diabetes, requires individuals to take responsibility (Newman et al., 2004). A study by Jacobs-van der Bruggen et al. (2007) suggests that community-based interventions with a focus on diabetes are cost effective in reducing the on-set of diabetes among high risk populations.

Effective support systems are needed to both improve diabetes prevention and disease management among African Americans and to counter some of the barriers to health improvement, such as poverty, lack of access to health care and lack of trust of health care systems. LHA models are public health interventions for communicating health information, promoting healthy lifestyle behaviors and improving health status outcomes. Core components are involved, including engage and train natural helpers from the community to provide outreach, health information, referral resources, social support and connecting the populations they serve to local health and human service agencies (Boutin-Foster et al., 2008; Earp et al., 2002; Levin, 1984; Story et al., 2010; Wiist & Flack,1990).

A review of the literature indicates that few studies of LHA models document its effectiveness on diabetes prevention and management (Norris et al., 2006; Zubaida et al., 2010). Further, the literature is void of descriptive studies of the leadership role of LHAs, such as CHAs, on diabetes-related health behaviors among African Americans in public housing communities.

Purpose Statement

The purpose of this research was to describe the leadership role of lay health advisors, known as Community Health Ambassadors (CHAs), on diabetes-related health behaviors of African Americans living in a public housing authority (PHA) in one city in southeastern North

Carolina. Leadership roles of CHAs were examined within the theoretical framework of transformational leadership.

The sample population included CHAs (n = 17) and the PHA residents (clients; n = 62) participating in the pilot Community Health Ambassador Program (CHAP). This was a one-sample pre-post evaluation study design (Creswell, 2009) with no control group in the study to compare to the intervention group. This study used mixed methods, Sequential Explanatory Approach, which, according to Creswell (2009), enables the researcher to explain and interpret quantitative results in more detail by collecting and analyzing follow-up qualitative data. Quantitative methodologies using secondary data from the CHAP were used in the first analytic phase and qualitative data were collected in the second analytic phase to elaborate on the findings from the quantitative data.

Research Questions

This study was designed to describe the leadership role of lay health advisors, known as Community Health Ambassadors (CHAs), on diabetes-related health behaviors of African Americans living in a public housing authority (PHA) in one city in southeastern North Carolina.

Three research questions guided the CHAP study:

- Research Question 1—What are the types of recommendations that CHAs made to clients in the sample population?
- Research Question 2—What is the relationship between recommendations by CHAs and their clients' diabetes-related health behaviors and outcomes?
- Research Question 3—What do CHAs and clients perceive as the successes and challenges in the implementation of the CHAP?

Definition of Terms

Clients, for the purpose of this study, are defined as individuals who are reached by a lay health advisor with health information, referrals to community services, resources, and health care, health assessments, and support (Norris et al., 2006; Rodney, Clasen, Goldman, Markert, & Deane, 1998).

Disease management for diabetes is defined as recommendations developed by the American Diabetes Association that all persons living with diabetes should receive to prevent complications and include, routine physician visits, Hemoglobin A1c testing, foot examinations by a health professional and dilated eye examinations (Hale et al., 2010).

Health disparities is defined by the National Institutes of Health (1999) as "the difference in the incidences, prevalence, mortality, and burden of disease and other adverse health conditions that exists among specific population groups in the United States" (p. 1).

Lay Health Advisors are viewed as informal leaders or natural helpers who are trusted in the community and trained to promote health through individual and group outreach activities, and brokers, and advocates. These dependable individuals are familiar with the community's unique cultural norms and social characteristics (Levin, 1984; Norris, et al., 2006; Pullen-Smith et al., 2008; Thomas et al., 2001; Wiist & Flack, 1990). Multiple terms are used to describe local leaders in this role, Community Health Workers, Community Health Advocates, Health Workers, Community Health Advisors, Ambassadors (Boutin-Foster et al., 2008; Pullen-Smith et al., 2008; Story et al., 2010).

Leadership skills as defined by Jago (1982) are "a *property* that includes a set of qualities or characteristics attributed to those who are perceived to successfully employ influence" (p

315). Northouse (2009) defines leadership skills as “the ability to use one’s knowledge and competencies to accomplish a set of goals or objectives” (p. 40).

Prevention focuses on healthy lifestyles to decrease the risk of chronic diseases such as diabetes and include maintaining a normal body weight, being physically active, refraining from smoking, eating a healthy diet, and moderate alcohol consumption (Joosten et al., 2010).

Social Networks are defined by Ferlander (2007) as the “structural and core elements of social capital and participation in the network characterizes a behavioral trait” (p. 116). Putnam (1995), as cited in Ferlander (2007), describes features of social organizations such as “networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit” (p. 67).

Training, in the context of LHA models, is defined as capacity and skill building efforts using a variety of strategies and topics, including health education seminars, presentation skills, role playing, handling issues of confidentiality, information sharing, practice sessions with a focus on conducting health screenings, implementing support and referral services and behavior change strategies (Earp et al., 2002; Fluery, Keller, Perez, & Lee, 2009; Hurd et al., 2003; Pullen-Smith et al., 2008; Story et al., 2010).

Significance of the Study

Findings from the study of CHAP have implications for future public health practice, research and policy. The CHAP pilot was an initiative of the North Carolina Office of Minority Health and Health Disparities, in partnership with the local public health department and PHA. The leadership roles of CHAs on diabetes-related health behaviors among African American residents of a public housing community in southeastern North Carolina are described. CHAP was implemented in an unique setting that engaged a historically underrepresented population of leaders and participants, thus expanding the current research on lay health advisor programs.

With increased healthcare costs, shrinking agency budgets and persistent disparities in health, health care agencies are challenged to find low-cost, comprehensive interventions that expand traditional clinic-based models of care into community settings. LHA models, such as CHAP, are viable options for public health providers seeking to engage racial/ethnic minority leaders in local strategies to eliminate disparities in diabetes. Populations at higher risk of diabetes, including African Americans, benefit from community-based approaches for prevention and management of diabetes (Jacobs-van der Bruggen et al., 2007) . LHAs work almost exclusively in community settings to serve as connectors between health care clients and providers to promote health among groups that have traditionally lacked access to adequate health care (Witmer et al., 1995). When implemented as local public health strategies, LHA models increase community capacity, build on existing resources, strengthen systems of health care, increase health knowledge and promote healthy lifestyles (Story et al., 2010).

Delimitations of the Study

The proposed study was limited in scope. Only CHAs and PHA residents of a public housing development in one city in southeastern North Carolina were included in the study. The sample population was further restricted to CHAs (n = 17) and their clients (n = 62) who participated a one year pilot of the CHAP. The findings are not generalizable (O'Leary, 2010) to other lay health advisor models as a result of the small sample size.

Another limitation was the short implementation time. The CHAP was initiated as a one-year pilot however, funding reductions forced the program to limit its activities after nine months. Within an 18-month period ongoing program activities were discontinued. Therefore, the full impact of the CHAP in the public housing community may not be demonstrated through this study.

Organization of the Study

The present study was organized into five chapters. Chapter 1 introduces the research study, and other core sections of the proposal, including the problem statement, summary, purpose, research questions, definition of terms, study's significance and delimitations. Chapter 2 reviews relevant literature and discusses the theoretical framework. Chapter 3 describes the methodological approaches used in the study. This chapter outlines the research questions, sample selection, instrumentation, reliability and validity, data collection and analysis procedures, and conclusions. The fourth chapter includes a discussion of the results, sample, and data analyses. Finally, a discussion of the study is covered in Chapter 5, including, relationships of the findings to prior research; implications for future practice, research and policy; and limitations and conclusions. References and appendices are included.

CHAPTER 2

Literature Review

This study used mixed methods, Sequential Explanatory Approach (Creswell, 2009) to describe the leadership role of Community Health Ambassadors (CHAs) on diabetes-related health behaviors of African Americans living in public housing communities in one city in Southeastern North Carolina.

This chapter features the study's theoretical framework, based on transformational leadership constructs, with comparisons to characteristics of LHAs. Peer reviewed articles were examined to describe components of LHA program models and their impact on various chronic diseases.

Theoretical Framework

The theoretical framework for the current study is based on the transformational leadership model. Historically, transformational leadership has been described from the perspective of individual character traits in which the individual is magnetic and inspirational with a style that influences others to success (Burns, 1978, as cited in Northouse, 2009; Bass, 1985). The concept of transformational leadership first emerged in the 1970's, however theorist James M. Burns further expanded the definition of the model to incorporate the important roles of both the leader and followers. He contends that transformational leadership is the process whereby an individual involves and encourages others to create a bond and elevate the level of integrity in both the leader and the followers (Burns, 1978). Transformational leaders inspire supporters to action, build trust and assist supporters to achieve their goals and aspirations (Frey et al., 2009).

Transformational leadership primarily has been studied in the context of organizational settings for a variety of organizations, such as educational institutions, pharmaceutical companies, and the automotive industry.

A study of transformational leadership and team performance examined the interrelatedness of the lifestyle personality attributes and leadership styles (Frey et al., 2009). Lifestyle personality traits were assessed using the BASIS-A Inventory and leadership styles were measured using the Multi-leadership Questionnaire (MLQ)-short form. Participants consisted of 371 managers who were enrolled in various Master of Business Administration programs in universities and colleges across the southern United States. Findings suggest that there is a relationship between lifestyle and transformational leadership styles. Transformational leaders are associated with being optimist, striving for excellence, achievement focused and possessing good coping skills. The study integrated lifestyle personality attributes and leadership attributes into training and educational tools to increase the effectiveness of leaders.

An organizational assessment of transformational leadership was conducted with 62 Research and Development teams in a multinational pharmaceutical company with headquarters in Germany (Kearney & Gebert, 2009). English-language surveys were emailed to approximately 339 team members and 62 team leaders. Transformational leadership was measured using a 20-item Multifactor Leadership Questionnaire (MLQ-5X). The results of the organizational assessment were mixed, but confirm that the role of transformational leaders is significant. Nationality and educational diversity were positively related to team performance when transformational leadership skills were high, but were not significant when transformational leadership was low.

A cross-sectional design was used to explore the relationship between transformational leadership and innovation among Research and Development (R&D) teams in the automotive industry (Eisenbeisis, Knippenberg, & Boerner, 2008). The study population included 33 Research and Development teams from one research institute and four international companies. Of the 188 participants, 84% were men between 32 and 52 years old. Transformational leadership was assessed using a 20-item scale from the Multifactor Leadership Questionnaire (MLQ) and support for innovation was measured using a four item scale from the Team Climate Inventory (TCI). Climate for excellence was measured using a seven-item scale from the TCI, while team innovation was measured using a 22-item scale.

Eisenbeisis et al. (2008) posit that transformational leadership significantly predicted support for innovation. There was a significant interaction between support for innovation and climate for excellence. Transformational leadership and support for innovation were positively related to team innovation only under high climate for excellence.

While literature on transformational leadership is discussed mainly in the context of organizations, this author contends that transformational leadership transcends organizational settings. This study proposes that the characteristics of transformational leaders are consistent with the roles of CHAs in community settings. Key traits described in the literature on transformational leaders are consistent with CHAs as natural helpers in communities. Transformational leaders and CHAs are characterized as visionaries who are respected and trusted by followers, ethical, supportive of followers, good advisors, and able to create major and sustained behavior change (Northouse, 2009). By promoting healthy behaviors in their sphere of influence, where they live, work, play and pray, LHAs are in position to promote and support sustained lifestyle behavior changes over time (Earp et al., 2002; Giachello et al., 2003). A

LHA's success in the community is measured in part by their ability to grasp pertinent health concepts, effectively communicate health information to the people and move others to action towards a common vision or goal.

Transformational leaders, like LHAs, challenge traditional ways of thinking and behaving while promoting new ideas and strategies, whether in the context of an organization or in the community. Research on transformation leaders documents their impact on groups. Specifically, researchers Wang and Howell (2010) identified three ways in which transformational leaders influence groups: "group identity or common characteristics; communicating a vision that clearly promotes buy-in from group members; and team-building to promote trust and collaboration" (p. 1136). Likewise, LHAs operate within their social networks to communicate health information, promote healthy lifestyle behaviors and improve health status outcomes among the people they reach. Natural helpers from the community are trained to reach individuals and/or groups with health information, referral resources, support services and eliminate barriers between health and human services agencies and populations at risk they serve (Earp et al., 2002; Levin, 1984; Story et al., 2010; Wiist & Flack, 1990).

Literature Review

Effective health promotion and disease prevention programs require health care providers to understand the contexts of health of the people they serve. Health is influenced either positively or negatively by social determinants to include multiple social, cultural, environmental, genetic, behavioral, economic and/or systemic factors (North Carolina Institute of Medicine, 2009; World Health Organization [WHO], 2005). These social determinants define the context of health in communities. Lay Health Advisors (LHAs) help providers understand ways in which these socio-cultural factors converge to shape health beliefs, behaviors and

ultimately health outcomes in communities. Individuals who are indigenous to the community are a priority target group for LHA programs.

Components of lay health advisor (LHA) programs. LHA models, as community-based public health strategies, increase community capacity, build on existing resources, strengthen systems of health care, increase health knowledge and promote healthy lifestyles (Story et al., 2010). As such, LHA programs can be an important vehicle for providers to increase their knowledge of the combination of factors that influence health behaviors and ultimately improve health status for low-income, African American and other populations at highest risk of developing diabetes and other chronic conditions.

Based largely on volunteers, LHA programs are designed and implemented in partnership with local leaders and researchers, local health care providers, government or other human service agencies. These expanded health resources, through LHAs, have been particularly useful in underserved and racial/ethnic minority communities (Eng & Smith, 1995).

The literature regarding LHA models consistently document training, leadership and social networks as core components of effective community-based interventions to promote health and prevent disease. This study assessed if CHAs and the clients they serve report training, leadership skills and social networks as factors contributing to the successes or failure of the CHAP in their community. The literature focuses on three core components of LHA programs, training, leadership, and social networks. Three themes consistently emerged, LHAs' preparation, leadership roles and modes to carry out health outreach activities. These three themes were highlighted and are organized under the following categories: training, leadership activities and outreach via social networks.

Training. Local leaders trained to communicate health information are the driving force for this community based intervention. Studies show that with adequate training, LHAs with different competencies in their knowledge of health and experiences can be successful in communities (Saad-Harfouche et al., 2010). Giachello et al. (2003) used a participatory action research (PAR) model to prepare leaders for their work to address diabetes disparities among poor, underserved racial/ethnic minority populations in a Chicago community. Those capacity building efforts resulted in increased awareness about diabetes prevention and management among people with diabetes and those at risk for diabetes. Three studies further demonstrate that trained LHA help individuals they reach by increasing their knowledge of the systems of care, reducing barriers to needed services and offering strategies for navigating complex health systems. For example, the success of a LHA program in Michigan, referred to as Health Workers, was closely linked to the training of its community leaders. The eight week course provided information on topics such as problem solving, social support networks, health promotion strategies, health and human services resources in the community, survey development and community organizing (Schulz et al., 2001).

Wiist and Flack (1990) found that training opportunities around cholesterol control enabled a core group of volunteer LHAs to teach the health education classes for one church-based health promotion program in Oklahoma. A 10-12 week training session was conducted to teach LHAs about the targeted health challenges, counseling, problem solving and healthy eating (Wiist & Flack, 1990). Participants in the Oklahoma project received information on risk reduction strategies including reading labels for salt, fat, sugar content, tips for cooking healthy meals, physical activities, weight management, etc.

Education and training to support the community-based work of Community Health Workers (CHW) was documented by Boutin-Foster et al. (2008) as an effective method for providing health information and access to health and human services for historically at risk populations. CHWs were vehicles for effective community outreach as demonstrated throughout this study's review of the literature. Because CHWs were indigenous to the communities they serve, they brought valuable knowledge to the outreach program regarding the social, political, and environmental factors that influence the well-being of the people they serve. Qualitative and quantitative methods were used to evaluate the effectiveness of the training and the program. The quantitative items were analyzed using univariate analyses to measure the frequency of each of response, while the qualitative components consisted of four open-ended items which asked respondents to describe usefulness, ways to improve the workshop, etc. This study documented the benefits of trained lay health advisors who implement community- driven health education and outreach programs.

Leadership. Clear leadership roles have emerged for LHAs, such as educators, case managers, role models, community organizers, advisors, program facilitators, gate keepers, patient navigators and research partners (Flax & Earp, 1999; Hurd et al., 2003; Schoenberg et al., 2009; Schulz et al., 2001; Story et al., 2010; Wiist & Flack, 1990). In an assessment of eighteen studies of Community Health Workers, five core services were documented by Norris et al. (2006) and involved patient care and support, patient educator, support for care delivery provided by healthcare professionals, liaison with the healthcare system, and social support for the client. Respected and trusted community based leaders are valuable resources for many underserved communities. The involvement of these indigenous leaders as partners in health, increases the likelihood that community level interventions are culturally appropriate and

tailored to the unique needs and concerns of the people they serve (Trickett et al., 2011). LHAs carry out their leadership roles by influencing policies and promoting system changes. For example, a study conducted in one North Carolina community on diabetes prevention and management reported that the capacity building training prepared local leaders as change agents **(**Plescia, Groblewski, & Chavis, 2008). LHAs were engaged as decision-makers in all phases of the health project, from development, implementation, problem solving, evaluation, documentation and dissemination.

In a 2009 landmark study that span 410 counties and 13 states in the Appalachian region, LHAs functioned as partners in the research process development, implementation and evaluation. LHAs were instrumental in shaping the research protocols, data collection tools and culturally relevant information packets regarding cervical cancer, pap tests, and local health resources (Schoenberg et al., 2009).

Story et al. (2010) cite a National Community Health Advisor (CHA) study that outlines seven core competencies of lay health advisors. These leadership roles include:

> (i) cultural mediating between communities and healthcare providers; (ii) informal counseling and social support; (iii) providing culturally appropriate health education; (iv) advocating for an individual's and the community's needs; (v) assuring individuals receive necessary services; (vi) building individual and community capacity; and (vii) providing limited direct services (e.g. blood pressure readings, glucose testing. (p. 376)

LHA leadership is further demonstrated in a 2001 study focusing on the prevention of sexually transmitted diseases in which LHAs served as gatekeepers to the community. These gatekeepers effectively reached at risk individuals with information regarding the importance of STD prevention, screening and treatment services (Thomas et al., 2001). These studies document

that LHAs are viewed as leaders and partners in assessing the health care needs, designing the interventions and assessment tools, collecting the data, and influencing the project's impact on health behavior changes among the targeted population.

Published work by Popper and Lipshitz (1993) define leadership development and describe its relation to theories of leadership. In addition, three components are outlined of leadership development programs and strategies for applying those steps. The components include self-efficacy, modes of motivating others and specific leadership skills. The most important source of self-efficacy is an experience of successful performance which builds confidence. Awareness of various models for motivating others and a self-assessment of how they are motivated are key components of the training. They contend that transformational leadership is the preferred approach, which is based on the two domains of self-efficacy and awareness. The core principles of these leadership development approaches apply to CHAs working in public housing communities.

Lay health advisors (LHAs) increase access to services, are culturally sensitive and resonate with the populations at risk for chronic diseases like diabetes (Eng & Smith, 1995; Hurd et al., 2003). Services provided are beneficial to low income, racial/ethnic minority populations. Eng and Smith's study reports these expanded health resources, through LHAs, have been particularly useful in underserved, African American communities.

Outreach via social networks. LHA is a social-ecological model that can be implemented at various levels including, individual, social network, organizational, community, and policy (Earp et al., 2002). Community leaders and their existing social networks provide a foundation upon which to build community-based health programs. Social networks facilitated by trust are essential to the success of LHA models. Trust is framed in the context of a social

occurrence that involves taking risks, is relational, and is a lens through which actions and motives are interpreted and acted upon (Dirks & Ferrin, 2001; Flores & Solomon, 1998; McEvily, Perrone, & Zaheer, 2003; Newton, 2001). Trust is highlighted as a key factor that influences participation in formal and informal social groups or networks (Kwak, Shah, & Holbert, 2004). Without these social networks to facilitate access to populations at risk for the targeted diseases and conditions, LHA training would be of little benefit to communities.

Models demonstrate how LHA can be used to build on existing social networks, specifically the church, to promote health and support healthy lifestyle changes. The Appalachian Cervical Cancer Prevention Project supports this concept. In this four year study, faith communities throughout a 13 state region served as the setting for the LHA program and demonstrated success in increasing the rate of cervical cancer screening among poor, underserved women ages 40-64 years old. Of the women interviewed for the project, approximately 70% reported they attended church at least twice a month. They also reported that they generally had strong feelings of trust and reliability for church based interventions (Schoenberg et al., 2009).

Further, a community based study conducted by Flax and Earp (1999) in rural North Carolina highlighted the significance of social networks. African American women who were counseled by LHAs on breast cancer prevention and early detection services reported that they had a trusting relationship with the LHA, were a part of the same social networks which facilitated frequent contacts and that their health advice influenced their decision to get a mammogram. Further, the women reported that the “LHAs counseled or talked to them on a one on one basis and were viewed as credible health advisors” (p. 190).

LHA programs and chronic diseases. Studies report LHAs' effectiveness through increased rates in screening among high risk individuals for many chronic diseases, breast cancer, cervical cancer, stroke and HIV and other sexually transmitted diseases (Earp et al., 2002; James, Eng, Earp, & Ellis, 2001; Schoenburg et al., 2009; Story et al., 2010). One study by Earp et al. (2002) effectively used LHAs to increase the rate of mammography screening among older African American women in a rural north eastern area of North Carolina. The LHAs model involved five intervention counties, five comparison counties and a network of 170 volunteer-LHAs. As a result, women reached by a LHA reported higher rates of mammography use than women with no exposure to the project's LHAs or promotional materials. This study recommended LHA interventions for disadvantaged women as defined by low-income, older, rural and with limited access to health care (Earp et al., 2002).

The impact of LHAs was highlighted in a national study. Schoenberg et al. (2009) implemented the first faith-based intervention trials in the Appalachian region which included 410 counties in 13 states, with a population of 22 million people. This region experience a range of socio-economic challenges including lack of transportation, low rates of insurance coverage, and high rates of poverty and health disparities. The four-year Faith Moves Mountains (FMM) intervention focused on the use of lay health advisors to increase screening rates for cervical cancer among the target population, approximately 420 women aged 40-64 years old. Thirty churches from various denominations were recruited. LHAs worked with the research team to develop culturally appropriate five-ten week education programs about cervical cancer, pap tests, and local screening resources. The rates of cervical cancer screening increased among the target population.

LHAs promote long term lifestyle behavior changes to improve health with a focus on preventing or managing high blood pressure, cancer and diabetes, reducing cholesterol levels, eliminating health disparities, and addressing social determinants of health (Giachello et al., 2003; James et al., 2001; Pullen-Smith et al., 2008; Schulz et al., 2001; Wiist & Flack, 1990). Wiist and Flack's (1990) study used the LHA model within community networks, specifically the church, to implement formal health education programs and establish peer counseling networks among Blacks. The purpose of the project was to assess the applicability of nutrition education as a strategy to reduce cholesterol levels. This study expanded past research that focused primarily on blood pressure screening and physical activity in church based lay health programs. Approximately 174 participants with a serum cholesterol of 200 mg per dl or higher were recruited to participate in the intervention, nutrition classes (education group) while an additional 174 participants with elevated serum cholesterol levels were referred to their personal physician (usual care group). LHAs taught the nutrition class and conducted follow-up screening six months after the initial screening. These trained volunteer LHAs were effective in sharing strategies to lower cholesterol levels among their participants. Similarly to diabetes, elevated cholesterol is a chronic condition that requires sustained lifestyle behavior changes in order to maintain levels within a healthy range. This study's success lends credibility to LHA programs as an effective strategy for addressing chronic diseases and conditions.

Community based participatory research models use LHAs to improve health, address disparities in health outcomes and expand the health resources in high risk communities (Schulz et al., 2001; Story et al., 2010). In one article, Schulz et al. (2001) used a case study approach to document the impact of an initiative to reduce disparities in health among black and Latino populations in East Side Village in Detroit, Michigan. Five year trend data were used to identify

the target area. The lay health advisor project, East Side Village Health Worker Partnership, exemplified the use of community-based partnerships as one mechanism for community members and public health professionals to work together to improve health and overcome mistrust. A two- pronged approach was implemented to address the social determinants of health through leadership and partnership development. Community partners and more than 40 lay heath advisors, called Village Health Workers (VHW), participated in the research question development, design and implementation. The LHA initiative was successful in integrating social issues like trust and health, identifying strategies for individual and collective action, developing a shared vision of change/priorities.

Few studies included in this literature reported effectiveness of LHA programs from the perspective of the LHA and/or the clients they serve. Two studies are cited. One feasibility study, in rural eastern North Carolina, assessed the women counseled by LHAs to determine their effectiveness in increasing mammography screening and follow-up (Flax & Earp, 1999). The purpose of the study was to evaluate the impact of lay health advisors on the attitudes and behaviors of the target population counseled in the program to determine if this study was feasible for broader application. An in-depth, semi-structured approach was used to interview older Black women who had been reached by LHAs. Findings support LHA projects as an effective, credible and feasible public health intervention. Two thirds of the interviewees reported that LHAs made a difference for them, either by providing informational support (mammography resources), emotional support (advice and encouragement), instrumental support (transportation), or appraisal support (positive feedback; Flax & Earp, 1999).

Another study, a Community Health Advocates (CHA) initiative, evaluated the program from the perspective of the CHA, managers of the community sites and the clients. CHA were

viewed as positive influences for meeting the client needs, fostering independence, reaching people with health information and linking individuals to community resources (Rodney et al., 1998).

Conclusion

In conclusion, the disparities in diabetes and poverty between African Americans and Whites in North Carolina serve as the focal points of this study. There is a need for low cost interventions which expand traditional clinic-based models of care, while incorporating the cultural and social nuances of populations experiencing the disparities. LHA community based models serve to connect individuals with existing resources and provide support to navigate complex health and human service systems (Eng & Smith, 1995; Hurd et al., 2003). This study described the leadership role of LHAs in a diabetes prevention and control pilot program in a city in southeastern North Carolina.

Research conducted in public housing authority communities supports this setting as a viable option for implementing health projects. Authors note that future research strategies to improve health behaviors and quality of life for lower income African Americans residing in public housing should focus on bridging residents with resources and services in the broader community (Eugeni et al., 2011). The current study builds on that concept.

Published research primarily has studied the components of Transformational Leadership in a business context. This study expands the scope of the Transformational Leadership constructs to community based leaders operating as LHAs in community settings. This leadership model is consistent with the components of LHA programs because community members provide leadership to improve the health status of the people in their social networks. LHAs, like transformational leaders inspire supporters to action, build trust and assist supporters

to achieve their goals and aspirations regarding their health status as well as the health of their community (Frey et al., 2009).

LHA models are viable options for health care providers seeking engage community leaders to improve the health status of African Americans, low income groups and other populations bearing a disproportionate burden of diabetes and other chronic diseases. Studies have demonstrated the positive influence of LHAs on health behaviors among individuals with chronic diseases or those at risk of developing chronic diseases (Earp et al., 2002; James et al., 2001; Schoenburg et al., 2009; Story et al., 2010; Wiist & Flack, 1990). This study added to the literature by exploring the leadership role of LHAs, known as Community Health Ambassadors (CHAs), on diabetes-related health behaviors of African Americans living in public housing communities. Few studies report program effectiveness from the perspective of the LHA and/or the clients they serve. The current study adds to the research literature by examining the CHAP from the perspectives of the CHA and their clients.

CHAPTER 3

Methodology

This chapter outlines the study's methodology with specific details on the sample population and selection process, instrumentation, reliability and validity, data collection procedures and data analysis procedures. The chapter concludes with a description of the sample, data collection and analysis procedures for the study.

The purpose of this research was to describe the leadership role of lay health advisors, known as Community Health Ambassadors (CHAs), on diabetes-related health behaviors of African Americans living in a public housing authority (PHA) in one city in Southeastern North Carolina. An overview of the PHA is described in Appendix A.

CHAs were participants in a one-year pilot program based on a lay health advisor model. The Community Health Ambassador Program (CHAP), a public health outreach strategy is designed to improve awareness, prevention and management of chronic diseases, including diabetes, the emphasis for this study (Pullen-Smith et al., 2008). Individuals (clients) reached through CHAs' social networks included those at risk of diabetes as well as those who are diagnosed with diabetes. The study's aims were to describe the outreach services provided by CHAs, assess changes in health behaviors and outcomes among their clients, explore associations between CHA outreach and diabetes- related health behaviors among their clients and assess the CHAP from the perspective of CHAs and clients.

This study used mixed methods, Sequential Explanatory Approach, which, according to Creswell (2009), enables the researcher to explain and interpret quantitative results in more detail by collecting and analyzing follow-up qualitative data. For CHAP, quantitative and qualitative data were assessed in the analysis. Quantitative methodologies using secondary data from the

CHAP were used in the first analytic phase and qualitative data were collected in the second analytic phase to elaborate on the findings from the quantitative data.

> According to Onwuegbuzie and Leech (2006),
>
> research questions in mixed methods studies are vitally important because they, in large part, dictate the type of research design used, the sampling size, and sampling scheme employed, and the type of instruments administered as well as the data analysis techniques (statistical or qualitative) used. (p. 475)

Three research questions guided the CHAP study:

- Research Question 1—What are the types of recommendations that CHAs made to clients in the sample population?
- Research Question 2—What is the relationship between recommendations by CHAs and their clients' diabetes-related health behaviors and outcomes?
- Research Question 3—What do CHAs and clients perceive as the successes and challenges in the implementation of the CHAP?

Research Design

This study utilized a cross-sectional design to assess the types of recommendations made by CHAs across the client sample, and a Sequential Explanatory Approach (Creswell, 2009) to evaluate the relationship between CHA recommendations (or outreach services) and healthy lifestyles in general and in diabetes-related; prevention behaviors, disease management skills, and services utilization (Figure 3.1).

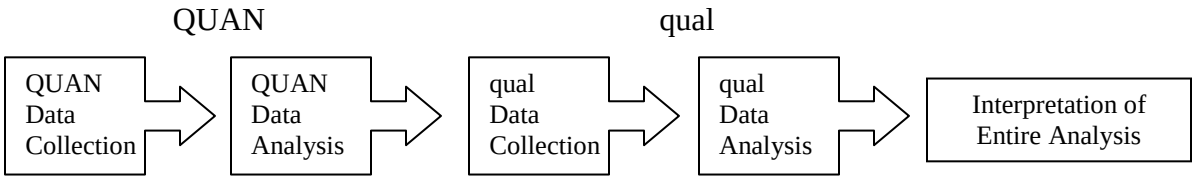

Figure 3.1. Sequential explanatory design (Creswell, 2009, p. 209).

First analytic phase (quantitative). Secondary quantitative data were generated by the CHAP using evaluation tools designed to capture CHA outreach services and clients' health assessment information at baseline and six months post-baseline. Data were examined to assess key trends in health behaviors, associations and outcomes for the sample population at baseline and associations among the sample population. The study's variables were screened using SPSS 21.0 statistical software for accuracy of data entry and to facilitate data analysis and interpretation (Morgan, Leech, Gloeckner, & Barrett, 2013).

Independent variables or predictor variables cause, influence or affect outcomes, while the dependent variables are the results or outcomes that the study seeks to measure (Creswell, 2009; O'Leary, 2010). Based on this logic, the independent variables in the study are the CHA outreach activities and services for clients. These CHA outreach activities and services included recommended clients to see a doctor or dentist; referred clients to healthcare services; distributed health information/materials to clients; reviewed goals with clients; connected clients with a health buddy; and identified transportation resources for clients (see Appendix E).

The dependent variables (client outcomes) were assessed at baseline and six-months post-baseline to measure changes. These included self-reported behaviors regarding nutrition and physical activity; health status rating; and clinical measures (weight, glucose, systolic and diastolic blood pressure; see Figure 3.2).

Clinical Outcome	Unit of Measurement
Weight Change	pounds (lbs) using standard scales
Glucose	(mg/dl) measured using a portable glucometer.
Systolic/Diastolic Blood Pressure	(mmHg) measured using a wrist sphygmomanometer

Figure 3.2. Clinical outcomes and unit of measurement.

To support CHAs' outreach efforts in the community, a toolkit was developed by a research team from the University of North Carolina at Chapel Hill in conjunction with NCOMHHD staff and active CHAs. CHAs in this study were trained by the research team on the use of the toolkit. The toolkit contained guidance for CHAs on the program's protocols and data collection forms. These forms are described in the Instrumentation Section of this proposal. The toolkit was designed to:

- Measure the impact of CHAP on increasing awareness, knowledge and changing health behaviors relative to chronic disease prevention or management;
- Measure the changes in clinical outcome measures, such as improved blood pressure, blood glucose, weight management, etc. for the clients reached by the program; and
- Assess the perceptions of the CHAs on their effectiveness in influencing their clients' awareness and health behaviors.

Second analytic phase (qualitative). To supplement the findings from the quantitative data, a qualitative component was implemented using a focus group approach. Focus group research was conducted to gain a more in-depth understanding of the CHAP pilot program. Two focus group sessions with open- ended questions to obtain views and opinions of the CHAs and clients were conducted (Creswell, 2013). The purpose was to assess the perceptions of the CHAs and their clients regarding their successes and challenges in the implementation of the CHAP.

Study Population and Selection

The total target population is comprised of an estimated 791 adults, ages 18 years or older, who reside in the PHA developments in a southeastern city in North Carolina. The study population for this research was a sub-set of the target population, residents who participated in

the CHAP pilot program. This was a one-sample pre-post evaluation study design (Creswell, 2009). Therefore, there was no control group in the study to compare to the intervention group. This study includes two distinct samples:

1. CHAs involved in CHAP Outreach (n = 17), and
2. All clients who completed a General Health Assessment form at baseline and during a six month follow-up (n = 62) and (n = 32) respectively.

The primary analysis focused on the secondary quantitative data documenting CHA outreach services and all clients reached during the baseline assessment and six month follow-up phases. Primary qualitative data were collected through the focus groups. Purposeful samples of CHAs and their clients were selected to assist in understanding and interpreting the findings in the quantitative phase of the study (Creswell, 2009, p. 178).

CHAP Process

A three-phased sequential process was used to implement the CHAP. CHAP Recruitment and Training occurred in phase one. CHAP outreach activities occurred in phase two and phase three involved a 6-month follow-up health assessment. Data analyzed in this study were generated during the second and third phases of the project.

Phase 1—CHAP recruitment and training. The recruitment of CHAs for the PHA project was accomplished through a collaborative effort between the local health department, PHA administrators and PHA Resident Leaders. A non-probability or convenience sample process, (Babbie, 2007), was used to select the CHAs in the study population based on their interest and availability to participate in the pilot program.

The Project Coordinator from the local health department introduced the CHAP to the PHA Executive Director. The Project Coordinator had been trained in 2011 as a CHA through

the NC OMHHD sponsored program. While the PHA Executive Director embraced the CHAP concept and proposal to implement the program in the six PHA developments, he recommended that Resident Leaders be involved in making the final decisions. The Project Coordinator was invited to present to Resident leaders at one of their regular bi-monthly meetings. The CHAP was endorsed by the Resident Leaders in the meeting as a good model for improving the health of PHA residents and the surrounding communities.

Resident Leaders played a key leadership role to identify potential CHA's. They used a variety of communication channels to recruit volunteers, including word of mouth, flyers provided by the Project Coordinator, and face-to-face encounters. Information regarding the CHAP was included in the PHA's monthly newsletters and calendar of activities and discussed at regular meetings. Resident Leaders set up meetings at various housing developments and invited residents to learn about the CHAP from the Project Coordinator. In addition, they also promoted the program to residents on an individual basis which represented about 90% of the recruitment effort. The Project Coordinator canvassed door to door in the PHA communities to share information about CHAP. Recommendations for potential CHAs also came from the Housing Managers who are PHA staff located at each site. The goal was to identify and recruit trusted community members who were willing and able to serve as a volunteer, complete the required training and share health information regarding diabetes prevention and management with individuals in their social networks. Project Coordinator and Resident Leaders used these general guidelines when recruiting potential CHA. This guidance focused on four criteria for LHA recruitment (Story et al., 2010): (a) Who do people in the community go to for help or advice?; (b) What person in the community do people trust will do what is right for the community?; (c)

When the community has had a problem in the past, who has been involved in working to solve it?; and (d) Who would have to be involved to get things done in the community?

Approximately 50 individuals from the six public housing developments were contacted to participate in the CHA training initiative. Twelve PHA residents volunteered to participate in the training to become a CHA. Training activities were consistent with the training requirements for all CHAs in North Carolina. Volunteers enrolled in the program by completing a general interest assessment and a formal application required by the local community college. Of the 12 registrants, ten completed the 22-hour course requirements to become a CHA in the Spring of 2011 (see Appendix C). An additional seven CHAs were trained in October 2011. Upon completion of the course, seventeen CHAs received a certificate and 2.0 continuing education credits from the North Carolina Community College System. The CHAs who meet the following criteria were included in the study:

- Resided in one of the six the public housing authority communities in the target area.
- Attended a minimum of 18 hours of the 22- hour course.
- Scored at least 80% on the post training exam.
- Provided outreach services to clients for at least three months post training.
- Documented diabetes-related outreach activities using the CHAP data collection tools.

Training materials for CHAs also included a toolkit to support their outreach efforts in the field. The toolkit contained forms to guide the CHAs on the program's protocols, as well as key data collection tools. These forms are described in the Instrumentation Section of this proposal.

Phase 2—CHAP outreach activities. Phase two mainly centered on CHA outreach services and activities within their social networks. The PHA was a primary target area. During

this phase, the CHAP was marketed to the residents of the PHA developments. The first community-wide health screening activity reached more than 100 people. An initial general health assessment was completed by the CHAs to establish baseline information for individuals (clients) interested in participating in the program. Health assessment forms were completed for sixty-two clients. Over the course of several months after the general health assessment event, the CHAP provided additional activities to promote healthy lifestyle behaviors among the community residents. For example, sessions were offered on nutrition, healthy eating tips, reading food labels, cooking demonstrations, and Zumba exercise classes. CHA's contacted clients by telephone, one-on-one or during other CHAP sponsored events.

Phase 3—6–month follow-up. Phase three involved the CHAP six month follow-up assessments with clients. CHAs administer the CHAP 6-Month Follow-up form either over the phone or in an in-person session with their clients (n = 32).

Instrumentation

Data collection tools were developed for practical purposes for use in the field, rather than for research. These tools were designed to track CHAs' outreach activities and their clients' diabetes-related health behaviors and outcomes. NC OMHHD used this mechanism to gather program data in an inexpensive and timely manner.

Through a contractual agreement with the Duke University's Department of Community and Family Medicine, researchers worked with NC OMHHD staff to develop a toolkit with uniform data collection tools, reporting procedures, a database to enter and house the information and CHAP protocols for the end users, CHA's. The CHA's in this study used the following forms to document their outreach efforts in the CHAP pilot program.

CHAP protocol forms. Strategies were implemented to ensure that CHA's were prepared for their leadership role to promote healthy lifestyle behaviors in the community. For example, All CHA's were trained on four key forms regarding the CHAP's general procedures and expectations which included a Health Ambassador Role Statement, CHA Client Release Waiver, CHA Client Code List, and Client Contact Sheet.

Health ambassador role statement. The Health Ambassador Role Statement includes a script for CHA for introducing the CHAP to potential clients and to discuss their roles as a CHA. The statement is made to each client in the first visit prior to gathering any client information or completing any forms.

Client release waiver. The purpose of the Client Release Waiver is to document that clients are aware of the clinical measurements taken in CHAP, provide protection if clients agree to have their measurements taken by the CHAP and the individual CHA. The three clinical measures, blood pressure, glucose, and weight are stated in the waiver.

CHA client code list and form tracker. The CHA Client Code List and Form Tracker include instructions for coding client forms. The codes allowed the NC OMHHD to obtain de-identified information about the clients and maintain confidentiality.

Client contact sheet. The Client Contact Information sheet was used to record information so that CHAs could maintain ongoing communications with their clients. This sheet, with name, phone number, email and preferred time to be reached, was used solely by the CHA. None of the information contained on the form was forwarded to the Project Coordinator or NC OMHHD.

CHAP health assessment data forms. Five health assessment forms primarily measure outcomes. These tools also were used to document the health improvement plan for clients and

the actions of the CHAs. CHA assessment forms were self-administered to capture pre and post process and impact measures, document CHA activities, and evaluate their perceived effectiveness in influencing the behaviors and awareness of their clients.

The forms include variables measured in nominal, ordinal and continuous scales. Nominal variables (Streiner & Norman, 2008) are named or finite categories in the CHAP instruments, such as race, gender, and questions requiring yes/no responses. As is characteristic of nominal variables, a number was assigned to represent these categories to facilitate tallying responses for describing population distributions (O'Leary, 2010). Ordinal variables, in the form of Likert scales are incorporated in the CHAP data collection tools as well. Likert scales are bi-polar and serve to rank order categories in a meaningful way (O'Leary, 2010; Streiner & Norman, 2008). For example, these scales capture CHAP data regarding clients' self-reported nutrition and physical activity behaviors and self-perceptions of diabetes control. Continuous level measures included in the CHAP data tools include ratio variables (O'Leary, 2010; Thompson, 2009) such as weight, height, and blood pressure.

Secondary data for the CHAP were generated using these five tools, including the CHAP Client Intake-General Health Assessment (Form A), CHAP- Client General Health Assessment 6- month Follow-up (Form B), CHA Bi-Monthly Update (Form C), Client Intake-Diabetes Health Assessment (Form DM) and CHAP 6-Month Diabetes Follow-up (Form DM-F). Each form is described below. A detailed summary of the health assessment variables contained in each form may be found in Appendix D.

CHAP Client Intake—General Health Assessment Form (Form A). Community Health Ambassador Client Intake Form (Form A) was designed to record baseline information on the client's health behaviors, health concerns and clinical measurements taken by the CHA. This

form also is used to document the health improvement plan for clients and the outreach services provided by the CHA's.

Form A, Community Health Ambassador Client Intake, contains variables for six areas, demographics, nutrition and physical activity behaviors, health history, clinical measures and CHA outreach services. Likert-type items based on a scale from "always" to "never" are incorporated in the nutrition and physical activities questions. Other questions requested factual information, such as demographic data and health utilization information.

CHAP Client General Health Assessment—6-Month Follow-up (Form B). CHAP-form B was designed to be completed by the CHAs in the six months following the initial assessment to evaluate improvements, reassess their clients' health needs and identify which strategies show promise for addressing those needs. This form includes variables covering four areas, self-reported health status update, nutrition and physical activity, clinical measures and CHA outreach services.

CHA Bi-Monthly Update (Form C). CHA Bi-Monthly Update (Form C) is a self-assessment tool designed to document activities and evaluate their perceived effectiveness in influencing their clients' health awareness and behaviors. The form focused on CHA outreach activities and includes nine variables. These variables range from the number clients reached to their perceptions of the impact they are having on the clients they serve in the program. The CHAs in this study opted to complete the forms on a monthly basis.

Client Intake—Diabetes Health Assessment (Form DM). Client Intake-Diabetes Health Assessment (Form DM) is a tool to record additional health behaviors and activities for those individuals who self-reported they have diabetes. This form was completed during the initial

health assessment phase. Three types of variables are included on Form D, diagnosis and adherence, diabetes monitoring and care services received.

CHAP 6-Month Diabetes Follow-up (Form DM-F). CHAP 6- Month Diabetes Follow-up (Form DM-F) assesses the behaviors of clients who reported having diabetes in the general assessment. Three types of variables are captured in form DM-F, self-perception of diabetes control using a Likert-type, diabetes monitoring and care services provided.

Reliability and Validity

Validation of existing instruments enables researchers to draw meaningful and useful conclusions and implications from scores on the tools (Creswell, 2009; Streiner & Norman, 2008). The Research team at UNC CH implemented steps to validate select questions in the data collection tools for the CHAP. While the data collection tools are a significant component of the CHAP, it is important to note that the tools were designed for practice and not specifically for research. However, content and face validity measures were covered for select variables using an evidence based practice model involving three key steps.

As noted by Streiner and Norman (2008), “content validity consists of a judgment by experts to determine if the measures appear to appropriate for the intended purpose” (p. 6). Two processes were implemented to seek guidance from content experts. First, an extensive literature review was conducted to determine the assessment questions and approaches used in existing LHA models. The questions in the CHAP data collection tools are based on recommendations in the literature regarding assessment questions and evidence from prior lay health advisor studies. Several key LHA studies were instrumental in shaping the phrasing and content of the questions. For example, one key resource was a comprehensive research study conducted by Norris et al. (2006) examined eighteen studies involving community health workers and diabetes to

determine their effectiveness in knowledge and behavior outcomes, physiological measures, and health outcomes.

Secondly, content validity was achieved by incorporating questions in the CHAP tools that have been validated in the literature. For example, key assessment questions relating to the client's history of screening for diabetes and other chronic diseases were derived from the Behavioral Risk Factor Surveillance Survey (2011). The Behavioral Risk Factor Surveillance System (BRFSS) is a random telephone survey of North Carolina's residents aged 18 and older in households with telephones. This national survey was initially developed in the early 1980s by the Centers for Disease Control and Prevention (CDC) in collaboration with state health departments and is currently conducted in all 50 states, the District of Columbia, and three United States territories. Through BRFSS, information is collected in a routine, standardized manner at the state level on a variety of health behaviors and preventive health practices related to the leading causes of death and disability such as cardiovascular disease, cancer, diabetes, and injuries. Questions contained in the data collection tools regarding rating overall health status were derived from other sources such as the AF-36, a national survey that estimates the relative burden of diseases through self-evaluations of general health status for both the general population and specific populations. Norms are described for more than 200 diseases and conditions.

Face validity indicates that one or more experts judge that an instrument appears to be evaluating the desired measures (Streiner & Norman, 2008). In order to achieve face validity, the CHAP data collection tools were pilot tested with two groups of active CHA's. Two focus group sessions were facilitated by the UNC CH Research team to obtain feedback and suggestions for

streamlining the tool for use in the field and clarifying the assessment questions. The tools were modified based on their recommendations.

Reliability measures whether scores resulting from past use of the tool is measuring something in a manner that is stable or consistent over time and reproducible (Creswell, 2009; Streiner & Norman, 2008). For the purposes of this study, the data collection tools were designed to document and evaluate the CHA outreach activities rather than for research purposes. Therefore reliability scores were not available prior to this study.e. An effort was made to conduct a pilot test of reliability for the CHAP Client Intake-General Health Assessment Form A post hoc.

In order test for reliability, two CHA's, who were not affiliated the PHA project were asked to identify five new clients each to assist with this process. Each CHA was asked to complete the CHAP Client Intake-General Health Assessment Form A based on feedback from the ten clients who previously had not participated in the program. One week later, CHA's asked those same clients to complete the form for a second time so that a crude estimate of reliability for the Client Intake Form A could be calculated using a kappa statistic**.**

Specific actions were taken to ensure that the qualitative data is accurate and credible. Qualitative validity means that the researcher uses certain techniques to check for accuracy of the findings, while qualitative reliability indicates that the researcher's approach is consistent across different researchers and procedures for deriving at the findings are documented (Creswell, 2013).

Data Collection

Approval from the Institutional Review Board (IRB) for Research at North Carolina A&T State University was obtained prior to starting the study's data analysis process. The IRB

application will include information on the purpose of the study, description of study participants, a copy of the letter of support from the PHA, and copy of the data collection tools.

Quantitative data collection. Secondary data were analyzed during phase one of the Sequential Explanatory Approach. These data were generated by the CHAs during the pilot program. The majority of the data collection activities occurred between June 2011 and January 2012. Five data collection forms were used by the CHA's. One form documented their outreach services. The remaining four forms were designed to collect client data and were completed either during face-to face sessions or via telephone conversations with their clients. None of the forms were self-administered by the clients. These forms included, General Health Assessment (Form A), Follow-Up Assessment (B), CHA Bi-Monthly Update (Form C) Diabetes Health Assessment (Form DM) and 6-Month Diabetes Follow-Up Assessment Form (DM-F) .

Instructions on the use of the forms occurred in two settings. The training facilitator, hired by the Community College System, introduced the data collection tools and reporting requirements to CHAs as part of the 22-hour required course (see Appendix B). Additional training on completing and submitting the data collection forms, was provided by the Project Coordinator during regular meetings with the CHAs. Interactive training sessions included role play for CHAs on how to complete the data collection forms. The Project Coordinator outlined data collection procedures. Each CHA was assigned a code to track their outreach activities. A corresponding code was assigned to clients as a way to link clients to the appropriate CHA. The codes were secured by the CHAP Coordinator, on site at the PHA office. The CHAs provided a hard copy of the completed forms to the Project Coordinator during their regular meetings and group activities. De-identified data were entered in the CHAP database designed by researchers at the University of North Carolina at Chapel Hill.

Permission was obtained from the Executive Director to access the de-identified data for this research study. The CHAP data base was housed at the University of North Carolina at Chapel Hill. Data collection involved several key steps. Contact was made with the University of North Carolina at Chapel Hill to access the database with de-identified data for CHAP. The secondary data collected using the five data collection tools for CHAP was studied. Information was prioritized and organized to create tables to describe the study's independent and dependent variables. These data captured information regarding demographics, CHA outreach, diabetes-related health behaviors and clinical outcomes.

Qualitative data collection. Qualitative data were collected using a focus group approach. The focus group format facilitated open dialogue with CHAP participants (Creswell, 2013). Two focus group sessions were held, one with CHAs and another with clients. Eligible clients were those who completed the general health assessment form at baseline and at the six month follow-up session.

The Project Coordinator attempted to reach all CHAs to invite them to participate in the focus group. Efforts were made over a two week period, to reach the 17 CHAs by telephone or via face- to-face contact. Specific steps were taken to over-recruit for the session with CHAs and clients to ensure that the optimum number of participants (between 5 and 10) were in attendance (Cook, 2005). To maximize attendance, the Project Coordinator called the potential focus group participants the day before to remind them of the agreed upon date, time and location of the sessions (Rabiee, 2004).

The Project Coordinator asked the CHAs who agreed to participate in the focus group to recruit at least one of their clients to participate in a client focus group session. CHAs determined the date and time for the discussions. Both focus group sessions were held at a site deemed

convenient by the CHAs, a community center located in one of the public housing authority communities. The focus group with CHAs was scheduled in the morning and the session with clients was held during the afternoon of the same day.

Each focus group session was planned for approximately one hour. The sessions included a moderator and a note taker. The moderator opened with a welcome, and presented an overview of the topic, purpose, and guidelines (Krueger, 1998). Prior to the start of the session, the moderator reviewed the consent form with the group and requested that each participant sign the form.

An interview protocol (Creswell, 2013) with eight open-ended questions guided the focus group discussions for CHAs and clients (Figure 3. 3 and 3. 4). The questions were designed to capture the insights and perceptions of CHAs and their clients regarding the successes and challenges of the CHAP in their communities, with a specific focus on diabetes-related health behaviors. Systematic steps were implemented to facilitate analysis of focus group data. Strategies implemented included, sequencing of the questions, capturing data, organizing data, participant verification and debriefing between the moderator and assistant moderator and sharing the preliminary reports with key stakeholders (Krueger, 1998).

Three strategies were implemented to capture the focus group discussions and assist the researcher to reconstruct key concepts. These included an audio recorder, the moderator's handwritten notes and notes from an assistant moderator (Krueger, 1998).

The moderator sought immediate feedback from participants at the end of the focus group session. The moderator's flipchart pages, with highlights of client responses for each question, were posted on the wall in full view throughout the discussion. At the end of the session, the moderator invited participants to add any additional comments or thoughts about the CHAP. Additional

remarks were written on the flip chart pages. This process ensured that participants had the opportunity to verify the moderator's notes reflected their comments and thoughts. In addition, a debriefing occurred between the moderator and the assistant moderator at the conclusion of each focus group session to summarize key highlights and impressions regarding the process.

1. From your perspective, as a CHA, what do you think was the most important thing you did t assist clients in the program? Do you have an experience or interaction between you and a client that you can share?
2. What type of health-related information did you share with clients?
3. How did you specifically help your clients' diabetes-related health behavior changes?
4. How would you describe ways that clients communicated with you? Were clients different i their responses when you reached out to them? Provided them with information? In what way?
5. What worked best for you as a CHA?
6. What are the things that impacted your ability to serve as a CHA?
7. What were some of the challenges for the Community Health Ambassador Program? As a CHA, was there anything you would have done differently to promote diabetes-related behavior changes? If so what? How?
8. How important do you think this Community Health Ambassador Program is to your community? Why?

Figure 3.3. Focus group interview guide—Community Health Ambassadors (CHAs).

1. From your perspective, what did your CHA do to help clients in the program? Do you have an experience or interaction between you and your CHA that you can share?
2. What type of health-related information did the CHA share with you?
3. How did your CHA help or hinder your diabetes-related health behavior changes? What cou have done differently by the CHA? What could you have done differently?
4. How would you describe the way your CHA communicated with you?
5. What is the one thing that you think worked best in CHAP?

Figure 3.4. Focus group interview guide—Clients/participants.

6. What things impacted your ability to participate in the CHAP?
7. What do you see, if any, are some of the challenges for the Community Health Ambassador Program?
8. How important do you think this Community Health Ambassador Program is to your community and why?

Figure 3.4. (cont.)

Data Analysis

Quantitative data. Frequency distributions were calculated to describe the demographic variables, including race, gender and education. Descriptive statistical methods (percentages and means) were used to organize the findings for each study population and summarize all of the variables in the study. These quantitative data were analyzed primarily using means and frequencies based on univariate and bivariate analyses. Univariate approaches examine one variable at a time and provide measures of central tendency, dispersion, and distribution of shapes, while bivariate analyses assess relationships between two variables (O'Leary, 2010). Resulting scores assisted in describing relationships between the CHA outreach activities and diabetes-related healthy lifestyle behaviors among the clients based on scores at the baseline and six month follow-up health assessments.

A test of reliability for the CHAP Client Intake-General Health Assessment Form A was conducted post hoc. Two CHAs, not affiliated the PHA project, identified five new clients each to assist with the process. Each CHA completed the CHAP Client Intake-General Health Assessment Form A the newly recruited clients. Approximately, one week later, CHAs completed form A for a second time with their five new clients. A crude estimate of test-retest reliability was assessed using Cohen's kappa to assess interobserver agreement for the selected nominal level variables (Leech, Barrett, & Morgan, 2011). For the nominal level variables, health history variables "ever screened" and "having had a family history of several chronic

diseases were examined (See Appendix C for Client Intake General Health Assessment Form A) For all 10 screening variables, all kappa values (except one doctor's visits), ranged from .613 to 1.0 with most being over .700 (Morgan et al., 2013) which is evidence of good reliability. For the nutrition and physical activity behaviors, we used a paired samples *t*-test correlation component For the values to be reliable, the correlations should be .70 or above (Leech et al., 2011). Of the 30 pairs of variables, all but five exceeded the correlation coefficient of .70. Most of these were very close to .70. However, for all variables used in the current study, all had either kappa values or correlation coefficients above .70 (except sweetened beverages; ordinal level, $r(15) = .653$ and blood pressure screening; nominal level, kappa(16) = .613). See Appendix G and Appendix H.

Qualitative data. Qualitative data were collected using a focus group approach. An audio recorder, moderator's notes and a notetaker's notes captured the focus group discussions. Open ended data compiled through focus sessions were analyzed and interpreted using Creswell's (2009) key steps to include, organize and prepare data, study all data, code the data by topic, use a coding process to describe the themes for analysis, describe which themes will be represented and interpreting the data. This information was assessed by the researcher for key concepts, to interpret findings or identify emergent themes (Emerson, Fretz, & Shaw, 1995; Hammersley & Atkinson, 2010).

Another source was sought to assist the researcher with data analysis, experts who were not present in the focus group discussions (Krueger, 1998). A professor /researcher in the Doctoral Program in Leadership Studies at North Carolina Agricultural and Technical State University and expert in qualitative research methods, engaged doctoral students in an Ethnography class in the review process. The professor and three Ethnography students reviewed

the raw data from focus group transcripts, moderator's notes, and assistant moderator's notes. In the first review, students examined the raw data for key word and themes without the interview guide. For the second review, students were provided the interview guide questions. Key themes were identified by the class and are reported in the results in Chapter 4.

The group feedback assisted this researcher in two ways. This strategy enabled the researcher to test reliability through an intercoder agreement process (Creswell, 2013), in which multiple coders analyzed the transcript data for key themes. In addition, feedback on the raw data was helpful in identifying insights and interpretations of the data that had not been included.

Summary of Variables

A summary of variables is presented in Appendix D and Appendix E. The first group of variables outlines outreach services that CHAs provided to clients (non-diabetic and diabetic) and are considered the independent variables. Outreach services are grouped into seven recommendations in the areas of referrals to doctor, dentist, community services, provided health information, reviewed health goals, connected them to health buddy and/or referred clients to transportation resources. CHAs rated the frequency of their outreach services using a Likert scale ranging from *Never to 10 or More Times.*

The second group of variables, dependent variables, measure outcomes. These variables will include clinical measures, behavioral measures for nutrition and physical activity, self-rated health and for diabetic clients, a self-report of having an A1C test administered by a medical provider. Clinical measures were assessed by the CHAs during the session and recorded on the client's forms. The clinical measures included in this study's analysis focused on weight change, glucose, and systolic/diastolic blood pressure. Nutritional behaviors are self-reported by clients using a five point Likert- type scale ranging from *Always to Never*. Three nutritional measures

were evaluated, fruit intake, vegetable intake, and sweetened beverages. The physical activity behavior, regarding length of time engaging in exercise on a weekly basis, is self-reported by clients using a Like-type scale ranging from *Always to Never*. A self-rated health measure allows clients to report their perception of their overall health status using a Likert-type scale ranging from "*Excellent to Don't Know."*

Measures for each category were recorded by the CHAs at baseline and 6-months to capture any changes in healthy lifestyle behaviors. A pre-post evaluation used paired samples *t*-tests (Leech et al., 2011; Morgan et al., 2013). A secondary analysis, on clients who self-reported having diabetes during the baseline assessment phase and six month follow-up assessment were included in the study's results. These pre-post data also were analyzed using paired samples *t*-tests.

Summary

In summary, the sample populations included the CHAs and the clients (self-reported diabetics and non-diabetics) who completed a general health assessment at baseline and six months. Data collection tools were designed for CHA to track their outreach activities. These data were analyzed using univariate and bivariate (percentages, means, chi-squared, and *t*-tests) analyses to describe the leadership role of Community Health Ambassadors (CHA) on diabetes-related health behaviors of clients reached in a one year pilot program Descriptive analyses played a critical role in clarifying the data trends and guided the researcher to answer the research questions. Themes were compiled from the two focus groups to capture the perceptions of CHAs' and their clients' regarding the successes and challenges in the implementation of the CHAP.

CHAPTER 4

Results and Analysis

This research was designed to describe the leadership role of lay health advisors, known as Community Health Ambassadors (CHAs) on diabetes-related health behaviors of African Americans living in public housing communities in one city in Southeastern North Carolina. Three research questions were posed in the study:

- What are the types of recommendations that CHAs made to clients in the sample population?
- What is the relationship between recommendations by CHAs and diabetes-related health behaviors and outcomes?
- What do CHAs and clients perceive as the successes and challenges in the implementation of the CHAP?

This chapter documents the study's findings to include the sample population, data analyses and results. A description of the sample population is followed by the study's quantitative and qualitative findings. The primary outcome measures were clients' self-reported behaviors regarding nutrition and physical activity, health status, and clinical measures taken by the CHAs at baseline and six months post- baseline. The quantitative dominant Sequential Explanatory Approach mixed methods design (Creswell, 2009) was used to make the study more comprehensive. During the First Analytic Phase, secondary data from the CHAP were analyzed using quantitative methodologies. Data generated from CHAP tools captured CHA outreach services and clients' health assessment information at baseline and six months post-baseline. These data were examined using descriptive statistics to assess key trends in health behaviors, associations and outcomes associations among the sample population. Qualitative data were

collected during the Second Analytic Phase. Primary data were generated through two focus groups with CHAs and clients. Finally, both sets of data are summarized to highlight associations between the two data sets.

Sample

The study included two sample populations: (a) CHA involved in CHAP outreach activities (n = 17), and (b) All clients with a completed General Health Assessment form at baseline and six months post baseline (n = 62 and n = 32, respectively). Tables 4.1 and 4.2 describe the general demographic characteristics of the Community Health Ambassadors and their clients respectively. The sample populations are described using frequency distributions (Morgan et al., 2013).

Table 4.1 shows CHAs' (n = 17) characteristics including, age, gender, ethnicity, education, and employment status. Valid percentages are used to describe the self-reported characteristics of CHAs. Seventeen volunteers completed the course requirements for the CHAP. All of the volunteers self-identified as African American. The CHAs were mostly females (88.9%) with ages that were equally distributed among the three categories, 35-41, 42-56 and 57-73 years old. Educational attainment was another self- reported characteristic, with the vast majority (82.4%) of the CHAs indicating they had a high school diploma or less. The final characteristic was specific to their current work status. Approximately two-thirds of the CHAs were out of the workforce, with 64.3% reporting they were unemployed. Retirees were the next largest category and accounted for 21.4%.

Clients' characteristics are reported using frequency distributions in Table 4.2 for those who completed a General Health Assessment Form at baseline (n = 62). Valid percentages were recorded. Variables outlined for clients included, age, gender, ethnicity, health insurance,

education, self-reported health outcomes, and health behaviors relative to nutrition and physical activities.

Table 4.1

Self-Reported Characteristics of Community Health Ambassadors (N = 17)

Characteristic	Valid Percent (%)
Age	
35-41	35.3
42-56	35.3
57-73	29.4
Gender	
Female	88.9
Male	11.1
Ethnicity	
African American	100.0
Education	
High School Graduate or Less	82.4
Greater than High School	17.6
Employment Status	
Retired	21.4
Unemployed	64.3
Employed Full-time or Part-time	14.3

Clients reached through the CHAP pilot program were predominantly African American females. Nearly half of the clients (48.3%) were between the ages of 35-64 years old with a high school diploma (45.8%). Another 25.4% of clients reported attended college or obtained an Associate degree. This shows that the clients (71.2%) obtained a high school diploma or college level training. The final characteristic in table 4.2 focused on health insurance coverage. Most of the clients were insured through either Medicare or Medicaid (66.7%), with 19.3% reporting they had private insurance. This demonstrates that 87% of the clients had some form of public or

private health insurance, which addressed one of the most common access barriers to health care, the lack of health insurance (North Carolina Institute of Medicine, 2009). The remaining 14% of clients reported having no insurance coverage. This figure is lower than the state average, which indicates that 23.0 % of African Americans in North Carolina are uninsured (North Carolina State Center for Health Statistics, 2010).

Table 4.2

Self-Reported Characteristics of CHAP Clients (N = 62)

Characteristic	*n*	Valid Percent (%)
Age		
18-34	17	28.3
35-64	29	48.3
65 or older	14	23.4
Gender		
Female	54	90.0
Male	6	10.0
Ethnicity		
African American	58	96.7
White	2	3.3
Education		
Less than High School	14	23.7
High School Graduate	27	45.8
Some College/AA Degree	15	25.4
College Graduate/Beyond	3	5.1
Health Insurance		
Medicare/Medicaid	38	66.7
Private	11	19.3
No Insurance	8	14.0

In summary, the sample population was made up of CHAs and clients participating in the CHAP pilot initiative in public housing communities in one city in southeastern North Carolina. The majority of the CHAs and clients were African American females. Most of the CHAs were out of the workforce either due to unemployment or retirement.

While most of the CHAs (82.4) had a high school diploma or less, clients reported having slightly more education. Clients (45%) reported they graduated from high school and another 25.4% attended college or obtained an Associate's degree. Another 5.1% of clients graduated from college. In addition clients were asked to report other indicators. Most of the clients (87.0%) had some form of health insurance through either a public (Medicaid/ Medicare) or private insurer.

First Analytic Phase (Quantitative)

Quantitative results are presented in the first analytic phase. Descriptive statistics were used to analyze the data, including frequency distributions, measures of central tendency, variability and shape (Morgan et al., 2013). Data analyses were limited by the study's small sample populations, CHAs (n = 17) and clients (n = 62). The study's variables were analyzed using SPSS 21.0 statistical software for accuracy of data entry and to facilitate data analysis and interpretation (Morgan et al., 2013).

Tables 4.3 and 4.4 use frequency distributions to describe self-reported health status outcomes and health behaviors of the clients participating in the CHAP pilot initiative. These data were recorded at baseline, during the general health assessment phase of the project. Table 4. 3 reports measures of distribution for clients' self-reported health outcomes for three diseases, hypertension, pre-diabetes and diabetes (n = 62). For the category of family history, two diseases were reported most frequently by clients, hypertension (62.9%) and diabetes (48.4%). Screening

rates among clients for the three health conditions were varied. Although more than half of the clients (62.9%) had a family history of hypertension and nearly half clients (48.4%) a family history of diabetes, less than one-third had ever been screened for hypertension (27.4%) or diabetes (24.2%).

Table 4.3

CHAP Clients' Health Outcomes (Self-Reported; N = 62)

Health Indicator	Family History		Ever Screened		Ever Told	
	n	%	*n*	%	*n*	%
Hypertension						
No	23	37.1	45	72.6	53	71.0
Yes	39	62.9	17	27.4	9	29.0
Pre-Diabetes						
No	59	95.2	57	91.9	60	93.5
Yes	3	4.8	5	8.1	2	6.5
Diabetes						
No	32	51.6	47	75.8	55	77.4
Yes	30	48.4	15	24.2	7	22.6

Hypertension = High =Systolic blood pressure 140/ diastolic blood pressure 90 mmHg or greater.
Pre-Diabetes measures (Glucose levels are high if fasting =100-126mg/dl or non-fasting =140-149 mg/dl)
Diabetes measures (Glucose levels are high if at fasting =100-249 mg/dl or non-fasting= 120-249 mg/dl).

The final health outcome focused on identifying those clients who had ever been told by a health professional they had one of the three diseases or conditions. Approximately one-third of clients (29.0%) clients had been diagnosed with hypertension while fewer clients (22.6%) had been diagnosed with diabetes. Compared to African American women in eastern North Carolina, the clients in the CHAP program had slightly lower rates of confirmed hypertension. According to the Behavioral Risk Factor Surveillance System (2011), 34% of African women in eastern North Carolina had been told by a doctor, nurse or other professional that they had hypertension.

However, the rate of diagnosed diabetes among clients (22.6%) was slightly higher than African American women (12.0%) in eastern North Carolina. These data suggest that many clients had some knowledge of high blood pressure (62.9%) and diabetes (48.4%) through their family history and/or personal experiences.

Health behaviors specific to nutrition and physical activity are reported in Table 4.4. A five-point Likert-type scale was used to record clients' responses to statements specific to their daily intake of fruit, vegetables, and sugar sweetened beverages. In addition, the tables identify the length of time per week in which clients engaged in physical activities as well as whether or not clients exercised with others. Due to a low N, the scale was collapsed into three categories, always/usually, sometimes, or rarely/never. The results show that one-third (32.2%) of clients reported they "sometimes" consumed two cups of fruit each day, but the majority (44.1%) reported they rarely or never consumed two cups of fruit on a daily basis. When compared to adults in North Carolina, a higher percentage of CHAP clients (32.2%) reported they consumed two cups of fruit a day versus 25.0% of adults in the state (Centers for Disease Control and Prevention [CDC], 2009). At least one-third of clients (35.0%) indicated they "always/usually" consumed 2 ½ cups of vegetables each day, while 45.0% of the clients indicating they "sometimes" consume the recommended servings. Similar results for vegetable intake for North Carolina adults in 2009 indicated that 30.1% consumed three or more servings of vegetables per day (CDC, 2009). Finally, in response to the statement, "drinks two or more cups of sugar-sweetened beverages each day" approximately 44.0% reported that they rarely/never consumed two or more cups of sugar sweetened drinks each day. However, a larger percentage (35.1%) of clients' noted they always/ usually consume two or more cups of sweetened beverages daily. Variables regarding physical activity among clients focused on both the length and frequency of

the physical activity. Approximately 40.3% of clients reported they always/usually engage in at least 150 minutes (2.5 hours) of physical activity every five days, while one-third (35.1%) stated they rarely/never engage in this level of physical activity on a weekly basis. More than one-third of clients (36.9%) indicated that they always/usually engage in physical activity with others. However, a higher percentage, 43.9%, noted that they sometimes exercise with others.

Table 4.4

Clients' Nutrition and Physical Activity Health Behaviors (N = 62)

Health Behavior Recommendations	Valid Percent (%) (Baseline)
Fruit Intake (2 cups/day)	
Always/Usually	23.7
Sometimes	32.2
Rarely/Never	44.1
Vegetable Intake (2.5 cups/day)	
Always/Usually	35.0
Sometimes	45.0
Rarely/Never	20.0
Sweetened Beverages (2+cups/day)	
Always/Usually	35.1
Sometimes	21.0
Rarely/Never	43.9
Physical Activity (2.5 hours/week)[†]	
Always/Usually	40.3
Sometimes	24.6
Rarely/Never	35.1
Exercise With Others	
Always/Usually	36.9
Sometimes	43.9
Rarely/Never	19.2

[†]Engage in at least 150 minutes (2.5 hours) of physical activity every five days.

Research Question 1 focused on CHAs' self-reported outreach activities. While 17 CHAs met the program's training requirements, only 13 CHAs who participated in CHAP's pilot in the PHA community were included in the study's findings. Table 4.5 reports the CHA outreach activities modeled in the program. Outreach activities included seven core strategies: Recommended the clients to see a doctor; recommended clients see a dentist; referred clients to health care services; provided health information reading materials; reviewed goals with clients; connected clients with a health buddy; and identified transportation resources for clients.

Table 4.5

Type and Frequency of Outreach Activities: CHAs (N = 13)

Activity	Valid Percent (%)
Recommended Doctor	
Never	44.4
1 or more times	55.6
Recommended Dentist	
Never	85.7
1 or more times	14.3
Referrals to Community Services	
Never	28.6
1 or more times	71.4
Provided Information/Materials	
Never	16.7
1 or more times	83.3
Reviewed Goals with Clients	
Never	30.0
1 or more times	70.0
Connected Client to Health Buddy	
Never	71.4
1 or more times	28.6
Identified Transportation Resources	
Never	83.3
1 or more times	16.7

CHAs were asked to rate their outreach activities using a five-point Likert scale ranging from never to 10 or more times, however, categories were combined due to the low N, are reported using the coding, “never” or “one or more times.” Of the seven core outreach activities, three were used most often by the CHAs. The vast majority of the CHAs (83.3%) provided health information reading materials, while 71.4% of the CHAs recommended clients to health care services. More than half (55.6%) reported they recommended clients to a doctor one or more times. These data also revealed that an overwhelming majority of CHAs never recommended clients to see a dentist, transportation resources, or that clients connect with a health buddy.

CHAs were asked to describe their capacity to carry out their roles and the types of outreach activities they used. Various Likert-type scales were used. For example, to report CHA abilities to perform outreach activities, options to report ranged from “not at all” to “very.” Questions on having adequate time and information used a scale from “strongly disagree” to “strongly agree.” For the question regarding meeting their personal goals, CHAs had the option to respond either “yes” or “no.” Table 4.6 uses frequency distribution, to report key findings. More than half (61.5%) of the CHAs responded that they had met their goal as a CHA. Stated reasons as to why the remaining 38.5% did not meet their personal goals for CHAP included busy schedules, over demanding program reporting requirements or they did not contact the number clients they had intended.

The vast majority, indicated agree/strongly agree that they had enough information (90.9%) and time (81.8%) to serve as a CHA. In addition, they indicated having confidence in their ability to serve. More than half of the CHAs (58.3%) reported they felt “very” equipped to help clients, with the remainder (41.7%) indicating they felt “somewhat” equipped. It is

important to note that none of the CHAs suggested that they were not equipped at all to help clients. While fewer than half (46.2%) noted they were “very” comfortable taking clinical measures, more than half (61.5%) felt “very” sure that their work was helping people change their health attitudes/behaviors.

Table 4.6

Self-Assessment of CHAs to Carry out their Roles (N = 13)

Assessment	Valid Percent (%)
Met Personal Goals As CHA	
Yes	61.5
No	38.5
Enough Time To Serve	
Strongly Disagree/Disagree	0.0
No Opinion	18.2
Agree	54.5
Strongly Agree	27.3
Enough Time To Serve	
Strongly Disagree/Disagree	0.0
No Opinion	18.2
Agree	54.5
Strongly Agree	27.3
Enough Information to Refer Clients	
Strongly Disagree/Disagree	0.0
No Opinion	9.1
Agree	63.6
Strongly Agree	27.3
Equipped to Help Clients	
Not at all	0.0
Somewhat	41.7
Very	58.3

Table 4.6

(cont.)

Assessment	Valid Percent (%)
Helpful in Assisting Clients	
Not at all	0.0
Somewhat	46.2
Very	53.8
Comfort Level for Clinical Screening	
Not at all	7.7
Somewhat	46.2
Very	46.2
Changing Attitudes/Behaviors of Clients	
Not at all	0.0
Somewhat	38.5
Very	61.5

CHAs carried out their work in various venues. The type and number of self-reported events that CHAs participated in the last two months are depicted in Table 4.7. Educational sessions (28.6%) were the type of event most frequented by CHAs, followed by clients' homes (21.7%). Other social networks were utilized including, social events (18.0%), workplace (15.0%) and faith-based (13.0%). These venues facilitated CHAs' access to and interactions with clients.

The second research question examined the relationship between recommendations by CHAs and diabetes-related health behaviors and their clients' health related outcomes. Data were analyzed using univariate and bivariate statistical methods. Data using univariate analyses (O'Leary, 2010) explored associations between CHA activities and their client's health behaviors from baseline to six months post-baseline. Table 4.8 shows clients' self-reported progress

towards following the health improvement plan established with the Community Health Ambassador and achieving their set goals.

Table 4.7

CHAs' Participation by Type and Number of Event (N = 13)

Type of Event[†]	*n*	Valid Percent (%)
Social	29	18.0
Educational Sessions	46	28.6
Faith-based	21	13.0
Health Fair	4	2.4
Client Home	35	21.7
Client Workspace	25	15.5
Other	1	0.6
Total	161	99.8[‡]

[†] Type and number of events you participated in as an Ambassador in the last two months
[‡] Total does not equal 100% due to rounding

Table 4.8

Clients' Self-Reported Progress towards Following a Health Improvement Plan and Achieving Established Goals Six Months Post-Baseline (N = 32)

Assessment	*n*	Valid Percent (%)
Followed Health Improvement Plan[†]		
Don't Know	1	3.1
Strongly Disagree	3	9.4
Disagree	3	9.4
No Opinion	10	31.3
Agree	9	28.1
Strongly Agree	6	18.8
Reached Goals[‡]		
Don't Know	3	9.4
Strongly Disagree	3	9.4
Disagree	3	9.4
No Opinion	13	40.6
Agree	8	25.0
Strongly Agree	2	6.3

[†] Clients used a six-point Likert scale to report if they followed their health improvement plan.
[‡] Clients used a six-point Likert scale to report if they reached the goals they had set.

A five-point Likert-type scale was used to document clients' responses and ranged from "strongly disagree," "disagree," "no opinion," "agree," and "strongly agree." The option, "don't know" was also added to the scale. Less than one-half of clients (46.9%) indicated that they "agreed/strongly agreed" that they followed the health improvement plan developed with their Community Health Ambassador. Approximately one-third (28.1%) did not have an opinion one way or the other. Goal setting was another area of focus in the study. Of the clients reporting, one-third (31.3%) "agreed/strongly agreed" that they had reached the goals they had set. However, a higher percentage (40.6%) reported they had no opinion regarding whether or not they had reached their goals.

A bivariate analysis (O'Leary, 2010) was conducted using Cross-tabulations and paired *t*-tests calculations for key variables. The Chi-squared values, degrees of freedom and level of significance are reported on each set of variables. Data were examined using two approaches, chi-square using Fisher's Exact Test and *t*-tests.

Cross tabulations were calculated to determine if there was an association between CHA outreach activities and health-related actions among clients. CHA recommendations were compared to clients' self-reported health-related actions within the past six months. Specific actions tracked in this study included, had a doctor's visit; used community services, read/used health information materials from CHAs, had a dentist visit; connected with a health buddy; and used transportation resources.

Cross tabulations using a chi-squared statistic with Fisher's Exact *t*-test (Morgan et al., 2013) was conducted to investigate the relationship between CHA recommendations and client actions within the six month follow-up period (see Table 4.9).

Table 4.9

CHA Recommendations and Clients' Health-Related and other Actions at Six Months Post-Baseline (Clients N = 32)

Client Actions	Recommendations		X^2	*df*	[a] *p*
	Never (%)	1+ times (%)			
Doctor Visit			.803	1	.563
No (Visit)	45.2	0.0			
Yes (Visit)	54.8	100.0			
Visited Dentist			.625	1	.813
No Visit	80.6	0.0			
Visit	19.4	100.0			
Community Services			.395	1	.708
No	83.0	100.0			
Yes	19.4	0.0			
Health Information/Materials			.492	1	.655
No	92.3	100.0			
Yes	7.7	0.0			
Connected with Health Buddy			.305	1	.762
No	86.7	100.0			
Yes	13.3	0.0			
Used Transportation Resources			9.978	1	.094
No	93.5	0.0			
Yes	6.5	100.0			

[a] Fisher's Exact Test

For the variable, "had a doctor's visit" ($X^2 = .803$, $df = 1$, $N = 32$, $p = .563$). For the variable regarding "had a dentist visit" ($X^2 = .625$, $df = 1$, $N = 32$, $p = .813$). The variable "used community services" was ($X^2 = .395$, $df = 1$, $N = 32$, $p = .708$). For "read or used health information materials from CHAs, the p value was ($X^2 = .492$, $df = 1$, $N = 32$, p = .655). The value for connected with a health buddy was ($X^2 = .305$, $df = 1$, $N = 32$, $p = .762$). Calculations

for “used transportation services” indicated (X^2 = .9.978, N = 32, df = 1, p = .094). Significance levels above p = .064 are not significant for one-sided tests. Therefore, for this study, Fisher’s exact *t*-test scores indicated there were no associations between CHA recommendations and clients’ health-related and other actions at six months ost-baseline.

A bi-variate analysis was conducted on clients’ clinical measures and overall health scores. In this study, clients’ clinical measures (weight, glucose, systolic and diastolic blood pressure) and self-rated overall health were compared at baseline and six months post-baseline. As noted in Table 4.10, within group analyses using paired *t*-tests (Morgan et al., 2013) were used to determine if there were statistically significant improvements for four clinical variables, weight, glucose, systolic blood pressure and diastolic blood pressure. A paired samples *t*- test shows that clients on average did not show significant improvement in weight loss (t = .916, p = .368) or Body Mass Index (BMI) scores (t = 1.25, p = .222).

The same holds true for glucose (t =.736, p = .473). The *t*-test scores for blood pressure also failed to show a significant improvement from baseline to six months. For example, systolic blood pressure, (t = .981, p = .337) and diastolic blood pressure, (t = -.458, p = .651). While the results suggests that the difference between the mean values at baseline and six month were not statistically significant for weight, BMI, glucose, systolic and diastolic blood pressures, the findings imply that there were general improvements for some clients. Specifically, improvements are documented in the areas of weight loss, lower BMI, reductions in glucose levels, as well as overall self-reported health. The average weight loss for the 32 clients from baseline to six months post-baseline was approximately 10 pounds.

Table 4.10

T-test of Clinical Measures and Self-Reported Health at Baseline and Six Months Post-Baseline (Baseline: N = 62; Six Months: N = 32)

Clinical Measures	Recommendations *M*	*SD*	Δ	*t*	*df*	*p*
Weight (lbs)				.916	27	.368
Baseline	197.8	47.6				
6 Months	187.9	35.0				
Mean Change			-9.9			
BMI			1.556	1.25	27	.222
Baseline	39.21	26.46				
6 Months	32.82	6.64				
Mean Change			-6.39			
Glucose (mg/dl)				.736	16	.473
Baseline	127.8	41.9				
6 Months	117.7	27.5				
Mean Change			-10.8			
Systolic Blood Pressure (mmHg)				.981	23	.337
Baseline	121.0	18.6				
6 Months	123.8	12.1				
Mean Change			+ 2.8			
Diastolic Blood Pressure (mmHg)				-.458	23	.651
Baseline	75.29	8.8				
6 Months	76.63	12.8				
Mean Change			+1.3			
Overall Health				-2.008	24	.056
Baseline	3.88	.8812				
6 Months	4.40	.9574				
Mean Change			+0.52			

Body Mass Index (BMI) measures: BMI 25-29.9=overweight; BMI 30 or greater=obese
Blood pressure is high if systolic blood pressure =140/diastolic blood pressure 90 mmHg or greater.
Glucose levels are high if at fasting =100-249 mg/dl or non-fasting 120-249 mg/dl).
Self-Reported health is coded from poor (1) to excellent (5)

The mean reduction in BMI scores was 6.39 points. The non-fasting glucose levels for the group were reduced on average by 10 mg/dl from 127.8 to 117.7mg/dl. It is important to note that individuals with a non-fasting glucose level of 120-249 mg/dl are considered diabetic. The clinical values for systolic and diastolic blood pressure did not indicate improvements from baseline to the six month post-baseline. However, the values for systolic and diastolic blood pressures remained within the normal range at baseline and six months post-baseline.

Three other variables suggested that the clients' health behaviors were moving in the right direction at six months post-baseline (Table 4.11). Approximately 6% more clients' reported they consumed the recommended daily servings of vegetables from baseline to six months post-baseline. Over the six month period, there was a 19% reduction in the number of clients who reported they consumed two or more cups of sweetened beverages each day. Finally, an additional 7% of the clients indicated they had consumed the recommended 2.5 cups of vegetables each day.

Table 4.11

CHAP Dependent Variables (Clients Health Behaviors) and Frequency Distributions at Baseline and Six Months Post-Baseline

	All Clients Baseline *N*=62 (Frequency)	Clients 6-Months *N*=32 (Frequency)	Measurements Δ from baseline to 6 months
Variables (Always/Usually)			
Fruit Intake (2 cups/day)	24.0	16.0	-8.0
Vegetable Intake (2.5 cups/day)	35.0	41.0	+6.0
Sweetened Beverages (2+ cups/day)	35.0	16.0	-19.0
Physical Activity (2.5 hours/week)	40.0	47.0	+7.0

Eats at least 3 cups of fruit each day.
Eats at least 2.5 cups of vegetables each day.
Drinks 2 or more cups of sugar-sweetened beverages each day (tea, soda, etc.).

Does physical activity for at least 150 minutes (2.5 hours) every five days. In summary, research question one focused on CHAs' self-reported outreach activities. Data revealed that three outreach services were implemented most frequently, dissemination of health information reading materials, referrals to health care services and recommendations that clients see a doctor. Additional data were assessed to document CHAs' capacity to serve. CHAs reported that they were prepared to implement the program activities for the CHAP. The vast majority, indicated agree/strongly agree that they had enough information (90.9%) and 81.8% had enough time to serve as a CHA. In addition, CHAs indicated they had the confidence and capacity to serve their communities. They used multiple venues to carry for outreach activities, but most often at educational events (28.6%), clients' homes (21.7%) and social gatherings (18.0%).

The second research question examined the relationship between CHAs' recommendations and diabetes-related health behaviors and their clients' health related outcomes. Cross tabulations using chi-square calculations indicated there were no associations between CHA recommendations and clients health behaviors among the variables measured, visits to a doctor, visits to a dentist, used community services, read health information, connected with a health buddy and used transportation resources. Bi-variate analyses using paired t-tests were calculated to assess four clinical measures for clients at baseline and six months post-baseline. Results suggest no differences between baseline and six- months for weight, glucose, systolic and diastolic blood pressures. However, preliminary findings suggests that general health improvements occurred for some clients in the areas of weight loss and reduced glucose levels. For example, on average clients lost 10 pounds and lowered their glucose levels by 10 mg/dl. In addition, there was an increase from baseline to six months post-baseline in the percentage of clients who had consumed the recommended servings of vegetables (6%) and engaged in the

recommended 2.5 hours per week of physical activity. Finally, 19% fewer clients reported at six months post-baseline, that they consumed two or more cups of sweetened beverages each day.

Second Analytic Phase (Qualitative)

The third research question focused on the perceptions of CHAs and their clients on the successes and challenges of implementing CHAP. Primary data were generated through two focus group interviews with CHAs and their clients. An interview guide, with open ended questions, was used to capture their views and opinion (Creswell, 2009).

Community Health Ambassadors (CHAs) were instrumental in various aspects of CHAP, including program planning, implementation, and data collection. For the purposes of this study, a sub-set of the focus group data was analyzed with a specific emphasis on leadership successes and challenges relative to implementing the program's outreach services and activities.

The model of leadership used by CHAs was examined within the theoretical construct of transformational leadership. According to Burns (2003), transformational leaders take the initiative to engage and mobilize people in the change process. Four character traits differentiate transformational leaders, identify with the group, inspire supporters to action, build trust and assist supporters achieve their goals (Frey et al., 2009; Wang & Howell 2010). These four character traits served as the frame for investigating data on the successes and challenges of implementing CHAP. Through a method of finding patterns and making comparisons within the focus groups, themes emerged (Denzin & Lincoln, 2011; Hammersley & Atkinson, 2010; Kreuger, 1998; Rabiee, 2004).

Findings—CHAs. The first focus group was conducted with five CHAs, all of whom were African American females who ranged in age from the mid-thirties to senior citizens. Participants were enthusiastic about the session and eager to share their experiences working in

the community to improve the health of their relatives, friends and neighbors. Two factors enhanced the focus group experience. First, the CHAs were familiar with each other. Throughout the previous year, CHAs participated in training sessions, meetings and community events. Secondly, the meeting was held in the same location as other CHAP activities. When focus group "participants sense they are similar, their comfort level increases and they are more open to voicing their opinions" (Morgan, 1998, p. 61).

Emergent themes regarding CHAs' leadership challenges and successes in implementing CHAP outreach services were organized based on the four character traits of transformational leaders, identify with the group, inspire supporters to action, build trust and assist supporters achieve their goals.

Identify with the Group.

Successes. CHAs spoke confidently as they discussed various outreach activities. Their comments highlighted ways in which CHAs identified with the clients they served. First, CHAs reported that they operated within their social networks to share information about their new role in the area of health, with a specific focus on diabetes awareness, prevention and control with family members, neighbors and friends. The functioned as concerned friends and neighbors. Other comments suggested that the CHAP positioned them to advocate and provide vital health screening services to the community.

> We walk through the community asking what clients need us to do. Telling them what we are there for. We discuss diabetes. We don't go in like a nurse.
>
> I find that getting close enough to them to talk to them about what we are doing is helping.
>
> We can check the clients' blood pressure, weight, blood sugar and height."

Participants stated the important role they played in the community to support and advocate for vulnerable populations in the health care system.

> We as Black people got to look out for our people. Another 75 year old lady went to the doctor. The doctor told her the medication may take you out of here. He said, It really don't matter because you are already 75 years old. They look at you like you have lived your life.
>
> We need to do more of that. Make sure clients are being checked by the doctor before they actually write them out a prescription based on what the patient tells them."

Finally, CHAs identified with the health challenges and concerns of their clients. They shared information about their own personal health problems and conditions.

> As an Ambassador I lay myself out to them. I lay my life out to them. I tell them I have had back surgery. I have screws in my back. I am a diabetic but I don't have to take medicine. I have high blood pressure. I let them know. I am just like you. I have the same things as you have, but this is what I do.

Challenges. Participants acknowledged their limitations as a CHA. Gaining the confidence of family members, friends and neighbors posed a problem for some CHAs. Relatives and friends recognized that the CHAs had limited training and therefore were not seen as health experts. Some of their family members and other clients were skeptical about CHAs having adequate knowledge to advise them on strategies to promote healthy lifestyles to prevent and/or control diabetes.

> Some family members don't open up to you because they feel we don't know what we are talking about.

> Some [clients] don't communicate because they feel we don't know anything or they say we are not doctors and will let us know that their doctor said, this or that. They will say, you're no doctor.
>
> Some clients communicate good, and talk to you freely, but some of them will not. Some will say they don't want you in their business. Some will say, that's my business. I don't think I want to tell you that."

Inspire supporters to action.

Successes. CHAs fulfilled their roles as health advocates in the community. They worked to motivate others to change unhealthy behaviors and provided tips for communicating effectively with health care providers. One strategy to motivate others to change unhealthy behaviors was to model healthy behaviors such as healthy eating, increased physical activity and adherence to their medications regime. Clients were mentored by CHAs on techniques for effective advocacy.

> So, if the people don't listen, just do. I started cooking the foods that they normally need. I start preparing it and give it to them. I feed it to them because they won't listen. I get to them that way.
>
> I do the same, especially if someone is having problems with their pressure. I let them know that I am on blood pressure medicine too. I let them know how I lost weight. I tell them how I cut down on my carbs to help with weight loss. I let them know that when I stop watching my carbs I get my weight back. I let them know everyone's system is not the same. I am genetically made up a little different than you are and your weight loss may be a little slower.

When possible, CHAs interacted with health care providers on behalf of clients, but in most cases, they advised clients on how to advocate for themselves.

> In dealing with some of the clients I found out that they have a tendency to not question their doctors about certain things. I let them know, that you should question the doctor. When they get medications, they act like they are scared to death to ask them what it's for. I tell them, the doctor is just a man or woman. If you want to know something, ask. It is important that clients are able to ask us about taking their meds properly. I had one client, the doctor had her taking one medicine and she was taking 1000[mg] in the morning and 1000[mg] at night and she was having terrible diarrhea. Plus she was taking insulin. As I begin to talk with her I opened my big mouth and told her she needed to talk to that doctor, because that is too much. She went and the doctor cut her meds in half. She is doing fine now.
>
> Patients don't ask these important questions. It is up to us to inform them that they need to ask questions.

Challenges. CHAs shared their perspectives of local health care providers and systems. Comments reflected a sense of disappointment in the quality of care they felt their clients received from area providers. They expressed frustration as they shared specific situations they experienced first-hand.

> It amazes me that people who are diabetics don't know what their A1C number is. Ask them questions like what is your A1C? Most of the clients don't even know what that is. The doctors don't tell them and they don't know. I tell them, I am not a diabetic, but since I had my training, I know that that is important.

> I have an 85 yr old client and the practitioner would write him a prescription without examining him and tell him to take it. I said to him that you do not take medicine from someone who just gives you a prescription, because you tell them what is wrong with you and they don't check you out. I told my client not to take it. I don't go there no more . The doctors don't like me because I spoke up and told him how are you going to give somebody medicine and you haven't even checked them out? They are still doing it. When they [client] get set in their ways you cannot change them. You keep talking and talking and it's nothing but wind going in and going out.

Build trust.

Successes. A recurring theme throughout the session was the level of social support they offered to clients. CHAs were strategic in their efforts to gain trust and earn the respect of their clients. They invested time to build relationships, listen to clients, and communicate on a regular basis.

> We must build a relationship with people. It ain't gonna catch hold in a hurry, but after while. We got some tough ones out there but we have found that if you continue building a relationship with them, they will listen to you and call you to ask questions. By building the relationship they learn how to trust you.
>
> Being honest with them is the one of the most important things there is. I am a diabetic, but I'm 62 and I'm not on meds. When they ask, what do you do? I tell them I try and eat right. My A1C is 6.2. I drink more water. I push the clients to drink more water. Be open and honest. People respect honesty.
>
> When the client ask when are you coming back. The client looks forward to you coming back. When clients tell others and they call you to come check on them too (referrals).

Challenges. CHAs acknowledged that they needed more time to build relationships with and earn the trust of some clients. Inadequate time to invest in the serving each client equitably was a leadership challenge.

> You have to build the trust. It don't come overnight. If have people you have been knowing for years and years, they are not going to accept you by talking. They feel like you are family and you don't know anything. You took this class and think you know everything.
>
> Some clients communicate good, and talk to you freely, but some of them will not. Some will say they don't want you in their business. Some will say, that's my business. I don't think I want to tell you that.
>
> Time can be a big issue. I work, but we must squeeze it in. Family and volunteering at church. We've got so much other things going on.

Assist supporters to achieve goals.

Successes. Having a positive influence on others was important to CHAs. With pride they shared stories about the lifestyle changes they observed in clients.

> The folks we have worked with, we see changes in them. Some of them have lost weight. Some have come out and are not as shy.
>
> We ask the client small point blank questions like, when was the last time you've been to the doctor? What meds are you taking? When do you go back to the doctor? What did he say? This will get the client to open up and tell you what's going on with them. They may share what symptoms they may be having. We can suggest they write a note so when they go back to the doctor they can let them know.

CHAs established relations with clients and put strategies in place for clients to maintain contact with them as needed.

> Make sure the client has your number because they will call to let you know what is going on with them.

Sharing health information and materials served as important tools for CHAs to establish credibility with clients. CHAs reported having written materials to give to clients increased their impact in the community.

> If I tell the client something it is helpful to have the material or literature to back up the information I am giving them. I do research and have the material handy to give them so they can read it for themselves.
>
> I bring handouts so the client can read and see for themselves if they don't monitor their insulin, watch what they eat, keep up with A1C they can develop heart disease, blindness and other problems.
>
> The program is very beneficial. We find out important information and we share it with people in our community.

Challenges. Improving health outcomes among the clients was a goal of the program. CHAs were faced with challenges such as how motivate others to change long term patterns of unhealthy behaviors.

> I agree with the ladies. My young daughter has type 2 diabetes, but she has lost 50lbs. She cut down on a lot of stuff she was eating. She's not drinking as many sodas, she cut back on smoking but she has not quit completely.

The costs associated with maintaining a healthy diet was another challenge observed by CHAs. They struggled to identify low cost, healthy options for clients with limited financial resources.

They reported that even when clients agree with the recommended changes to improve their health, financial constraints often came up in the conversation.

> Some can't eat properly because they can't afford to buy what they need or what is best for them.
>
> Some people will listen, but they are not in a financial situation to buy what they need.
>
> We can suggest V8 juice or go buy the store and buy the client some.

Finally, CHAs found it difficult to address some health concerns with clients when their health provider had not acknowledged the issue. One clear example was shared.

> One lady was really overweight. I asked her, has the doctor talked with you about your weight? She said no. The clients need to be taught to watch their weight. I told her, I am not diabetic but I watch my weight. I am on that scale.

In summary, CHAs expressed strong identification with clients. They were members of the same community and often shared similar health challenges. CHAs invested time in their communities to earn the trust of their clients. This investment opened the door for them to deal with clients openly and honestly about tough health issues. Techniques to inspire others to action included modeling healthy behaviors and teaching clients how to advocate for themselves when dealing with health care providers. Finally, CHAs were proud of the positive influences they had on their clients' quality of life.

Leadership challenges in the CHAP centered on motivating others to change behaviors, overcoming mistrust and gaining the confidence of family members, neighbors and friends who recognized that CHAs had very limited training in health. It was a challenge for CHAs to inspire clients to action when they identified a potential health concern that the health care provider had not previously discussed the health issue with their clients. CHAs were motivated to lead by

example and maintain visibility in the community. Family connections and having a history in the community can either facilitate or hinder the work of CHAs. Participants indicated that they had to establish credibility as a leader in health with some family members and friends. Finally, CHAs reported that they were challenged by clients who lacked self-motivation to change their health behaviors. People have a choice. This challenge however is not unique to CHAP. This is an ongoing and problem for health care providers in general.

Focus group—Clients. The second focus group included five clients from the CHAP pilot program and consisted of four African American females and one White female. The clients ranged in age from the late twenties to retirement age.

The clients were less familiar with each other. They appeared really timid and unsure about the focus group process. Participants seemed somewhat reserved and cautious throughout the session. For example, two of the clients responded in a low tone of voice and constantly looked down when speaking. One client did not participate in the discussion. She would occasionally shake her head in agreement with comments from others.

Clients' perceptions of successes and challenges of implementing CHAP were related to CHAs' leadership. Findings were framed within the four character traits of transformational leaders (Wang & Howell, 2010; Frey et al., 2009). For the purposes of this study, a sub-set of the clients' focus group data was analyzed for emergent themes related to the four character traits of transformational leaders, identify with the group, inspire supporters to action, build trust and assist followers achieve goals. Clients' highlighted successes for each of the four character traits. However, challenges were noted only for one trait, to assist followers achieve goals.

Identify with the group. Statements from clients indicated that they were comfortable with the ways in which CHAs talked to them. Effective communication was emphasized by participants.

> Language was easy to understand. They talked to you, not over you.
>
> Communication was good! They don't make you feel defeated.

Inspire others to action. Clients expressed their appreciation to CHAs for the outreach services and information they provided as part of the CHAP.

> I liked it. It was helpful and it made me keep track of myself.
>
> The walking, walking was good. Zumba! I like Zumba!

Build trust.

Successes. From the clients' perspective, CHAs put forth extra effort to make them feel comfortable with them and the program. They reported that CHAs took time to explain the CHAP and their roles in the community.

> The Ambassadors don't make you feel ashamed or little.
>
> One of the good things Ambassadors did to help clients was explain to them, that they are not doctors and nurses and that they are their neighbors and friends. By doing that it made participants comfortable enough to talk about certain things. Ambassadors were able to make the clients feel comfortable about the program.

Assist followers to achieve goals.

Successes. Clients highlighted CHAs tailored information and services to their individual interests and concerns. They accommodated their individual needs. Clients reported that CHAs explained the clinical values for blood pressure and glucose, taught them how read food labels and provided cooking demonstrations on preparing healthy foods.

They helped us with the numbers. Showed us what's good and not good with blood sugar and blood pressure.

[Ambassadors] helped us and shared with us the different food groups, health and nutrition. That was really helpful, especially for those of us with diabetes.

They showed us how to read the labels.

They showed us how to cook certain dishes we wouldn't normally cook and eat, like veggie sticks instead of chips.

The advice that they would give us whether I was doing things right or wrong. It was very helpful.

Challenges. Two clients identified the lack of group activities and follow- up as challenges for CHAP.

If there were enough of us clients we could have formed a little group and gotten together at one time, maybe had a round table discussion.

Follow up with participants for things, like how did you like the last dish, etc.?

I think we should have interaction more often.

Overall the clients felt that the CHAs had been helpful to them. Positive comments mainly concentrated on CHAs' communication styles, the health information shared to address their individual concerns and strategies used to support healthy lifestyles.

Summary Comparison of the Quantitative Results and Qualitative Findings

The sample population included CHAs involved in CHAP Outreach (n = 17), and clients who completed a General Health Assessment form at baseline and six- months post baseline (n = 62 and n = 32, respectively). The primary analysis focused on the secondary quantitative data documenting CHA outreach services and clients reached during the baseline

assessment and six- month follow-up phases. Primary qualitative data were collected through two focus groups. Purposeful samples of CHAs and their clients were selected to assist in understanding and interpreting the findings in the quantitative phase of the study (Creswell, 2009).

A Sequential Explanatory mixed methods design was selected for this study to examine CHAP as thoroughly as possible. The quantitative data documented core services and activities provided by the CHAs, while qualitative data expanded our understanding of the study's impact. Descriptive statistical methods to analyze the quantitative data used univariate and bivariate calculations (percentages, means, chi-squared, and *t*-tests) to describe the leadership role of CHAs on diabetes-related health behaviors of clients reached in a one-year pilot program. Descriptive analyses played a critical role in clarifying the data trends and guided the researcher to answer the research questions.

Focus group data increased the researcher's awareness of the how CHAP was received and perceived by the people involved in the program, i.e. CHAs and their clients. CHAs and clients discussed the program from an individual and community perspective. Their comments provided insights into some of the leadership successes and challenges to implement CHAP. Open-ended data collected through the focus group process were organized and prepared, studied and themes generated for analysis and interpretation (Creswell, 2009; Denzin & Linclon, 2011; O'Leary, 2010).

The style of leadership used by CHAs was examined with the theoretical framework of transformational leadership. Burns (2003) suggests that "transformational leaders take the initiative to mobilize people in the process of change, encouraging a sense of collective identity and collective efficacy, which in turn brings stronger feelings of self worth and self efficacy; an

enhanced sense of meaningfulness in their work and lives" (p. 26). Four character traits of transformational leaders, identify with the group, inspire supporters to action, build trust and assist supporters achieve their goals (Frey et al., 2009; Wang & Howell, 2010) served as a frame for comparing the study's qualitative findings. The transformational leadership construct was used to frame and summarize the quantitative and qualitative data sets. Selective findings (see Table 4.12) demonstrate the ways in which the quantitative results were enhanced by qualitative data collected in this study.

Table 4.12

Comparison of Character Traits of Transformational Leaders and Selective CHAP Quantitative Results and Qualitative Findings

Transformational Leaders	Quantitative Results	Qualitative Findings
Identify With Group	CHAs and clients shared similar demographics (age, gender, educational levels, socio-economic status, and community of residence).	Concerned friends and neighbors
		Provided health screenings services in communities
	100% CHAs felt equipped to serve their community.	Shared similar health challenges
	CHAs provided clinical screenings for weight, blood glucose and blood pressure	
Inspire Supporters to Action	100% CHAs report somewhat/very that their assistance was changing their clients' health attitudes and behaviors.	Modeled healthy behaviors
		Motivated clients
		Mentored on effective advocacy

Table 4.12

(cont.)

Transformational Leaders	Quantitative Results	Qualitative Findings
Build Trust	Approximately 22% of the CHAs visited clients in their homes. At least 18% of CHAs communicated with clients during social events.	Effective communication Invested time to build relationships Visited clients in their homes Made clients feel equal
Assist Supporters to Achieve Goal	83% of the CHAs provided health information and materials	Shared health information and advice to clients Tailored information to the needs of clients

Identify with the group. CHAs identified with their clients. They were neighbors, friends and relatives. Their similar ages, educational levels, and socio-economic backgrounds were prime indicators that CHAs identified with their clients. In addition, CHAs had many of the same health challenges as their clients. CHAs accommodated clients by making visits to their homes. These shared experiences facilitated trust between the two groups and enhanced program outreach activities. From the perspective of clients, CHAs were effective communicators.

Inspire supporters to action. All CHAs reported that they believed their assistance was changing their clients' health attitudes and behaviors. Comments suggest that clients agreed with that statement. For example, clients credited the CHAP for encouraging them to participate in physical activities such as Zumba exercise classes, walking and cooking demonstrations for preparing healthy foods.

Build trust. CHAs were strategic in their efforts to gain their clients' respect and trust. They reached clients at social events and made home visits. Clients liked the ways in which CHAs talked to them. CHAs made them feel equal.

Assisted supporter to achieve goal. According to CHAs, the training provided by CHAP equipped them to provide health information and outreach services to the community. Clients also commented that the health information they shared was useful to them. They discussed specific services that were tailored to meet their needs, such as guidance on preparing healthy foods, reading food labels, and providing nutrition. One of the challenges expressed by clients related to the limited follow-up from CHAs. Clients expressed a need for more contact and interactions with CHAs, especially when new information was introduced to them in a training session.

In summary, the quantitative data, which documented core services and activities provided by the CHAs, was enhanced by the qualitative data generated through focus groups. A comparison of selective findings from the quantitative and qualitative data suggests that overall, CHAs and clients perceived the CHAP as a valuable resource to their communities.

A detailed discussion of the results is covered in Chapter 5, including, relationships of the findings to prior research; implications for future practice, research and policy; and limitations and conclusions.

CHAPTER 5

Discussion and Implications

This study was designed to describe the leadership role of lay health advisors, known as Community Health Ambassadors (CHAs), on diabetes-related health behaviors of African Americans living in a public housing authority (PHA) in one city in Southeastern North Carolina. The CHAP pilot was an initiative of the North Carolina Office of Minority Health and Health Disparities, in partnership with the local public health department and PHA.

CHAs were participants in a one-year pilot program, Community Health Ambassador Program (CHAP), a public health outreach strategy is designed to improve awareness, prevention and management of chronic diseases, including diabetes. The sample population consisted of CHAs and individuals (clients) reached through the program, and included those at risk of diabetes as well as those who are diagnosed with diabetes. The study's aims were to describe the outreach services provided by CHAs, assess changes in health behaviors and outcomes among their clients, explore associations between CHA outreach and diabetes-related health behaviors among their clients and assess the CHAP from the perspective of CHAs and clients. A mixed-methods Sequential Explanatory Research Approach (Creswell, 2009) was used to analyze the study's secondary data using descriptive statistics (frequencies, means, chi-square and t-tests). Data analyses were limited by the study's small sample population (CHAs: $n = 17$; clients: $n = 62$). Primary data were generated through two focus groups with CHAs and clients. Findings were assessed for emerging themes (Emerson et al., 1995; Hammersley & Atkinson, 2010).

Chapter 5 discusses the quantitative results and qualitative findings. The study's results will be compared to prior research on lay health advisor models. Implications for future practice,

research and policy are outlined. Finally, Chapter 5 includes a section on the study's limitations and conclusions.

Discussion

A descriptive analysis of the Community Health Ambassador Program (CHAPP was appropriate for answering the research questions. This study's findings underscore the positive influence of trained volunteer leaders on raising the awareness of healthy lifestyles in historically, underserved low-income public housing communities. By contrast, this study documents challenges in evaluating an underfunded community-based public health program staffed by volunteer leaders.

First analytic phase. Frequency distributions were used to describe the study's sample population. Clients and CHAs mainly were African American females, with similar educational and socio-economic backgrounds. They resided in the same communities and socialized in settings outside of activities sponsored by CHAP. CHAs often visited clients in their homes (21.7%). These shared experiences facilitated communication and trust building between the two groups. Trust is a key factor influencing participation in formal and informal social groups or networks (Kwak et al., 2004). These findings lend credibility that CHAP was successful in tapping into existing social networks.

Descriptive statistics using frequency distributions provided vital health information on clients at baseline. Although more than half of the clients (62.9%) had a family history of hypertension and nearly half (48.4%) a family history of diabetes, less than one-third of clients had ever been screened for hypertension (27.4%) or diabetes (24.2%). The low screening rates among clients for hypertension and diabetes highlighted the need to implement the screening and early detection services provided through CHAP.

Compared to African American women in eastern North Carolina, the clients in the CHAP program had slightly lower rates of confirmed hypertension at 29.0% and 34.0% respectively. However, the rate of diagnosed diabetes among clients (22.6%) was nearly doubled that of African American women (12.0%) in eastern North Carolina (BRFSS, 2011).

Less than half of the clients reported that they regularly engaged in three key healthy behaviors to prevent the onset of or to control high blood pressure and diabetes. For example, one third of clients (32.2%) consumed 2 cups of fruit each day, while 45.0% of clients consumed 2.5 cups of vegetables on a daily basis. Although a higher percent of clients (40.3%) reported they engaged in physical activities at least 2.5 hours every five days, fewer than half of the clients participated at the recommended levels on a weekly basis.

Research suggests that "lifestyle change, with all of its behavioral-environmental reciprocal determinations) can do for health what nothing else in all of medicine can do" (Katz et al., 2011, p. 17). These data also reinforced the need for programs, like CHAP, to provide targeted resources and support for public housing residents at risk for diabetes and/or those who have not managed their chronic illness. The need to promote healthy lifestyles in the public housing communities was evident to the CHAs. They seized the opportunity to share information regarding practical strategies such as diet and exercise, to improve overall health. Their ultimate goal was to inform and support clients to prevent the onset of the diseases and/or prevent complications associated with uncontrolled hypertension and diabetes. Complications of diabetes include heart disease, stroke, hypertension, blindness, kidney disease, amputations, etc. (American Diabetes Association, 2011).

Baseline data, collected during the general health assessment phase, were used by CHAs to tailor program activities to their clients' needs/interests. These activities supplemented the

structured outreach activities of CHAP. For example, CHAs offered nutrition education and exercise classes at the PHA's community center. Food preparation demonstrations and Zumba exercise classes were highlighted by focus group participants (CHAs and clients) as successes for CHAP.

Three questions guided the research. The first question focused on the recommendations CHAs made to clients based on outreach activities and recommendations designed by CHAP. These seven core strategies included: recommended clients see a doctor; recommended clients see a dentist; referred clients to health care services; provided health information reading materials; reviewed goals with clients; connected clients with a health buddy; and identified transportation resources for clients. Self-reported data indicated that CHAs provided health information materials, referred clients to health care services, and reviewed goals with clients more frequently than they recommended clients to see a doctor. CHAs' actions were consistent with the information conveyed during the focus group session. CHAs felt they had the confidence and capacity to serve their communities. The majority of CHAs reported they felt "very" equipped for the role; their assistance was making a difference and they were comfortable taking clinical measures. While there were no specific questions regarding CHAs' perception of the training provided through the CHAP, they made comments to suggest they believed they were equipped upon completing the 22 hour course offered through the North Carolina Community College System. One participant shared, "The program is very beneficial. We find out important information and we share it with the people in our community." Another participant stated, "[We] get the education we need and the materials and information we know what we are talking about when we are talking to them [clients]."

The second question used descriptive statistics to examine associations between the CHA recommendations and diabetes-related health behaviors among their clients at baseline and six-months post-baseline. The study had a high attrition rate, with thirty two (52%) of the clients completing assessments at baseline and six months post-baseline. These preliminary data were analyzed using univariate and bivariate statistical methods. Cross tabulations using chi-square calculations indicated there were no associations between CHA recommendations and clients self-reported health behaviors at six months post-baseline. Variables used to measure health behaviors included, visits to a doctor, visits to a dentist, used community services, read/used health information, connected with a health buddy and used transportation resources.

In addition, results of paired *t*-tests scores indicated that there were no differences between clinical values at baseline and six-months post baseline for clients' weight, glucose, systolic and diastolic blood pressures. While the differences were not statistically significant, there were indications that some clients were moving in the right direction to improve their health. For example, on average clients lost almost 10 pounds and lowered their glucose levels by 10 mg/dl.

Several factors affected these findings. The CHAP was not fully implemented in PHA communities. Funding for the one year pilot program ended after nine months due to reductions in the local agency's budget. Funding for the Project Coordinator's position was eliminated, but the staff person continued to work with the CHAP on a part-time voluntary basis for three months. With reduced staff support and no program resources, it was not feasible to maintain program operations and activities. As a result, CHAs' outreach and reporting activities were inconsistent. Educational sessions and Zumba exercise classes phased out. CHAs needed ongoing support to remain actively involved in the program.

While lay health models primarily are based on volunteers, these findings emphasize the key roles of agencies. Agency partners who engage community leaders to promote healthy lifestyles, must be committed to maintaining continuity of program support and financial investments to under gird the work of community leaders over time. As noted by Hurd et al. (2003) community-based approaches such as CHAP must incorporate ongoing support systems from both the medical community and social networks including family, friends, co-workers, and church members. Long term investments of time and financial resources are essential to determine the impact of the CHAP on diabetes -related health behaviors public housing residents.

Second analytic phase. Focus group interviews were utilized to answer the third question on successes and challenges in implementing the CHAP. CHAs and their clients shared insights in separate sessions. CHAs were instrumental in various aspects of CHAP, including program planning, implementation, and data collection. For the purposes of this study, a sub-set of the focus group data was analyzed with a specific emphasis on leadership successes and challenges relative to implementing the program's outreach services and activities.

The model of leadership used by CHAs was examined within the theoretical construct of transformational leadership. Primary data were analyzed for themes related to leadership successes and challenges based on the four character traits of transformational leaders, identify with the group, inspire supporters to action, build trust and assist supporters achieve their goals (Frey et al., 2009; Wang & Howell 2010). These four character traits served as the frame for investigating data on the successes and challenges of implementing CHAP. A comparison of transformational leaders' character traits, quantitative results and qualitative findings suggest that

CHAs and clients perceived the CHAP to be a valuable program for the community and for them personally.

CHAs led with a focus on improving the health of their communities. They carried out their roles as friends and neighbors, through outreach, follow-up, mentoring, coaching, and other actions to address diabetes-related and other health-related concerns of their clients. As is the case with other LHA models, the CHAs were viewed as leaders in their communities. However, they had to earn the respect of family, friends and neighbors as health advisors, advocates and a trusted resource on health matters. CHAs invested time to listen to clients and build trusting relationships. Future training modules should include a component on strategies for building trust as health advocates.

For example, even though the chi-square and t-tests did not yield statistically significant results, most CHAs reported feeling "very" sure that their work was helping people change their health attitudes and behaviors. Findings from the focus group discussion with clients also suggested that CHAs had a positive influence on healthy lifestyle behavior changes. Clients cited specific examples, such as CHAs motivated them to increase physical activities (walking and Zumba), demonstrated how to incorporate healthy food choices in their diets, and educated them on how to interpret clinical values for blood pressure.

In summary, the quantitative data, which documented core services and activities provided by the CHAs, was enhanced by the qualitative data generated through focus groups.

Relationship to Prior Research

This study extended prior research concerning lay health advisor models and diabetes awareness and prevention by describing the leadership role of CHAs' on diabetes-related health behaviors among clients residing in public housing communities. Four themes emerged as a

result of this study and are related to prior research in the areas of public housing and health; tools and resources; leadership development; and the role of social trust.

This pilot program engaged residents of public housing communities as partners in health. Research conducted in public housing communities supports this setting as a viable option for implementing the CHAP. The majority of public housing residents are racial/ethnic minority women, who represent the group that is driving health disparities in the United States (Ruel et al., 2010). A recent study suggests that health is a bigger problem for public housing residents than is lack of employment (Manjarrez et al., 2007). In their research on barriers to healthy lifestyles in public housing communities, Eugeni et al.,(2011) found that residents engaged in lower rates of leisure physical activity due in part to personal and environmental barriers. The literature consistently describes LHA interventions as powerful mechanisms of addressing health-related attitudes, beliefs, and social norms at the social network and community levels (McQuiston, Chio-Heuel, & Clawson, 2001). Lay health advisors (LHA) roles are designed to provide comfort to people who know and trust them, they may function as a unique "community-based system of care and social support" (Fluery et al., 2009). Current research supports CHAP as an appropriate model to engage the sample population, primarily African American women residing in public housing communities, in health promotion activities. In a study to increase mammography screening rates among older AA women, LHA interventions were recommended for disadvantaged women as defined by low-income, older, rural and with limited access to health care (Earp et al., 2002). LHA interventions are models for change to improve health and address disparities within the context of the community (Story et al., 2010). Benefits of LHA programs are documented by other researchers as well. In one lay health advisor model, called Community Health Workers (CHW), the authors suggest that "CHW are indigenous to the

communities they serve and bring valuable knowledge to the outreach program regarding the social, political and environmental factors that influence the well being of the people they serve" (Boutin-Foster et al., 2008, p. 63).

Providing the appropriate tools and resources that CHAs needed to support their efforts was essential. To identify those tools and resources, CHAP's Project Coordinator sought advice from the CHAs because they were knowledgeable of the cultural nuances of the sample population and the community. The program was tailored accordingly to provide educational materials for dissemination. Other research suggested that educational materials may not be necessary in a LHA program. For example, in one study, advice appeared to be more efficacious than materials. Earp et al. (2002) suggests the interventions should emphasize the lay health advisor network rather than the development and dissemination of educational materials. Contrary to findings by Earp et al. (2002), CHAs indicated that the educational materials helped them build credibility for their roles and the program. They relied on health education materials to reiterate the information they shared with clients. Approximately 83.3 % of CHAs reported they distributed health information materials as part of their outreach. CHAs participating in the focus group session reiterated the importance of educational materials as a means to increase their credibility as health leaders in communities. Participants noted that "If I tell clients something, it is helpful to have the material or literature to back up the information I am giving them. I do research and have the material handy to give them so they can read it for themselves." A study of LHAs and their impact on cervical cancer screening rates emphasizes the value of educational materials. The study suggests that cervical cancer screening rates increased among the target population in large part due to home visits and custom made information packets to promote communication and trust (Schoenberg et al., 2009).

CHAs believed they met their goals to improve the health of their families, friends and neighbors and expand local systems of care by sharing life-saving health information through their social networks. Findings from focus group discussions with clients support this position. CHAs assisted clients by providing services, resources and support. They mentored clients to make healthier food choices and increase physical activity as part of a regime to promote healthy lifestyles and prevent the on-set of or control diabetes. Having a sense confidence and competence are important components of leadership development. Published work by Popper and Lipshitz (1993) defines leadership development and describes three components, self-efficacy, modes of motivating others and specific leadership skills. The most important source of self-efficacy is an experience of successful performance which builds confidence. Awareness of various models for motivating others and a self-assessment of how they are motivated are key components of the training. The core principles of these leadership development approaches are applicable to CHAs trained to work in public housing communities.

Preparing community leaders for their role in the field was a priority for the CHAP. Training for CHAs incorporated interactive sessions, role play, a practicum on taking clinical measures and field experience. CHAP's training model was unique in that it approved and offered by the North Carolina Community College System. CHAs who completed the 22 hour course receive 2.0 continuing education units from the college. Research on other LHA programs supports the importance of training participants on topics such as problem solving, social support networks, health promotion strategies, health and human resources in the community, survey development and community organizing (Schulz et al., 2001).

As members of the communities they served, CHAs were in place to be a resource for their family, friends, neighbors and providers for many years well beyond the life of any formal

program or pilot project. LHA programs are tools to meet the growing demands for sustainable community-based interventions that increase access to culturally sensitive services and which resonate with the populations at risk for chronic diseases (Eng & Smith, 1995; Hurd et al., 2003). LHA models are guided by the assumption that an individual's behavior is influenced by the social groups to which they belong, and from which they derive their social identity (Eng, Parker, & Harlan, 1997; Eng & Young, 1992). Understanding the role of trust is an essential component in social networks. Findings from the focus group with CHAs support this point. It is important to note that trust remained a factor although the majority of CHAs and clients were members of the same racial/ethnic group. CHAs reported that some clients were hesitant to share health information. One CHA stated "Some clients communicate good and talk to you freely, but some of them will not." Another CHA shared that "Some will say they don't want you in their business. Some will say, that's my business. I don't think I want you to know that." The lack of trust was an underlying factor. CHAs were intentional in their efforts to establish trust with clients. They invested time to build relationships with clients, visited clients in their homes, provided clients with their telephone numbers, etc. Research suggests, through trust, the actions and underlying motives of others are interpreted (McEvily et al., 2003; Newton, 2001). Trust is a dynamic and ongoing process that influences social groups and civic engagement (Kwak et al., 2004). Social networks facilitated by trust are essential to the success of CHAP and other lay health advisor models and provide a foundation upon which to build sustainable community-based programs. The lay health advisor project, East Side Village Health Worker Partnership, exemplified the use of community-based partnerships as one mechanism for community members and public health professionals to work together to improve health and overcome mistrust (Schulz et al., 2001).

Implications

This study was a first step in looking at CHAP, based on a lay health advisor model, with a focus on diabetes in public housing communities. Residents of the public housing authority (PHA) and other community leaders were recruited and trained using a standardized curriculum through the North Carolina Community College System and received 22 hours of continuing education credit for completing the course. This network of volunteer CHAs provided diabetes awareness, prevention and control information and support services to public housing residents. The results of this pilot study indicated that it is feasible to implement the CHAP in public housing communities. The study's small sample size and one sample design limited the researcher's ability to test the CHAP for effectiveness. However, while these data were not statistically significant, preliminary findings suggests that clients participating in the CHAP had some improvements in clinical outcomes (weight loss, and a decrease in BMI and glucose levels) and health behaviors (consumption of vegetables and sweetened beverages and physical activity). Specifically, on average from baseline to the six month post-baseline assessment, the 32 clients who completed the clinical assessments loss nearly 10 pounds, lowered their body mass index (BMI) by six points and reduced their glucose levels by 11mg/dl. On average, 6% more of the clients reported they consumed the recommended 2.5 or more cups of vegetables each day. Approximately 19% fewer clients consumed two or more sweetened beverages each day from baseline to six months. These quantitative results were supported by focus group findings which indicated that CHAs and clients believed the CHAP was beneficial to them and their community. Preliminary data are suggestive that if this study was conducted with a larger study population, the program's effectiveness may be determined. Eugeni et al. (2011) concludes that future research strategies to improve health behaviors and quality of life for lower

income African Americans residing in public housing should focus on bridging residents with resources and services in the broader community, which was the focus of the CHAP model. CHAs played an instrumental role in all aspects of the program including development, implementation, data collection, reporting, and assessment. The role of LHAs in research is documented as part of a 2009 landmark study that spanned 410 counties and 13 states in the Appalachian region. LHAs functioned as partners in the research process development, implementation and evaluation. LHAs were instrumental in shaping the research protocols, data collection tools and culturally relevant information packets regarding cervical cancer, pap tests, and local health resources (Schoenberg et al., 2009). A comparison group and an adequate sample size are essential to test the effectiveness of LHA models like CHAP in future studies.

The leadership role of LHAs and the outreach strategies most frequently used by LHA programs to influence diabetes-related behavior change among their clients in public housing communities are not readily available in the literature. LHAs promote long term lifestyle behavior changes to improve health with a focus on preventing or managing high blood pressure, cancer and diabetes, reducing cholesterol levels, eliminating health disparities, and addressing social determinants of health (Giachello, et al., 2003; James et al., 2001; Pullen-Smith et al., 2008; Schulz et al., 2001; Wiist & Flack, 1990). However, there is insufficient evidence regarding the effectiveness of lay health models on diabetes prevention and management (Faridi et al., 2010; Zubaida et al., 2010). Results of the current study did not demonstrate a relationship between CHA activities and clients' diabetes related health behaviors. However, anecdotal information, captured through focus group discussions, suggested that CHAP was a valuable resource in the community. In addition, clients participating in the CHAP had improvements in clinical outcomes (weight loss and a decrease in BMI and glucose levels) and health behaviors

regarding vegetable intake, sweetened beverages consumed and physical activity. The preliminary findings from this study underscore the critical need for expanded research, with a specific focus on low-income populations at risk of developing diabetes and other chronic conditions. A 2006 study suggests that, "with the growing need to provide effective, culturally appropriate healthcare and support, much more research is warranted" (Norris et al., 2006, p. 554). LHA programs are viable community-based options for further study.

This study's findings expanded the literature on lay health advisor models by examining the successes and challenges of the CHAP pilot in public housing communities from the perspectives of the CHAs and the clients they served.

Recommendations for Future Research

As suggested in the published literature, a more targeted approach is required to reach high risk groups. CHAP model interventions should be carefully targeted to lower income, rural AA women (Earp et al., 2002). Small changes in behavior may have a large impact when they are observed in a population. In future studies, detection of small changes will likely require very large sample sizes (Sorensen, Emmons, Hunt, & Johnson, 1998).

Additional research is needed to assess costs associated with the training, support and resources required to fully implement and sustain CHAP. This study did not evaluate the program or human resources needed to implement CHAP.

Future research on the CHAP should assess the quantity of information that CHAs shared with clients as well as the types and sources of health education materials distributed. In addition, an increased understanding of the frequency and modes of communication used by CHAs would assist to standardize CHA activities in future CHAP models.

Limitations of the Study

A descriptive study was limited in its ability to determine the impact of CHA outreach activities on clients' diabetes-related health behaviors. Descriptive statistics were used to analyze the data using frequency distributions, means, chi-square and *t*-tests. Data analyses were further hampered by the small sample populations (CHAs $n = 17$ and clients $n = 62$). Although the study used a one-sample design, findings from the focus group sessions with the CHAs and their clients enhanced the quantitative results.

Another limitation related to limited program resources. The elimination of program funding after nine months, limited the CHAP's scope and reach in PHA communities. There were inconsistencies in data collection and reporting forms designed for the CHAP which further hindered the analysis of the program.

Clients were not engaged in the follow-up assessment process. Half (51%) of the clients ($n = 62$) completed a follow-up assessment form at six months post-baseline. Data analyses were limited by the study's small sample populations.

Finally, a convenience sample was the recruitment strategy employed in this study (Creswell, 2009). CHAs' motivations for participating in the CHAP were not assessed. Some may have participated based on their personal interest in diabetes specifically or health in general, had the time availability to devote to the program, had confidence in their ability to communicate health information, etc.

Conclusion

The persistent and significant disparities in diabetes deaths and poverty rates between whites and African Americans in North Carolina were the driving forces for this study of African Americans living in public housing communities in one city in southeastern North Carolina**.**

Living in public housing communities, with concentrated poverty, exacerbates the burden of chronic health conditions among the African American populations in this study. A recent study suggests that health is a bigger problem for public housing residents than is lack of employment (Manjarrez et al., 2007). The problems associated with being poor in America are well documented. Low income families in particular are negatively impacted by barriers such as lack of health insurance and limited access to health care providers. Studies document that people living in poverty have reduced access to needed medical care, which contribute to higher rates of sickness and death (Ahmed, Lemkau, Nealeigh, & Man, 2011; Carrillo et al., 2011). These barriers include poverty, lack of culturally competent health care systems, lack of trust and any other factors that impede access to screening, treatment and disease management.

The solutions however are not well documented. Health care systems throughout North Carolina and the nation are challenged by the health disparities. The CHAP, based on a lay health advisor model, was selected for this study in an effort to document the important role that community leaders play when engaged in community based health programs. CHAs played a pivotal role to counter barriers and identify solutions to increase access to life-saving health information and resources for low income African Americans residing in public housing communities.

With shrinking budgets and growing disparities in health, agencies are forced to seek low-cost, models that expand traditional activities to improve the health of at-risk populations. Public health providers who partner with local leaders to implement CHAP can tap into a public health intervention to extend health resources from clinic-based models of care to community based and community-owned models of prevention and early detection. Effective community engagement will require providers to implement collaborative models of partnerships involving community partners as local experts (Toms, Lloyd, Carter-Edwards, & Ellison, 2010).

The involvement of indigenous leaders as partners in health increases the likelihood that community level interventions are culturally appropriate and tailored to the unique needs and concerns of the people they serve (Trickett et al., 2011). The influence of culture on health beliefs and practices cannot be overstated. Culture is defined as patterns of behavior that includes thoughts, communications, actions, customs, beliefs, values and institutions of a group, ceremonies, and practices of a group of people (Cross, Bazron, Dennis, & Isaacs, 1989; U.S. Department of Health and Human Services, 2001). Rice (2007) further states that "culture is the totality of ways that shape how individuals see and respond to the world and community around them" (p. 624). Cultural competence, on the other hand, is the ability to effectively respond to the challenges and opportunities when faced with socio-cultural diversity (Cox & Beale, 1997). Rice (2007) states that when culture is ignored by a public service provider, people are not getting the services or support they need, or even worse those individuals may be receiving services that are more harmful than helpful. Therefore, without a basic level of culture competence, providers will be challenged to reduce the chasm between the health care systems and racial/ethnic minority populations that perpetuate disparities in health.

LHA programs provide intrinsic rewards to community leaders. Community leaders' skills are enhanced through training on conducting interviews, data collection, evaluation, outreach strategies and clinical screenings (Fluery et al., 2009; Pullen-Smith et al., 2008; Story et al., 2010). Training is further emphasized in the literature. Based largely on volunteers, successful lay health advisor (LHA) models work with local health and human services providers to accomplish their goal of improving the health of their community. As such, CHAP and other lay health advisor models provide a mechanism for public health providers to increase their understanding of the combination of factors that influence health behaviors and ultimately

improve health status of low-income, African American and other populations at highest risk of developing diabetes and other chronic conditions.

The Patient Protection and Affordable Care Act (PPACA) of 2010 challenged the nation to provide quality and affordable health care for all. For states to carry out the provisions of the law, policy makers and providers must implement policies, programs and services to reduce social, cultural, and financial barriers to preventive care and treatment services. The goals of PPACA are to eliminate health disparities, transform the health of communities and ultimately reduce the skyrocketing costs of health care.

Numerous provisions are aimed at reducing health disparities, such as making improvements in preventive care; expanding coordinated care for chronic diseases including diabetes; promoting cultural competence and diversity in health care, and expanding insurance coverage (PPACA, 2010). In response, health care systems are seeking practical and proven strategies to improve the health of racial/ethnic minorities, poor and other disparate groups.

New models of care are warranted that extend health care services from traditional clinic-based models to community-based models of care. Katz et al. (2011) submit that traditional clinic-based health education and screening services are not adequately meeting the needs of diverse populations for culturally appropriate health promotion and disease prevention activities in community settings where people live, work, play or pray. Liburd et al. (2005) state that public health's approach to preventing and controlling cardiovascular disease and type 2 diabetes has focused on "fixing" the patient by addressing behavioral risk factors, diet and physical activity (p. 18). There is an urgent need to establish policies that move public health agencies from a "fixing" the patient model to engaging community leaders in solutions to the persistent and significant health disparities.

CHAs are local leaders who operate at the individual and community levels to influence policies and promote system changes. For example, a study conducted in one North Carolina community on diabetes prevention and management reported that the capacity building training prepared local leaders as change agents **(**Plescia et al., 2008). LHA models, like CHAP, are uniquely positioned to engage and support community leaders in their efforts to improve the health of racial/ethnic minorities and low income groups. The involvement of these indigenous leaders as partners in health increases the likelihood that community level interventions are culturally appropriate and tailored to the unique needs and concerns of the people they serve (Trickett et al., 2011). LHAs carry out their leadership roles by influencing policies and promoting system changes. The style of leadership used by CHAs was examined with the theoretical framework of transformational leadership. Burns (2003) suggests that "transformational leaders take the initiative to mobilize people in the process of change, encouraging a sense of collective identity and collective efficacy, which in turn brings stronger feelings of self worth and self efficacy; an enhanced sense of meaningfulness in their work and lives" (p. 26).

Historically, diabetes screening, prevention and management programs have occurred in clinical settings and used clinic-based models of care. These traditional approaches must make way for new models that engage community leaders as equitable partners in the process (Toms et al., 2010). It is essential that community based models of care are grounded in the realities faced by people experiencing disparities in health. The involvement of indigenous leaders as partners in health increases the likelihood that community level interventions are culturally appropriate and tailored to the unique needs and concerns of the people they serve (Trickett et al., 2011).

Without their participation, health care systems will continue to miss the mark by failing to address some of the social and cultural nuances of racial/ethnic minority communities.

These community support systems, through CHAP and other LHA models, strengthen the health and quality of life for the entire community (Trickett et al., 2011). The CHAP pilot program established a model of engagement which empowered public housing residents to become health advisors and advocates in their network of family, friends, and neighbors. The preliminary results suggests that it was feasible to implement CHAP in public housing communities. While the results of the quantitative data analyses were not statistically significant, the preliminary findings suggests that clients participating in the CHAP had improvements in clinical outcomes and health behaviors. CHAP built on the assets of public housing communities by tapping into the network of leaders and increasing their knowledge and basic skills to promote healthy lifestyles. In the meantime, CHAs claimed ownership of the process. As one CHA stated, “We as Black people got to look out for our people”.

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Appendix A

Overview of the Public Housing Authority of One Southeastern NC City

The targeted Public Housing Authority (PHA) was founded more than 50 years ago and consists of six communities, with properties designated for the elderly, families and Section 8 programs. Of the total 1,225 units, approximately 100 are designed for elderly residents, while the remaining 1,125 are public housing units for families. The vast majority (90%) of the 2,632 residents are African Americans. Of the remaining residents, 10% represent White and Hispanic populations. The following table describes the age distribution of residents for each of the six housing units.

Public Housing Authority and Age Distribution per Unit

Public Housing Unit	Residents 0-17 years	Residents 18+ years
Red	255	90
Gold	320	120
Green	338	140
Yellow	328	133
Blue	300	107
Silver	300	200

These data reveal that 1,841 (70%) of the residents are youth (ages 0-17 years). The remaining 791(30%) are adults 18 years and older. In order to ensure anonymity, colors, assigned by the community partner, are used to depict the housing units rather than the names of the units. The PHA supports the involvement of residents at decision making tables. Each of the six communities has one or more representatives who serve as Resident Leaders**.** Resident leaders assist community members by providing information, resources, referral information and support.

Appendix B

Community Health Ambassador Program (CHAP) Descriptive Overview

The Community Health Ambassador Program (CHAP) was established in 2006 by the North Carolina Office of Minority Health and Health Disparities in partnership with Success Dynamics, Community Development Corporation (SD, CDC), North Carolina Community College System (NCCS) and the Old North State Medical Society. The program was designed to train and educate community leaders throughout North Carolina to eliminate disparities in health by improving the awareness, prevention and management. The CHAP has two unique features which distinguish it from traditional lay health advisor models. First, the CHAP offers continuing education credits through the community college system for participants who successfully meet the course requirements. Secondly, the model has been implemented statewide in conjunction with a broad network of partners, including community-based organizations, faith-based organizations, statewide health advocacy organizations, American Indian Tribal Organizations, human services organizations and local public health agencies. More than 400 volunteers in North Carolina have successfully completed the training requirements offered through the CHAP since the program's inception. A 2010 assessment conducted by the University of North Carolina at Chapel Hill, revealed that approximately 200 CHAs remained active in their outreach efforts in communities which represented 22 counties in the state. Figure 2 identifies the county locations.

The CHAP course is offered through the North Carolina Community College System (NCCS), which consists of 58 campuses. The course is offered through Continuing Education. A group of six facilitators were recruited and trained by the OMHHD, public health staff and

clinical providers on the CHA components. Each facilitator met NCCS' Continuing Education requirements for instructors. Training sessions were held on a local community college campus.

The CHA training is consistent with training components for lay health advisor models in the literature (James et al., 2001; Wiist & Flack, 1990**)** CHA consists of 22 hours of instruction. Participants were trained using the curriculum approved by NCOMHHD and NCCS's Office of Continuing Education. The training is organized into seven core sections: Introduction to Public Health, The Role of Community Health Ambassadors, Human Body, Diabetes, Blood Pressure, Group Project, Resources, Referrals and Glucose Checks (Pullen-Smith et al., 2008). While the majority of the sections are presented in 50 minutes, three components, The Human Body, The Group Project Introduction and Wound Evaluation were presented in 30minute segments. The CHA training occurred over the course of two weekend sessions and included a combination of classroom instruction, interactive sessions and field practice.

Participants received a pre- post-test on diabetes. The initial training session was offered for three hours on Friday evening and seven hours of instruction on Saturday. The following weekend was designated to field study. Students compiled a directory of resources of local health and human resources agencies, services provided, and eligibility requirements. The resource guide was used by CHAs for information, referrals and follow-up related to diabetes awareness, prevention and management. At the conclusion of the training, participants had to score at least 80% on the post- test to pass the course and become an active CHA.

The CHAP was implemented in multiple counties throughout the state, creating an urgent need for the NC OMHHD to document the feasibility and effectiveness of the program for two key reasons. First, these data were essential to secure ongoing funding from public and private sources. Secondly, these data were needed to position the program for expansion statewide.

In order to document the work of CHAs and assist in evaluating the CHAP, a toolkit was developed by a Research team from the University of North Carolina at Chapel Hill in conjunction with NCOMHHD staff and active CHAs to:

a. Measure the impact of CHAP on increasing awareness, knowledge and changing health behaviors relative to chronic disease prevention or management;
b. Measure the changes in clinical outcome measures, such as improved blood pressure, blood glucose, weight management, etc. for the clients reached by the program; and
c. Assess the perceptions of the CHAs on their effectiveness in influencing their clients' awareness and health behaviors.

Appendix C

CHAP Client Intake General Health Assessment Form A

Ambassador Code:					**Client Code:**								
Enter your CHA 4-digit code					*Enter your CHA 4-digit code + a 4-digit code for the client*								

GENERAL HEALTH ASSESSMENT: CLIENT INTAKE

Please put a check (✓) in the box or print for your client's responses.
Keep this in a file with all of your client's information.
All information provided by your client is confidential.

DEMOGRAPHICS

Date: __ __ / __ __ / __ __ __ __ Month Day Year	**1a. Client Zip Code:**	**b. County:**	**2. Lives Alone:** ☐ Yes ☐ No
3a. Age: ☐ 18-24 ☐25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65-74 ☐ 75 and better			**b. Gender:** ☐ Female ☐ Male

4. Ethnicity:
☐ African-American/Black ☐ Asian/Hawaiian/Pacific Islander ☐ White/Caucasian
☐ American Indian/Alaskan Native ☐ Hispanic/Latino (of any race) ☐ Other: _____

5a. Occupation: ☐ Work Full-Time ☐ Work Part-Time ☐ Unemployed ☐ Retired	**b.** Does your job require you to sit much of the day? ☐ Yes ☐ No ☐ NA

6. Main Form of Transportation:
☐ Drive Self ☐ Family/Friends Drive You ☐ Bus ☐ Bike ☐ Walk ☐ Other _____

7. Education:
☐ No High School ☐ High School Graduate ☐ Trade School ☐ Bachelor's Degree
☐ Some High School ☐ Some College ☐ Associate's Degree ☐ Graduate Degree

HEALTH UTILIZATION INFORMATION

8a. Health Insurance: ☐ Medicare/Medicaid ☐ Private ☐ No insurance	**b. Regular Primary Care Doctor:** ☐ Yes ☐ No ☐ Don't Know	**c. Usual Place for Receiving Health Care:** ☐ Clinic ☐ Private MD ☐ Health Dept. ☐ Emergency room ☐ Urgent Care

9. Last Visit to the Doctor:
☐ Within past month ☐ Within past 6 months ☐ Within past year
☐ Within the past 2 years ☐ More than 2 years ☐ Don't Know

NUTRITION AND PHYSICAL ACTIVITY BEHAVIORS

10. Nutrition	Always	Usually	Sometimes	Rarely	Never
Eats at least 2 cups of fruit each day	☐	☐	☐	☐	☐
Eats at least 2 ½ cups of vegetables each day	☐	☐	☐	☐	☐
Drinks 2 or more cups of sugar-sweetened beverages each day (tea, soda, etc.)	☐	☐	☐	☐	☐
Eats chips or fries each day	☐	☐	☐	☐	☐
Eats fast food 3 or more times per week	☐	☐	☐	☐	☐
Fries food when cooking	☐	☐	☐	☐	☐
Reads food labels when shopping	☐	☐	☐	☐	☐
Eats meals alone	☐	☐	☐	☐	☐
11. Physical Activity					
Typically exercises with others	☐	☐	☐	☐	☐
Does physical activity for at least 150 minutes (or 2 ½ hours) each week	☐	☐	☐	☐	☐
Does strength training exercises (lifting weights, stretch band exercises, sit-ups, push-ups, leg lifts, or squats) in a usual week	☐	☐	☐	☐	☐
Does stretching exercises (yoga, pilates, chair stretching, or standing stretches) in a usual week	☐	☐	☐	☐	☐

HEALTH OUTCOMES

Please put a check (✓) in the box for your client's responses.

12a. Health History	**Ever Screened For?**	**Ever Told You Had?**	**Told Within the Past Year?**	**12b. Have a Family History?**

Ambassador Code:					Client Code:								
Enter your CHA 4-digit code					*Enter your CHA 4-digit code + a 4-digit code for the client*								

High Blood Pressure/Hypertension	☐	☐	☐	☐
High Cholesterol	☐	☐	☐	☐
Diabetes	☐	☐	☐	☐
Pre-diabetes	☐	☐	☐	☐
Breast Cancer (Women only)	☐	☐	☐	☐
Cervical Cancer	☐	☐	☐	☐
Colon Cancer	☐	☐	☐	☐
Prostate Cancer (Men only)	☐	☐	☐	☐
Overweight/Obesity		☐	☐	☐
Coronary Heart Disease		☐	☐	☐
Heart Attack		☐	☐	☐
Heart Failure		☐	☐	☐
Stroke		☐	☐	☐

Please put what the client <u>says</u> (not what is measured). If they don't know, <u>leave blank</u>.

13a. Weight	b. Height	c. Blood Pressure	d. Glucose
Weight _____ lbs	(_____ ft _____ in) Height _____ in	_____ / _____mmHg Systolic Diastolic	_____ mg/dL

14. How would you rate your health over the past month?
☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor ☐ Don't Know

Willingness to be measured and discuss an improvement plan

15. Are you willing to have some health measures taken?	16. Are you willing to talk with me about a health improvement plan?
☐ Yes ☐ No ☐ At a Later Date: _____	☐ Yes ☐ No ☐ At a Later Date: _____

17. Health assessment location:
☐ Client's Home ☐ Church ☐ Mall/ Shopping Center ☐ Worksite ☐ Other_____

Client's Clinical Values (Measured During Assessment)

18a. Weight b. Height	c. Blood Pressure	d. Glucose
Weight _____ lbs Height _____ in. BMI (Body Mass Index) _____ ☐ Height and weight not taken	_____ / _____mmHg Systolic Diastolic Systolic Blood Pressure (SBP) Diastolic Blood Pressure (DBP) ☐ Blood pressure not taken	_____ mg/dL Ate before glucose test? ☐ Yes (non-fast) ☐ No (fasting) ☐ Glucose measure not taken
Get client's BMI from the BMI Table. *Overweight: BMI 25-29.9* ***Obese: BMI 30 or greater***	*At Risk: SBP 120-139, DBP 80-89* *High: SBP 140-179; DBP 90-114* ****VERY HIGH: SBP 180+, DBP 115+***	*High: Fasting: 100-249;* *Non-Fasting: 120-249* ****VERY HIGH: 250+***

19. For Male Clients Only – PSA Screening Within the Past Year:	20. For Female Clients Only –
☐ Yes [PSA (if known) _____] ☐ No ☐ Don't Know	*a. Breast Cancer Screening Within the Past Year:* ☐ Yes ☐ No ☐ Don't Know *b. PAP Exam Within the Past Year:* ☐ Yes ☐ No ☐ Don't Know

21. *Immediate Care Recommended
Client had at least one very high value: ☐ Yes ☐ No
Recommended client seek immediate health care: ☐ Yes ☐ No

Ambassador Code:					Client Code:								
Enter your CHA 4-digit code					*Enter your CHA 4-digit code + a 4-digit code for the client*								

22. For what health issue(s) are you interested in learning more about? ***(check all that apply)***

- ☐ Breast Cancer
- ☐ Depression
- ☐ Diabetes
- ☐ Heart Disease
- ☐ Hypertension
- ☐ Obesity
- ☐ Prostate Cancer
- ☐ Stroke

23. For what health actions are you interested in learning more about? ***(check all that apply)***

- ☐ Eating Healthy
- ☐ Cooking Healthy
- ☐ Exercise
- ☐ Stop Smoking
- ☐ Losing or Maintaining Weight
- ☐ Improving Your Mental Health
- ☐ Improving Your Overall Health
- ☐ Better Access to Health Care and Services

24. Health Improvement Plan: ***(please print)***

25. Client's Goal(s) by Next Visit: ***(please print)***

26. Ambassador Actions Taken: ***(check all that apply)***

- ☐ Recommended client see a doctor
- ☐ Referred client to community organizations or services
- ☐ Provided client with health information resources
- ☐ Reviewed goals with client
- ☐ Connected client with a health buddy
- ☐ Identified transportation resources for client

Health information and transportation resources provided, if any *(include resources used from your CHAP education and training manual)*:

_____

_____

_____

27. Next Visit:

☐ Next visit scheduled (date and time):_____ ☐ To be scheduled ☐ No next visit
Date Time

28. CHA Notes:

Include any questions by the client, any information that assists you as the CHA in any follow-up visits, and any questions you may have for OMHHD that you want to ask at a later time. Please do not include any names or information that would identify your client.

Appendix D

Community Health Ambassador Program (CHAP) Variables

FORM A	FORM B	FORM DM	FORM DM-F	FORM C
Client General Health Assessment[1]	**Client General Health Assessment 6-Month Follow-Up[2]**	**Diabetes Client Intake Health Assessment[3]**	**6-Month Diabetes Client Follow-Up Health Assessment[4]**	**Community Health Ambassador (CHA) Bi-Monthly Update[5]**
Demographics • Age group • Health insurance • Ethnicity • Gender • Education	**Self-Reported Health Status Update** • Rating of overall health (Likert) • Health changes • Diabetes diagnosis • Adherence to health improvement plan (Likert) • Reached Goals (Likert) • Client Actions Taken -Doctor's visit -Dentist visit -Medications adherence -Services Accessed - Connected with health buddy -Transportation resources used -Improved diet -Increased physical activity -Screening for Health Issue	**Diagnosis and Adherence** • Type of diabetes • Age or Time of diagnosis • Education Received (Likert) • Current medications taken	**Self-perception of diabetes control (Likert)**	**CHA Outreach** • Venue Type and Number • Total clients • Total NEW clients • Personal goals met • Frequency of CHA Outreach Services (Likert) -Recommend: -see MD or Dentist -Services referrals -Provided health - information -Reviewed goals - Health buddy -Transport resources referral
Nutrition and Physical Activity Behaviors (Likert) • Fruit intake • Vegetable intake	**Nutrition and Physical Activity Behaviors (Likert)** • Fruit intake • Vegetable intake	**Diabetes Monitoring** • Timeframe for A1- C test • Knowledge of A1- C	**Diabetes Monitoring** • Medications adherence • Physical exam	• Perception of Adequate time to serve (Likert) • Perception of adequate

FORM A	FORM B	FORM DM	FORM DM-F	FORM C
Client General Health Assessment[1]	**Client General Health Assessment 6-Month Follow-Up[2]**	**Diabetes Client Intake Health Assessment[3]**	**6-Month Diabetes Client Follow-Up Health Assessment[4]**	**Community Health Ambassador (CHA) Bi-Monthly Update[5]**
• Sugar sweetened beverage intake • Chips/Fries intake • Fast food intake • Length of time engaged in physical activity weekly • Frequency of weekly physical activity	• Sugar sweetened beverage intake • Chips/Fries intake • Fast food intake • Length of time engaged in physical activity weekly • Frequency of weekly physical activity	value • Frequency of Blood Glucose Checks (Likert) • Frequency of Physical Exam (Likert) • Provider checked feet/visit • Dialated eye exam • Cholesterol level checked • Timeframe of Cholesterol check(Likert) • Nutrition and Physical Activity (Likert) -Eats from six food groups a day - Eats 3 times/day -Eats same time per day -Reads food labels -Adheres to exercise plan	• Provider checked feet • Eye exam • A1 C checked • Cholesterol checked • Blood pressure checked • Current diabetes medications taken • Frequency of blood glucose checks • Nutrition and physical activity (Likert) -Eats from six Food groups a day - Eats 3 times/day -Eats same time per day -Reads food labels -Adheres to exercise plan	information (Likert) • Perception of ability as CHA (Likert) - Level of preparedness -Usefulness of assistance -Level of comfort in taking clinical measures -Perception of impact on health attitudes and behaviors • Suggestions for improving experience •
Health History • Last MD visit • Self –rated health (SF-3) • Ever screened for, diagnosed, told in past year, and family history of: o Hypertension o High Cholesterol o Diabetes o Pre-diabetes	• Not Applicable	**Care Services Received** • Physician • Dietician/nutritionist • Pharmacist • Eye doctor • Dentist • Foot doctor • Neurologist	**Care Services Received** • Physician • Dietician/nutritionist • Pharmacist • Eye doctor • Dentist • Foot doctor • Neurologist	

FORM A	FORM B	FORM DM	FORM DM-F	FORM C
Client General Health Assessment[1]	**Client General Health Assessment 6-Month Follow-Up[2]**	**Diabetes Client Intake Health Assessment[3]**	**6-Month Diabetes Client Follow-Up Health Assessment[4]**	**Community Health Ambassador (CHA) Bi-Monthly Update[5]**
○ Breast Cancer ○ Cervical Cancer ○ Colon Cancer ○ Prostate Cancer ○ Heart Disease ○ Stroke		• Family members • Friends • Home health aides • Other(s)	• Family members • Friends • Home health aides Other(s)	
Clinical Measures • Weight • Height • BMI • Blood glucose	**Clinical Measures** • Weight • Height • BMI • Blood glucose			
Ambassador Outreach Services • Recommend see MD • Recommend see dentist • Service referral • Provided health information • Reviewed goals • Connected to health buddy • Transportation resource referral	**Ambassador Outreach Services** • Recommend see MD • Recommend see dentist • Service referral • Provided health information • Reviewed goals • Connected to health buddy • Transportation resource referral			

[1] **Report Form A: General Health Assessment Form** – A tool to use to record your client's health behaviors and health measurements and the actions you have taken as a health ambassador.
[2] **Report Form B: Follow-up Assessment –** A tool to assess your client's behaviors and health measurements and your actions 6 months after the general assessment.
[3] **Report Form DM-F: 6-Month Diabetes Follow-Up Assessment Form** – A tool to assess behaviors at 6 months for your clients who reported having diabetes in the general assessment.
[4] **Report Form DM: Diabetes Health Assessment Form** – A tool to record additional health behaviors and activities of your clients who report they have diabetes.
[5] **Report Form C: CHA Bi-Monthly Update Form –** A tool to assess your bi-monthly progress serving as a health ambassador. For the study population, this form was completed monthly.

Appendix E

CHAP Measurement Predictors or Independent Variables (for Measuring Impact)

Independent Variables	Measurements Defined
CHA OUTREACH ALL CLIENTS BASELINE	
Recommended See Doctor	Percent of CHA who recommended see a doctor at initial health assessment
Recommended See Dentist	Percent of CHA who recommended see a dentist at initial health assessment
Service Referrals	Percent of CHA who referred clients to community organizations or services
Provided Health Information	Percent of CHA who provided clients with health information resources
Reviewed Goals	Percent of CHA who reviewed goals with clients
Connected to Health Buddy	Percent of CHA who connected clients with a health buddy
Referred to Transportation Resources	Percent of CHA who Identified transportation resources for client
CHA ACTIVITIES FOR CLIENTS WITH DIABETES BASELINE	
Recommended See Doctor	Percent of CHA who recommended see a doctor at initial health assessment
Recommended See Dentist	Percent of CHA who recommended see a dentist at initial health assessment
Service Referrals	Percent of CHA who referred clients to community organizations or services
Provided Health Information	Percent of CHA who provided clients with health information resources
Reviewed Goals	Percent of CHA who reviewed goals with clients
Connected to Health Buddy	Percent of CHA who connected clients with a health buddy
Referred to Transportation Resources	Percent of CHA who Identified transportation resources for client

Appendix F

CHAP Measurement Outcomes (for Measuring Impact)

Outcome Variables	Measurements Defined
CLINICAL (measured by the CHA)	
Weight Change*	Weight Change (lbs) = Weight at 6 months - weight at baseline or initial assessment
Glucose (measured at random)*	Glucose change (mg/dL) = glucose at 6 months - glucose at baseline or initial assessment
Systolic Blood Pressure	Systolic BP Change = systolic BP at 6 months - systolic BP at baseline or initial assessment
Diastolic Blood Pressure	Diastolic BP Change = diastolic BP at 6 months - diastolic BP at baseline or initial assessment
BEHAVIORAL – NUTRITIONAL (self-reported by client)	
Fruit intake	Change in proportion of the sample from baseline to 6 months who **always** consume 2 cups per day; Change = Number at 6 months who report always/total sample - Number at baseline who report always/total sample
Vegetable intake	Change in proportion of the sample from baseline to 6 months who **always** consume 2.5 cu per day; Change = Number at 6 months who report always/total sample - Number at baseline who report always/total sample
Sweetened Beverages	Change in proportion of the sample from baseline to 6 months who **never** consume 2+ cup per day; Change = Number at 6 months who report always/total sample - Number at baseline who report always/total sample
BEHAVIORAL – PHYSICAL ACTIVITY (self-reported by client)	
Time length	Change in proportion of the sample from baseline to 6 months who **always** do at least 2.5 hours of physical activity weekly; Change = Number at 6 months who report always/total sample - Number at baseline who report always/total sample
SELF-RATED HEALTH	
Self-rated health	Percent increase from baseline to 6 months in the proportion of the sample who report havi excellent health
DIABETES Client (self-reported)	
A1-C test	Percent Increase from baseline to 6 months in the number of the sample population with diabetes who report **YES** that they had an A1C test
Nutrition and Physical Activity	Change in proportion of the sample from baseline to 6 months who **always** consume foods from 6 six food groups
	Change in proportion of the sample population from baseline to 6 months who **always** eats times a day
	Change in proportion of the sample population from baseline to 6 months who **always** eats meal at same time
	Change in the proportion of the sample population from baseline to 6 months who **always** read food labels
	Change in the proportion of the sample population from baseline to 6 months who **always** follow a prescribed exercise plan

* Primary outcome variables.

Appendix G

Health History and Kappa Values for Nominal Variables

	N	Kappa Values Ever Screened	*N*	Kappa Values Family History
High blood pressure/hypertension	16	.613	16	.600
High Cholesterol	16	.636	16	.556
Diabetes	16	.875	16	.773
Pre-Diabetes	16	1.000	16	.818
Breast Cancer	16	.875	15	.842
Cervical Cancer	15	.857	15	.634
Colon Cancer	16	.862	12	.-----
Prostate Cancer	5	1.000	5	.625
Heart Disease	--	.-----	13	.571
Stroke	--	.-----	14	.843

*Kappa values of .7 or above considered reliable.

Appendix H

T-test Reliabilities for Health and Physical Activity Behaviors

	Nutrition and Physical Activity Behaviors	*N*	Correlation
Pair 1	Eats 2 cups fruitpre & fruitpost	15	.972
Pair 2	Eats 2.5 cups vegepre & vegepost	14	.988
Pair 3	Drinks 2+ Sugar beverages drinkpre & drinkpost	15	.653
Pair 4	Eats chips/fries daily eatspre & eatspost	15	.538
Pair 5	Eats fast foods efoodpre & efoodpost	14	.749
Pair 6	Does 2.5 hours physical activity phyactpre & phyactpost	14	.976
Pair 7	Number times exercise each week exerore & exerpost	14	.893
Pair 8	Last visit to doctor docpre & docpost	12	.824
Pair 9	Health rating during past month healthpre & healthpost	12	.896
Pair 10	Weight in lbs. weightpre & weightpost	16	.993

*Pre- and post-paired t-test correlations of .7 or above considered reliable.