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Examination of the Association between Patient Empowerment and Diabetes Management among an Urban African American Population by Gender, Age, Socioeconomic Status and Education Level

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EXAMINATION OF THE ASSOCIATION BETWEEN PATIENT EMPOWERMENT AND DIABETES MANAGEMENT AMONG AN URBAN AFRICAN AMERICAN POPULATION BY GENDER, AGE, SOCIOECONOMIC STATUS AND EDUCATION LEVEL

by

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ABSTRACT

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Examination of the association between patient empowerment and diabetes management among an urban African American population by gender, age, socioeconomic status and education level
(Under the direction of FRANCES McCARTY, Ph.D., FACULTY MEMBER)

Diabetes mellitus is a significant problem in the United States with the burden being greater in the African American population. Because diabetes is complex and costly, the importance of self-care management changes the disease management paradigm from "provider-centered" to "patient-centered". Empowerment is recommended as a possible solution for barriers to self-management education and better diabetes care. "Patient empowerment is defined as helping patients discover and develop the inherent capacity to be responsible for one's own life." Although patient empowerment is a valuable philosophy, there are gaps between the philosophy and actual practice. There are limited studies addressing the effectiveness of patient empowerment at improving diabetes management. Therefore, this study examined the association of patient empowerment and diabetes management by gender, age, socioeconomic status and education level by using the data from the Patient Empowerment to Improve Diabetes Care (PEIDiC) intervention conducted in the Diabetes Clinic of the Grady Health System (GHS). In this study, diabetes management was measured by glycated hemoglobin (HbA1c) level which shows the average blood glucose level over the past two to three months. Patient empowerment was measured by two standardized tools which were the Diabetes Empowerment Scale-Short Form (DES-SF) and Patient Activation Measure (PAM). In this study, patient empowerment scores measured by these tools were not associated with HbA1c level in African American diabetes patients of the Diabetes Clinic of the GHS. Further study is necessary to understand the association between patient empowerment and diabetes disease management by using different measures of patient empowerment, different levels of disease management, and measurement in different settings.

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Chapter I

Introduction

According to the Centers for Disease Control and Prevention (CDC), 23.6 million people living in the United States—7.8% of the total population—is estimated to be suffering from diabetes mellitus. Among them, 75% are diagnosed and 25% do not know their diabetic health status (CDC, 2009).

"Diabetes is a disease in which the body has a shortage of insulin or a decreased ability to use insulin, a hormone that allows glucose (sugar) to enter cells and be converted to energy. When diabetes is not controlled, glucose and fats remain in the blood and, over time, damage vital organs" (CDC, 2009). There are two major types of diabetes: type 1 and type 2 diabetes. Type 1 diabetes develops when the body's immune system destroys pancreatic beta cells which make the insulin hormone that regulates blood glucose in the body (CDC, 2007). This form of diabetes mainly occurs in children and young adults but it can actually occur at any age. Type 1 diabetes accounts for 5 to 10% of all diagnosed diabetes cases and type 2 diabetes accounts for 90 to 95% of all diagnosed diabetes cases. Although there is no known way to prevent type 1 diabetes, type 2 diabetes can be prevented or its onset delayed up to a certain extent (CDC, 2007).

Type 2 diabetes usually develops when the need for insulin rises and the pancreas gradually loses its ability to produce it (CDC, 2007). Type 2 diabetes is usually associated with older age, obesity, a history of gestational diabetes, impaired glucose metabolism, physical inactivity, and race or ethnicity. Hispanic or Latino Americans, American Indians, and some Asian Americans and

Native Hawaiians or Other Pacific Islanders are at particularly high risk for type 2 diabetes (CDC, 2007).

Almost 12% of those diagnosed with diabetes are African Americans and 3.7 million or 14.7% of all non-Hispanic blacks age 20 and older were estimated to have diabetes (National Institute of Health, 2008). African Americans were twice as likely to be diagnosed with diabetes as non-Hispanic Whites. According to 2006 data, African American men were 2.2 times as likely to start treatment for end-stage renal disease related to diabetes, as compared to non-Hispanic white men. African Americans were 2.3 times as likely as non-Hispanic Whites to die from diabetes. According to 2005 data, diabetic African Americans have twice the chance of being hospitalized compared to diabetic non-Hispanic Whites (U.S Department of Health and Human Services, 2009).

In Georgia, the rate of diabetes is even higher than the national rate. In 2007, 10.1% of Georgia adult population had been diagnosed with diabetes. It is estimated that for every two people who have been diagnosed with diabetes, another has not yet been diagnosed, and therefore, the actual rate is estimated to be doubled which would be 20.2% (Georgia Department of Community Health, Division of Public Health, 2008).

Diabetes was the seventh highest cause of death listed on U.S. death certificates in 2006 in the U.S. as well as in Georgia. In Georgia, the age-adjusted death rate per 100,000 populations was 2.3 times higher among the African American population than among Whites and it is identical to the national estimation (Georgia Department of Community Health, Division of Public Health, 2008). These data indicate the size of the burden of diabetes and its complications in the African American population in Georgia.

In addition, the cost of diabetes is very high. The total health care cost for diabetes is estimated to be $174 billion, which includes direct medical costs of $116 billion and indirect costs of $58 billion (The American Diabetes Association (ADA), 2008). Indirect medical costs are related to disability, work loss and premature death. It is estimated that 1 in every 5 health care dollars in the

U.S. is spent caring for someone with diagnosed diabetes, while 1 in every 10 health care dollars is attributed to diabetes (ADA, 2008). These estimations do not include social cost of intangibles such as pain and suffering, care provided by non paid caregivers, excess medical cost associated with undiagnosed diabetes, and diabetes-attributed costs for health care expenditure categories. Therefore, the actual national burden of diabetes is likely to be higher than the $174 billion estimation (ADA, 2008).

Moreover, people with diagnosed diabetes have medical expenditures that are about 2.3 times higher than medical expenditures for people without diabetes (CDC, 2009). Diabetes related complications account for nearly 50% of direct health care or medical cost due to diabetes (ADA, 2008). Secondary and tertiary prevention methods that is, effective management to prevent complications related to diabetes and reduced morbidity and mortality related to complications of diabetes, can play a very important role in reducing diabetes related health care costs.

Purpose of Study

The purpose of this study is aimed at understanding the factors which may improve diabetes disease management. Understanding the factors that influence diabetes management will provide significant information regarding areas in which diabetes disease management can be improved. In diabetes disease management, the importance of patient empowerment has been recognized and the paradigm is shifting from a traditional provider-centered model to a patient-centered model (Funnell & Anderson, 2004; Funell et al., 1991). “Patient empowerment is defined as helping patients discover and develop the inherent capacity to be responsible for one’s own life” (Funnell & Anderson, 2004, p.124; Funnell et al., 1991). There are many inherent issues, such as gaps between the theoretical concept and practical application of patient empowerment in diabetes care and its short-term and long-term effects in diabetes management. It is important that the total effects of the patient empowerment approach to diabetes management are better understood. This study looks at the association between patient empowerment and glycated hemoglobin (HbA1c) level. HbA1c test is one of the recommended tests for diagnosis and it is also used to predict the risk for the long-term complications of diabetes (ADA, 2010a; ADA, 2010b). It gives the average blood glucose level of a person over the past two to three months and the measure is given as a percentage (ADA, 2010a). Specifically, this study is focused on whether or not there is an association between patient empowerment and diabetes management in terms of HbA1c by age, socioeconomic status, education and gender.

Hypothesis

Based on the aforementioned research question, the following hypotheses were created:

1. H_0 = DES score in diabetes care is not negatively associated with the HbA1C level of diabetes patient

H_a = Diabetes Empowerment Scores (DES score) in diabetes care is negatively associated with the HbA1c level of diabetes patient

2. H_0= PAM score is not negatively associated with the HbA1c level of diabetes patient

H_a= Patient Activation Measure score (PAM score) in diabetes care is negatively associated with the HbA1c level of diabetes patient

Chapter II

Literature Review

Currently in the United States, nearly 8% of population is living with diabetes mellitus (CDC, 2009). Moreover, diabetes is a serious disease and it can lead to severe complications, such as blindness, kidney damage, cardiovascular disease, stroke, and lower-limb amputations. To date, no cure for diabetes has been found. However, once a person has diabetes there are ways to manage it (CDC 2007).

Diabetes is the leading cause of new cases of blindness among adults aged 20-74 years old, kidney failure and non-traumatic lower extremities amputation (CDC 2007). Therefore, it is imperative for the people living with diabetes to learn how to correctly manage the disease in order to prevent these complications and maintain their quality of life. For both type 1 and type 2 diabetes, the best prophylaxis against microvascular complications is tight glycemic control. The best prophylaxis against macrovascular complications is comprehensive risk reduction including glycemic, lipid and blood pressure control, smoking cessation, regular eye and feet examinations and other regular care according to the recommendations of the American Diabetes Association (ADA) (ADA, 2010b; CDC 2007; Stratton, et al., 2000).

In general, every percentage point drop in HbA1c blood levels can reduce the risk of micro vascular complications such as eye, kidney and nerve diseases by 40% (CDC, 2007). Blood pressure control for patients with diabetes reduces the risk of cardiovascular disease such as heart disease or stroke among the persons with diabetes by 33% to 50%. In most cases, for every 10 mmHg reduction in systolic blood pressure, the risk for any complication related to diabetes is reduced by 12% (CDC, 2007).

Improved control of low density lipoprotein cholesterol can reduce cardiovascular complications by 20-50% for patient with diabetes. Detection and treating diabetes eye disease with laser therapy can reduce the development of severe vision loss by about 50 - 60%. Comprehensive foot care programs can reduce amputation rates by 45-85%. Detecting and treating early diabetes kidney disease by lowering blood pressure can reduce the decline in kidney function by 30-70% (CDC, 2007).

Glycemic control is a fundamental requirement for day-to-day management of diabetes. It is also the most important factor in care and prevention (ADA, 2005; Stratton, et al., 2000). Glycemic control is measured by different types of blood glucose level measurement such as fasting blood glucose, random blood glucose level, two hour postprandial blood glucose level and HbA1c level (ADA, 2005).

Fasting glucose is the standard measure used to diagnose diabetes in the United States. Currently, HbA1c test is also recommended for diagnostic purpose as well as prediction of the risk for the long-term complications of diabetes (ADA, 2010a; ADA, 2010b). It gives the average blood glucose level of a person over the past two to three months and its measure is given as a percentage (ADA, 2010a). The recommended testing frequency of HbA1c is approximately every three months but it can be more or less frequent depending on the stability of glycemic control (ADA, 2010b).

Selvin et al. (2010) said HbA1c test have certain advantages over fasting glucose test for the diagnosis of diabetes. In their study, HbA1c levels were found to be an accurate predictor of future diabetes and a better predictor for diabetes related complications such as stroke and heart disease (Selvin et al., 2010). HbA1c tests have an advantage over the fasting blood glucose because they do not require patients to fast for accurate results; they have stability as they are not affected by stress, illness and, day-to-day variability (ADA, 2010a).

In January 2010, the ADA revised their recommendation for the screening and diagnosis of diabetes. In the revised guidelines, the ADA classified people with HbA1c levels 5.7 to 6.4 percent as very high risk for developing diabetes over the following five years (ADA, 2010b). A person without diabetes would have an HbA1c of about five percent and the diagnosis of diabetes would be made if the level rose to 6.5 percent or higher (ADA, 2010b). The ADA recommends people with diabetes to keep HbA1c level below seven percent in order to manage their disease properly and prevent complications (ADA, 2010b).

Although people with type 1 diabetes need insulin delivered by an injection or a pump for their survival, people with type 2 diabetes may be able to control their glucose level just by following an exercise program and a healthy meal plan (CDC, 2007). Among adults with diagnosed diabetes in both type 1 or type 2, 14% take insulin only, 13% take both insulin and oral medication, 57% take oral medication only and, 16% do not take either insulin or oral medication. Medications for each individual with diabetes usually change during the course of the disease (CDC, 2007).

Because of its long-term nature and importance of day to day care, diabetes self-care management and active participation of patients in their care are important factors in successful diabetes management (Funnell et al., 2010). Although good practices of physicians and other health care providers are important, disease management is not solely in the hands of health care providers. Moreover, many psychological, emotional, social, spiritual, cognitive, economic, literacy, and cultural factors are intertwined with diabetes management, and traditional medical models usually ignore these important factors (B. Anderson & Funnell, 2005; Funnell & Anderson, 2004). Therefore, Funnell et al. (1991) proposed the empowerment model as an appropriate model for diabetes management to address the areas neglected in traditional medical models in diabetes care (Funnell & Anderson, 2004; Funnell et al., 1991).

In this literature review, the empowerment model in diabetes care will be discussed by its important components. They are six components to this model; (1) racial and cultural issue, (2) the concept of patient empowerment in the diabetes care, (3) self-management education, (4) goal setting, (5) patient-provider communication, and (6) literacy.

(1) Racial & Cultural Issue

Racial or ethnic minority populations and people with low socioeconomic status are facing a greater risk of developing diabetes complications (Liburd, 2010). As stated, the African American population is one of the populations who are having a higher burden of diabetes both in terms of prevalence and complications. Correa-de-Araujo, McDermott, & Moy (2006) found that hospitalization due to diabetes complications decrease with higher income level in each racial and ethnic group (Correa-de-Araujo et al., 2006). Therefore, income appears to be a very important factor in diabetes management and control.

However, disparities in quality of health care, differences in health care behavior such as nutritional habits or physical inactivity, adherence to medication, psychosocial factors such as differing level of trust in providers or the health care systems, health literacy, educational attainment, access to health care, lack of or inadequate health insurance are also possible factors in the disparities of diabetes control (Dreeben, 2001; Liburd, 2010).

"Research has shown that doctors have poorer communication with minority patients than with others, but problems in doctor-patient communication have received little attention as a potential cause, a remedial one, of health disparities" (Ashton, et al., 2003). Cultural competency and cultural sensitivity of health care provider is a necessity to address health disparities in the different racial and ethnic groups. The patient empowerment approach is one of the possible solutions for addressing racial disparity in diabetes care (Dreeben, 2001; Greene, McClellan, Gardner & Larson, 2006; Liburd, 2010, p. 45).

(2) The Concept of Patient Empowerment in Diabetes Care

Patient empowerment is a philosophy that requires "a paradigm shift" from the traditional provider-centered medical model to a patient-centered collaborative care (Funnell & Anderson, 2004; Funnell & Anderson, 2003; Funnell et al., 1991). "Patient empowerment is defined as helping patients discover and develop the inherent capacity to be responsible for one's own life" (Funnell & Anderson, 2004, p.124; Funnell et al., 1991).

To foster the philosophy of empowerment in their practice, the health care providers need to recognize that people with diabetes are the experts of their own lives and are responsible for choices they make (Funnell & Anderson, 2003). Within this model, the role of the health care providers is "to inspire, inform, support and facilitate their patients to identify and attain their own goals" (Funnell & Anderson, 2003, p.456). Instead of applying behavior strategies to patients to change behavior, the health care providers should explain these strategies to their patients and allow them to make changes in behaviors of their own choosing (Funnell & Anderson, 2003; Funnell et al, 1991; Anderson, Funnell, Barr, Dedrick, & Davis, 1991). Because these changes are identified by the patients as being important to them, they are more likely to maintain the changes (Anderson et al., 1991; Funnell & Anderson, 2003; Funnell et al, 1991).

In the empowered caring model, which evolved out of a qualitative explanatory study with public health nurses, these nurses conceptualized empowerment as "an active, internal process of growth that was rooted in one's own cultural or religious or personal belief systems, reached toward actualizing one's full potential, and occurred within the context of a nurturing nurse-client relationship" (Falk-Rafael, 2001, p.4, Appendix A). The public health nurses believed that providers could only facilitate empowerment in others and could not create it for them. They identified that the empowerment process included active participation and increased awareness of one's own strengths and limitations, rights to have control over personal or family health issues, a voice in decisions directly affecting one's health, and social and political factors that influence health and health care (Falk-Rafael, 2001).

Moreover, an increase in knowledge and skills to act correctly on informed choices are also interwoven with active participation and increased awareness. They asserted that the process of empowerment began internally and it produces a ripple effect that positively affected the family members and other individuals that patients interacted with. Therefore, the health care providers are also empowered through their patients in a reciprocal effect (Falk-Rafael, 2001).

However, mere assumption of equal partnership in disease management is not sufficient to empower patients (Paterson, 2001). In health care settings, it is very common for the health care providers to discount the experiential knowledge of diabetes patients. Also, it is very common that the health care providers do not provide enough information and skills to support informed decision making process of diabetes patients. The health care providers are unable to let go of their own agendas, their control in the decision making process, feeling responsible for their patients (Funnell & Anderson, 2004; Paterson, 2001).

Embracing the philosophy of empowerment and integrating it into practice is easier said than done. The health care providers not only need to believe in the empowerment philosophy but also need to be aware of their own behaviors and learn to reflect and make necessary changes in their practice. Therefore, it takes behavior change and commitment of health care providers in order to cultivate a real empowerment approach in diabetes care (B. Anderson & Funnell, 2005; R. Anderson & Funnell, 2005; Funnell & Anderson, 2003). In a study from Sweden, the researchers found that physicians and nurses needed ongoing support to use an empowerment approach in their practices because it was difficult to define their role in the empowerment caring practice and they did not feel secure with the new roles (Adolfsson, Smide, Gregeby, Fernström, & Wikblad, 2004).

In the health care settings, empowered behaviors of patients are found to be associated with healthcare decision-making in terms of knowledge seeking, active involvement in the treatments, and self-treatment (Pierce & Schwartz, 2008, p. 3). A patient-centered collaborative approach in chronic illness care has been found to be effective (Wagner, et al., 2001). Research has documented that the patient empowerment approach is effective in the diabetes care (Anderson et al., 1995).

(3) Self-Management Education

Arnold, Butler, Anderson & Funnell (1995) proposed that as much as 95% of self-care is usually provided by the ill persons or their families in diabetes management. In the study by O'Connor et al. (2008), it was also found that the 95% of variance in HbA1c control was attributable to the patient level such as increased adherence to treatment guidelines or readiness to change (O' Connor et al., 2008). Diabetes self-management education (DSME) has been recognized as an essential component in diabetes care (ADA, 2010b; CDC, 2009; Funnell et al., 2010; National Institute of Health, 2008). The National Standard for DSME is designed on the evidence and are reviewed and updated every 5 years by a task force from the representatives of the key organizations in the field of diabetes education and care (ADA, 2010b; Funnell et al., 2010).

However, the actual DSME practice in the diabetes care seems to be very limited. Even though many health care settings are providing self-care management education, there are gaps in patient knowledge of diabetes care. The barriers in self-care management education include poor patient-provider communication, low health literacy of patients, low self-efficacy of patients, race, cultural and gender issues (Clark, 2008; Leichter, 2005; Gazmararian, Ziemer & Barnes, 2009; Odegard & Gray, 2008).

Moreover, the requirements of self-care management education for diabetes patients are very diverse and therefore, an individualized approach is recommended by national standards of DSME (Funnell et al., 2010). To keep the patient's glycemic index at the desirable level requires knowledge, skills, and psychosocial self-efficacy in a diabetes patient. Some basic necessary education includes stress management, nutrition, importance of adherence to medication, significance of exercise and physical activity, and self-monitoring of glucose level. Both hypoglycemia and hyperglycemia can cause acute life threatening complications like diabetic ketoacidosis and hyperosmolar nonketotic coma. Patients need to learn how to diagnose, appropriately treat and prevent these life threatening complications (Funnell et al., 2010; Funnell & Haas, 1995). In addition to that, they need to learn how to prevent, detect and seek treatments for chronic complications. Comorbidities are very common in diabetes patients and the care of comorbid diseases cannot be ignored in the DSME (Funnell et al., 2010; Funnell & Haas, 1995).

Furthermore, a one time education program is rarely effective; patients need on-going self-management education and support from their providers and the entire diabetes health care team. The researchers suggested that diabetes education should aim at a positive attitude to active self-care because it was found that patient's attitude was the most important determinant for active self-care. Social environment also has an important influence on the attitude of the patients and a supportive atmosphere is very important for the patient with diabetes (de Weerdt, Visser, Kok, & van der Veen, 1990). The supportive environment can be facilitated through support group formation, educating and counseling for family members, as well as creating supportive health care settings.

The objective of DMSE within the empowerment philosophy is to help patients to clarify their own problems, values and motivations and to identify diabetes related goals they really want to achieve in their diabetes care (Anderson et al., 1995; Funnell et al., 1991). To achieve DSME objectives, patients need a psychologically safe environment to explore their own emotions. Patients also need to have enough information on diabetes care and various treatment options, benefits and drawbacks of these options and enough knowledge and skills to change their own behaviors and solve their own problems (Arnold et al., 1995). The collaborative goal setting approach is an effective strategy in the empowerment-based DSME (Funnell & Anderson, 2004).

(4) Goal settings

The DSME within this approach enables patients to participate in the decision making process, have informed choices, and affords the ability not to blindly comply with or adhere to provider-selected goals (Funnell & Anderson, 2004). In general, the goal setting approach was found to have beneficial effects such as an increase in motivation and higher performance if they are self-set and attainable goals. However, conflicts between the provider's and patient's goals can cause undesirable effects (Locke & Latham, 2002). The collaborated goal setting approach is a solution to avoid conflicts between health care provider goals and patient goals. Goal setting helps both patients and providers. For patients, the process creates a sense of accountability and ownership which are very important in successful self-care management. For providers, collaborative goal setting helps them to identify the barriers to successful treatment (B. Anderson & Funnell, 2005; Langford, Sawyer, Gioimo, Brownson, & O'Toole, 2007).

Since the patients participate in the selection of goals, they are clear about these goals and therefore, more likely to be successful in achieving them (Heisler et al., 2002). Engaging patients in the goal setting process not only improves their self-efficacy but also provides emotional support and facilitates learning (Funnell & Anderson, 2004). Moreover, goal setting can enhance self-monitoring skill of the patient which is an integral part of the behavior change process (Delamater, 2006).

Funnell & Anderson identified a five step goal setting empowerment process: 1. explore the problem or issue; 2. clarify feelings and meaning; 3. commit to action; 4. experience and 5. evaluate the plan (Funnell & Anderson, 2004). Diabetes educators that have used collaborative goal setting approach have found some unexpected barriers to diabetes management (B. Anderson & Funnell, 2005). Implementing a successful empowerment process takes time, commitment, tolerance, understanding of patients' needs, patient support, and self-directed behavior change by the health care providers. Anecdotal evidence provided by diabetes educators and nurses suggests that collaborated goal setting can be an effective part of diabetes management (B. Anderson & Funnell, 2005; Falk-Rafael, 2001; Langford et al., 2007).

(5) Patient-Provider Communication

Provider behavior is a very important part of patient empowerment. Anderson & Funnell (1999) said attitude and vision of diabetes educators can influence the outcome of disease management. Physician behavior change has the possibility of fostering faster improvement in disease management (Solomon, 1995). Patient-centered care is now recognized as a core public health professional competency, central to meeting patients' evolving needs, improving the quality of care, and transforming the health care system (Institute of Medicine, 2003). This approach is especially important given the ethnic and cultural diversity in the United States (Institute of Medicine, 2003).

Research suggests that patient-provider interaction styles can influence patients' self-management in diabetes care (Heisler, Bouknight, Hayward, Smith, & Kerr, 2002). Physicians who used a participatory decision making style of communication can improve patients' self-care management. Patient perception of how well their physicians provide information on their illness and treatment were also strongly associated with diabetes self-management (Heisler et al., 2002). Patient understanding of their care was also found to have a strong independent effect on diabetes self-management (Heisler et al., 2002). Increasing patient motivation and patient engagement in the treatment may also be the secondary effect of patient involvement in the decision making process which improves the self-care management behavior (Worlpert & Anderson, 2001).

Physicians can provide essential basic knowledge needed for their patients to make their own decisions about their treatment and self-care priorities. Therefore, measures to promote better physician communication and patient understanding can improve patient's self-management behavior

(Heisler et al., 2002). However, many studies found that patients desire to seek more information from their physicians are not met. Many patients leave a physician's office visit without knowing how they should take care of themselves (Beisecker & Beisecker, 1990; DiMatteo, 1998).

In actual health care settings, primary care physicians and specialists are often unable to give the required amount of time to talk and educate the patient, which are vital to the adherence to treatment. Patients should be referred to diabetes educators for additional information and essential DSME but that does not always happen in diabetes care. The barrier includes restriction of DSME by health insurance providers (Powell, Glover, Probst, & Laditka, 2005).

Studies have found that feedback and reminders to providers improve the physicians' adherence to clinical guidelines (Phillips et al., 2002; Schectman, et al., 2004). Receiving patient feedback can have an effect on treatment. Improving provider-patient communication can facilitate positive health care outcomes by both improving patient adherence to self-care management and provider adherence to diabetes management guidelines.

(6) Literacy

Since patients need enough knowledge to make rational decisions for their own lives to feel empowered, communication materials are regarded as very useful tools for providing knowledge. Currently internet-based self care education is being provided by many organizations, but people with no or low computer literacy skills and general literacy skills are unable to access them. Printed materials are commonly used by health care centers to give additional information to the patients to compensate for the limited period of consultation (Mayer & Villaire, 2007).

However, communication materials should not be a replacement for the necessary education provided by health care providers. A meta-analysis of randomized controlled trial studies on self-management education for adults with type 2 diabetes found that there is an association between patient and educator contact time and improvement of HbA1c. It is noted that there is a decrease of 1% HbA1c for every additional 23.6 hours of contact between patients and educators (Norris, Lau, Smith, Schmid, & Engelgau, 2002). Therefore, the importance of interpersonal communication should not be discounted.

Because of health literacy issues, the communication materials should be simple, clear and designed for an audience of low reading level. Health literacy is the term used for literacy skills in the context of health care (Institute of Medicine, 2004). Literacy skills of Americans range from the nonreader to the highly literate. Half the U.S population read at the ninth-grade level or lower and most current health care instructions are above that level. About one out of five adult Americans read below the fifth-grade level (Doak, Doak & Root, 1996, p. 9).

In a study of adult health literacy in urban clinics, almost half of the patients were unable to read well enough to follow the instructions for laboratory tests and radiology procedures. Out of those patients, 43% denied difficulty in reading (Nurss et al., 1997). In the review by Roter, Rudd, & Comings (1998), they also noted that patients did not confess the reading difficulties to their health care providers, spouses, family members and friends (Roter et al., 1998). However, the intelligence levels of these patients were not limited and they were able to understand and learn the health education information provided by the health care providers (Doak et al., 1996; Nurss et al., 1997). Therefore, it is very important to understand and address the literacy issue properly in the implementation of patient empowerment interventions in diabetes care.

Areas of Future Research

There has been limited research on the comprehensive intervention of patient empowerment. Although there are interventions which claim to have a "patient empowerment in diabetes care" approach, they are using only some areas of the empowerment model. The interventions are mainly targeted to self-care management education and training of nurses and diabetes educators. Changes in attitude and behaviors of physicians are rarely addressed even though it is a very important area in the empowerment process.

Aujoulat, Luminet, & Deccache (2007) investigated the patient's experience in the empowerment process and they found "powerlessness" of patients in an empowerment care setting because the need of empowerment goes beyond medical settings. These are areas of future research because it is imperative to understand methods which can be used to enhance and sustain the empowerment of patients. Even though empowerment is a philosophy that is possible to enhance the practice of the providers, its effectiveness will depend on the vision and skills of the providers who are using it (Anderson & Funnell, 1999). It is important to develop evidence-based interventions by using this philosophy in its entirety. There are many questions to be answered in the patient-empowerment practices in diabetes care and looking at the association of patient empowerment level and desired outcome of metabolic control is an important preliminary step in addressing the application of this philosophy to practice.

Chapter III

Methods & Procedures

Primary Data Collection

Participants

Participants in this study were recruited in the Diabetes Clinic of the Grady Health System (GHS), Atlanta, Georgia for the intervention study named Patient Empowerment to Improve Diabetes Care (PEIDiC). The Endocrinology Division of the Medical Department of the Emory University conducted the study in collaboration with the Diabetes Clinic of the Grady Health System. The study was funded by ADA.

About 50% of patients in the Diabetes Clinic of GHS do not reach their ADA HbA1c goal. Ninety percent of first time visitors to the Diabetes Clinic of GHS are African Americans, 61% female and 87% have type 2 diabetes with median diabetes duration of 1.3 years. The average patient age is 52 years with 80% of patients age 40 and above. Average BMI is 31.7 kg/m^2 and 29% are overweight and 68% are obese. Patients tend to be economically disadvantaged, less than half have any type of health insurance, and literacy levels are low in many patients. Almost half of the patients are unable to read well enough to follow instructions for laboratory tests and radiology procedures (Barnes, C.S, personal communication, November 12, 2009).

For the primary study, eligibility requirements included a) being a patient in the Diabetes Clinic of the Grady Health System, b) Type 2 diabetes on insulin, c) and HbA1c greater than 7. Exclusion criteria included patients with language barriers or other issues (e.g. mentally impairment) that precluded reliable communication. A total of 828 patients who met the criteria voluntarily participated in the study; 450 patients were in the control group and 378 patients were in the intervention group.

Procedures

The research team of the Endocrinology Division of the Medical Department of the Emory University collected the data from June 2005 to June 2008. Recruitment took place at the Diabetes Clinic of the GHS. The researchers randomized patients into control group or the intervention group based on the last digit of the patient's medical record number: even digits to intervention group and odd digits to the control group. During recruitment, the patients were systematically approached and screened for possible participation. Those who choose to consider the study were taken to a private room in the Diabetes Clinic. If the patient consented to participate in the study, the pre-intervention questionnaires were administered primarily by interview because of the low literacy of many of the patients of the Diabetes Clinic of the Grady Health System.

While control patients received care as usual, the intervention patients received a) a "real time" (current values) road map (Appendix B), b) a communication card (Appendix C), c) coaching by a nurse or coach on goal setting of A1c and blood sugar level, and d) instructions on how to use these communication tools at home. The real time road map was a visual graphic report on the progress of A1c level and random blood glucose (sugar) level of patients over time (usually the last 6 clinic visits); it was generated by the nurse or coach from the computer at each intervention patient visit. A traffic spotlight analogy was used to present the status of glycemic control and the road maps were printed in color and given to the patient to post at home. They used red bars to show the patient's glycemic control being in the danger zone, yellow bars to show the patient's glycemic control in the caution zone and green bars to show the patient's glycemic control being good and normal. It is visually attractive and patient-friendly and an easy to follow progress report on the patient's glycemic control.

The communication card was a wallet-sized card which contains three questions related to A1c: what should my A1c be to stay healthy?; what is my A1c?; and what can we do to get my A1c better? The patients in the intervention groups were coached to practice the questions and were encouraged to use the card during their visits to the health care providers. The coach and patient, together, set diabetes management goals and documented these goals on the road maps. The coach helped the patients practice how to ask questions and negotiate goals with their doctors.

The panel of questionnaires were collected at 6 month (≥4 to <10 months), 12 month (≥10 to <16 month), 18 months (≥16 to <22 months) and 24 months (≥22 to <28 months). The research coach recruited participants from month 3 until month 33 of the study period; the duration of participation in the study varied from 8 to 26 month depending on the accrual date. All procedures were conducted by a trained research nurse or coach and were approved by appropriate Institutional Review Boards (IRB).

Measures

The study measures included data obtained from questionnaires, clinical lab values, self-report demographics (such as income and education level), and chart review. The data used in this sub-analysis included diabetes-related psychosocial self-efficacy measured by the 28-item Diabetes Empowerment Scale-Short Form (DES-SF) and the 13-item Patient Activation Measure (PAM).

DES-SF was developed by the Michigan University Diabetes Research and Training Center (Anderson, Funnell, Fitzgerald & Marrero, 2000; Anderson, Fitzgerald, Gruppen, Funnell, & Oh, 2003; Appendix D). Survey items for the DES-SF began with the common stem, "In general, I believe that I…" and sample statements include: "…know what part(s) of taking care of my diabetes that I am dissatisfied with," "…can find ways to feel better about having diabetes," and "…know enough about myself as a person to make diabetes care choices that are right for me." Possible responses on a 5-point Likert scale ranged from one (Strongly Disagree) to five (Strongly Agree). The scale is scored by averaging the scores of all completed items. Reliability and validity data provided preliminary evidence that the DES is a valid and reliable measure of overall diabetes-related psychosocial self-efficacy (Anderson et al., 2003).

The original questionnaire contained 37 items representing eight conceptual dimensions which assessed the need for change, developing a plan, overcoming barriers, asking for support, supporting oneself, coping with emotion, motivating oneself, and making diabetes care choices appropriate for one's priorities and circumstances. Using factor analyses the questionnaire was reduced to the current 28-item containing these three subscales: 1) managing the psychosocial aspects of diabetes with 9 items, 2) assessing dissatisfaction and readiness to change with 9 items, and 3) setting and achieving goals with 10 items (Anderson et al., 2003). The total scale score was used in this study.

PAM was developed by Dr. Judy Hibbard at the University of Oregon (Hibbard, Mahoney, Stockard, & Tusler, 2005; Hibbard, Stockard, Mahoney, & Tusler, 2004; Appendix E). The PAM score measures the knowledge, skills and confidence for managing one's own health and healthcare. It is generally used as a measure of patient empowerment in managing healthcare and disease status. The version used in the PEIDiC study is a shortened 13-item instrument which is down from the original 22-item that specifically deals with patients suffering from chronic conditions like diabetes. The Patient Activation Measure is scored by summing the 13 question survey (Hibbard et al., 2005). Each question used a Likert-type agreement scale with four possible answers: disagree strongly, disagree, agree and agree strongly. If one or two questions were missing answers the score was computed from the available answers and scaled up to represent the score from the 13-item questionnaire. If more than two answers were missing then the whole test is regarded as a missing a score (Hibbard et al., 2005). The raw score was converted to a theoretical 0 to 100 scale with 0 being the lowest activation and 100 being the highest. This score is also reported as one of four corresponding levels of activation with the lowest level being the least empowered.

Levels of Activation are categorized as follows:

Stage 1**-** "Starting to Take a Role" (score ≤47): Patient does not yet grasp that they must take an active role in their health.

Stage 2**-** "Building Knowledge and Confidence" (score≥47.1 and ≤55.1): Patient lacks the basic facts or has not connected these facts into a larger understanding of their health.

Stage 3**-** "Taking Action" (score ≥55.2 and ≤67.0): Patients have the key facts and are beginning to take action but may still lack confidence.

Stage 4**-** "Maintaining Behaviors" (score ≥67.1): Patients have adopted new behaviors but are still working to maintain these under stress or crises (Rask et al., 2009).

The Patient Activation Measure was developed using Rasch analyses and is an interval level, Guttman like measure. Validity has generally been shown by demonstrating that patients falling into a specific activation stage could be categorized the same way by independent judges who looked at interviews done with the patients (Hibbard et al., 2005; Hibbard et al., 2004). Previous research has shown that higher PAM scores indicate better adherence to medication, more self-management behaviors, and healthier behaviors (Hibbard, Mahoney, Stock, & Tusler, 2007; Mosen, Schmittdiel, Hibbard, Sobel & Remmers, 2007; Rask et al., 2009).

The knowledge level of patients on diabetes management was measured by a non-standardized questionnaire. In the questionnaire, the knowledge level of HbA1c is measured by the question "what should your A1c be?" Based on the responses, the patients were divided into three groups: patients who know the correct A1c goal; patients who do not know correct A1c goal but recognized the A1c term; patients who did not recognized the term A1c.

The socio-demographic data, clinical data and laboratory data were collected from the existing Diabetes Patient Tracking System (DPTS). DPTS was implemented in the GHS in 1991. It is an electronic database with feedback, reporting and decision support modules used to track patient outcomes. Clinical data from every diabetic visit to the Medical and Diabetes Clinic of the GHS were manually entered. Laboratory and administrative data were obtained by electronic transfer from GHS main laboratory. Therapy and disease markers, such as A1c, blood pressure, and lipid profiles can be linked to a single patient and monitored overtime.

Secondary Data Analysis

The data from PEIDiC randomized controlled longitudinal intervention study were provided for this analysis by the Diabetes Clinic of the GHS and by the research team of the Endocrinology Division of the Medical Department of the Emory University. The data were de-identified through the removal of identifiers such as patient medical record numbers, date of birth and addresses. This study was approved by the Georgia State University IRB.

Eligibility

As stated, 828 patients participated in the study and their data were incorporated into the data set. After non-African American patients were omitted from the study, 786 patients were left for this analysis. Of these 786 patients, 529 patients who have complete DES and PAM score and HbA1c data for the study period were used for this study.

Study Variables

The cross-sectional data analysis utilized three dependent variables: Diabetes Empowerment Score which is the summary score from the 28-item DES-SF, the summary score from the 13-item PAM, and the HbA1c level of each patient. Patients in the intervention group received additional individualized coaching, real time road map and HbA1c communication cards as stated and patients in the control group received Diabetes Clinic Standard care. The independent variables were the intervention and demographic factors of age, gender, educational attainment and income level.

Data Management

SPSS Version 16.0 was utilized for data management and statistical analysis purposes. Age was recoded from a continuous variable to the categorical variables of “50 and younger”, “51-64” and “65 and older”. Educational attainment was recoded from 6 categories to 3 categories which were “lower than high school graduate level”, “high school graduate or GED” and “some college or technical school and higher”.

Socioeconomic status or income level was recoded from 10 categories to 3 categories which were “income less than $5,000”, “income between $5,000 to $9,999” and “income $10,000 and more”.

Statistical Analysis

Descriptive analyses were conducted on the demographic variables of age, gender, educational attainment, employment, marital status, income level and other patient characteristics such as Body Mass Index (BMI), duration of diabetes, insulin use, HbA1c level, DES score and PAM score at the baseline level. The mean and standard deviations (SD) were computed for all the continuous variables while frequencies and percentages were computed for all categorical variables. Additional descriptive analyses were conducted to compare the control group and intervention group on these variables at baseline.

Two-Way ANOVA was conducted on DES score, PAM score and HbA1c level at the baseline and 12 month study period and with intervention group and demographic characteristics as independent variables. The mean and SD were computed for all variables. These analyses were conducted for descriptive purposes in order to describe these variables with respect to different levels of age, gender, educational attainment and income level.

Correlation

Pearson correlation was conducted to determine the degree of association of the dependent variables, (for example, HbA1c with DES and PAM scores overall as a group, at different intervention periods and by study group). These analyses were also stratified at by levels of age, gender, educational attainment and income.

Chapter IV

Results

The overall sample was 63.3% female and 66% reported an education level greater than or equal to high school graduate or GED. Only 16.5% of the overall sample was married and only 9.5% were employed full-time. The insulin use for the treatment of diabetes at the baseline level was 95.7% for the overall sample. Mean age was 55.6 years (SD = 11.37) and mean BMI of the overall sample was 34.6 (SD = 8.54, N = 519). Mean duration of diabetes of the overall sample was 10.8 years (SD = 8.12). Mean baseline HbA1c of the overall sample was 8.6% (SD = 2.10), mean baseline DES score of the overall sample was 4.2 (SD = 0.69) and mean baseline PAM score of the overall sample was 74.3 (SD = 16.48). The two treatment groups did not differ on any of these variables at the baseline assessment. However, the two groups did differ ($p = 0.013$) on income with the intervention group having a slightly higher percent (41.7%) in the upper income category compared to the control group (34.9%).

Two-Way ANOVAs were utilized to understand how HbA1c, DES scores and PAM scores differed between the study groups at the baseline and 12 month intervention period. Analyses were cross-sectional and the samples were stratified by age, gender, income and educational attainment to assess effect modification.

As seen in Table 2a, HbA1c did not appear to differ between the treatment and the control groups at the baseline and 12 month assessments. However, the mean HbA1c of both treatment and control group at the 12 month appeared to be lower than mean HbA1c of baseline at the different levels of age groups.

The result of a Two-Way ANOVA with baseline HbA1c as the dependent variable and treatment group and age group as independent variables indicated a significant main effect for age group ($F(2, 523) = 9.11$, $p < 0.001$), but no effects for either the treatment group main effects or the treatment by age group interaction. Based on the Tukey's post hoc test, mean HbA1c was significantly higher in the <50 age group compared to both the 51-64 age group ($p = 0.01$) and ≥ 65 age group ($p < 0.001$). The means for the two other age groups did not differ significantly. The result of a Two-Way ANOVA with 12 month HbA1c as the dependent variable and treatment group and age group as independent variable indicated a significant main effect for age group ($F(2, 316) = 6.53$, $p = 0.002$) but no effects for either two treatment groups or the treatment by age group interaction. Based on the Tukey's post hoc test, mean HbA1c was significantly higher in the <50 age group compared to the ≥ 65 age group ($p = 0.001$). The means for the other age groups did not differ significantly. As seen in Table 2b, the mean HbA1c of the both treatment and control groups at the 12 month appeared to be lower than mean HbA1c of baseline at all the different levels of age groups.

The results of Two-Way ANOVAs with baseline and 12 month HbA1c as the dependent variables and treatment group and gender as independent variables indicated no statistically significant effects for either the main effects or the interaction effect. As seen in Table 2c, the mean HbA1c of both treatment and control groups at the 12 month appeared to be lower than mean HbA1c of baseline for both genders.

The results of Two-Way ANOVAs with baseline and 12 month HbA1c as the dependent variable and treatment group and income as independent variables indicated no statistically significant effects for either the main effects or the interaction effect. As seen in Table 2d, the mean HbA1c of both treatment and control groups at the 12 month appeared to be lower than mean HbA1c of baseline at all the different levels of income.

The results of Two-Way ANOVAs with baseline and 12 month HbA1c as the dependent variable and treatment group and educational attainment as independent variables indicated no statistically significant effects for either the main effects or the interaction effect. As seen in Table 2e, mean HbA1c of both the treatment and control group at the 12 month appeared to be lower than mean HbA1c of baseline at all the different levels of educational attainment except in the control group for those with some college or technical school and higher where the values were very similar.

As seen Table 3a, DES scores did not appear to differ between the treatment and the control groups at baseline and 12 month. The result of a Two-Way ANOVA with baseline DES scores as the dependent variable and treatment group and age group as independent variables indicated a significant main effect for age group ($F(2, 523) = 3.675$, $p = .026$) and significant interaction effect for age group and treatment group ($F(2, 523) = 4.161$, $p = .016$). There was no main effect for treatment group. Based on Tukey's post hoc test, mean DES score was significantly higher in the 51to 64 age group compared to ≥ 65 age group in the control groups ($p = 0.011$) and it was significantly higher in the < 50 age group compared to 51to 64 age group in the intervention groups ($p = 0.025$). The means for the other age groups did not differ significantly at the baseline.

The results of a Two-Way ANOVA with 12 month DES scores as the dependent variable and treatment group and age as independent variables indicated no statistically significant effects for either the main effects or the interaction effect. As seen Table 3b, DES scores did not appear to differ between the treatment and the control groups at baseline and 12 month of the intervention period at any age groups except at the ≥ 65 age group which appeared have higher DES score in the intervention group at the 12 month.

The results of Two-Way ANOVAs with baseline and 12 month DES scores as the dependent variable and treatment group and gender as independent variables indicated no statistically significant effects for either the main effects or the interaction effect. As seen in Table 3c, DES scores of the study groups at 12 month did not appear to differ from DES scores at baseline for either gender.

The result of a Two-Way ANOVA with baseline DES score as the dependent variable and treatment group and income as independent variables indicated a significant main effect for income ($F(2, 498) = 4.094$, $p = 0.017$) but no effects for either treatment group or the treatment by age group interaction. Based on Tukey's post hoc test, mean DES score was significantly higher in the ≥$10,000 income group compared to $5,000 to $9,999 group ($p = 0.023$). The means for the other income groups did not differ significantly at the baseline. The results of a Two-Way ANOVA with 12 month DES scores as the dependent variable and treatment group and income as independent variables indicated no statistically significant effects for either the main effects or the interaction effect. As seen in Table 3d, DES scores did not appear to differ between the treatment and the control groups at baseline and 12 month of the intervention period at any income levels.

The result of a Two-Way ANOVA with baseline DES scores as the dependent variable and treatment group and educational attainment as independent variables indicated a significant main effect for educational attainment ($F(2, 521) = 5.949$, $p = 0.003$) and significant interaction effect for educational attainment and treatment group ($F(2, 521) = 3.438$, $p = 0.033$). There was no main effect for treatment group. Based on the Tukey's post hoc test, mean DES score was significantly higher in the some college or technical school and above group compared to the mean DES scores of lower than high school graduate level group ($p = 0.009$) and high school graduate or GED group ($p = 0.001$) in the intervention groups. The means between the other educational attainment groups did not differ significantly.

The results of a Two-Way ANOVA with 12 month DES scores as the dependent variable and treatment group and educational attainment as independent variables indicated no statistically significant effects for either the main effects or the interaction effect. As seen in Table 3e, DES scores did not appear to differ between the treatment and the control groups at baseline and 12 month of the intervention period at any levels of educational attainment.

As seen in Tables 4a to 4e, the results of Two-Way ANOVA with baseline and 12 month PAM scores as the dependent variables and treatment group and age, gender, income, or educational attainment as independent variables indicated that there were no statistically significant effects for either the main effects or the interaction effects. As seen in Tables 4a to 4e, PAM scores appeared to be higher at the12 month period in both treatment and the control groups.

In order to understand the association between DES score and HbA1c and PAM score and HbA1c, Pearson's correlations were utilized to determine the degree of association of these variables at the baseline, 6 month and 12 month intervention periods. The sample was also stratified by age, gender, income and educational attainment to assess confounding and effect modification. A seen in Table 5a, a negative association between DES score and HbA1c was found in the intervention group at the 6 month period of intervention at $p < 0.05$ level ($r(132) = -0.21$, $p = 0.014$) but there was no other significant association in the other groups. As seen in Table 5b, a negative association between DES score and HbA1c was found in the intervention group age more than or equal to 65 at the 6 month period of intervention at $p < 0.01$ level ($r(31) = -0.52$, $p = 0.003$) and no other significant association between DES score and HbA1c was found in any other groups.

As seen in Table 5c, a negative association between DES score and HbA1 was found in the intervention group female at the 6 month period of intervention at $p < 0.01$ level ($r(89) = -0.31$, $p = 0.003$) but there were no other significant associations in the other groups. As seen in Table 5d, a negative association between DES score and HbA1c was found in the control group with income of \$5,000 to \$9,999 at the 12 month period at $p < 0.05$ level ($r(34) = -0.42$, $p = 0.015$) but there were no other significant association between DES score and HbA1c in any other groups.

As seen in Table 5e, a negative association between DES score and HbA1c was found in the control group who had some college or technical school or higher level of educational attainment at the 6 month period at $p < 0.05$ level (r (30) = -0.38, p = 0.036). There was also a negative association between DES score and HbA1c in the intervention group who were high school graduate or GED at the 6 month period at $p < 0.01$ level (r (62) = -0.36, p = 0.004). There were also a possible negative association between DES score and HbA1c in the intervention group who had some college or technical school or higher level of educational attainment at the 6 month period but it was not significant (r (31) = -0.32, p = 0.083). Apart from these, no other significant associations between DES score and HbA1c were found in the analyses.

Although many Pearson's correlations coefficients between DES score and HbA1c were not significant, there was a pattern of weak negative association between the DES score and HbA1c in the correlation matrix. It seems to support hypothesis I which said DES score in diabetes care is negatively associated with the HbA1c level of diabetes patient.

As seen in Table 6a, there was no significant association between PAM score and HbA1c level in the treatment groups at both baseline and the 12 month period. As seen in Table 6b, a negative association between PAM score and HbA1c was found in the intervention group at the 6 month period for those ≤ 50 years of age at $p < 0.05$ level (r (37) = -0.37, p = 0.025) but there were no significant associations between PAM score and HbA1c at the other intervention periods or other age groups.

As seen in Tables 6b to 6d, there were no significant associations between PAM score and HbA1c of the treatment groups by gender and different levels of income groups at baseline, 6 month and 12 month intervention periods. As seen in Table 6e, a negative association between PAM score and HbA1c was found in the intervention group at the 12 month period of the study group with lower than high school graduate level of educational attainment at $p < 0.05$ level (r (22) = -0.45, p = 0.034).

Although many Pearson's correlation coefficients between PAM score and HbA1c were not significant, there was a pattern of weak negative association between the PAM score and HbA1c in the correlation matrix. It seems to support hypothesis II which said PAM scores in diabetes care is negatively associated with the HbA1c level of diabetes patients.

Table 1: Descriptive characteristics of the study sample at baseline

Variables	Overall N = 529	Control N = 287	Intervention N = 242	P-Values
Female (%)	63.3	63. 6	62.8	0.844
Married (%)	16.5	16.1	17	0.881
High School Graduate or GED and above (%)	66	63.3	69.3	0.291
Employed full-time (%)	9.5	8.7	10.3	0.890
Total Household Income (%)				0.013
<$5,000	33.9	31.6	36.6	
$5,000 -$9,999	28.0	33.5	21.7	
≥ $10,000	38.1	34.9	41.7	
Age (years) Mean (SD)	55.6 (11.37)	56.2 (11.59)	54.8 (11.08)	0.156
BMI Mean (SD)	34.6 (8.54)	34.7 (8.71)	34.5 (8.35)	0.825
Duration of diabetes (years) Mean (SD)	10.8 (8.12)	10.4 (8.00)	11.3 (8.24)	0.226
Baseline Hb A1c (%) Mean (SD)	8.6 (2.10)	8.5 (2.10)	8.7 (2.08)	0.265
Baseline DES score Mean (SD)	4.2 (0.69)	4.2 (0.70)	4.1 (0.67)	0.632
Baseline PAM score Mean (SD)	74.3 (16.48)	74.8 (15.79)	73.7 (17.28)	0.430
Using Insulin at baseline (%)	95.7	96.9	94.2	0.313

Note: BMI overall N= 519, Control N= 279, Intervention N= 240. One person did not report gender.

Table 2a: HbA1c levels at baseline and 12 month in different study groups

	Baseline Mean (SD), N	12 month Mean (SD), N
Control	8.5 (2.10), 287	8.0 (2.10), 178
Intervention	8.7 (2.08), 242	8.0 (1.77), 144

Table 2b: HbA1c levels at baseline and 12 month in different study groups stratified by age

		Baseline Mean (SD), N	12 month Mean (SD), N
≤50	Control	9.1 (2.43), 83	8.7 (2.94), 42
	Intervention	9.2 (2.53), 82	8.5 (2.19), 41
51-64	Control	8.4 (1.97), 131	8.0 (1.95), 79
	Intervention	8.7 (1.83), 111	7.9 (1.52), 68
≥ 65	Control	8.1 (1.81), 73	7.5 (1.31), 57
	Intervention	8.1 (1.57), 49	7.5 (1.58), 35

Note: According to the Tukey's tests, mean HbA1c was significantly higher in the < 50 age group compared to both the 51-64 age group ($p = 0.01$) and $\geq$ 65 age group ($p < 0.001$) at baseline and mean HbA1c was significantly higher in the <50 age group compared to the ≥ 65 age group ($p = 0.001$) at 12 month.

Table 2c: HbA1c levels at baseline and 12 month in different study groups stratified by gender

		Baseline Mean (SD), N	12 month Mean (SD), N
Male	Control	8.6 (2.30), 104	8.4 (2.67), 58
	Intervention	9.1 (2.32), 90	8.2 (1.71), 55
Female	Control	8.5 (1.98), 182	7.9 (1.75), 119
	Intervention	8.6 (1.90), 152	7.9 (1.80), 89

Table 2d: HbA1c levels at baseline and 12 month in different study groups stratified by income

		Baseline Mean (SD), N	12 month Mean (SD), N
<$5,000	Control	8.9 (2.32), 85	8.3 (2.30), 50
	Intervention	8.8 (2.02), 86	8.1 (1.69), 51
$5,000 - $9,999	Control	8.5 (2.02), 90	7.8 (2.05), 58
	Intervention	8.5 (2.05), 51	8.0 (2.03), 35
≥ $10,000	Control	8.2 (1.78), 94	8.0 (2.00), 62
	Intervention	8.8 (2.10), 98	7.8 (1.59), 56

Table 2e: HbA1c levels at baseline and 12 month in different study groups stratified by educational attainments

		Baseline Mean (SD), N	12 month Mean (SD), N
lower than high school graduate level	Control	8.6 (2.13), 105	7.9 (2.06), 67
	Intervention	8.5 (1.75), 74	7.9 (1.69), 49
high school graduate or GED	Control	8.5 (2.21), 107	7.9 (1.74), 72
	Intervention	8.8 (2.10), 104	8.2 (1.87), 61
some college or technical school and higher	Control	8.5 (1.94), 74	8.5 (2.72), 38
	Intervention	9.0 (2.37), 63	7.8 (1.71), 34

Table 3a: DES scores at baseline and 12 month in different study groups

	Baseline Mean (SD), N	12 month Mean (SD), N
Control	4.2 (0.70), 287	4.1 (0.62), 120
Intervention	4.1 (0.67), 242	4.2 (0.59), 100

Table 3b: DES scores at baseline and 12 month in different study groups stratified by age

		Baseline Mean (SD), N	12 month Mean (SD), N
≤50	Control	4.2 (0.75), 83	4.2 (0.57), 26
	Intervention	4.3 (0.60), 82	4.3 (0.54), 31
51-64	Control	4.3 (0.65), 131	4.2 (0.53), 59
	Intervention	4.0 (0.70), 111	4.2 (0.63), 43
≥ 65	Control	4.0 (0.71), 73	3.9 (0.72), 35
	Intervention	4.0 (0.65), 49	4.3 (0.60), 26

Note: According to the Tukey's test, mean DES score was significantly higher in the 51to 64 age group compared to ≥ 65 age group in the control groups ($p = 0.011$) and it was significantly higher in the < 50 age group compared to 51to 64 age group in the intervention groups ($p = 0.025$) at baseline.

Table 3c: DES scores at baseline and 12 month in different study groups stratified by gender

		Baseline Mean (SD), N	12 month Mean (SD), N
Male	Control	4.2 (0.71), 104	4.1 (0.62), 47
	Intervention	4.2 (0.66), 90	4.2 (0.59), 38
Female	Control	4.2 (0.70), 182	4.1 (0.62), 72
	Intervention	4.1 (0.67), 152	4.2 (0.60), 62

Table 3d: DES scores at baseline and 12 month in different study groups stratified by income

		Baseline Mean (SD), N	12 month Mean (SD), N
<$5,000	Control	4.2 (0.75), 85	4.1 (0.51), 36
	Intervention	4.1 (0.73), 86	4.1 (0.68), 37
$5,000 - $9,999	Control	4.1 (0.70), 90	4.0 (0.68), 38
	Intervention	4.0 (0.69), 51	4.1 (0.58), 23
≥ $10,000	Control	4.3 (0.63), 94	4.2 (0.64), 43
	Intervention	4.2 (0.60), 98	4.3 (0.49), 38

Note: According to the Tukey's test, mean DES score was significantly higher in the ≥ $10,000 income group compared to $ 5,000 to $ 9,999 group (p = 0.023) at baseline.

Table 3e: DES scores at baseline and 12 month in different study groups stratified by educational attainments

		Baseline Mean (SD), N	12 month Mean (SD), N
lower than high school graduate level	Control	4.1 (0.75), 105	4.0 (0.68), 44
	Intervention	4.1 (0.72), 74	4.2 (0.50), 24
high school graduate or GED	Control	4.2 (0.66), 107	4.2 (0.55), 51
	Intervention	4.0 (0.69), 104	4.2 (0.68), 51
some college or technical school and higher	Control	4.2 (0.68), 74	4.15 (0.62), 25
	Intervention	4.4 (0.46), 63	4.3 (0.53), 25

Note: According to the Tukey's test, mean DES score was significantly higher in the some college or technical school and above group compared to the mean DES scores of lower than high school graduate level group ($p = 0.009$) and high school graduate or GED group ($p = 0.001$) in the intervention groups at baseline.

Table 4a: PAM scores at baseline and 12 month in different study groups

	Baseline Mean (SD), N	12 month Mean (SD), N
Control	74.8 (15.79), 287	78.1 (14.81), 120
Intervention	73.7 (17.28), 242	78.4 (17.35), 98

Table 4b: PAM scores at baseline and 12 month in different study groups stratified by age

		Baseline Mean (SD), N	12 month Mean (SD), N
≤50	Control	74.1 (15.33), 83	78.8 (16.65), 26
	Intervention	75.0 (18.74), 82	79.4 (16.57), 31
51-64	Control	77.4 (15.34), 131	80.4 (14.04), 59
	Intervention	73.3 (16.55), 111	77.6 (17.75), 43
≥ 65	Control	71.1 (16.46), 73	73.6 (14.06), 35
	Intervention	72.3 (16.55), 49	78.4 (18.25), 24

Table 4c: PAM scores at baseline and 12 month in different study groups stratified by gender

		Baseline Mean (SD), N	12 month Mean (SD), N
Male	Control	76.0 (14.82), 104	77.4 (17.02), 47
	Intervention	73.4 (17.64), 90	77.9 (18.35), 38
Female	Control	74.1 (16.33), 182	78.5 (13.38), 72
	Intervention	73.9 (17.12), 152	78.6 (16.83), 60

Table 4d: PAM scores at baseline and 12 month in different study groups stratified by income

		Baseline Mean (SD), N	12 month Mean (SD), N
<$5,000	Control	75 (16.42), 85	79.8 (15.65), 36
	Intervention	70.6 (18.13), 86	79.8 (19.52), 37
$5,000 - $9,999	Control	75.3 (15.97), 90	73 (15.13), 38
	Intervention	76.2 (14.41), 51	73.3 (16.66), 23
≥ $10,000	Control	75.9 (15.16), 94	81.4 (13.17), 43
	Intervention	75.1 (17.30), 98	79.9 (15.65), 36

Table 4e: PAM scores at baseline and 12 month in different study groups stratified by educational attainments

		Baseline Mean (SD), N	12 month Mean (SD), N
lower than high school graduate level	Control	73.4 (17.31), 105	75.7 (13.24), 44
	Intervention	72.6 (18.64), 74	76.6 (16.91), 23
high school graduate or GED	Control	75.7 (15.93), 107	79.8 (16.17), 51
	Intervention	72.7 (16.35), 104	78.4 (18.59), 50
some college or technical school and higher	Control	75.5 (13.23), 74	78.9 (14.52), 25
	Intervention	77.1 (16.63), 63	80 (15.57), 25

Table 5a: Correlations between DES scores and HbA1c levels at different time periods in different study groups

	DES scores		
Hb A1c	Baseline r(n)	6 month r(n)	12 month r(n)
Overall	0.04 (529)	-0.09 (280)	-0.084 (206)
Control	0.041 (287)	0.02 (148)	-0.07 (112)
Intervention	0.04 (242)	-0.21 (132)*	-0.01 (94)

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5b: Correlations between DES scores and HbA1c levels at different time periods in different study groups stratified by age

	DES scores					
Hb A1c	Baseline		6 month		12 month	
	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)
≤50	0.06 (83)	0.11 (82)	-0.16 (42)	-0.11 (36)	-0.17 (24)	-0.16 (29)
51-64	-0.04 (131)	-0.06 (111)	0.09 (63)	-0.19 (65)	-0.09 (56)	-0.26 (42)
≥ 65	0.11 (73)	-0.04 (49)	0.09 (43)	-0.52 (31)**	-0.03 (32)	0.21 (23)

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5c: Correlations between DES scores and HbA1c levels at different time periods in different study groups stratified by gender

	DES scores					
Hb A1c	Baseline		6 month		12 month	
	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)
Male	0.06 (104)	0.08 (90)	0.03 (54)	-0.07 (43)	-0.22 (42)	-0.20 (37)
Female	0.03 (182)	-0.00 (152)	0.06 (93)	-0.31 (89)**	0.31 (69)	-0.05 (57)

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5d: Correlations between DES scores and HbA1c levels at different time periods in different study groups stratified by income

	DES scores					
Hb A1c	Baseline		6 month		12 month	
	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)
<$5,000	-0.11 (85)	0.19 (86)	0.11 (46)	-0.24 (49)	0.08 (33)	-0.21 (36)
$5,000 - $9,999	0.20 (90)	-0.18 (51)	0.05 (42)	0.06 (29)	-0.42 (34)*	-0.34 (20)
≥ $10,000	0.13 (94)	0.02 (98)	-0.00 (55)	-0.19 (52)	-0.02 (42)	0.15 (36)

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5e: Correlations between DES scores and HbA1c levels at different time periods in different study groups stratified by educational attainments

	DES scores					
Hb A1c	Baseline		6 month		12 month	
	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)
lower than high school graduate level	0.02 (105)	-0.04 (74)	0.06 (49)	0.05 (39)	0.08 (41)	0.13 (23)
high school graduate or GED	0.12 (107)	0.07 (104)	0.22 (68)	-0.36 (62)**	-0.15 (48)	-0.09 (47)
some college or technical school and higher	-0.05 (74)	0.05 (63)	-0.38 (30)*	-0.32 (31)	-0.22 (23)	-0.26 (24)

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6a: Correlations between PAM scores and HbA1c levels at different time periods in different study groups

	PAM score		
Hb A1c	Baseline r(n)	6 month r(n)	12 month r(n)
Overall	-0.03 (529)	-0.06 (278)	-0.04 (204)
Control	-0.02 (287)	0.02 (147)	-0.03 (112)
Intervention	-0.03 (242)	-0.15 (131)	-0.05 (92)

Table 6b: Correlations between PAM scores and HbA1c levels at different time periods in different study groups stratified by age

	PAM score					
Hb A1c	Baseline		6 month		12 month	
	Control	Intervention	Control	Intervention	Control	Intervention
≤50	0.04 (83)	0.01 (82)	-0.20 (41)	-0.37 (37)*	0.06 (24)	-0.20 (29)
51-64	-0.08 (131)	-0.10 (111)	0.15 (63)	0.00 (63)	-0.19 (56)	0.06 (42)
≥ 65	-0.02 (73)	-0.06 (49)	-0.00 (43)	-0.28 (31)	0.08 (32)	0.09 (21)

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6c: Correlations between PAM scores and HbA1c levels at different time periods in different study groups stratified by gender

	PAM score					
Hb A1c	Baseline		6 month		12 month	
	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)
Male	-0.09 (104)	-0.06 (90)	0.01 (53)	-0.20 (43)	-0.04 (42)	0.04 (37)
Female	0.02 (182)	-0.01 (152)	-0.01 (93)	-0.12 (88)	0.00 (69)	-0.11 (55)

Table 6d: Correlations between PAM scores and HbA1c levels at different time periods in different study groups stratified by income

	PAM score					
Hb A1c	Baseline		6 month		12 month	
	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)
<$5,000	-0.16 (85)	0.14 (86)	-0.01 (45)	-0.28 (48)	0.21 (33)	0.08 (36)
$5,000 - $9,999	0.03 (90)	-0.16 (51)	0.05 (41)	-0.16 (28)	-0.14 (34)	-0.10 (20)
≥ $10,000	0.15 (94)	-0.05 (98)	0.01 (56)	-0.02 (52)	-0.29 (42)	-0.19 (34)

Table 6e: Correlations between PAM scores and HbA1c levels at different time periods in different study groups stratified by educational attainments

	PAM score					
Hb A1c	Baseline		6 month		12 month	
	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)	Control r(n)	Intervention r(n)
lower than high school graduate level	-0.13 (105)	0.05 (74)	0.16 (49)	-0.02 (38)	0.20 (41)	0.45 (22)*
high school graduate or GED	0.09 (107)	-0.05 (104)	0.06 (67)	-0.16 (63)	0.06 (48)	-0.19 (46)
some college or technical school and higher	-0.00 (74)	-0.08 (63)	-0.22 (30)	-0.30 (30)	-0.36 (23)	-0.00 (24)

*. Correlation is significant at the 0.05 level (2-tailed).

Chapter V

Discussion & Conclusion

Discussion

Diabetes is a costly complex disease to manage, and therefore, its burden in the United States is great (CDC, 2009; ADA, 2008). Because the prevalence, morbidity and mortality rates of diabetes are higher for African Americans as compared to their white counterparts, they carry a higher share of the burden of diabetes (U.S Department of Health and Human Services, 2009). Racial disparities in access to health care, health literacy problems, socio economic factors, beliefs, behaviors, lifestyles and other cultural issues suggest patient empowerment can be a solution to these problems (Dreeben, 2001; Greene et al., 2006, Liburd, 2010).

Patient empowerment is a philosophy which is changing the medical paradigm from the traditional provider-centered medical care model to the patient-centered care model (Funnell & Anderson, 2004). The patient-centered care has been tested and shown effective in chronic illness care (Wagner et al., 2001). In current diabetes care, the patient empowerment model is used mainly in DSME and nursing care (B. Anderson & Funnell, 2005; Falk-Rafael, 2001). Individualized education based on assessment and planning collaboratively with patients, an important area of patient empowerment, has been suggested as one of the standards of national DSME guidelines (Funnell et al., 2010).

However, many other areas are needed to be considered to fully empower a patient. To encourage the patient's autonomy of their own care, health care providers should integrate the patient empowerment philosophy into their practice (B. Anderson & Funnell, 2005; R. Anderson & Funnell, 2005). In addition to that, health care providers need a supportive environment to foster a patient empowerment approach because letting go of control in disease management is not an easy task for them (Adolfsson et al., 2004). Furthermore, patient's powerlessness goes beyond medical settings and it is important to identify problems of powerlessness and to find ways to address these identified problems (Aujoulat et al., 2007).

Even though there are studies on certain important parts of patient empowerment in diabetes care, there are still gaps in fully understanding the implications of patient empowerment. Trainings, guidelines, philosophies, and theories are available there but there are very limited studies in the implementation of diabetes care using this philosophy fully. The association between patient empowerment and HbA1c is of great interest, but still not completely understood. Therefore, this study was focused on assessing this association.

The Descriptive Analyses

The descriptive analyses helped to understand the characteristic of the study sample. More than half of the study sample was female and less than 20% were married. Less than 10% had full-time employment and more than half of them were living with an annual income less than $10, 000. The mean age of the study sample was about 56 years and over half of them had an education level of high school graduate or GED or greater. The mean duration with diabetes was about 11 years and about 96% were on insulin implying that the study population was probably very familiar with diabetes self-management education and the health care providers of the Diabetes Clinic.

Cross-sectional analysis showed there were no significant differences of HbA1c level between the intervention groups (control/ intervention) at both intervention periods. HbA1c level was found to be highest in the youngest age group, was $\leq$ 50 years, at baseline and at the 12 month period.

Empowerment level of patients was measured by two scales: the DES-SF and PAM. The baseline mean DES score was 4.2 indicating the empowerment level of the study sample was already high when compared to the mean DES score (3.89) of urban African Americans in the City of Detroit (Anderson et al., 2005). The baseline mean PAM score was 74.3 indicating that the study sample was already in the activation level stage 4, the highest level of activation. The mean PAM score in this study was higher than the mean PAM score of chronic disease patients from a study in Oregon where the study sample was predominantly white female and between 50-70 years of age (Hibbard et al., 2007).

The descriptive cross-sectional study of DES scores (Table 3b) showed that the mean DES score was significantly higher in the intervention group for the less than 50 age group. It was significantly higher in 51-64 age group versus 65 or older age group in the control group at the baseline. It was also significantly higher in the study sample for subjects of more than $10,000 annual income versus subjects with an income $5,000 to $9,999 in both treatment groups at the baseline (Table 3d). In addition , the mean DES score was significantly higher in the subjects with some college or technical school and higher level of education versus the subjects with a lower level of education in the intervention group at baseline (Table 3e). The findings suggest that mean DES scores in this sample were higher for those in the younger age group, and for those with a higher income level and higher education attainment. There were no significant differences of DES score between the intervention groups at both intervention periods. No significant differences were found in the cross-sectional study of PAM scores at different age, gender, income, and educational attainment levels.

Testing of Hypothesis I

It was hypothesized that the DES scores of patients in diabetes care would be negatively associated with the HbA1c level. There were some significant negative associations between DES scores and HbA1c level as follows:

- overall intervention group at the 6 month period of intervention (Table 5a, p. 39),
- the intervention group age more than or equal to 65 at the 6 month period of intervention (Table 5b, p. 39),
- the intervention group female at the 6 month period of intervention (Table 5c, p. 39),
- the control group income $5000 to $9,999 at the 12 month period of intervention (Table 5d, p. 40),
- the control group who had some college or technical school or higher level of educational attainment at the 6 month period of intervention (Table 5e, p. 40) and
- the intervention group who were high school graduate or GED at the 6 month period of intervention (Table 5e, p. 40).

There were also many weak negative associations between DES score and HbA1c level (Table 5a to 5e, p. 39 - 40). However, there was no consistent pattern of association which can strongly support the hypothesis. Therefore, it was concluded that there was no significant association between DES score and HbA1c level based on data from the sample.

Few studies were found that allowed for comparison of the findings from this study.. In a previous study which used the 37-item DES, it was concluded that patient empowerment is effective for both psychosocial and blood glucose level improvement (Anderson et al., 1995). The participants were middle-aged women, overweight and more than half were using insulin. Another study which used the 28-item DES-SF did not show any significant results (Anderson, et al., 2005). The study sample was African American and predominantly female but only 38% were on insulin. Another study showed DES-SF score and HbA1c levels both changed in a positive direction, but were not correlated (Anderson et al., 2003).

Testing of Hypothesis II

It was hypothesized that PAM scores of patients in diabetes care would be negatively associated with the HbA1c level. There were very few significant associations between PAM score and HbA1c level as follows:

- the intervention group at the 6 month intervention period of the study group ≤ 50 years of age (Table 6b, p.41) and
- the intervention group at the 12 month intervention period of the study group lower than high school graduate level of educational attainment (Table 6e, p.42).

There were many weak associations between PAM score and HbA1c level but there was no consistent pattern which can strongly support the hypothesis (Table 6a to 6e, p.41 - 42). Therefore, it was concluded that there was no significant association between PAM score and HbA1c level based on data from the sample.

Very few studies were found that allowed for comparison of these results. In a previous study which was done in the GHS, it was found that diabetes patients with high PAM score were more likely to engage in self-care behavior like feet checks, and exercising regularly, and they were more likely to receive eye examinations. However, it was not associated with HbA1c knowledge. The study participants were African American women with a mean age of 51 years (Rask et al., 2009). In another study which was done with 50-70 year old predominantly white women who were chronic disease patients, it was found that a positive change in PAM score was related to positive change in a variety of self-management behavior and also related to maintenance of that self-management behavior overtime (Hibbard et al., 2007). Another study by Mosen et al. (2007) which was done on chronic disease patients also showed similar results, however, the study participants were about 62 years old and predominantly white.

An empowerment-based multi disciplinary education program for diabetes patients with prolonged self-management difficulties has shown that empowerment has a beneficial effect on glycemic control especially in women (Keers, et al., 2006). A study of a pilot program on empowerment-based diabetes management among low-income African American has also shown better HbA1c control and higher percentage of receiveing eye, feet and dental examinations in the patients enrolled in the program (Greene, 2006).

Limitations

There were many limitations to this study. This study used data of African American patients from the Diabetes Clinic of the Grady Health System and may not be generalizable outside this population. Another limitation relates to sample size. Many issues contributed to the sample size issue such as failure to return, failure to obtain lab work and poor adherence. Given these issues, only data collection at baseline through 12 month of the intervention was used for this analysis. Sample sizes were different between baseline and the 12 month period, and also between different intervention groups and among gender and different levels of age, income, and educational attainment. Therefore, comparison of these data was difficult. In addition, the scales used in the patient empowerment surveys may be less sensitive in certain populations (Bernal, Wooley, & Schensul, 1997; Chachamovich, Fleck, & Power, 2009; Hartley & MacLean, 2006).

Moreover, there were very few significant differences in the HbA1c level, DES score, and PAM score between the treatment groups at baseline and 12 month in this particular study sample. Less variation in data may be due to the fact that patients from both treatment groups were both able to access the endocrinologists, nutritionists, HbA1c information and standardized diabetes educations. In addition, duration of diabetes for the subjects was substantial and most were on insulin. It is possible that the study sample was very familiar with diabetes self-management education and the health care providers of the Diabetes Clinic. Volunteer bias and spillover effect were also possible in the PEIDiC study. Finally, baseline DES score and PAM score showed their level of empowerment was already high.

Conclusion

Patient empowerment scores measured by DES-SF and PAM were not significantly associated with HbA1c level in African American diabetes patients of the Diabetes Clinic of the Grady Health System. Further study is necessary to understand the association between patient empowerment and diabetes disease management by using different measures of patient empowerment, different levels of disease management, and measurement in different settings.

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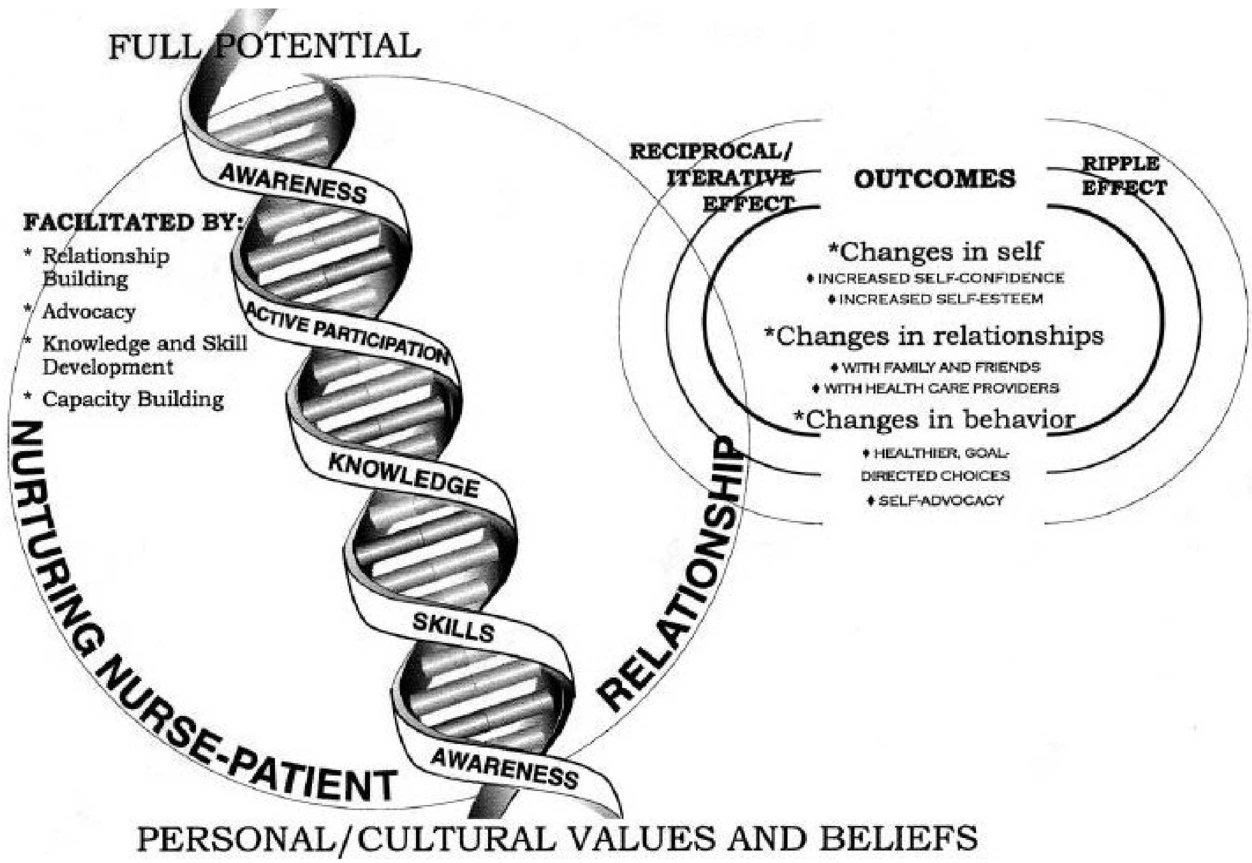
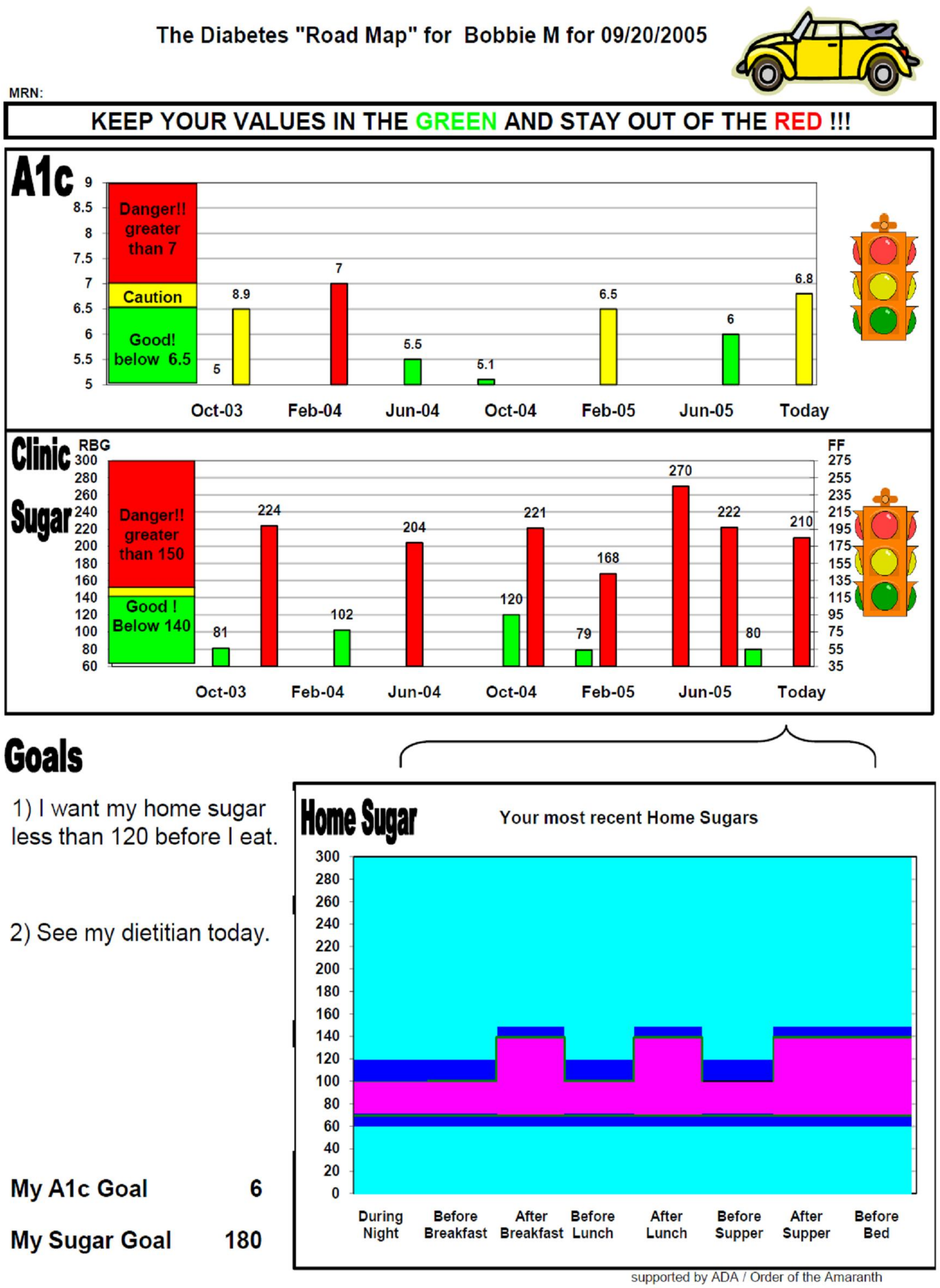
APPENDICES

APPENDIX A: Empowered Caring Model



Source: Falk-Rafael, A. R. (2001). Empowerment as a process of evolving consciousness: a model of empowered caring. *Advances in Nursing Science, 24*(1), pp. 5. Reproduced with permission of the author.

APPENDIX B: A Real Time Road Map

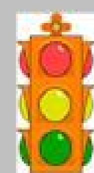


APPENDIX C: Communication Card

"What should my A1C be to stay healthy?"

"What is my A1C?"

"What can we do to get my A1C better?"



APPENDIX D: Diabetes Empowerment Scale-Short Form

Attitudes Toward Diabetes – DES

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that I:					
1. ...know what part(s) of taking care of my diabetes that I am **satisfied** with.	( )	( )	( )	( )	( )
2. ...know what part(s) of taking care of my diabetes that I am **dissatisfied** with.	( )	( )	( )	( )	( )
3. ...know what part(s) of taking care of my diabetes that I am ready to change.	( )	( )	( )	( )	( )
4. ...know what part(s) of taking care of my diabetes that I am not ready to change.	( )	( )	( )	( )	( )
5. ...can choose realistic diabetes goals.	( )	( )	( )	( )	( )
6. ...know which of my diabetes goals are **most** important to me.	( )	( )	( )	( )	( )
7. ...know the things about **myself** that either help or prevent me from reaching my diabetes goals.	( )	( )	( )	( )	( )
8. ...can come up with good ideas to help me reach my goals.	( )	( )	( )	( )	( )
9. ...am able to turn my diabetes goals into a workable plan.	( )	( )	( )	( )	( )

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that I:					
20. ...can cope well with diabetes-related stress.	( )	( )	( )	( )	( )
21. ...know where I can get support for having and caring for my diabetes.	( )	( )	( )	( )	( )
22. ...can ask for support for having and caring for my diabetes when I need it.	( )	( )	( )	( )	( )
23. ...can support myself in dealing with my diabetes.	( )	( )	( )	( )	( )
24. ...know what helps me stay motivated to care for my diabetes.	( )	( )	( )	( )	( )
25. ..can motivate myself to care for my diabetes.	( )	( )	( )	( )	( )
26. ...know enough about diabetes to make self-care choices that are right for me.	( )	( )	( )	( )	( )
27. ...know enough about my-self as a person to make diabetes care choices that are right for me.	( )	( )	( )	( )	( )
28. ...am able to figure out if it is worth my while to change how I take care of my diabetes.	( )	( )	( )	( )	( )

Thank you very much for completing this questionnaire.

Appendix E: Patient Activation Measure

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. When all is said and done, I am the person who is responsible for managing my health condition.	☐	☐	☐	☐
2. Taking an active role in my own health care is the most important factor in determining my health and ability to function.	☐	☐	☐	☐
3. I am confident that I can take actions that will help prevent or minimize some symptoms or problems associated with my health condition.	☐	☐	☐	☐
4. I know what each of my prescribed medications do.	☐	☐	☐	☐
5. I am confident that I can tell when I need to go get medical care and when I can handle a health problem myself.	☐	☐	☐	☐
6. I am confident I can tell a doctor concerns I have even when he or she does not ask.	☐	☐	☐	☐
7. I am confident that I can follow through on medical treatments I need to do at home.	☐	☐	☐	☐
8. I understand the nature and causes of my health condition(s).	☐	☐	☐	☐
9. I know the different medical treatment options available for my health condition.	☐	☐	☐	☐
10. I have been able to maintain the lifestyle changes for my health condition that I have made.	☐	☐	☐	☐
11. I know how to prevent further problems with my health condition.	☐	☐	☐	☐
12. I am confident I can figure out solutions when new situations or problems arise with my health condition.	☐	☐	☐	☐
13. I am confident that I can maintain lifestyle changes, like diet and exercise, even during times of stress.	☐	☐	☐	☐