VARIABLES THAT MAY AFFECT PHYSICAL ACTIVITY LEVELS IN AFRICAN AMERICAN FEMALES WITH TYPE 2 DIABETES

by

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Submitted to Rush University in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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DISSERTATION APPROVAL FORM

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Type 2 diabetes continues to pose a significant health challenge for the United States. The incidence and prevalence rates for type 2 diabetes are higher for certain at risk populations such as African American females. Personal behaviors including high-fat, high-caloric diets and physical inactivity result in obesity and insulin resistance that are associated with type 2 diabetes. Physical inactivity is particularly common in African American females, and this places them at an increased risk for the development of type 2 diabetes. Certain variables have been shown to influence physical activity. The purpose of this study was to examine how selected variables such as family/friend social support for exercise, self-efficacy for exercise, body image discrepancy, exercise variables including physical environment, sense of community, social issues and roles, and socioeconomic status (household income and level of education) influence physical activity levels in African American females with type 2 diabetes. The design for this study was nonexperimental, descriptive, cross-sectional, and correlational. A series of self-report instruments were used to examine the relationships between the independent study variables and the dependent variable, physical activity. In addition, two short
narrative questions that asked about physical activity and exercise and a third that asked about physical activity and diabetes were formulated and asked by the principal investigator (PI); the participants’ responses were written down by the PI. The sample for the study consisted of 50 African American females who had a documented diagnosis of type 2 diabetes and who were recruited from the diabetes center of a mid-sized hospital. Results of the study suggested that higher levels of self-efficacy for exercise, family social support for exercise, and a decrease in physical environmental barriers may serve to increase physical activity levels in this population. No relationship was observed between friend social support for exercise, body image discrepancy, sense of community, social roles and issues, socioeconomic status, and physical activity levels.
DEDICATION

This dissertation is dedicated first to God for giving me the strength to pursue this endeavor and then to the people in my life who have supported me over the course of the past seven years. To my children, Adrienne and Marc, for giving me their unconditional love and encouragement. To David, my friend and soul, for supporting me and for being there for me every step of the way. To the memory of my parents, John and Dorothy, for all their hard work and for teaching me to believe in myself. To my best friend, Mary Ann, and close friends, Samantha, Linda D., Marci, and JoAnna, for their patience and understanding. And finally, to my special friends, Yvette, Loretta, and Lisa, whose help, support, and hand-holding during this endeavor will never be forgotten.
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CHAPTER I

The Research Problem

Introduction

Diabetes poses a significant clinical and public health challenge for the United States. According to the American Diabetes Association, the total prevalence of diabetes in the United States for all ages in 2007 was 23.6 million people or 8% of the population (American Diabetes Association Total Prevalence of Diabetes & Pre-diabetes, n.d.). Of these 23.6 million people, 17.9 million have been diagnosed with diabetes while another 5.7 million remain undiagnosed (American Diabetes Association Total Prevalence of Diabetes & Pre-diabetes, n.d.). This number of diagnosed cases of diabetes has more than tripled when compared to the 5.6 million cases diagnosed in 1980 (Centers for Disease Control and Prevention Diabetes Data and Trends, 2008). Approximately 90% to 95% (16.1 to 17.0 million respectively) of the 17.9 million diagnosed cases have type 2 diabetes (American Diabetes Association The Dangerous Toll of Diabetes, n.d.).

Data indicate that the number of diagnosed cases of diabetes in the United States will continue to increase. Narayan, Boyle, Geiss, Saaddine, and Thompson (2006) predict that the number of diagnosed case is expected to reach a staggering 48.3 million by 2050. There are several factors that account for this increased prevalence. Age is one factor that accounts for the increased prevalence of diabetes. Results of the Diabetes Prevention Program supports that increasing age is one of the predictors for the development of type 2 diabetes since it is more prevalent in those over age 45 (Edelstein, et al., 2005). This is particularly important when considering the future population trends of the United States as the number of aging “baby boomers” continues to grow. Another
factor that contributes to the increase in prevalence rates of diabetes is the increased
growth of at-risk populations. These at-risk populations include African Americans,
Hispanics, American Indians, Alaska Natives, Asians, and other Pacific Islanders.
According to Centers for Disease Control and Prevention (CDC) National Diabetes
Surveillance System (2008), the prevalence of type 2 diabetes in these populations is
especially high when compared to that of Caucasians. Data from the CDC National
Diabetes Surveillance System (2008) shows that the age-adjusted prevalence of
diagnosed diabetes from 1980 through 2006 was higher among African Americans when
compared to Caucasians, particularly in African American females. In 1980, the age-
adjusted prevalence of diagnosed diabetes for African American females was 4.9 per 100
population as compared to 2.6 per 100 population for Caucasian females. While the age-
adjusted prevalence of diagnosed diabetes for both Caucasian and African American
females had increased in 2006, prevalence rates continued to remain highest for African
American females (8.8 per 100 population) as compared to Caucasian females (5.0 per
100 population) and Hispanic females (5.1 per 100 population) (Centers for Disease

There are several factors that may serve to explain this dramatic increase in
diabetes among African American females as well as other at-risk populations.
Socioeconomic status, such as level of education and income, may provide some
explanation for this increase. African American females along with members of other at-
risk populations are often economically disadvantaged and are less likely to have access
to adequate health care (Aday, 2001; Black, 2002). Lack of education in these groups
may also limit the degree to which they seek preventive health care (Aday, 2001; Agency
for Healthcare Research and Quality [AHRQ], 2000). Other factors that contribute to this
dramatic increase in diabetes include personal behaviors, such as high-caloric, high-fat
diets and lack of physical activity resulting in obesity and insulin resistance (Brancati,
Kao, Folsom, Watson, & Szklo, 2000). Both obesity and insulin resistance are associated
with type 2 diabetes (Rewers & Hamman, 1995).

Serious health problems and complications may result from type 2 diabetes,
including neuropathy, retinopathy, nephropathy, coronary artery disease (CAD),
peripheral vascular disease (PVD), stroke, amputations, and dental disease (CDC
National Diabetes Fact Sheet, 2005). Retinopathy, nephropathy, and neuropathy
(microvascular disease) are complications that are thought to occur from chronic
hyperglycemia. These findings are supported by the Diabetes Control and Complications
Trial (DCCT). Findings of this study support that lowering of blood glucose resulted in a
76% reduced risk for retinopathy, 50% reduced risk for nephropathy, and 60% reduced
risk for neuropathy (National Diabetes Information Clearinghouse, 2008). The role of
chronic hyperglycemia in the development of macrovascular complications such as CAD,
stroke, and PVD is less conclusive. However, persons with type 2 diabetes experience
cardiovascular events and mortality two to four times more often than those without type
2 diabetes. The occurrence of these events correlates with elevated glycosylated
hemoglobin (HbA1C) levels (CDC National Diabetes Fact Sheet, 2005). Health problems
and complications that are associated with diabetes contribute to impaired quality of life
as well as substantial economic costs. Changes in lifestyle may result from diabetes-
related complications such as cardiovascular disease, blindness, end-stage renal disease,
and lower-limb amputations (American Diabetes Association Complications of Diabetes
in the United States, n.d.). The economic costs of diabetes are staggering and continue to increase. The American Diabetes Association (2003) estimated that the total cost of diabetes in 2002 was as much as $132 billion dollars; this included direct medical expenditures as well as indirect expenditures such as lost workdays, restricted activity days, and permanent disability. These total costs are projected to rise to an estimated $156 billion by 2010 and to $192 billion by 2020 (American Diabetes Association, 2003).

Risk for the development of complications that occurs with type 2 diabetes may be reduced by maintaining HbA1C levels as close to normal (<6%) as possible (American Diabetes Association, 2007; American Diabetes Association, 2008; American Diabetes Association, 2009). Measures to achieve good glucose control include taking prescribed medications, self-monitoring of blood glucose, following a calorie/carbohydrate-controlled, heart-healthy diet, and exercising regularly. Regular exercise should consist of at least 150 min/week of moderate-intensity aerobic physical activity (50% to 70% of maximum heart rate) or 90 min/week of vigorous aerobic exercise (>70% of maximum heart rate) and resistance training three times per week. Exercise should be distributed over at least 3 days per week and with no more than 2 consecutive days without physical activity (American Diabetes Association, 2007; American Diabetes Association, 2008; American Diabetes Association, 2009). Regular physical activity such as this helps to improve blood glucose levels, insulin sensitivity, promote weight loss, and decrease obesity (American Diabetes Association, 2007; American Diabetes Association, 2008; American Diabetes Association, 2009).

Despite the benefits of exercise that were previously outlined, physical inactivity
continues to affect a large portion of the population of the United States. According to the U.S. Physical Activity Statistics Report compiled by the CDC, only 48.1% of the population of the United States met the recommended guidelines for physical activity in 2005 (CDC U.S Physical Activity Statistics, 2008). This problem of physical inactivity is particularly common in African American females. Schoenborn, Adams, Barnes, Vickerie, and Schiller, (2004) reported that 55.1% of African American females were physically inactive as compared to 38.3% of Caucasian females. This lack of physical activity places African American females with type 2 diabetes at an even greater risk for the development of diabetes-related complications (American Diabetes Association Complications of Diabetes in the United States, n.d.). Therefore, it is important to identify factors that may serve as facilitators as well as those factors that may serve as barriers of physical activity in this population.

Certain variables such as social support and self-efficacy have been shown to influence health behavior. Research indicates that social support is an important facilitator of exercise (Nies & Kershaw, 2002) and diabetes diet adherence (Wen, Shepherd, & Parchman, 2004). Self-efficacy is also regarded as a key facilitator of exercise behavior (Sharma, Sargent, & Stacy, 2005). Bandura’s self-efficacy theory (1986) has also been used to predict diabetes self-management as well as treatment adherence (Aljasem, Peyrot, Wissow, & Rubin, 2001).

Body image is another variable that may influence physical activity. Body image refers to an individual's perception of body size and the emotional attitude towards that perception. It is suggested that both perception of body size and the emotional attitude towards that perception influence the need for weight control which can be achieved
through regular physical activity (Baptiste-Roberts, Gary, Bone, Hill, & Brancati, 2006). Perception of body size, body shape, and body image ideals (body shape desired) are formed and influenced by culture (Fitzgibbon, Blackman, & Avellone, 2000). In the United States, African American women tend to prefer larger and more moderate body sizes as ideal in comparison to Caucasian women who tend to favor thin, slender body sizes. African American women also perceive their actual body sizes as being closer to their ideal body sizes. On the other hand, Caucasian women tend to favor smaller body sizes than their own as being ideal. This may help to explain why African American females are less likely to perceive themselves as overweight when compared to Caucasian females (Celio, Zabinski, & Wilfley, 2002; Flynn & Fitzgibbon, 1998). Acceptance of a heavier body image and body image ideal by African American women may act as an important contributor to the perception of the lack of need for weight loss and exercise (Baptiste-Roberts, et al., 2006).

Exercise barriers and socioeconomic status are other variables that may influence physical activity. Exercise barriers are defined as factors that prohibit or keep one from exercising (Sechrist, Walker, & Pender, 1987). Barriers to exercise may include such things as physical environment, social issues, and social roles (Evenson, Eyler, Wilcox, Thompson, & Burke, 2003). Socioeconomic status (level of education and income) may also act as a determinant of physical activity (Williams, 1997; Williams, 2002). Lower levels of education and income may result in less likelihood of changing health behaviors (Williams & Jackson, 2005). This study will examine the relationship of selected variables to self-report of physical activity in African American females with type 2 diabetes. These variables include family/friend social support for exercise, body image
discrepancy, exercise self-efficacy, exercise barriers, and socioeconomic status (level of education and household income).

Definition of Terms

1. **Family social support**
   
   refers to things that “members of the household” might do or say to someone who is trying to exercise regularly (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). In this study, family social support was measured by the family subscale of the Social Support and Exercise Survey (Sallis, 1986; Sallis, et al., 1987).

2. **Friend social support**
   
   refers to things that “friends, acquaintances, or co-workers” might do or say to someone who is trying to exercise regularly (Sallis, et al., 1987). In this study, family social support was measured by the friend subscale of the Social Support and Exercise Survey (Sallis, 1986; Sallis, et al., 1987).

3. **Self-efficacy for exercise**
   
   is defined as confidence that one can successfully execute a behavior required to produce a specific outcome (Bandura, 1986). Self-efficacy for exercise is defined as the confidence that an individual has that she can exercise three times per week for 20 minutes in the face of a variety of barriers to exercise. In this study, the Self-Efficacy for Exercise Scale was used to measure how confident the individual is that she would exercise under any of a group of particular circumstances (Resnick & Jenkins, 2000).
4. **Body image**

is defined as one's perception of body size and the emotional attitude towards that perception (Baptiste-Roberts, et al., 2006).

5. **Current body image**

refers to the figure on the figural rating scale that the female in this study was asked to identify that most accurately represents her current body shape (Fitzgibbon, et al., 2000).

6. **Ideal body image**

refers to the figure on the figural rating scale that the female in this study was asked to identify that she desires (Fitzgibbon, et al., 2000).

7. **Body image discrepancy (BD)**

is defined as the disparity between estimated current body image and ideal body image. The BD score is obtained by subtracting the ideal body image (IBI) from the current body image (CBI). A BD score of greater than zero (0) indicates a CBI that is heavier than the individual's ideal. A BD score of less than zero indicates a CBI that is lighter than the individual's ideal. A BD score of zero indicates that CBI and IBI are the same (Fitzgibbon, et al., 2000). In this study, the Body Image Instrument that was developed for African American females was used to measure BD (Pulvers, Lee, Kaur, Mayo, Fitzgibbon, Jeffries, et al., 2004).

8. **Exercise barriers**

refer to things that prevent or keep one from exercising (Sechrist, et al., 1987).

In this study, the Women and Physical Activity Survey (WPAS) was used to
assess correlates of physical activity. These correlates include things in the physical environment, as well as sense of community, social roles, social issues, and self-efficacy (Evenson, et al., 2003).

9. **Socioeconomic status**

refers to such things as income and level of education (Williams, 1997; Williams, 2002). In this study, level of education was measured by the highest grade or degree completed; income was measured as a range of annual household income.

10. **Metabolic equivalent (MET)**

is a multiple of oxygen uptake at rest and equals approximately 3.5ml/kg/min. (Pollack & Wilmore, 1990).

11. **Physical activity level**

refers to bodily movement that is produced by the contraction of skeletal muscles and results in energy expenditure (Kohl, Blair, Paffenbarger, Macera, & Kronenfeld, 1988; McArdle, Katch, & Katch, 2001; Segal, Kenny, Wasserman, & Casteneda-Sceppa, 2004). In this study, physical activity level was assessed by using the coding algorithms from the CHAMPS physical activity measures (Stewart, Mills, King, Haskell, Gillis, & Ritter, 2001; University of California at San Francisco, 2003). Frequency of activity per week for all physical activities and metabolic equivalents (METs) per week for moderate-intensity physical activities were determined. A MET value of 3.0ml/kg/min. was used to compute MET values for praise dancing (Resnicow, McCarty, Blissett, Wang, Heitzler, & Lee, 2003). In this study, the Modified CHAMPS Physical Activity Questionnaire was used to assess physical activity levels (Resnicow, et al., 2003).
12. **Exercise**

is a subset of physical activity and consists of planned, structured, and repetitive body movements (Kohl, et al., 1988; Segal, et al., 2004). In this study, exercise-related activities were assessed by using the coding algorithms from the CHAMPS physical activity measures (Stewart, et al., 2001; University of California at San Francisco, 2003). Frequency of activity per week for all exercise-related activities and metabolic equivalents (METs) per week for moderate-intensity, vigorous-intensity, and strength training exercise-related activities were determined. In this study, the Modified CHAMPS Physical Activity Questionnaire was used to assess exercise-related activities (Resnicow, et al., 2003).

13. **African American**

is defined as non-Hispanic black or Black and refers to a person whose origins are from any of the black racial groups of Africa (National Institutes of Health [NIH] Policy on Reporting Race and Ethnicity Data, 2001).

14. **Body mass index (BMI)**

is a number that is calculated by dividing the individual’s weight (kilograms) by the individual’s height (meters$^2$). BMI provides an indicator of body fatness for most people and is used to screen for weight categories (CDC Healthy Weight – it’s not a diet, it’s a lifestyle, 2009).

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**Purpose of the Study**

The purpose of this study was to examine how selected variables such as family/friend social support for exercise, self-efficacy for exercise, body image
discrepancy, exercise barriers, and socioeconomic status (level of education and household income) influence physical activity levels in African American females with type 2 diabetes. The African American females with type 2 diabetes in this study have attended or were attending a diabetes education program that was taught by a certified diabetes educator (CDE). The specific aims of the study were to:

1. determine the relationships of family/friend social support for exercise on physical activity levels;
2. determine the relationship of self-efficacy for exercise on physical activity levels;
3. determine the relationship of body image discrepancy on physical activity levels;
4. determine the relationship of various barriers (physical environment, sense of community, social roles, and social issues) on physical activity levels;
5. examine the relationship of level of education and household income on physical activity levels.

**Study Hypotheses**

The following hypotheses were tested in this study.

1. A positive correlation exists between greater amounts of friend social support for exercise and greater amounts of physical activity levels.
2. A positive correlation exists between greater amounts of family social support for exercise and greater amounts of physical activity levels.
3. A positive correlation exists between higher levels of self-efficacy for exercise and
greater physical activity levels.

4. A positive correlation exists between body image discrepancy and physical activity levels when the current body image score is greater than the ideal body image score.

5. A negative correlation exists between greater amounts of exercise barriers and physical activity levels.

6. A positive correlation exists between higher levels of education and greater physical activity levels.

7. A positive correlation exists between higher levels of household income and greater physical activity levels.

**Significance of the Study**

The management of type 2 diabetes is a life-long challenge. Treatment includes medication use (oral agents and/or insulin), self-monitoring of blood glucose, daily meal planning, and regular physical activity. Regular physical activity helps to improve glycosylated hemoglobin levels, insulin sensitivity, promote weight loss, and decrease the risk for the development of diabetes-related complications (American Diabetes Association, 2007; American Diabetes Association, 2008; American Diabetes Association, 2009). Despite these benefits, many African American females with type 2 diabetes continue to remain physically inactive. Therefore, it is critical to identify those factors that promote as well as those that act as barriers to physical activity in this population.

A review of the literature reveals that there is a lack of analysis that identifies facilitators and barriers of physical activity in African American females with type 2
diabetes. While research has shown that social support and self-efficacy have acted as facilitators of physical activity in non-diabetic populations, only one study was found that examined the relationship of both these variables (social support and self-efficacy) on physical activity levels in African American females with type 2 diabetes (Samuel-Hodge, et al., 2000). Body image is another variable that may affect physical activity levels. Research indicates that body image is influenced by an individual’s culture. In the United States, African American females tend to prefer and view larger body sizes and shapes as “ideal” as compared to white women who tend to favor small, thin body sizes (Celio, et al., 2002; Flynn & Fitzgibbon, 1998). This preference for larger body size and shape may negatively impact the need for exercise and weight loss in those African American females with type 2 diabetes. Such a relationship has never been explored and may help to explain the lack of physical activity in this population. A variety of other factors including physical environment, social issues, social roles, as well as socioeconomic status may also impact physical activity levels in this population. Knowledge of what factors facilitate as well as those that deter physical activity can provide direction for the development of tailored interventions to enhance physical activity behaviors in this population. An increase in physical activity levels will assist the African American female with type 2 diabetes to maintain normoglycemic blood levels, decrease insulin resistance, and decrease the risk for the development of diabetes-related complications.
CHAPTER II

Literature Review and Conceptual Framework

The purpose of this study was to examine the relationships among (a) family and friend social support, (b) self-efficacy for exercise, (c) body image discrepancy, (d) environmental structures including physical environment, sense of community, social issues and roles, (e) socioeconomic status (education and income), and physical activity levels in African American females with type 2 diabetes. In the present chapter, a review of the literature relevant to this study will examine the following: (a) the benefits of physical activity as a preventative measure and treatment modality for type 2 diabetes, (b) self-efficacy theory and body image, (c) the relationship between social support and treatment self-management, adherence, coping with illness, and physical activity levels, (d) the relationship between self-efficacy and physical activity, (e) the relationship between body image discrepancy and physical activity, (f) the relationship between potential or perceived barriers and physical activity, and (g) the relationship between socioeconomic status and physical activity.

Benefits of Physical Activity

The prevalence of type 2 diabetes continues to pose a significant health threat to the residents of the United States. Risk factors that place individuals at an increased risk include age, genetics, and membership in certain high-risk ethnic groups such as American Indians or Alaska Natives, Asians and other Pacific Islanders, and African Americans. Other risk factors include consumption of high-fat, high-caloric diets, and physical inactivity (Brancati, et al., 2006). While risk factors such as age, genetics, and
ethnicity can not be modified, others such as diet and physical inactivity can. Behavioral changes including low-fat, calorie controlled diets and leading a more active lifestyle promote weight loss, decrease insulin resistance, and decrease the risk for the development of type 2 diabetes. These same behavioral changes help achieve glucose control as well as decrease the risk of the development of complications associated with type 2 diabetes including nephropathy, retinopathy, neuropathy, lower limb amputations resulting from peripheral vascular disease, and cardiovascular events such as stroke and myocardial infarction (American Diabetes Association Complications of Diabetes in the United States, n.d.). Results of two major studies, the Insulin Resistance Atherosclerosis Study (Mayer-Davis, et al., 1998) and the Diabetes Prevention Program (Fisher, Walker, Bostrom, Fischhoff, Haire-Joshua, & Johnson, 2002), support that regular physical activity aids in increasing insulin sensitivity as well as decreasing the risk for the development of type 2 diabetes. A brief explanation of the metabolic effects and benefits of physical activity follows.

Physical activity helps to improve blood glucose levels by increasing glucose transport across the cell membrane of skeletal muscle and by decreasing insulin resistance (Wasserman & Halseth, 1998). The movement of glucose from capillaries into skeletal muscle occurs as muscle blood flow and cardiac output are increased during exercise (Koistinen & Zierath, 2002). The decrease in insulin resistance is thought to occur from an increase in glucose transporter-4 (GLUT-4) proteins from an intracellular pool to the plasma membrane. GLUT-4 proteins are thought to be the major mechanism by which exercise increases glucose uptake at the cellular membrane into skeletal muscle via diffusion (Goodyear & Kahn, 1998). These beneficial metabolic effects of exercise
last approximately 48 hours. Therefore, Hayes (1997) advocates that physical activity must be performed regularly and consistently (5 to 7 days per week for 30 to 45 minutes per session).

In addition to improvements in glycemic control and insulin sensitivity, regular physical activity helps decrease risk factors related to cardiovascular disease including hypertension, left ventricular diastolic dysfunction (LVDD), dyslipidemia, and vascular inflammation (Stewart, 2002). Hyperinsulinemia, associated with type 2 diabetes, results in hypertrophy of the tunica media of the vascular wall and sustained hypertension. Regular physical activity may help control hypertension by increasing insulin sensitivity resulting in decreased insulin levels and a lessening of the hypertrophic effects of insulin on the tunica media (White & Sherman, 1999). Regular physical activity may also up-regulate the endothelial release of nitric oxide (NO) resulting in improved endothelial vasodilator function and a decrease in blood pressure (Stewart, 2002). Other important benefits of regular physical activity include reductions of cholesterol, low-density lipoproteins (LDL), and very-low-density lipoproteins (VLDL), and increases in high-density lipoproteins (Stewart, 2002). LVDD and levels of inflammation markers including C-reactive protein and interleukin-6 (IL-6) are also improved (Stewart, 2002).

Several studies examined the effects of physical activity on glycosylated hemoglobin (HbA1C), triglycerides, and body composition. Khan and Rupp (1995) conducted a randomized control study with a sample of 39 sedentary type 2 diabetics to determine if any significant differences existed between those who entered into an exercise training program (N=21) and those who did not (N=18). Both groups documented their diet and remained on their established drug therapy regimen. Blood
values including serum cholesterol, triglycerides, fasting blood glucose, and HbA₁C along with body composition and fitness-related values were measured at baseline and upon completion of the 15-week study. Study results indicated that while there were no significant differences between the groups for HbA₁C, triglycerides, and HDL, the exercise group showed a trend toward reduction in HbA₁C and triglycerides and an increase in HDL levels as compared to the control group. While both groups experienced significant decreases in percent of trunk fat (p<.01) and percent of total body fat (p<.05), the exercise group had a greater reduction in trunk fat and total percent of body fat as compared to the control group. Results of this study indicated that exercise in conjunction with diet and drug therapy may help to modify HbA₁C levels, blood lipid values, and body composition values.

Walker, Piers, Putt, Jones, and O'Dea (1999) evaluated the effects of physical activity on blood glucose levels, triglycerides, and body composition in a sample of 11 females with type 2 diabetes and 20 normoglycemic women. All participants were postmenopausal, of similar age, and BMI. The study intervention consisted of walking for 1 hour per day, 5 days each week for 12 weeks and a 7-day diet intake done at three time points - beginning, midway, and end of the study. Measurement of fitness measured by the VO₂ max walk test, body weight, body composition measured by dual-energy x-ray absorptiometry, and blood samples for HbA₁C, fasting glucose, insulin, and lipoproteins were obtained at baseline and upon study completion. Results indicated that VO₂ max improved significantly in both groups (p<.005). BMI, upper body fat content, waist circumference, and fasting blood glucose decreased significantly in the diabetic participants (p<.05); however, the non-diabetic participants failed to lose body fat.
HbA₁C, total cholesterol, and LDL decreased significantly in both groups (p<.05), but HDL levels remained unchanged. Results of this study indicated that physical activity was beneficial for females with type 2 diabetes as well as those who were normoglycemic.

Argus-Collins, Kumanyika, Ten Have, and Adams-Campbell (1997) examined the effects of physical activity on glycemic control and blood lipids in 64 African Americans who were primarily female (exact number was not specified). Participants were randomized to one of two interventions: (a) usual diabetes care including diet instruction, and (b) usual diabetes care including diet and exercise instruction. Results at the end of the 12-week program indicated that participants who received diet and exercise instruction had significant decreases in HbA₁C (p<.01) and diastolic blood pressure (p<.05). The diet and exercise instruction group also had larger decreases in blood lipid levels as compared to the diet instruction group, but these values did not reach significance.

Rimmer, Silverman, Braunschweig, Quinn, and Liu (2002) also evaluated the effects of physical activity on glycemic and blood lipid control in a sample of 30 type 2 diabetics who were predominantly African American females. Results of the one group, pretest, posttest 12-week nutrition and exercise intervention indicated that significant improvements were made in total cholesterol (p<.005), cardiovascular fitness (p<.01), muscular strength and endurance (p<.0001), and triceps skinfold measurements (p<.01). However, no significant changes were observed for HDL cholesterol, triglycerides, blood glucose, or HbA₁C levels, or body weight.

Physical activity is an important treatment regimen for type 2 diabetes. Regular
physical activity helps to improve glycemic control, decrease insulin resistance, produce favorable changes in lipid fractions and other risk factors related to cardiovascular disease, and promote optimal weight management. Despite these benefits, many African American females with type 2 diabetes continue to remain physically inactive; certain factors may prevent or hinder physical activity in this population. Barriers to physical activity in this population may include factors such as low self-efficacy, lack of social support for exercise, body image discrepancy, psychosocial issues such as lack of education and poverty, and certain demographic factors including lack of places to exercise, lack of community support, and concerns for safety. Therefore, further exploration of these factors and their effect on physical activity levels are warranted.

Overview of Social Cognitive Theory and Self-Efficacy

Bandura’s self-efficacy is derived from social cognitive theory and will be used as the theoretical framework for this study. Self-efficacy addresses psychological factors that affect health behaviors as well as methods that can be used to promote behavioral change (Bandura, 1997). Self-efficacy is the central focus of Bandura’s work and is defined by Bandura as “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses” (Bandura, 1986, p. 391). Self-efficacy is the belief that one can execute a behavior successfully; it is the confidence that one has about performing a particular activity including confidence in overcoming barriers to performing a behavior. Self-efficacy is built through repetition; repetition changes performance expectation
According to Bandura (1986), self-efficacy is the driving force of human behavior. Those with increased self-efficacy about a particular behavior have greater confidence about the behavior; they will attempt to execute the behavior more readily with greater intensity, and with greater perseverance than those with weaker self-efficacy (Bandura, 1986; Gorin & Arnold, 1998). There are four principle sources of self-efficacy information. A brief description of these principle sources follows.

The four principles or sources of self-efficacy are (a) performance attainment, (b) vicarious experience, (c) verbal persuasion, and (d) physiologic state. The first principle, performance or enactive attainment, is the most important and influential source of self-efficacy and is based on mastery experiences. Successes increase self-efficacy while failures decrease self-efficacy. Once established, enhanced self-efficacy can be generalized to other activities especially to activities that are similar to those in which self-efficacy has been enhanced. Vicarious experience or modeling is the second principle and is defined as seeing similar others perform a task successfully. Verbal persuasion is the third source of self-efficacy and involves talking people into believing that they possess the capabilities that will enable them to achieve what they seek. However, one must remember that these beliefs must be realistic and that an individual must possess the necessary skills and knowledge to carry out the behavior. Physiologic state is the last source of self-efficacy and is the emotional arousal that affects how people judge their capabilities. High arousal can lead to fear and debilitation while small amounts of arousal can increase stamina and heighten perceived self-efficacy with corresponding improvements in performance (Bandura, 1986).
Self-efficacy or the confidence to execute a behavior (physical activity/exercise) including the confidence to overcome barriers to executing the behavior (physical activity/exercise) will be examined in this study. The two sources of self-efficacy that are utilized by the diabetes educators at the diabetes center include verbal persuasion and vicarious experience (modeling). During their diabetes classes and instruction, participants receive information on various ways to increase their activity levels and are encouraged to set realistic goals for increasing their physical activity (verbal persuasion). The participants discuss how and what they do to increase their activity levels during the group support meetings (vicarious experience). This gives other participants a chance to explore other options for increasing their activity levels as well as serving as a motivator for others like themselves.

Self-efficacy has been used as a behavioral change model to promote positive health behaviors. An overview of studies that examines how self-efficacy has been used to promote these behaviors follows.

Overview of Studies Examining Effects of Self-Efficacy on Health Behaviors

Self-efficacy theory has been used to change as well as to maintain health behaviors. The following studies have examined the effects of self-efficacy on exercise adherence, levels of physical activity, and diabetes self-management.

In 1995, Skelly, Marshall, Haughey, Davis, and Dunford (1995) conducted a study to examine the extent to which perceived self-efficacy and confidence in outcomes affected adherence to a diabetes regimen involving glucose testing, medication, diet, and exercise adherence. The sample consisted of 118 urban African American females aged
30 to 80 years who had a diagnosis of type 2 diabetes. Self-report questionnaires and a one day log of diabetes self-care practices were done on two occasions, separated by an interval of 4 to 5 months. Study results indicated that self-efficacy had the greatest influence on diet and exercise adherence at both Time 1 \( (r=0.486, p<.05; r=0.731, p<.05, \text{ respectively}) \) and Time 2 \( (r=0.164, p<.05; r=0.539, p<.05, \text{ respectively}) \). Results of this study supported that self-efficacy was an important determinant of diet and exercise adherence.

In 2004, Melkus, et al. conducted a study to determine whether culturally competent classes can positively affect aspects of diabetes care. Aspects of diabetes care included (a) glucose control, (b) weight loss, (c) diabetes knowledge of self-management skills, and (d) diabetes-related distress (stress caused by living with diabetes). The sample for this one group, pretest, posttest quasi-experimental study was recruited from an urban community setting and was comprised of 25 African American females aged 18 to 60 years with type 2 diabetes. A series of self-report measurement tools were used to measure diabetes self-efficacy outcome expectancies, diabetes-related distress, and diabetes knowledge. Physiologic measurements including BMI, glycosylated hemoglobin (used to assess glucose control), and C-peptide (used to confirm a diagnosis of type 2 diabetes) were obtained on all participants. Self-report and physiologic measurements were obtained at baseline and at three months. The intervention consisted of weekly diabetes classes that tailored educational materials and teaching methods to African American females. Results of the study indicated that glycosylated hemoglobin (HbA1C) levels, fasting blood glucose (FBS), BMI, weight, and diabetes-related distress were all significantly reduced \( (p<.05) \) as a result of the program. However, there was no
significant change in diabetes knowledge and diabetes self-efficacy post-intervention when compared to pre-intervention scores. The outcome effects of the tested intervention on physiologic and psychosocial measures while promising need further testing with a control condition. Future testing of the intervention methods and materials with a larger sample and a two-group design is warranted.

In 2001, Aljasem, et al examined relationships of diabetic-specific treatment behaviors and self-efficacy with respect to self-care behaviors including exercise, diet, skipping medication, blood glucose monitoring, adjusting insulin to avoid or correct hyper or hypoglycemia, and adjusting diet to avoid hypoglycemia. The sample for this correlational study consisted of 309 adult patients with type 2 diabetes between 24 to 88 years of age who were of mixed race, gender, and marital status. A series of self-report instruments were used to measure self-efficacy, self-care behaviors, and behaviors related to diabetes care. Results of this study indicated that participants who perceived fewer barriers to exercise walked more frequently for longer than 20 minutes (r=-0.13, p=.04). Older individuals and those who perceived fewer barriers to healthy eating behaviors got closer to following an ideal diet (r=0.13, p=.04; r=-0.25, p<.001, respectively). In addition, higher levels of assertiveness efficacy (questioning health care providers) were associated with less skipping of diabetic medications (r=-0.16, p=.02), and higher levels of planning efficacy (meal planning and recording blood glucose levels) were associated with more frequent testing of blood glucose levels (r=0.26, p<.001).

The previous studies examined the relationship between self-efficacy, exercise adherence, levels of physical activity, and diabetes self-management. The following studies explored the relationship between self-efficacy and physical activity in non-
diabetic populations. Young and Stewart (2006) evaluated if self-efficacy and social support served as determinants of physical activity. The sample for this study consisted of 196 African American females recruited from 11 churches in the Baltimore area. These 11 churches were randomized to one of two interventional programs, aerobic exercise or low-intensity stretching classes combined with health lectures conducted concurrently over a six month period. A series of self-report instruments were used to measure physical activity levels, exercise self-efficacy, social support for exercise, and quality of life at baseline and at the end of the six month intervention. Statistical analyses were conducted using analysis of covariance (ANCOVA) using a mixed-model approach in which the fixed effects of physical activity (primary outcome), treatment condition, and covariates of age and baseline physical activity were analyzed with the random effects terms for church nested in treatment condition and individual nested within church. Another covariate, BMI, was examined in the preliminary model but was not included in the final model since it did not correlate with the primary outcome (physical activity). Results of this study indicated that physical activity levels increased in both groups, however physical activity levels did not differ between the groups at the end of the six month intervention (p=0.3). Baseline social support from friends and baseline exercise self-efficacy were significantly predictive of physical activity change (t=2.09, p=.04; t=2.73, p=.008, respectively).

Another interventional study was conducted by Gallagher, Jakicic, Napolitano, and Marcus (2006) to evaluate if self-efficacy, decision making, and barriers to physical activity were affected by a six month behavioral weight loss program. The program consisted of weekly group sessions that focused on strategies to decrease food intake and
to increase energy expenditure. The sample was comprised of 192 healthy, sedentary females between the ages of 21 to 45 years with a BMI of 27 to 40 kg/m². Participants were randomly assigned to one of four groups: (a) 1000 kcal/day with moderate intensity physical activity, (b) 1000 kcal/day with vigorous intensity physical activity, (c) 2000 kcal/day with moderate intensity physical activity, and (d) 2000 kcal/day with vigorous intensity physical activity. Measurements, including BMI, physical activity recall, processes for change, and physical activity self-efficacy were taken at baseline and at the end of the six month intervention. Statistical analyses were performed using repeat-measures analysis of variance (RM-ANOVA). At the end of the six month intervention, significant decreases in weight (p<.05) and barriers to physical activity (p<.05) were observed. In addition, physical activity self-efficacy (p<.01) and physical activity behavioral processes (p<.01) significantly increased from baseline. Partial correlations were also computed for weight loss, social support, and physical activity self-efficacy. These analyses revealed significant relationships between 6-month weight loss and social support (r=0.17, p<.05) and 6-month weight loss and 6-month values of physical activity self-efficacy (r=0.29, p<.05) indicating that self-efficacy and vicarious experience through group activity may have played an important role in this behavioral weight loss program.

Wilbur, Miller, Chandler, and McDevitt (2003) explored factors that influenced physical activity and adherence to a 24 week home-based walking program in 153 midlife working-class African American and Caucasian women. Each of the participants completed a series of self-report instruments at baseline to determine previous exercise experience, social role influence, self-efficacy, and exercise self-determinism. Self-
efficacy and exercise self-determinism were also measured at 24 weeks. Adherence to walking was measured using a heart rate monitor and an exercise log. Differences between the Caucasian and African American women with regards to adherence to frequency of walking, previous exercise experience, social role influences, and exercise self-determinism (motivation) were evaluated using student’s t-tests. Paired t-tests were used to identify change in self-efficacy for exercise and exercise motivation from baseline to the end of the walking program. Study results indicated that while walking adherence was significantly higher for the Caucasian women than for the African American women (t=-3.46, df=151, p=.001), the African American women had significantly higher self-efficacy for exercise scores when compared to the Caucasian women (t=2.31, df=151, p=.02). Higher education and more experience with regular exercise when the participant was in her twenties were also associated with higher exercise motivation; however, these results were not significant. Study results supported that walking adherence may have been associated with previous exercise experience as well as race (Caucasian). The researchers also indicated that the African American females’ social roles and their belief that household chores are a form of physical activity may also help to explain these differences; however, these factors require further exploration.

Litt, Kleppinger, and Judge (2002) examined the relationship of self-efficacy and exercise adherence in 189 white women age 59 to 78 years, diagnosed with low bone density, and who underwent an intervention consisting of moderate walking and upper and lower body exercises. A series of self-report instruments, used to examine social learning constructs including self-efficacy, motivation for exercise, decisional balance
(weighing the pros and cons) for exercise, and social support, were administered at baseline and 12-month follow-up. Measurements on upper body and lower body condition including documentation of number of repetitions and amount of weight lifted during strength training were obtained at baseline and every three months for 12 months. Results indicated that (a) readiness for exercise and social support for exercise were significant factors in predicting moderate exercise at the beginning of the trial (p<0.01, and p<0.001 respectively), (b) higher self-efficacy for adherence significantly contributed to maintenance of exercise behavior over time (p<0.05), and (c) social support for exercise was significantly predictive of exercise at 12 months (p<0.05). The results of this study supported that adherence to an exercise program at the 12 month follow-up was related to higher levels of self-efficacy as well as social support.

Sarkar, Fisher, and Schillinger (2006) explored the relationship between self-efficacy and physical activity in 408 patients with type 2 diabetes. The sample participants were of various ethnicities that included 73 (18%) Pacific/Asian Islanders, 102 (25%) African Americans, 171 (42%) Latinos, and 62 (15%) Caucasians. A diabetes self-efficacy scale and a scale to measure diabetes self-management were used to assess factors related to diet, exercise, medication adherence, and monitoring of blood glucose. The short version of the Test of Functional Health Literacy in Adults was used to assess health literacy levels. Results of multiple regression analyses suggested that self-efficacy was a major determinant of physical activity (p<.05), self-monitoring of blood glucose levels (p<.05), and foot care (p<.05), but not medication adherence (p=0.40). In addition, the association between self-efficacy and diabetes self-management was consistent across ethnicities and health literacy levels.
Self-efficacy has been used as a theoretical framework to study various behaviors in diabetic as well as non-diabetic populations. Health behaviors that were associated with higher levels of self-efficacy in these studies included better diabetes self-management skills, adherence to diabetic plan of care, and adherence to walking or exercise programs. Results of these studies indicated that self-efficacy, social support in the form of modeling, and verbal persuasion may have acted as determinants of change, resulting in improvements or change in health behaviors.

Despite the valuable knowledge that was gained from these previous studies, self-efficacy studies in African American females with type 2 diabetes are limited. Some of the studies in this review were conducted with samples of relatively healthy, non-diabetic females (Gallagher, et al., 2006; Wilbur, et al., 2003) or with type 2 diabetics of various ethnicities (Aljasem et al., 2001; Sarkar et al., 2006). Therefore, results from these studies may not be generalizable to African American females with type 2 diabetes. Other studies such as the one conducted by Melkus et al. (2004) lacked a control group and was conducted with a small sample of African American females with type 2 diabetes. Further testing of such interventions using large samples of African American females with type 2 diabetes and two-group designs are warranted to determine the effects of the interventions. These results can be utilized to tailor physical activity programs and educational materials that are specific to African American females with type 2 diabetes.

Overview of Studies Examining Family/Friend Social Support

Social support systems or structures are comprised of clusters of networks of
people who have various ties amongst one another. Social networks include friends, occupational colleagues, as well as kinships or family. These systems of support are important because of their influence on learning as well as helping to influence and to predict behaviors such as physical activity. Bandura (1986) suggests that learning and change in behaviors occur as a result of “modeling” in addition to the interpersonal influence of others. An overview of studies that examined these relationships follows.

Social support has been studied by researchers in terms of its relationship to treatment self-management, adherence, coping with chronic illness, and physical activity levels. The first group of studies in this section evaluated the effects of social support on coping with chronic illness. In 1990, Primomo, Yates, and Woods conducted a correlational study to explore who in the participant’s network provided social support, and to explore what type of social support was provided. The sample for this correlational study consisted of 125 females who were primarily white, married, employed, and who experienced one of three chronic illnesses: (a) breast cancer, (b) fibrocystic breast disease, or (c) diabetes. Self-report instruments were used to assess various sources of support, family cohesiveness and adaptability to the participant’s illness, marital quality, family stressors related to the participant’s/mother’s illness, and the participant’s degree of depression. Statistical analyses were performed using RM-ANOVA. Results of this study indicated that the female’s partner followed by the family provided significantly more affectional (emotional) support than acquaintances, neighbors, health care providers, or the female’s friends (p < .05) while friends provided significantly more affirmational (confirmation of feelings) and affective (motivational) support than the participant’s family (p < .01). Despite the fact that aid from
acquaintances, neighbors, and health care providers was significantly less than from family or friends (p<.05), participants in this study confided more to them about their illness than to family or friends. In addition, those participants who were less depressed received more affectional support from their partners as well as more affectional and affirmational support from their family resulting in less confiding to friends about their illness. Outcomes of this study suggested that various dimensions of support from different sources in the women’s networks may have had an effect on how the women coped with their chronic diseases and who they sought support from.

White, Richter, and Fry (1992) evaluated the effects of social support on coping with a chronic illness with a sample of 158 females with diabetes. The primary aims of this correlational study were to assess the impact of potential stressors, coping strategies, and perceived social support on the psychosocial adaptation of women with diabetes. Outcomes of this study revealed that potential stressors, ways of coping, and social support explained 56% of the variance of psychosocial adaptation to diabetes. Of these three variables, social support was the main variable that explained women’s adjustment to diabetes as well as health outcomes related to complications of diabetes. The results suggested that greater amounts of perceived social support resulted in greater psychosocial adjustment to diabetes.

Studies were also conducted that examined the relationship of social support and diabetes self-management. Anderson-Lofton and Moneyham (2000) explored the perceptions of health care provider characteristics that facilitated or inhibited healthy choices and health and social services necessary for effective diabetes management through focus group interviews. The sample for this study consisted of 22 male and
female participants who were between 35 to 80 years of age of which 82% were African American. Results of the focus group interviews indicated that effective diabetes self-management including diet and medication adherence and symptom management were influenced by supportive health care providers, peer social support groups, supportive family and friends, and the availability of medications and supplies. Study results supported that support systems influenced learning and positive self-management behaviors.

Savoca and Miller (2001) examined beliefs and perspectives among people with type 2 diabetes in relation to dietary requirements, food selection and eating patterns, and attitudes about dietary self-management practices. This qualitative study was conducted with a sample of 45 male and female type 2 diabetics aged 40 to 65 years. Individual interviews were conducted with members of the sample; common characteristics from the interviews were grouped, and themes were identified. Social support followed by dietary self-efficacy and time management were identified as the most influential mediating variables for meal planning and dietary adherence.

Samuel-Hodge, et al. (2000) conducted a qualitative study to explore what factors influenced type 2 diabetes self-management in a sample of 70 southern African American females who were recruited from a university outpatient internal medicine clinic. Females in this study cited social support and spirituality (role of religious beliefs) as positive determinants on their day-to-day management of diabetes.

revealed that these females had assumed the complex role of supporter to others while still having to manage their diabetes. A lack of understanding by members of their social network and family in relation to the difficulties of managing diabetes and the stress of day to day living were identified by study participants as barriers to diabetes self-management. The women in this study also indicated that they wanted help and support in such a way that did not make them seem weak and dependent. These results supported that positive support from kinships or family was essential to diabetes self-management.

The last study to explore effective strategies of diabetes self-management was conducted by Nagelkerk, Reick, and Meengs (2006). Focus groups were used to explore perceived barriers and effective strategies of diabetes self-management. The sample for this study was comprised of 24 white male and female type 2 diabetics who resided in a rural community. Themes that emerged from this qualitative study indicated that support by health care providers and having a support person facilitated diabetes self-management skills including diet and exercise. Barriers to diabetes self-management included lack of health care provider support, lack of information, and a plan of care that was not individualized to meet the needs of the diabetic. These results indicated that positive support from others helped to promote diabetes self-management skills.

Nies and Kershaw (2002) investigated how perceived benefits of exercise, self-efficacy, goal setting, restructuring plans, relapse prevention, and social support acted as predictors of physical activity. The sample for this cross-sectional study was comprised of 198 women aged 30 to 60 years: 48% were African American and 52% were Eastern European. Relationships of the independent variables (benefits of exercise, self-efficacy, goal setting, restructuring plans, relapse prevention, and social support) to the dependent
variable (physical activity) were examined using a series of self-report instruments. Physical activity performance was assessed by the Rockport 1-mile walk. Study results indicated that as self-efficacy increased, time to walk 1 mile significantly decreased ($r=-.17$, $p<.05$). The findings also suggested that the better the restructuring plans and the better a person's relapse prevention, the greater the physical activity level ($r=.14$, $p<.05$; $r=.13$, $p<.05$, respectively). In addition, increased social support was related to vigor ($r=.15$, $p<.05$). Findings from this study indicated that self-efficacy and social support were important predictors of physical activity.

Two studies examined the relationships among social support, self-efficacy, and physical activity. Dye, Haley-Zittin, and Willoughby (2003) conducted a qualitative study in 31 adults with type 2 diabetes who were over the age of 55 years of which 71% were African American. Four focus groups were conducted using an interview guide to determine primary health concerns and behaviors, favored learning methods by the participants, perceived barriers to learning, and to assess food and exercise preferences. Themes that emerged as a result of these focus groups indicated that while social support was a major determinant of exercise adherence and learning about diabetes and heart disease, self-efficacy served as a major determinant of diet adherence. Sharma, et al. (2005) conducted a cross-sectional study examining these same relationships in 240 African American females over age 18 years. A series of instruments were used to assess physical activity, self-efficacy for physical activity, family and friend social support, and for measuring the importance of emotional, informational, and appraisal support from family and friends. Findings from this study indicated that friend social support and self-efficacy were significantly predictive for moderate intensity leisure-time physical activity.
(t=3.591, p<.0001; t=4.949, p<.0001, respectively) and accounted for 23% of the variance.

Two studies were conducted with participants from the Latino population to examine relationships between social support and physical activity. The first study, conducted by Wen, et al. (2004), examined the relationship between social support, diet, and physical activity in 138 Mexican Americans with type 2 diabetes who were 55 years of age or older. A series of self-report instruments to assess diabetes family support, barriers to self-care, diabetes self-efficacy, acculturation, diabetes self-care activities, and depression were administered. Results of this study indicated that family support and higher levels of self-efficacy were predictive of diet self-care (r=.236, p<.01; r=.342, p<.01, respectively) and exercise self-care (r=.415, p<.01; r=.454, p<.01, respectively). In addition, household status including number of residents and who those residents were that lived in the household was predictive of diet self-care (r=.205, p<.05) but not exercise self-care. Another study outcome indicated that as barriers to diet and exercise decreased, diet self-care and exercise self-care increased (r=-.257, p<.01; r=-.374, p<.01, respectively).

Bull, Eakin, Reeves, and Riley (2006) conducted a correlational study of 200 low-income, Spanish-speaking Latinos who were over 30 years of age, primarily female, and who had various chronic health conditions. Phone interviews assessed demographics including health status, physical activity level, dietary behavior, and social-environmental support for chronic illness management. Results of this study indicated that support from family, healthcare providers, and others as an important predictor of physical activity (p=.018) and diet (p<.001). In addition, better dietary behavior was associated with being
female (p=.002) and having more than one chronic condition (p=.007).

In all the studies described in this section, social support was shown to be an important facilitator of health promoting behaviors such as exercise and diet adherence, learning to cope with chronic illnesses, and effective diabetes self-management. Support that facilitated these behaviors came from family, friends, the community, and health care providers. Similar results were reported in a study conducted by Samardzija (2006) with a sample of African American females with type 2 diabetes. The findings from this study indicated that there was a significant correlation between friend social support and physical activity levels (r=0.85, p<.05) suggesting that social networks (friends) influenced behavior through vicarious experience and verbal persuasion. Social support or encouragement from others helped to foster behavioral change and adherence as well as to predict behavioral outcomes. Results from these studies supported the interaction of person and environment as a major factor influencing human behavior (Bandura, 1986).

Overview of Body Image

Body image is a multidimensional construct that encompasses one’s perception of body size and the emotional attitude towards that perception. It is not just a picture of one’s body that is formed in one’s mind, but it is the cumulative set of images, fantasies, and meanings about one’s body parts, and functions. Body image affects one’s emotions, thoughts, and behaviors (Pruzinski & Cash, 2002). Kreuger (2002) describes body image as the basis of “self-representation” and the foundation of the psychological self. The formation of body image is thought to begin in infancy during interactions with the infant’s caretaker, and it is thought to be formed by the time a child reaches 6 to 8 years
Body image is influenced by many factors; examination of these factors follows.

Cultural socialization is one of many factors that influence body image. Cash (2002) suggests that cultural attitudes foster acquisition of body image attitudes. Culture dictates standards and expectations about appearance as well as what is attractive and what is not attractive. Cultural standards may also vary across time. This fact is exemplified by the value that Caucasians placed on thinness in the 1970's as compared to the healthy, athletic body types of the present (Jackson, 2002). Cultural standards may also vary with respect to the part of the world that one comes from. For example, in some parts of the world, fatness is a cultural symbol of social prestige as well as one of sexual attractiveness. In these cultures, fatness is associated with upper socioeconomic status and sufficient access to food (Sobal & Stunkard, 1989). In this manner, cultural standards and expectations are internalized by members of a particular culture; these cultural standards and expectations then serve to influence the body image of members of that culture.

Another factor that influences body image development is one's physical characteristics. The attractiveness and social acceptability of one's physical appearance impacts how that individual is perceived and treated by others. How well one's appearance matches social standards of physical attractiveness may affect how that individual evaluates him or herself (Cash, 2002).

Other factors that influence body image include one's personality and interpersonal experiences. Attributes such as self-esteem and positive self-concept help to facilitate the development of a positive evaluation of one's body while negative self-
concept and poor self-esteem help foster a negative evaluation of one’s body.
Interpersonal experiences in the form of interactions with family and others also
contribute to meanings that one develops about his or her body (Cash, 2002). These past
interactions with others also influence body image attitudes including the cognitive-
behavioral importance that one places on his or her appearance as well as positive (body
satisfaction) or negative (body dissatisfaction) appraisal of one’s body as well as beliefs
about one’s appearance (Cash, 2002).

Before delving into the research literature on body image, factors that influence
body image in African American females compared with Caucasian females are explored.
Body image ideals vary among cultures. In the United States, African American females
are more satisfied with their bodies when compared to Caucasian females despite the fact
that African American females may be heavier than their Caucasian counterparts (Flynn
& Fitzgibbon, 1998; Jackson, 2002). Caucasians equate attractiveness with “slenderness”
while African Americans have more flexible standards of attractiveness. African
Americans include personal style, how well one is groomed, how one’s clothes look and
fit, hairstyle, skin color, and ethnic pride in being Black when considering what is
attractive (Celio, et al., 2002).

African Americans are also more flexible in their attitudes towards weight and
body shapes; they are less prejudice against overweight persons than Caucasians are.
African American females tend to prefer larger and more moderate body sizes as ideal as
compared to Caucasian women who tend to favor thin, slender body sizes as ideal
(Cachelin, Rebeck, Chung, & Pelayo, 2002). As a result, overweight African American
females are more likely to view their bodies as attractive as compared to overweight
Caucasian females (Celio, et al., 2002; Flynn & Fitzgibbon, 1998). This is due to the fact that African American females have greater body image satisfaction that allows them to be more satisfied with their weight, body size, body parts (especially the lower torso), and body appearance. When compared to Caucasian females, African American females perceive their actual body size to be closer to their ideal body size. This fact may help to explain why African American females are less likely to perceive themselves as overweight when compared to Caucasian females (Celio, et al., 2002; Flynn & Fitzgibbon, 1998).

Other factors influencing body image in African American females include BMI, socioeconomic status, opposite sex preferences, maternal influence, peer influence, sexual maturation, and “Black beauty” standards (Celio, et al., 2002). BMI can have positive or negative effects on body satisfaction in African Americans just as it does in Caucasians. In some instances, a higher BMI that is associated with specific body parts such as buttocks and hips results in greater body satisfaction for African American females. Socioeconomic status is another factor that may influence body image in this population; however, this relationship has yielded varying results. Outcomes of some studies suggest that African American females of lower socioeconomic status tend to be heavier, are satisfied with a larger ideal body size, and that body dissatisfaction increases as levels of income increase; however, other studies have found no such relationship. Another factor influencing body image in this population is opposite sex preferences. Some African American women believe that African American males prefer larger and shapelier women. When African American males were given a choice among varying sizes of silhouettes, they preferred moderate shapes to the thinner shapes that were
preferred by their Caucasian male counterparts (Celio, et al., 2002).

Celio et al. (2002) address four other factors that influence body image in African American females. Maternal influence is one factor that influences body image. African American mothers are more accepting of overweight body sizes of their children as compared to Caucasian mothers. Peer influence is another influencing factor. African American girls pay more compliments to each other, are less competitive, and value unique, individual styles, as compared to white girls who tend to conform to mainstream ideals. Sexual maturation may also influence body image. African American girls are more likely to develop earlier than white girls of the same age resulting in greater body satisfaction. The last factor that may influence body image in African American females is ethnic identity defined as adopted beliefs, attitudes, and behaviors that are characteristic of a particular ethnic group. The more an African American female identifies with Black culture, the more likely she is to adopt “Black beauty” standards that result in greater body satisfaction (Celio, et al., 2002).

Literature Examining Studies on Body Image

One of the first studies that examined the relationship between body image and culture was conducted by Masssara and Stunkard (1979). The primary purpose of this study was to determine preferences for body size in a group of 341 Puerto Rican males and females from lower socioeconomic class. Body types were represented by six male and six female figures of varying size ranging from “too thin” to “too fat”. Participants were asked (a) to choose the body size that they preferred for themselves, (b) to choose the body size that they preferred for their spouse, (c) to choose the body size that was
most attractive, (d) to select the body size that they felt their spouse would find most attractive, and (e) to select the body size that they felt was the healthiest. Cross-tabulation of the weight categories indicated that 61% of the participants rated male body types that were +4% deviations from ideal body weight as normal; sixty eight percent of the participants rated male body types that were +23% deviations from ideal body weight as normal. In regards to female body types, 73% of the participants rated female body types that were +9% deviations from ideal body weight as normal, and 34% rated female body types that were +28% deviations from ideal body weight as normal. These results indicated that “heavier” body types were preferred by both sexes in this study.

Two other studies that were conducted in the 1990’s with African American females yielded similar findings. Gore (1999) conducted focus groups with 55 African American females to identify their definitions and descriptions of body weight. Results indicated that the women agreed that weight was culturally defined and were satisfied with their weight and shape. An implication of this study by the researcher was that the women’s perception of their weight and appearance may hinder behaviors that contribute to weight loss. Liburd, Anderson, Edgar, and Jack (1999) conducted a similar study in a sample of 33 African American females with type 2 diabetes who were mostly unemployed. Findings of this study indicated that the women equated middle-to-large body sizes with health. Pear-shaped bodies were also preferred by the females. The researchers suggested that culture and socioeconomic status contributed to the participants’ perception as well as preference for body size and shape.

In 2000, Fitzgibbon, et al. conducted a correlational study with a sample of 63 white, 95 Hispanic, and 231 African American females to determine at which BMI body
image discrepancy (current body image minus ideal body image) arose in females. The Figure Rating Scale for Body Image was used to calculate body image discrepancy for each participant. Descriptive statistics indicated that (a) the mean level of education of the sample was 12.3 years, and (b) average BMI for the white and Hispanic females was 29.4 kg/m² as compared to 30.4 kg/m² for the African American females. In the first regression model, whites were the reference group, and BMI was the dependent variable; body discrepancy, African American and Hispanic ethnic status and demographics including age and education, and their interaction terms were entered together. Results indicated that the between-group demographic differences were significant for age (F(2, 364) =7, p<.01), education (F(2, 381) =55.1, p<.01), and BMI (F(2, 372) =8.7, p<.01). A second regression equation including age, education, marital status, and site of recruitment was performed; results of this regression indicated that education was the only demographic variable to significantly predict body image discrepancy (F(6, 346) =25, p<.01). A BMI of greater than 25 kg/m² was used as the overweight criterion. After adjusting for education, results of the regression models for the three groups were as follow. The white women in the sample became dissatisfied at an average BMI of 24.6 kg/m² and were 0.36 BMI kg/m² below the overweight criterion of 25 kg/m² (t(340) = 3.86, p<.01). African American women became dissatisfied at an average BMI of 29.29 kg/m² or 4.61 kg/m² above the overweight criterion of the white women (t(340) = 3.31, p<.01), while Hispanic women became dissatisfied at a BMI of 28.57 kg/m² or 3.94 kg/m² above that of the white women (t(340) =3.06, p<.05). The same study also indicated that there was no body image discrepancy between the African American females and Hispanic females (t(340) =0.60, P<.55). Study findings suggested that white females
experienced body image discrepancy at a lower BMI as compared to the African American and to the Hispanic females.

In 1993, Allan, Mayo, and Michel conducted a study with 36 white and 31 African American females with BMIs between 28 to 45 kg/m² to: (a) identify what factors influenced body size values and (b) identify linkages between body size values and weight management activities. The Massara & Stunkard Body Size Values Tool was used to assess the participants’ body size values. The researchers utilized qualitative methods to identify linkages between body size values and weight management activities. Results indicated that African American females of lower socioeconomic status had a larger BMI; these females also perceived a heavier body size to be more attractive when compared to African American females of a higher socioeconomic status and to white women. The African American females in this study also felt influenced by friends and family to maintain a larger body size. Findings of this study supported that culture and socioeconomic status may influence body image.

Several studies were conducted to examine if ethnicity affected body image. In a correlational study, Snooks and Hall (2002) examined the influence of ethnicity on weight, body image, and self-esteem while controlling for socioeconomic status in a sample of 50 middle-class females (16 African Americans, 21 European Americans, 13 Mexican Americans). Demographic information including marital status and number of years married, number of children, occupation and education, and BMI was obtained for each of the participants. Self-esteem was assessed using the Texas Social Behavior Inventory. “Real” and “ideal” body sizes were obtained using a figural rating scale. Findings suggested there were no significant differences between ethnic groups with
regards to income. While the Mexican American women were less educated than the other two
groups, the difference was significant between the Mexican American and the European American women with the Mexican American women being significantly less educated than the European American women \( (F_{(2, 48)} = 3.78, p<0.05) \). However, there was no difference between the Mexican American and African American women in terms of education. Spearman’s \( r \) was used to determine agreement between the participants’ real and ideal body sizes; there was agreement between these two scores \( (r = 0.30, p<0.01) \) indicating that there were no ethnic differences between real and ideal body size within the groups. However, significant differences regarding BMI were found between the African American and European American females \( (F_{(2, 47)} =3.86, p<0.03) \). While the African American females had a significantly higher BMI \( (30.5 \text{ kg/m}^2) \) and were significantly heavier than the European American women \( (25.28 \text{ kg/m}^2) \), the African American women held more positive attitudes toward their body size and experienced less body image anxiety than the European American women. The Mexican American women did not differ from either the African American or European American women in regards to BMI or attitudes towards body size. Regardless of ethnic descent, there were no differences found in self-esteem between the groups.

Yates, Edman, and Aruguete (2004) conducted a study to distinguish BMI and body/self-dissatisfaction among Asian subgroups in a sample of 312 male and 509 female psychology students from a community college in Hawaii. Participants were of white, Japanese, Filipino, Chinese, part-Hawaiian/Hawaiian, and multiethnic origins. An additional 112 African American students were recruited from a community college in Missouri. BMI was obtained on all participants; figural drawings were used to assess
body dissatisfaction and to assess self-dissatisfaction. Pearson correlation analyses were performed to determine whether BMI scores were related to self-loathing and body dissatisfaction. Results indicated a significant positive correlation between BMI and body dissatisfaction for males ($r=.600$, $p<.0001$) and females ($r=.610$, $p<.0001$), and between BMI and self-dissatisfaction for males ($r=.256$, $p<.0001$) and females ($r=.281$, $p<.0001$). ANOVA analyses also indicated that the males had significantly higher BMI scores ($F(1, 778) =50.30$, $p<.0001$, and significantly lower self-dissatisfaction scores ($F(1, 770) =12.61$, $p<.0001$) than the females. Ethnic differences on BMI scores for the females was significant ($F(6, 476) =9.77$, $p<.0001$) with African American females having the highest mean BMI of all female groups (24.97 kg/m$^2$) as compared to the white (23.24 kg/m$^2$), Japanese (20.89 kg/m$^2$), Filipino (21.71 kg/m$^2$), Chinese (19.35 kg/m$^2$), Hawaiian (19.35 kg/m$^2$), and other multiethnic females (21.97 kg/m$^2$). Despite having the highest BMI of all female groups, the African American females were relatively comfortable with their bodies and selves. Results of this study supported that ethnicity may play a significant role in one’s perception of his or her body image.

Other studies examined eating behaviors and attitudes, meaning of body parts, and age in terms of their relationship to body image. Rucker and Cash (1992) conducted a correlational study to compare body image and eating behaviors in a sample of 49 African American and 55 white female college students match based on age and weight. A self-report instrument was used to examine eating behaviors, and the Body Image Assessment silhouettes were used to assess the participants’ current and ideal body images. BMI was obtained on each of the participants as well. Results indicated that the white female college students reported significantly greater body dissatisfaction ($p<.02$)
and significantly greater negative evaluations of their appearance (p<.03) when compared to the African American females. Compared with whites, the African American females held body-size ideals that were less thin and similar to their current perceived size, evaluated their overall appearance more positively, and displayed less concern about dieting, fatness, and weight fluctuations.

Akan and Grilo (1995) conducted a study to assess eating attitudes and behaviors in a sample of 98 female college students (36 African Americans, 34 Asian-Americans, and 28 Caucasians). A series of self-report instruments were used to assess anxiety, self-esteem, eating attitudes, fear of becoming or being fat, and physical appearance related to body parts. Black and Asian acculturation instruments were used to assess the respective participants’ acculturation status. None of the participants in this study met the criteria for eating disorders. Assimilation scores of the African Americans and Asian-Americans did not reveal any differences in the variables related to acculturation. ANOVA showed that Caucasians had significantly higher scores for eating attitudes ($F_{(2, 95)} = 3.69, p<.03$), as compared to the other two groups which did not differ from one another. The Asian-Americans reported significantly fewer instances of being teased about weight or size ($F_{(2, 95)} = 4.87, p<.01$) as compared to the Caucasians and African Americans. Caucasians scored significantly higher on dietary restraint ($F_{(2, 95)} = 4.95, p<.009$), eating concerns, ($F_{(2, 95)} = 4.27, p<.02$), and self-esteem scores ($F_{(2, 95)} = 3.78, p<.03$) than did the Asian-Americans; however, these results were not significant when compared to the African Americans. Scores for body dissatisfaction were greatest for Caucasians (95.57) as compared to the African Americans (77.89) and Asian-Americans (78.21); however, these results were not significant ($F_{(2, 95)} = 2.96, p=.06$). Pearson correlation analyses
were performed to test relationships among BMI, eating attitudes/behaviors, body image, and the psychological variables separately for the three groups. In the Caucasian group, BMI was positively correlated with body image (p<.0001); public self-consciousness was significantly correlated with eating attitudes/behaviors (p<.01) and body image (p<.05) while self-esteem was negatively correlated with eating attitudes (p<.05) and body image (p<.05). In the African American group, BMI was positively correlated with eating attitudes/behaviors (p<.0001) and body image (p<.001); public self-esteem and social anxiety were positively correlated with eating behaviors (p<.001) and body shape (p<.0001) while self-esteem was negatively correlated with eating behaviors (p<.0001) and body image (p<.0001). In the Asian-American group, body image was positively correlated with BMI (p<.0001) while public self-consciousness was positively correlated with eating attitudes/behaviors (p<.05) and body image (p<.05); self-esteem was negatively correlated with body-image (p<.05). Multiple stepwise regression analyses were performed to predict body dissatisfaction using BMI, self-esteem scores, weight/size teasing scores, general appearance scores, public self-consciousness scores, and social anxiety scores. Among Caucasians, weight/size teasing, public self-consciousness, and BMI accounted for 59% of the variance in body dissatisfaction. Among African Americans, public self-consciousness, BMI, and self-esteem accounted for 66% of the variance in body dissatisfaction. Among Asian-Americans, 45% of the variance in body dissatisfaction was explained by BMI and public self-consciousness. Results of this study suggested that weight, eating behaviors and attitudes, and body dissatisfaction were influenced by cultural factors.

A later study was conducted by Altabe (1998) to assess multiple dimensions of
body image including perceptions and meanings about one’s body parts in a diverse ethnic population comprised of Caucasian, African American, Hispanic, and Asian psychology students (150 males and 185 females). A series of self-report instruments were used to assess perceptions and meanings about one’s body parts. Results of the study indicated that whites had significantly more size discrepancy (perceived body image) than either the African Americans or Asians (p<.01, and p<.05 respectively). The African Americans had significantly higher self-ratings of attractiveness (p<0.01), and the African American females had significantly more positive rankings of self than the white, Asian, or Hispanic females in the study (p<0.01). Study findings suggested that perceptions and meanings about one’s body parts were influenced by culture as well as ethnicity.

Miller, Gleaves, Hirsch, Green, Snow, and Corbett (2000) determined if feelings about body parts varied with gender and race in a sample of 120 male and female African American, Latin, and white college students aged 18 to 49 years. Multidimensional aspects of body image including perceived appearance, perceived health, perceived illness, body area satisfaction, body esteem, and desired responding were tested using a series of self-report instruments. Two-way ANOVAs were performed to compare racial/ethnic and genders in terms of social desirability. Results were not significant and indicated that there were no main or interaction effects for social desirability among the groups. When testing for confidence, there was a significant main effect for race/ethnicity (F(2, 114) =3.14, p<.05), as well as a significant gender and race/ethnicity interaction (F(2, 114) =4.34, p<.05); this interaction appeared due to the fact that African American and Latino American males and females scored equivalently, while the
European American males scored significantly higher than the European American females ($F_{(1, 38)}=13.1, p<.001$). Two-way ANCOVAs compared racial/ethnic and gender groups on body image measures while controlling for BMI, age, socioeconomic status, and social desirability. Results indicated there were main effects for race/ethnicity on 4 of the 10 subscales of the Multidimensional Body-Self Relations Questionnaire (MBSRQ); African Americans scored the highest on appearance evaluation ($F_{(2, 114)}=7.97, p<.001$), orientation to illness ($F_{(2, 114)}=6.72, p<.001$), and body area satisfaction ($F_{(2, 114)}=7.02, p<.001$), and lowest on weight preoccupation ($F_{(2, 114)}=6.50, p<.001$) when compared to the whites and Latinos. ANCOVA was also performed to assess body esteem among the groups; BMI, age, and social desirability served as covariates. There were no significant differences for body esteem among the groups. However, African American females scored highest for self-ratings of sexual attractiveness ($F_{(2, 57)}=5.4, p<.01$) and lowest for weight concern ($F_{(2, 56)}=6.51, p<.01$) as compared to the Latinas and white women. In this study, African Americans demonstrated a more positive view of their bodies as compared to the other two groups.

A more recent study examined if body image estimates in African American females differed as a function of age in a sample of 379 African American females between the ages of 16 and 96 years (Williamson, White, Newton, Alfonso, & Stewart, 2005). Current body size, ideal body size, and realistic body size (size that female believed she could maintain) were assessed in each of the females using a figural rating scale. Subjects who were 16 to 25 years reported significantly thinner ideal body size goals than those who were older ($p<.05$). Those who were 16 to 35 years reported significantly greater body discrepancy (difference between current body size and ideal
body size) than those over 35 years of age (p<.05). These findings suggested that body image measures may differ in African American females across different age groups.

In 2002, Paeratakul, White, Williamson, Ryan, and Bray conducted a secondary data analysis to (a) compare one’s self-perception of overweight according to sex, race, and socioeconomic status, and (b) to compare self-perception of overweight among those classified as normal weight, overweight, and obese. Data for this study were taken from a sample of 5440 adults who participated in the Continuing Survey of Food Intakes study. The sample consisted of 4265 Caucasians, 621 African Americans, 425 Hispanics, and 149 others whose race was not specified (2720 males, 2720 females). Results indicated that Caucasian males and females perceived themselves as overweight as compared to the African American males and females (p<.05). African American females were significantly less concerned about their weight (p<.05), reported less pressure to be slim (p<.05), were less dissatisfied with their body weight (p<.05), and had greater acceptance of their being overweight (p<.05) than did the Caucasian females. The African American females also considered themselves as being attractive even if they were overweight. The outcomes of this study supported findings of previous studies which indicated that African Americans had a more positive body image and were less concerned with weight when compared to Caucasians.

The next three studies examined relationships between body image and weight loss. The first of these studies was conducted by Kumanyika, Wilson, and Guilford-Davenport (1993) to examine weight-related attitudes and practices of 500 African American females aged 25 to 64 years. Eighty five percent (N=425) of the participants had a high school education or college, and 78% of the sample (N=390) were employed.
Multiple logistic analyses were performed with sets of independent variables that included education, parity, marital status, presence of diseases including diabetes and hypertension, use of alcohol and tobacco, exercise status, and body image perception on weight status. Findings revealed that awareness of obesity-related health risks among all the participants were high (p<.01). In addition, women who were overweight perceived themselves as such but considered themselves to be very attractive (p<.001) suggesting that the women had a positive body image of themselves. Other results indicated that no negative attitudes by other African Americans were exhibited toward those African Americans who were overweight or obese (p<.05). Among the subset of 368 who had ever attempted to lose weight, those who were overweight were significantly more likely to have regained all or most of the weight lost during their most recent weight loss attempt (p<.05). These findings suggested that although African American females were aware of their weight, absence of strong negative social pressure and positive body image may have limited the extent to which weight loss efforts were sustained.

Anderson, Janes, Ziemer, and Phillips (1997) examined the relationship between body image and weight loss in a sample of 224 female and 146 male African Americans recruited from a diabetes clinic. BMI, a series of body image questions, and questions about self-rated health, mood control, and health locus of control were utilized in this correlational study. Study results indicated that overweight males viewed their current size as larger than desired. The females who were overweight viewed their current and desirable body size as significantly larger than females of normal weight (p<.0001, and p<.003 respectively). In addition, current body size for overweight as well as normal weight for females was larger than desired (p<.0001, and p<.005 respectively).
Differences also existed between the sexes. Discrepancy between current and desired weight was greater for females than males \((p<.0001)\). Those females who were less satisfied with their body size were more likely to report trying to lose weight than those females who were satisfied with their body. An implication of these findings by the researchers was that satisfaction with body image may be an important determinant of whether or not an individual may try to lose weight.

James (2003) examined gender differences in body dissatisfaction, obesity status, and weight loss strategies among 552 male and 237 female African Americans. Results indicated that significantly more males \((40\%)\) than females \((24\%)\) were satisfied or very satisfied with their weight \((p<.0001; \text{OR}, 3.2)\). In addition, significantly more females than males tried to lose weight in the last year \((p<.0001)\). The researcher concluded that perceptions of weight and body size varies by gender, and that women were more likely than men to be dissatisfied with weight and body size.

Two studies examined perceived body image among African Americans. Harris (1995) explored contributions of family, self, and sociocultural factors in relation to conceptualizations of body image in a sample of 90 African American female college students from three large predominantly Euro-American universities. The sample ranged from middle class to lower working class with 72\% of family incomes ranging from $40,000 to $10,000. A series of self-report instruments to examine body attitude, social self-esteem, attitudes associated with being black, and a demographic questionnaire to obtain information about the participants and their family were used to examine the study variables. ANOVAs indicated that women whose fathers earned a high school degree or less were more dissatisfied with their bodies than those whose fathers earned a four-year
college degree ($F_{(3, 69)} = 5.65, p<.002$). A greater BMI was associated with more body dissatisfaction ($r = .55, p<.001$), less body-areas satisfaction ($r = .53, p<.001$), less favorable evaluation of physical appearance ($r = .46, p<.001$), less concern for and participation in fitness-enhancing behaviors ($r = -.24, p<.05$), and less favorable evaluation of fitness ($r = -.35, p<.01$). Other results of this study indicated that higher ideal weights were associated with greater body dissatisfaction ($r = .34, p<.01$) and less favorable evaluations of physical appearance ($r = -.23, p<.05$). In addition, higher levels of self-esteem were associated with more favorable physical appearance ($r = .34, p<.05$) and engagement in more health-enhancing behaviors ($r = .35, p<.01$). Results of this study indicated that body image attitudes were associated with fathers’ education, evaluation of physical appearance, fitness, BMI, and self-esteem.

Baptiste-Roberts, et al. (2006) conducted a correlational study to assess current, desired, and best body image along with correlates of body image dissatisfaction in a sample of 185 African American females ($N = 141$) and males ($N = 44$) with type 2 diabetes. Participants assessed each of their perceived and desired body images and the desired body image for the opposite sex by the Scale of Body Figures by Stunkard. Results indicated that females had a significantly heavier perceived body image of themselves than the males had of themselves ($p=0.02$). When males and females were compared, the females in this study desired a slightly leaner body image than did the males; however, these results were not significant ($p=0.08$). In addition, the majority of women significantly perceived their current body image as heavier than their desired body image ($p<0.05$); however, in spite of these findings, the females continued to accept a heavier body image as “ideal” for themselves. The males preferred a body image for
the women that was similar to the women’s desired body image; however, these results were not significant (p=0.678). Significant correlates of body image dissatisfaction for the women in this study included their perception of being overweight and attempting weight loss through diet or exercise (p<0.05). An implication of this study was that perhaps the acceptance of a heavier body image among African American females with type 2 diabetes could be an important contributor to their perception of the lack of need for weight loss and exercise (Baptiste-Roberts, et al., 2006). This study, however, did not assess relationships that may have existed between body image and physical activity levels.

Results of these studies support that body image is a very complex and multidimensional construct. Body image influenced how one perceived his or her body as well as what constituted the “ideal body”. Such attitudes were influenced by cultural standards as well as interaction with others. Culture dictated standards about appearance as well as attractiveness and was internalized by members of that ethnic group. Appearance also impacted how an individual was perceived and treated by other members of the group further serving to influence the individual’s body image (Cash, 2002).

In the previous studies that were part of this review, attractiveness in African Americans was not equated with “slenderness” as it was with Caucasians. Instead, attractiveness was determined by culture and ethnicity. The African American females in these studies tended to favor a larger body size, and experienced greater satisfaction with their weight, body size, and body parts when compared to white females. These factors were thought to influence the need for weight control (Baptiste-Roberts, et al., 2006).
Such body satisfaction may affect motivation as well as the perceived need for weight loss in African American females with type 2 diabetes; in turn, this may affect the perceived need for exercise in this population. To date, there are no studies that have examined this relationship. Therefore, further examination of this relationship is warranted.

Overview of Studies Examining Psychosocial Determinants of Physical Activity

A variety of psychosocial and demographic factors have been shown to influence whether or not a person engages in physical activity. These include socioeconomic status, physical environment, sense of community, and social issues and roles (Eyler, et al., 2002; Williams, 1997; Williams, 2002). African Americans, especially females, are at a greater disadvantage than Caucasian females with respect to socioeconomic status (Williams, 1997). Lack of education, poverty, and racial segregation may contribute to a lesser likelihood of African American females changing health behaviors (Williams, 1997; Williams & Jackson, 2005). A lower socioeconomic status may relate to less leisure time and less opportunity for recreational exercise as well as pressure against engaging in such behaviors by others such as family and/or friends (Sobal & Stunkard, 1989).

In addition to socioeconomic status, other factors contributing to physical inactivity may include concerns for safety, lack of places to walk, and lack of community support (Brody, Jack, Murry, Landers-Potts, & Liburd, 2001; Eyler, et al., 2002; Jack, Liburd, Vinicor, Brody, & Murry, 1999; Wilbur, Chandler, Dancy, Choi, & Plonczynski, 2002; Wilbur, Miller, Montgomery, & Chandler, 1998; Williams, 2002; Williams &
Jackson, 2005). These factors may partially explain why many African American females with type 2 diabetes continue to remain sedentary despite the knowledge that physical activity is beneficial in helping to achieve glucose control.

The American’s Changing Lives Study (Lantz, et al., 1998) investigated the degree to which cigarettes, alcohol, sedentary lifestyle, and BMI explained the observed association between socioeconomic characteristics and mortality over a 7 ½ year period of time in a sample of 3,617 participants. Results from this study indicated that less than 11 years of education and an annual income of less than $10,000 were associated with a significantly greater prevalence of mortality risk, being overweight, and physical inactivity in both males and females (p<.001).

Several researchers conducted meta-analyses to examine correlates of physical activity. Krummel, et al. (2001) analyzed 65 population-based studies including studies that focused on improving women’s cardiovascular health through behavior change for tobacco use, alcohol use, and physical inactivity. Results of this meta-analysis indicated that physical inactivity was associated with less than 12 years of education and low levels of income. Another finding of this review indicated that physical activity was related to (a) exercise counseling by a physician, (b) higher levels of self-efficacy, (c) self-monitoring, and (d) program incentives.

Eyler, et al. (2002) conducted a meta-analysis of 91 studies to assess correlates of physical activity in adult Caucasian, African American, American Indian, Asian, and Hispanic women. Findings from this study would be utilized for making informed recommendations for future physical activity research among women, including minority groups. Results indicated that African American women were less likely to engage in
structured or leisure-time physical activity when compared to Caucasian women. Other findings of this study suggested that lower levels of education and income, presence of chronic health conditions, safety concerns related to residing in unsafe neighborhoods, lack of places to exercise, and family responsibilities including caring for children or others acted as barriers of physical activity in African American females. Positive determinants of physical activity included diabetes self-efficacy and social support (Eyler, et al., 2002).

Several studies were also conducted to determine what factors served as barriers of physical activity and diabetes self-management. Nies, Vollman, and Cook (1999) conducted a qualitative study with 16 African American women between the ages of 35 and 50 years. Focus groups explored their experiences with physical activity. Verbatim transcripts of audiotapes were coded and analyzed. The major barrier themes to physical activity and diabetes self-management that emerged during the analysis included: (a) lack of child care, (b) no one to exercise with, (c) competing responsibilities such as work and family responsibilities, (d) lack of support by family or friends, (e) lack of space in the home, and (f) residing in an unsafe community neighborhood.

Another qualitative study that utilized focus groups was conducted by Wilbur, et al., (2002) in a sample of 48 low-income urban African American women. Findings from this study would be utilized to help develop community-based exercise interventions to meet the needs of low-income urban African American women. Barrier themes that emerged during the analysis included (a) concerns for safety (b) distance to exercise areas, and (c) lack of transportation to exercise areas.

Wilbur, Vassalo, Chandler, McDevitt, and Miller (2005) examined factors that
influence exercise self-efficacy in 102 sedentary women aged 40 to 65 years (27 African Americans, 63 Caucasians). The intervention for this one-group pretest-posttest study consisted of a 24-week walking program in which an assigned research team member met with each participant to deliver the intervention using sources of self-efficacy beliefs to enhance confidence for exercise, verbal persuasion, and physiological arousal. Heart rate monitor and activity logs were utilized to record heart rate changes that occurred during the intervention from baseline. A self-efficacy for exercise scale that was comprised of barriers to exercise was given to the participants at baseline, 24 weeks, and 48 weeks (maintenance phase). Chi-square analysis was performed to detect differences between the women who completed the maintenance phase and those who did not; results indicated that significantly more Caucasian than African American females completed the maintenance phase ($p<.05$). A two-sample $t$-test was performed to detect differences in adherence during the intervention, exercise self-efficacy at the end of the intervention, and change in exercise self-efficacy and body fat from baseline to the end of the intervention between those who completed maintenance and those who did not. Women who completed maintenance had significantly greater adherence ($t=7.48$, $df=88$, $p<.001$), increased self-efficacy from baseline ($t=3.17$, $df=82$, $p=.002$), and change in percentage of body fat ($t=2.14$, $df=86$, $p=.035$). Barriers to exercise that were identified in this study included lack of time due to work, family events, and family crises.

Gallagher, et al. (2006) examined psychosocial factors affecting physical activity in a sample of 165 overweight women who participated in a behavioral weight loss program that included behavioral education, calorie restricted diet, and home-based exercise. Findings of this six month experimental weight loss study suggested that
various obstacles including bad weather, lack of facilities, and family obligations had an impact on individuals who reported less than 150 minutes of physical activity per week but not in those individuals who reported more than 300 minutes of physical activity per week. Reasons for these differences were not reported. However, perhaps those who reported more than 300 minutes of physical activity per week had greater levels of exercise self-efficacy.

Results of these studies indicated that a variety of factors affected physical activity levels. Lower levels of education and income were correlated with lower levels of physical activity. Other factors such as lack of places to walk, lack of exercise facilities, residing in unsafe community neighborhoods and family responsibilities also contributed to physical inactivity. Such issues may help to explain physical inactivity patterns in African American females with type 2 diabetes.

Conclusion

Many variables may affect physical activity levels in African American females with type 2 diabetes. Variables included in this literature review examined (a) social support, (b) exercise self-efficacy, (c) body image discrepancy, (d) environmental structures such as physical environment, sense of community, social issues and roles, and (e) socioeconomic status including level of education and household income. Studies that were included in this review examined the effects of these variables on diabetes self-management skills, diabetes program adherence, body satisfaction, and adherence to walking or exercise programs. Results of this literature review indicated that self-efficacy and social support acted as positive determinants of health behaviors. Other
variables such as lower levels of education and income, environmental barriers, and social roles and issues resulted in physical inactivity and resistance to changing health behaviors. While these variables have been studied independently in a variety of ethnic/racial populations, males and females, and in healthy as well as not so healthy individuals, these variables have not been examined exclusively in African American females with type 2 diabetes. Such a study is important to determine how these factors may affect physical activity levels in this population. Results of such a study may be used to design tailored interventions to increase physical activity levels in this population.

Body image and body image discrepancy were other variables that were examined in this review. Results of studies suggested that African American women were more satisfied with their bodies and were more accepting of their bodies than Caucasian females. Such satisfaction and acceptance may affect motivation as well as the need for weight loss through exercise. However, this relationship has never been explored in African American females with type 2 diabetes. Therefore, further examination of this relationship is warranted and will be a primary focus of this research.
CHAPTER III

Methods

Study Design

The purpose of this study was to examine how selected variables such as family/friend social support for exercise, self-efficacy for exercise, body image discrepancy, exercise barriers, and socioeconomic status (level of education and household income) influence physical activity levels in African American females with type 2 diabetes.

The design for this study is nonexperimental, descriptive, cross-sectional, and correlational. The independent variables for this study are family and friend social support for exercise, self-efficacy for exercise, body image discrepancy, barriers including physical environment, sense of community, social roles and issues, and socioeconomic status including level of education and household income. The dependent variable of this study is physical activity level. Possible relationships between the independent variables and the dependent variable are depicted in Figure 1.

Sample and Setting

The sample for this study consists of African American females who have a documented diagnosis of type 2 diabetes; this diagnosis was obtained from the chart at the diabetes center. In addition, the sample included those African American females who have received instruction on the importance of exercise by the certified diabetes educator at the diabetes center. A power analysis based on data obtained from the pilot study was conducted to estimate the sample size needed to improve the chances of
Figure 1

Possible Relationships Between the Independent Variables and the Dependent Variable

**Independent Variables**

- > Friend Social Support
- > Family Social Support
- > Body Image Discrepancy
- > Exercise Barriers
- > Level of Education
- > Household Income

**Dependent Variable**

> Self-efficacy for Exercise (modeling, verbal persuasion)

Physical Activity Levels
obtaining significant results and avoiding a Type II error. Pilot data suggests an estimated correlation coefficient of .85 between friend social support for exercise and physical activity levels. But in order to make sure that our estimates are robust, assuming an effect size of r=.40, a one-tailed alpha of .05, and a sample of 50 for the study, one obtains an estimated power of .90 (Cohen, 1988).

Subjects were obtained by purposive sampling from the diabetes center that is affiliated with one of the hospitals in Northwest Indiana. The inclusion and exclusion criteria for participant selection were as follows.

Inclusion criteria for the study sample were:

1) African American female with type 2 diabetes;
2) age 18 years or older;
3) documentation of type 2 diabetes;
4) documentation of instruction by a certified diabetes educator on the importance of exercise;
5) ability to legally consent for self, not lack decisional capacity, and able to read, write, and understand English; and
6) consent to participate in this study.

Exclusion criteria for the study sample were:

1) pregnancy;
2) diagnosis of end-stage renal disease necessitating dialysis;
3) retinopathy resulting in blindness;
4) lower extremity amputations that may limit the ability to ambulate without the use of an assistive device;
5) the inability to ambulate without assistance or the use of an assistive device such as a walker; 

6) severe neuropathy; or 

7) severe cardiovascular/peripheral vascular disease that may prohibit the subject from participating in physical activity.

Setting

This study was conducted at the diabetes center of a mid-sized area hospital located in Northwest Indiana. Teaching at the facility was conducted by a certified diabetes educator (CDE), and included medication instruction as well as instruction on glucometer testing, and lifestyle changes. Instruction on lifestyle changes included following a calorie/carbohydrate-controlled, heart-healthy diet, and exercising regularly.

Teaching was done on an individual basis as well as group instruction. This setting was selected for data collection because it provided standard diabetic teaching according to the American Diabetes Association guidelines (2008).

Protection of Human Subjects

This study was approved by the Rush Institutional Review Board as well as the study institution and principal investigator's place of employment. Participants were informed of the purpose of the study through verbal and written explanation as well as how to contact the principal investigator should any questions arise during the period of the study (Appendix A). In addition, all consenting participants were informed through verbal and written explanation of other individuals with whom their information may be shared (Appendix B). All clients meeting the inclusion criteria and those who entered
into the study were told that they can choose not to participate or may withdraw from the study at any time without affecting their diabetes education. The risks for participating in this study were minimal as clients were asked to complete a set of questionnaires during their visit to the clinic; there were no physical risks or discomforts. Subject identification numbers were used instead of names; this was done to protect the subjects’ confidentiality and privacy for data collection, analysis, and publication of results.

Measurements

Social Support and Exercise Survey

The Social Support and Exercise Survey (Sallis, 1986) is a 13-item, self-report instrument that will be used to measure perceived social support for exercise behaviors from family and friends during the last three month period (Appendix C). Perceived social support for exercise from family is measured separately from friend social support (Sallis, et al., 1987). Each question on the scale is rated twice, once for family and once for friends. Social support from family is defined as activities that “members of the household” may do or say that influence the individual; positive social support helps the individual move toward goals while negative social support blocks or hinders goal attainment (Sallis, et al., 1987). Social support from friends refers to activities that “friends, acquaintances, or co-workers” may do or say that influences the individual. Once again, positive social support helps the individual to progress toward goals while negative social support hinders goal attainment (Sallis, et al., 1987). All participants were asked to write a number between 1 (none) and 5 (very often) in the provided space for those statements that applied to them; an 8 indicated that the statement did not apply.
The Social Support and Exercise Survey is scored differently for family and friends. In scoring the scales for family and friends, "8" (does not apply) is recoded to "1" (none). Perceived family and friend support for exercise are determined by summing items 1-6 and 10-13; scores can range from 9 to 45 with higher scores indicating perceived positive support from family and friends for exercise. For family rewards and punishment, items 7-9 are summed; however, rewards and punishment are not scored for friends because these items did not emerge in the factor analysis in the original study (Sallis, et al., 1987).

Validity and reliability of the Social Support and Exercise Survey were established. Concurrent criterion-related validity of the Social Support and Exercise Survey was established by correlating social support factor scores with a physical activity questionnaire by the American College of Sports Medicine (1986) that was designed to identify subjects who were obtaining sufficient exercise to produce a cardiorespiratory training effect. Concurrent criterion-related validity was supported by a Pearson correlation coefficient of 0.35 (p<0.001) for family support and 0.46 (p<0.001) for friend support. Construct validity was established by correlating the Social Support and Exercise Survey with Sarason’s Social Support Questionnaire (Sallis, et al., 1987). Cronbach’s alpha was used to measure internal consistency of each factor on the scale. Alpha coefficients for the entire scale ranged from 0.61 to 0.91. Alpha coefficients for the friend and family social support scales were 0.84 and 0.91 respectively. Factor test-retest reliabilities ranged from 0.55 to 0.86 for the entire instrument, 0.79 for friend social support, and 0.77 for family social support.

The Social Support and Exercise Survey was used by Samardzija in 2006 in a
pilot study that was conducted with a sample of 10 African American females with type 2
diabetes. Results of that study indicated that there was a very strong correlation (r=0.85,
p<.05) between friend social support for exercise and physical activity levels. However,
the same study showed no relationship between family social support and physical
activity levels.

Self-efficacy for Exercise Scale

The Self-efficacy for Exercise Scale is a 9-item rating scale that measures how
certain one is at that moment that he or she could exercise three times per week for 20
minutes if a particular situation occurred. This scale is a revision of McAuley’s self-
efficacy barriers to exercise measure and is based on Bandura’s theory of self-efficacy
(Resnick & Jenkins, 2000). Participants were asked to circle a number between 0 (not
certain) and 10 (very certain) for each item; scores are summed and divided by 9. A
higher score indicates high self-efficacy for exercise while a low score indicates low self-
efficacy for exercise.

Construct and criterion-related validity of the scale have been established.
Construct validity was tested using two empirically supported hypotheses: (a) individuals
with better physical health were more likely to have stronger self-efficacy expectations,
and (b) individuals with better mental health were more likely to have stronger self-
efficacy expectations. The 12-item Short Form Health Survey was used to measure
perceived physical and mental health status of the participants. The Expected Outcomes
for Habitual Exercise scale was used to measure positive outcomes of physical activity;
outcome expectations are predictive of exercise activity. As hypothesized, the 12-item
Short Form Health Survey subscale scores for physical and mental health, when
controlled for gender and age, significantly predicted physical and mental health scores on the Self-efficacy for Exercise Scale \( (F=38.9, \, p<0.05, \text{ and } F=24.3, \, p<0.05) \) respectively. When controlled for gender and age, scores on the Self-efficacy for Exercise Scale were significantly predictive of exercise activity \( (F=78.8, \, p<0.05) \), accounting for 30% of the variance in exercise activity (Resnick & Jenkins, 2000). Criterion-related validity was established using structural equation modeling (SEM). Correlations between each item on the Self-efficacy for Exercise Scale and other factors known to influence exercise activity including benefits of exercise, impaired health, fear of injury, and unpleasant sensations associated with exercise were determined. These other factors likely accounted for the remaining 70% of the variance in exercise activity. Lambda X estimates or correlations between the Self-efficacy for Exercise Scale score and each of these other factors ranged from 0.61 to 0.87; all were statistically significant \( (p<0.05) \).

The Self-efficacy for Exercise Scale has a Cronbach's alpha coefficient of 0.92. This indicates sufficient evidence of internal consistency. Squared multiple correlation coefficients using structural equation modeling ranged from 0.38 to 0.76; this provides further evidence of internal reliability (Resnick & Jenkins, 2000).

**Body Image for African Americans**

The Body Image for African American females (Pulvers, et al., 2004) is a figural rating scale consisting of nine front-view drawings of incremental increasing size of adult women (Appendix D). This instrument was used to assess current body image (CBI), ideal body image (IBI), and body image discrepancy (BD). The instrument is modeled after Stunkard's nine-figure scale. Figures are labeled “A” through “I” with “A” being
very underweight and “I” being the most overweight; each letter corresponds to a number ranging from one to nine with “1” being very underweight and “9” being the most overweight (Appendix E). Hair and facial features of the figures were designed by the researchers to resemble females of color (African American). This figural rating scale was shown to African American females who meet the inclusion criteria and consented to be in the study. In this study, each participant was asked to choose the figure that looked most like her (CBI), and the body shape that she most desired (IBI). Body image discrepancy was determined by subtracting the IBI from the CBI. Scores are interpreted as follows: (a) a BD score of greater than zero (>0) indicates a CBI that is heavier than the participant’s ideal, (b) a BD score of less than zero (<0) indicates a CBI that is lighter than the participant’s ideal, and (c) a BD score of zero (0) indicates that the participant’s CBI and IBI are the same (Appendix E).

Validity of the instrument has been established. Content validity was established by a panel of expert judges. Criterion validity was established using the Stunkard figural rating scale and the Williamson scale (Pulvers, et al., 2004). The new instrument was positively correlated with both the Stunkard and Williamson scales (r = 0.90 and 0.92 respectively). Convergent validity was determined by evaluating how strongly observer body size correlated with one another and with participants’ ratings of body image; correlations between observer body size ratings and participant body image ratings ranged from 0.75 to 0.83 for women. In addition, the degree to which observer ratings of body size correlated with participants’ perception of their weight status and how well participants’ rating of their body image correlated with perception of their own weight status was determined; Spearman correlation was 0.69 for women. Another important
point to be made was that the participants in this study found the instrument to be culturally relevant and sensitive (Pulvers, et al., 2004).

The instrument was also found to be reliable. The Body Image for African Americans instrument has a Cronbach's alpha coefficient of 0.95. An interrater reliability of 0.85 was established at the time of the original study (Pulvers, et al., 2004).

**Women and Physical Activity Survey**

The Women and Physical Activity Survey is a 28-item Likert-type scale that consists of five sections containing questions asking about things that may act as barriers to physical activity. These sections include: (1) physical environment, (2) sense of community or neighborhood issues, (3) social issues to assess social perceptions that may be relevant to physical activity, (4) social roles to assess role strain and its relationship to physical activity, and (5) self-efficacy (Evenson, et al., 2003). Items in each of the sections with the exception of section 5 are summed and divided by the number of questions. A lower score in section 1 (physical environment) indicates less barriers are present that may hinder physical activity; higher scores in sections 2, 3, and 4 indicate a greater sense of community, social issues, and social roles respectively. This instrument was used in this study to assess correlates that may serve to hinder physical activity levels in African American females with type 2 diabetes.

Test-retest reliability was established with women of various ethnic backgrounds in urban as well as rural communities. Reliability of self-reported physical activity and its correlates were determined using intraclass correlation coefficients (ICC) overall and separately by location and race/ethnicity. Intraclass correlations for African American females were as follows: (a) ICC for physical environment = 0.40-0.61, (b) ICC for sense
of community = 0.75, (c) ICC for social issues = 0.70, (d) ICC for social roles = 0.55, and
(e) ICC for self-efficacy = 0.44.

Level of education and household income

This information was obtained from the demographic sheet (Appendix F). Participants were directed to check the highest level of education as well as a range of household income. Highest level of education completed includes the following: (a) sixth grade education or less, (b) some high school, (c) high school, (d) some college, (e) college graduate, and (f) graduate school. Annual household income includes (a) less than $12,000, (b) $12,000 to $20,000 per year, (c) $20,001 to $30,000 per year, (d) $30,001 to $40,000 and (e) greater than $40,000 per year. In addition, each participant was asked to list the number of individuals residing in her household.

Modified CHAMPS Physical Activity Questionnaire

The Modified CHAMPS Physical Activity Questionnaire (Appendix G) is a 31-item questionnaire that asks about frequency and time spent doing various activities; the participant is instructed to think about the past two weeks (Resnicow, et al., 2003). Each participant was asked to write how many times, on average she has participated in a specific activity. In addition, she was also asked to circle the amount of time spent in that activity during a one-week period of time. Frequency of activity is calculated by summing all exercise-related activities for the week. Caloric expenditure is calculated as follows. First, duration (hours/week) for each activity is recoded as follows: (a) less than 1 hour per week = 0.5, (b) 1 – 2.5 hours per week = 1.75, (c) 3 – 4.5 hours per week = 3.75, (d) 5 – 6.5 hours per week = 5.75, (e) 7 – 8.5 hours per week = 7.75, (f) 9 or more hours per week = 9.75, and (g) duration not answered will be given a score = 0; this
number is known as the duration variable. Next, a new weighted duration variable for each activity is created for each recoded duration variable previously described. This is be done by multiplying the duration variable by a corresponding coding algorithm MET value. Next, caloric expenditure per week is determined by multiplying the weighted duration variable by 3.5 and by 60 (to convert METs/minute to METs/hour) and by weight in kg/200; this variable is known as the caloric expenditure per week. Finally, total caloric expenditure per week will be determined by summing the caloric expenditure per week across activities (Resnicow, et al., 2003; Stewart, et al., 2001; University of California, San Francisco, 2003).

Construct validity and reliability of the instrument was established in a sample of African Americans participating in the Healthy Body/Healthy Spirit intervention trial. Construct validity was established by comparing the modified CHAMPS measure to cardiorespiratory fitness (estimated VO₂ max) and physiologic parameters related to fitness including blood pressure, body mass index, and total cholesterol. Reliability of the instrument was established by determining the correlation of self-report responses of moderate to vigorous physical activities (≥ 3 METs), vigorous physical activities (≥ 5 METs), and sports with VO₂ max. Range of correlations for these activities ranged from 0.16 to 0.32 respectively with a correlation of 0.17 for all activities. Correlations were statistically significant (p <0.05) for all activities, vigorous physical activities, and sports but were not statistically significant for moderate to vigorous physical activities (Resnicow, et al., 2003).

Narrative questions

Two short narrative questions that ask about physical activity and exercise and a
third that asks about physical activity and diabetes were formulated by the principal investigator (Appendix H). The first two questions refer to the previous two weeks. Prior to asking the first two questions, the principal investigator defined physical activity as well as exercise and gave examples of each. The first question is, “On a day that you were most physically active and which may have included exercise, what were some of the things that helped you to do these activities?” The second question is, “On a day that you were not physically active or did not exercise, what were some of the things that got in the way of your being able to exercise or be physically active?” The third question asks the participant what she has been told about physical activity/exercise and diabetes. The principal investigator (PI) verbally asked each participant these questions; the participants’ responses were written down by the PI and are included as part of the study. It is hoped that this would help the principal investigator to gain additional insight into factors that positively as well as negatively influence physical activity and exercise in this population.

**Study Protocol**

Potential subjects were identified by the staff at the diabetes center that met the inclusion/exclusion criteria outlined in Appendix I. In addition, recruitment flyers that described the purpose of the study (Appendix J) were placed in the lobby of the center. All potential subjects for this study must have received education by the CDE at the center about the importance of physical activity as a treatment modality for their type 2 diabetes. This education on physical activity was documented in the clients’ charts. Staff at the clinic site identified potential participants and obtained verbal consent from the
subjects in order that the PI may contact them about the study. Once potential subjects were identified, each was contacted by the PI and a time to meet with the subject at the clinic was established.

Once identified, each of the potential subjects was taken to a private area by the PI to obtain study consent. At that time, each of the potential subjects received an explanation of the purpose, benefits, and risks of the study; this was done in order for the potential subjects to be able to give informed consent. Potential subjects were told that benefits include identifying how social support, exercise self-efficacy, body image, various other factors including physical environment, sense of community, social issues, and social roles, and socioeconomic status influence physical activity levels in this population. Potential subjects were also informed that it will take approximately 45 to 50 minutes to complete the surveys and interview. Information obtained from the surveys and that which is obtained from the three narrative questions may help lead to a better understanding of how these variables influence physical activity levels in this population as well as help to identify additional factors that promote as well as those that act as barriers to physical activity. Such information may be used to develop tailored interventions that may serve to increase physical activity levels in this population. Participants were also told at this time that there are no physical, legal or financial risks. In addition, there were no risks related to privacy and confidentiality as participants are not asked to reveal their names. Participants were identified by a number which appeared on the outside of the packet and on each of the survey tools within the packet; this was done for the purpose of data entry. Each participant selected a numbered packet out of the stack of packets; a total of 60 packets were available for the sample of 50 participants
to choose from. Participants were also told that they may choose to withdraw from the study at any time without fear of penalty; participants were furnished with the PI’s phone number and home address. All participants received a copy of the signed informed consent and authorization to share personal health information in research form at this time.

Only those subjects who were able to comprehend the information given to them, volunteer, and consent to the study were a part of the study. Those who met these criteria were asked to sign the consent (Appendix A) and authorization to share personal health information in research form (Appendix B). Potential subjects were not coerced during the recruitment process. Those who gave informed consent were then asked to complete the survey instruments that included the Self-efficacy for Exercise Scale, Women and Physical Activity Survey (WPAS) Social Support and Exercise Survey (Appendix C), Body Image Instrument for African American Females (Appendix D), Modified CHAMPS Physical Activity Questionnaire (Appendix G), and the demographic questionnaire (Appendix F) in a private area/room of the clinic. Upon completion of the survey instruments, participants were interviewed by the PI; responses to the three narrative questions (Appendix J) were written on each of the narrative forms by the PI and/or participant. Upon completion of the interview, each of the participants received a 20 dollar bill for their time and trouble.

At the completion of each interview, the PI returned the signed consent, authorization to share personal health information in research form, and survey instruments to the appropriate manila envelope marked with the participant’s identification number. Data collected at the site was placed in a locked “rolling office”
that the PI purchased for this study; collected data remained in the rolling office and were taken by the PI to her home office at the end of each day. Once the PI returned to her home office, all data collected was placed in a locked file cabinet in the PI’s home office; the door to the office also remained locked. Data was entered into a computer owned by the PI; the computer is password protected and can only be unlocked by the PI.

**Data Analysis**

After data collection was completed, the following data was available on each subject: (a) demographic information containing level of education and household income, (b) social support from family and friends, (c) self-efficacy for exercise, (d) body image discrepancy, (e) information on exercise barriers including physical environment, sense of community, and social issues and roles, and (f) physical activity levels. All data from the instruments with the exception of level of education and household income (nominal data) were considered interval data.

The SPSS 11.5 for Windows statistical software package (SPSS Inc., Chicago, IL) was used for all data analysis with the exception of the narrative data in this study. Narrative data was analyzed and written in narrative form. Descriptive statistics were computed for demographic data. The Pearson product moment correlation coefficient (r) was used to quantify and determine the relationship between two variables. Relationships between family social support for exercise, friend social support for exercise, self-efficacy for exercise, body image discrepancy, exercise barriers including physical environment, sense of community, and social issues and roles, and socioeconomic status (level of education and household income) and physical
activity levels were analyzed by Pearson correlations procedures.
CHAPTER IV

Results

The results of this study are organized into three sections. The first section describes characteristics of the sample. The second section consists of descriptions of the major study variables and an analysis of the findings. The third section presents the findings related to each research hypothesis and a brief description of the participants’ responses to the narrative questions (Appendix J) asked by the PI.

Sample Characteristics

Approximately 200 African American females who attended the diabetes center at the time of this study were approached for enrollment into the study. Ninety six of the participants who were approached did not meet the inclusion criteria. Twenty individuals had severe cardiovascular disease, 20 had severe neuropathy, and eight had foot deformities that resulted from their diabetes and limited their ability to ambulate. Ten had lower extremity venous ulcerations resulting in pain that limited their activity levels, and 12 had chronic renal failure that was rapidly progressing to end-stage renal disease. Twenty other females used an assistive device such as a walker or cane for the purpose of ambulating; this may have limited their ability to be physically active. Two of the remaining six who did not meet the inclusion criteria were blind, and four were unable to read or write. Forty eight individuals who were approached did not wish to participate in the study because of fear of study participation or time constraints. Two other individuals stated they would participate if the study instruments could be completed via telephone, and two others wanted me to come to their homes for the purpose of
completing the survey instruments and narrative questions. Of those who were approached, 50 participants were enrolled in the study location between July 7, 2008 and September 26, 2008. Study participants were obtained by purposive and snowball sampling. All participants enrolled into the study met the inclusion/exclusion criteria (Appendix K) and agreed to participate in this study.

**Characteristics of the sample**

The data in Table 1 includes a demographic summary of the 50 participants. The data in Table 2 shows the mean values for glycosylated hemoglobin, length of time with diabetes, height, weight, BMI, and total weekly minutes of activity as well as total weekly minutes of moderate activity for the participants.

**Age and gender.**

The subjects ranged in age from 25 to 93 years of age; mean age of the sample was 56 years (SD=14.44). All participants (N=50) were female.

**Marital status and children**

Eighteen (30.5%) of the participants were married, and thirteen (20%) were widowed. Eight (13.6%) were single, eight (13.6%) were divorced, two (3.4%) were separated, and one (1.7%) was partnered. Forty six (92%) of the participants had children.

**Level of education.**

Twenty four participants (48%) completed high school, and four (8%) had completed some high school. Of the remaining 22 participants, sixteen (32%) had some college, five (10%) graduated from college, and one (2%) completed graduate school.

**Employment and annual household income.**
Table 1 Demographic Summary of Participants (N=50)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>Range</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>25 – 93</td>
<td>56.0</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>18</td>
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</tr>
<tr>
<td>Partnered</td>
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<td>1.7</td>
</tr>
<tr>
<td>Single</td>
<td>8</td>
<td>13.6</td>
</tr>
<tr>
<td>Divorced</td>
<td>8</td>
<td>13.6</td>
</tr>
<tr>
<td>Separated</td>
<td>2</td>
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</tr>
<tr>
<td>Widowed</td>
<td>13</td>
<td>20.0</td>
</tr>
<tr>
<td>Children</td>
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<td></td>
</tr>
<tr>
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<td>46</td>
<td>92.0</td>
</tr>
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<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Employed</td>
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<td></td>
</tr>
<tr>
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<td>15</td>
<td>30.6</td>
</tr>
<tr>
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<td>34</td>
<td>69.4</td>
</tr>
<tr>
<td>Level of education</td>
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<tr>
<td>Less than 6\textsuperscript{th} grade</td>
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<td></td>
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<tr>
<td>Some high school</td>
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<tr>
<td>High school graduate</td>
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<tr>
<td>Some college</td>
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<td>9</td>
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<td>Greater than $40,000</td>
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<td>22.0</td>
</tr>
<tr>
<td>Medications</td>
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<tr>
<td>No medications (diet controlled)</td>
<td>3</td>
<td>6.0</td>
</tr>
<tr>
<td>Insulin</td>
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<td>6.0</td>
</tr>
<tr>
<td>Oral medications</td>
<td>29</td>
<td>58.0</td>
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<tr>
<td>Insulin and oral medications</td>
<td>15</td>
<td>30.0</td>
</tr>
<tr>
<td>Self-monitoring of blood glucose on a regular basis</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>44</td>
<td>88.0</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>12.0</td>
</tr>
<tr>
<td>Presence of diabetes-related complications</td>
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<td></td>
</tr>
<tr>
<td>Retinopathy</td>
<td>7</td>
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</tr>
<tr>
<td>Nephropathy</td>
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<tr>
<td>Neuropathy</td>
<td>18</td>
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<tr>
<td>Foot problems</td>
<td>12</td>
<td>24.0</td>
</tr>
<tr>
<td>Heart disease</td>
<td>13</td>
<td>26.0</td>
</tr>
</tbody>
</table>
Table 2

Mean glycosylated hemoglobin, height, weight, BMI, number of years with diabetes, total weekly minutes of activity, and total weekly minutes of moderate activity (N=50)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycosylated hemoglobin*</td>
<td>5.2 – 13.4</td>
<td>8.3</td>
<td>1.69</td>
</tr>
<tr>
<td>Height</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cm.</td>
<td>152.4 – 175.3</td>
<td>164.1</td>
<td>7.13</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kg.</td>
<td>65 – 166.8</td>
<td>93.3</td>
<td>21.36</td>
</tr>
<tr>
<td>Body mass index (BMI)</td>
<td>23.9 – 54.2</td>
<td>34.6</td>
<td>7.43</td>
</tr>
<tr>
<td>Average number of years with diabetes</td>
<td>1 – 35</td>
<td>7.1</td>
<td>7.96</td>
</tr>
<tr>
<td>Weekly minutes of activity</td>
<td>210 – 2610</td>
<td>831.5</td>
<td>530.5</td>
</tr>
<tr>
<td>Weekly minutes of moderate activity</td>
<td>30 – 1560</td>
<td>377.8</td>
<td>346.7</td>
</tr>
</tbody>
</table>

*Glycosylated hemoglobin values were available on 48 of the participants
Fifteen participants (30.6%) who enrolled into the study were employed outside of the home. Thirty four participants (69.4%) listed that they were unemployed or retired, and one participant chose not to answer the question. Eleven participants (22%) had income levels of less than $12,000 per year, 12 (24%) reported an annual household income of $12,000 to $20,000, 16 (32%) had incomes of $20,001 to $40,000, and 11 (22%) reported annual household incomes of greater than $40,000.

**Diabetes information and diabetes-related complications.**

Number of years with diabetes for this sample ranged from 1 to 35 years with a mean of 7.14 years (SD=7.96). Reported glycosylated hemoglobins ranged from 5.2% to 13.4% with a mean of 8.3% (SD=1.69). Fifty eight per cent (N=29) of the participants were on oral agents for their diabetes, 6% (N=3) were on insulin, 30% (N=15) were on both insulin and oral agents, and 6% (N=3) were diet controlled. Forty four participants (88%) reported that they monitored their blood glucose on a regular basis, and six (12%) reported that they monitored their blood glucose levels sporadically or not at all. Thirteen (26%) reported a history of heart disease, 18 (36%) reported a history of neuropathy, 12 (24%) had problems with their feet that were related to diabetes, eight (16%) had been diagnosed with nephropathy, and seven (14%) had retinopathy.

**Height, weight, and BMI.**

Height was obtained in centimeters using a stadiometer. Heights of the participants ranged from 152.4 – 175.3 cm. (60 inches to 69 inches) with a mean height of 164.1cm (SD=7.13) or 64.6 inches. Each participant was weighed on a digital scale and weight was obtained in kilograms (kg.). Participants ranged in weight from 65 kg. to 166.8 kg. (143 pounds to 367 pounds) with a mean weight of 93.3 kg. (SD=21.36) or
205.3 pounds. Range of BMIs went from 23.9 m² to 54.2 m² with a mean of 34.6 m² (SD=7.43).

**Total weekly minutes of activity and total weekly minutes of moderate activity.**

The total weekly minutes of physical activity and total minutes of moderate-intensity physical activity were obtained from the Modified CHAMPS Physical Activity Questionnaire. Total weekly minutes for all physical activity ranged from 210.0 to 2610.0 minutes with a mean of 831.5 minutes (SD=530.5). Total weekly minutes for all moderate-intensity physical activity, defined as 3.0 to 5.9 METs (U.S. Department of Health and Human Services, 2008), ranged from 30.0 to 1560.0 minutes with a mean of 377.8 minutes (SD=346.7). The mean of 377.8 minutes of moderate-intensity physical activity for this sample met the national guideline of at least 150 minutes a week of moderate-intensity physical activity for adults (U.S. Department of Health and Human Services, 2008).

**Findings Related to Study Variables**

Independent variables examined in this study included: (a) family social support for exercise; (b) friend social support for exercise; (c) self-efficacy for exercise; (d) body image discrepancy (BD); (e) exercise barriers including physical environment, sense of community, social roles, and social issues; (f) socioeconomic status including level of education and annual household income; and (g) the dependent variable which was physical activity level.

**Social support, self-efficacy, BD, exercise barriers, and socioeconomic status**

Table 3 contains a correlation matrix that displays the correlation coefficients and
levels of significance. This table indicates the relationship between variables including family social support for exercise, friend social support for exercise, self-efficacy for exercise, body image discrepancy (BD), exercise barriers including physical environment, sense of community, social roles, and social issues, socioeconomic status including level of education and annual household income, and physical activity level.

There were significant relationships between the following variables. There was a positive correlation between family social support for exercise and activity frequency ($r=.314, p=.026$) indicating that those who had greater levels of family support reported greater frequency of activity. In addition, family social support for exercise and level of income were also positively correlated ($r=.327, p=.020$) indicating that greater household income levels may increase family support for exercise. Self-efficacy was positively related to activity frequency ($r=.347, p=.014$) and caloric expenditure for physical activity ($r=.293, p=.039$) indicating that those who reported greater levels of self-efficacy also reported greater frequency of activity as well as greater caloric expenditure for physical activity. Self-efficacy for exercise and physical environmental barriers were negatively correlated ($r=-.325, p=.021$) indicating that as barriers in the physical environment increased, self-efficacy for exercise decreased. There was also a negative relationship between physical environmental barriers and activity frequency ($r=-.389, p=.005$) and caloric expenditure for physical activity ($r=-.310, p=.028$) indicating that an increase in physical environmental barriers resulted in decreased frequency of activity as well as a decrease in caloric expenditure for physical activity in this sample. Another negative significant relationship existed between physical environmental barriers and
Table 3 Correlations

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family support</td>
<td></td>
<td>.138</td>
<td>.180</td>
<td>.314*</td>
<td>.251+</td>
<td>-.133</td>
<td>.180</td>
<td>-.082</td>
<td>.165</td>
<td>-.091</td>
<td>.045</td>
<td>.327*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=.079</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Friend support</td>
<td>1</td>
<td></td>
<td>.227</td>
<td>.144</td>
<td>-.041</td>
<td>-.193</td>
<td>-.103</td>
<td>-.211</td>
<td>-.115</td>
<td>.221</td>
<td>-.082</td>
<td>.059</td>
</tr>
<tr>
<td>3. Exercise self-efficacy</td>
<td>1</td>
<td></td>
<td>.347*</td>
<td>.293*</td>
<td>-.325*</td>
<td>.187</td>
<td>-.076</td>
<td>.164</td>
<td>-.091</td>
<td>-.076</td>
<td>.198</td>
<td></td>
</tr>
<tr>
<td>4. Activity frequency</td>
<td>1</td>
<td></td>
<td>.661**</td>
<td>-.389**</td>
<td>.184</td>
<td>-.084</td>
<td>-.178</td>
<td>.059</td>
<td>.003</td>
<td>.125</td>
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<tr>
<td>5. Activity calories</td>
<td>1</td>
<td></td>
<td>-.310*</td>
<td>.199</td>
<td>-.088</td>
<td>-.016</td>
<td>.240+</td>
<td>-.008</td>
<td>.249+</td>
<td>p=.093</td>
<td>p=.082</td>
<td></td>
</tr>
<tr>
<td>6. Environmental barriers</td>
<td>1</td>
<td></td>
<td>-.527**</td>
<td>-.094</td>
<td>-.116</td>
<td>.240+</td>
<td>-.206</td>
<td>-.167</td>
<td>p=.093</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Sense of community</td>
<td>1</td>
<td></td>
<td>-.048</td>
<td>.097</td>
<td>-.464**</td>
<td>.066</td>
<td>.118</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>8. Social issues</td>
<td>1</td>
<td></td>
<td>.237+</td>
<td>-.014</td>
<td>-.199</td>
<td>-.141</td>
<td>p=.098</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>9. Social roles</td>
<td>1</td>
<td></td>
<td>-.137</td>
<td>.083</td>
<td>.103</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10. Body image discrepancy score</td>
<td>1</td>
<td></td>
<td>.070</td>
<td>-.063</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11. Education</td>
<td>1</td>
<td></td>
<td>.267+</td>
<td>p=.061</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>1</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed); +. Correlation approached significance
sense of community (r=-.527, p=.001) indicating that greater physical environmental barriers resulted in decreased sense of community. Finally, there was a negative correlation between sense of community and body image discrepancy (r=-.464, p=.001) indicating that as sense of community decreased, body image discrepancy increased.

Hypothesis Testing

The following research hypotheses were tested by examining the Pearson correlation coefficients between the study variables.

Hypothesis One

The first hypothesis postulates that a positive correlation exists between friend social support for exercise and amount of physical activity level. This hypothesis was not supported. No significant relationship between total frequency of physical activity and friend social support for exercise was observed (r=.144, p=.312), and no significant relationship was observed between total caloric expenditure for physical activity and friend social support for exercise (r=-.041, p=.777).

Hypothesis Two

The second hypothesis postulates that a positive correlation exists between family social support for exercise and physical activity level. This hypothesis was supported. A small positive but stable correlation between family social support for exercise and total frequency of physical activity was demonstrated (r=.314, p=.026; 95% CI, .130 to .480) and explained about 10% of the variance in increased frequency of physical activity. However, only a trend was observed between family social support for exercise and increased caloric expenditure for physical activity (r=.251, p=.079).
Hypothesis Three
The third hypothesis postulates that a positive correlation exists between self-efficacy for exercise and physical activity level. This hypothesis was supported. A small positive but stable correlation between self-efficacy for exercise and total frequency of physical activity (r=.347, p=.014; 95% CI, .150 to .495) was demonstrated and explained approximately 12% of the variance in increased frequency of physical activity. In addition, a small positive correlation between self-efficacy for exercise and total caloric measurement of physical activity (r=.293, p=.039; 95% CI, .095 to .455) was demonstrated and explained approximately 8.6% of the variance in increased caloric expenditure for physical activity. Participants who had higher levels of self-efficacy for exercise had greater frequency activity levels and greater caloric expenditure for physical activity.

Hypothesis Four
The fourth hypothesis postulates that a positive correlation exists between body image discrepancy and physical activity levels when the current body image score is greater than the ideal body image score. This hypothesis was not supported. No significant relationships between body image discrepancy and physical activity levels and total caloric expenditure for physical activity were observed (r=.059, p=.683; r=.240, p=.093 respectively).

Hypothesis Five
Hypothesis five postulates that a negative correlation exists between greater amounts of exercise barriers including physical environmental barriers, sense of community, social roles, social issues, and physical activity levels. This hypothesis was partially supported. Small but stable negative correlations were observed between
physical environmental barriers and total frequency of physical activity and total caloric expenditure for physical activity (r=-.389, p=.005; 95% CI, -.210 to -.545; and r=-.310, p=.028; 95% CI, -.125 to -.475, respectively) indicating that as physical environmental barriers increased, frequency of physical activity levels and total caloric expenditure for physical activity decreased. Physical environmental barriers explained approximately 15% of the variance for decreased frequency of physical activity and approximately 9.6% of the variance for decreased total caloric expenditure for physical activity. Significant relationships between total frequency of physical activity, sense of community, social roles, and social issues were not observed (r=.184, p=.201; r=-.178, p=.216; r=-.084, p=.563 respectively). In addition, no significant relationships were observed between total caloric measurement of physical activity, sense of community, social roles, and social issues (r=-.088, p=.541; r=-.199, p=.167; r=.016, p=.914 respectively).

**Hypothesis Six**

Hypothesis six postulates that a positive correlation exists between higher levels of education and greater physical activity levels. This hypothesis was not supported. No significant relationships between level of education, frequency of physical activity level, and total caloric expenditure for physical activity were observed in this study (r=.003, p=.986; r=-.008, p=.959 respectively).

**Hypothesis Seven**

Hypothesis seven postulates that a positive correlation exists between higher levels of household income and greater physical activity levels. This hypothesis was not supported. No significant relationships between household income, frequency of physical activity level, and total caloric expenditure for physical activity were observed
Responses to Narrative Questions

Question One

The first question asked participants about what things may have helped them be most physically active and which may have included exercise on a given day. Responses included such things as having "somewhere to walk - like in the mall" and having "things to do" such as errands. Family as well as friend encouragement also served as motivators for some of the participants as did having to do chores around the house such as cleaning, gardening, and childcare. Some participants cited that "health reasons" were what motivated them the most while others stated that being determined to "just to do it" acted as a motivator.

Question 2

The second question asked participants to address factors that may have gotten in the way of being physically active and which may have included exercise on a given day. Feeling tired, just not feeling well, and pain were cited as the primary reasons by 21 participants. Family issues and responsibilities and lack of time were also cited as reasons for being physically inactive. Loose dogs, stress, work, church, and watching television were other reasons that accounted for some of the participants' inactivity.

Question Three

The third question asked participants to address what they knew about physical activity and diabetes. All 50 participants replied that they knew that it was essential for glucose control. One participant also added that physical activity helps with "depression"
and cholesterol control.
CHAPTER 5

Discussion

The primary purpose of this study was to examine how selected variables including family/friend social support for exercise, self-efficacy for exercise, body image discrepancy, exercise barriers, and socioeconomic status (level of education and household income) influence physical activity levels in African American females with type 2 diabetes. The study findings, interpretation of the findings, study limitations, nursing implications, and suggestions for future research are discussed.

Study Sample

The sample for this study consisted of 50 African American females with a diagnosis of type 2 diabetes. Recruitment took place at a hospital affiliated diabetes center. As compared to previous studies (Melkus, et al., 2004; Young & Stewart, 2006), the participants in this study resided in close proximity to the study location. The diabetes center and the affiliated hospital are located in a predominantly African American neighborhood. Patients who attend the diabetes center as well as its hospital affiliate are mostly African Americans who reside in the area. Recruitment from one geographic area and one study location has contributed to the homogeneity of the sample, but has limited the generalizability of the study results.
discrepancy, exercise barriers, and socioeconomic status (level of education and household income) were examined upon completion of the participants' diabetes education instruction. Outcome variables were measured using a series of self-report instruments and a demographic questionnaire. In addition, each participant was asked three questions: (a) what things promoted physical activity and/or exercise during the last two weeks, (b) what things hindered physical activity and/or exercise during the last two weeks, and (c) what did the participant know about physical activity/exercise and type 2 diabetes.

The Effect of Friend Social Support for Exercise and Family Social Support for Exercise on Physical Activity Levels

The purpose of hypothesis one was to examine if a positive correlation exists between friend social support for exercise and amount of physical activity level. This hypothesis was not supported. No significant relationship was observed between friend social support, total frequency of physical activity, and total caloric expenditure for physical activity.

Several explanations may be offered for the lack of significant findings between friend social support for exercise and increased physical activity levels. First of all, the majority of females in this study (69%) were unemployed or retired. Therefore, they may have had closer ties to family and received greater amounts of support from family. A previous study by Primomo, et al. (1990) examined what type of support was provided by various individuals in one's support network. Results of this study indicated that emotional support was offered more readily by family as compared to friends and that
motivational support came from friends. Emotional support from family may have been a more important determinant of physical activity for these participants because of the possibility of closer family associations. Results of a study conducted by Wen, et al. (2004) suggested that greater family support rather than friend support was predictive of exercise self-care in a sample of Mexican American type 2 diabetics. A second explanation for the lack of significant findings may be attributed to a lack of understanding by the participants' friends on the importance of regular physical activity for effective diabetes control so physical activity may not have been encouraged by friends. This may have been perceived as a lack of support for physical activity by the African American females in this study. Studies conducted by Carter-Edwards, et al. (2004) and White, et al. (1992) suggested that perceived social support was essential to diabetes self-management including physical activity.

The purpose of hypothesis two was to examine if a positive correlation exists between family social support for exercise and physical activity level. A significant relationship between total frequency of physical activity and family social support for exercise was observed; therefore, this part of the hypothesis was supported and must be accepted. Support from family may have contributed to the participants' psychosocial adaptation to diabetes resulting in increased physical activity. Previous studies that examined family support suggested that positive support from family was essential to diabetes self-management (Carter-Edwards, et al., 2004; Primomo, et al., 1990; White, et al., 1992). While a significant relationship was observed between total frequency of physical activity and family social support for exercise, only a trend was observed between family social support for exercise and increased caloric expenditure for physical
activity. One possible explanation for lack of significant findings between family social support for exercise and increased caloric expenditure was that the participants may have forgotten the actual time they spent participating in some of the activities listed on the physical activity questionnaire during the week (decay of memory) but remembered the number of times they participated in a certain activity (Whitley, 2002).

**Self-efficacy and Physical Activity/Exercise**

The purpose of hypothesis three was to examine if a positive correlation exists between self-efficacy for exercise and physical activity level. A significant relationship between self-efficacy for exercise, total frequency of physical activity, and total caloric measurement of physical activity was observed. Participants who had higher levels of self-efficacy for exercise had greater frequency activity levels and greater caloric expenditure for physical activity. These findings are similar to previous studies (Gallagher, et al., 2006; Litt, et al., 2002; Sarkar, et al., 2006; Skelly, et al., 1995; Young and Stewart, 2006), and suggest that increased self-efficacy is one of the primary determinants of physical activity.

**Body Image Discrepancy and Physical Activity Levels**

The purpose of hypothesis four was to examine if a positive correlation exists between body image discrepancy and physical activity levels when the current body image score is greater than the ideal body image score. No significant relationships were observed between body image discrepancy, frequency of physical activity, and total caloric expenditure for physical activity.
Several explanations may be offered for the lack of significant findings between body image discrepancy and physical activity levels. First of all, the women in this study may have been satisfied with their weight and body size and did not see the need for more physical activity. These findings support results from previous studies that examined various aspects of body image in African Americans with diabetes (Anderson, et al., 1997; Baptiste-Roberts, et al., 2006). Another explanation for the lack of significant findings may be related to average age of the sample. The mean age of participants in this study was 56 years (SD=14.44); slender body shape and size might not have been equated with “attractiveness” in this age group. Results of a study conducted by Williamson, et al. (2005) with a sample of African American females between the ages of 16 and 96 years suggested that body image differed across age groups and that those over 35 years of age had less body image discrepancy than those who were 16 to 35 years of age. A third explanation for lack of significant findings may be attributed to the fact that African American females are less concerned with body size as compared to women of other ethnicities. Studies conducted by Fitzgibbon, et al. (2000), Rucker and Cash (1992), and Snooks and Hall (2002) suggested that African American females had more positive attitudes towards body size and therefore had less body image anxiety.

Physical Activity Barriers and Physical Activity Levels

The purpose of hypothesis five was to examine if a negative correlation exists between greater amounts of exercise barriers including physical environmental barriers, sense of community, social roles, social issues, and physical activity levels. Small but
stable negative correlations were observed between physical environmental barriers, total frequency of physical activity, and total caloric expenditure for physical activity. Plausible explanations explaining these relationships follow. First of all, 96% (N=48) of the 50 participants resided in the same inner city area in which the study took place. This area is economically depressed and crime rates are high; this may have acted as a deterrent to exercising outside. In addition, this area lacks indoor exercise facilities. These findings, as compared to results of previous studies (Eyler, et al., 2002; Nies, et al., 1999; Wilbur, et al., 2002; Wilbur et al., 1998; Williams, 2002; Williams & Jackson, 2005), suggested that concerns for lack of safety and lack of places to exercise resulted in decreased physical activity. No significant relationships were observed between sense of community, social roles and issues, and physical activity.

Several explanations may be offered for the lack of significant findings between these variables. In relation to “sense of community”, neighborhood support and community services such as police protection were not cited as inadequate by the participants so they were not considered as barriers to physical activity as was suggested in previous studies (Brody, et al., 2001; Eyler, et al., 2002; Jack, et al., 1999; Wilbur, et al., 1998; Williams, 2002; Williams & Jackson, 2005). In reference to “social roles”, family responsibilities that may decrease the amount of available time for exercise were not an issue for these study participants. A previous study conducted by Wilbur, et al. (2005) suggested that family responsibilities resulted in a lack of time for exercise and were a barrier to physical activity. The final relationship that was examined in hypothesis five was “social issues” or perceptions relevant to physical activity. The lack of significant findings for this relationship may be attributed to the fact that the
participants in this study may not have had a more positive view of women who exercised, and therefore, they (study participants) did not exercise. This attitude may be related to cultural attitudes towards body size that were previously discussed.

Level of Education and Physical Activity Levels

The purpose of hypothesis six was to examine if a positive correlation exists between higher levels of education and greater physical activity levels. This hypothesis was not supported. One explanation may be offered for the lack of significant findings between level of education and physical activity levels. The majority of female participants in previous studies that examined this relationship had less than a high school education (Eyler, et al., 2002; Krummel, et al., 2001; Lantz, et al., 1998). In this study, only four of the participants (8%) reported that they did not complete high school. Therefore, the findings from these previous studies may not have been applicable to this study.

Level of Household Income and Physical Activity Levels

The purpose of hypothesis seven was to examine if a positive correlation exists between higher levels of household income and greater physical activity levels. This hypothesis was not supported. Some plausible explanations may be offered for the lack of significant findings between household income and physical activity levels. First of all, participants did not report their exact annual household income level. Instead, participants checked off the range on the demographic questionnaire that best reflected their annual household income. The range, as a measurement tool, can be unstable
because it is based on two variables in the distribution – a minimum value and a maximum value (Duffy & Jacobsen, 2001). As a result, the range may not have been sensitive enough to detect the relationship between household income and physical activity levels. A second explanation is that of the 50 participants; 11 reported an annual household income of less than $12,000. Participants from previous studies (Eyler, et al., 2002; Krummel, et al., 2001; Lantz, et al., 1998) that looked at this relationship may have had incomes that were less than $12,000.

**Other Findings**

There were other significant findings in this study that may affect physical activity levels in African American females with type 2 diabetes. First of all, there was a significant positive correlation between family social support for exercise and level of income ($r = .327$, $p = .020$; 95% CI, .285 to .330). The results indicate that as the level of household income increases, family support for exercise increases. This finding is particularly important since previous studies indicate that there is a relationship between family social support and physical activity. Another result of this study indicated that sense of community or attitudes about ones neighborhood worsened as the number of physical environmental barriers increased ($r = -.527$, $p = .001$; 95% CI, -.495 to -.530). In addition, as attitudes about ones neighborhood worsened, body image discrepancy increased ($r = -.464$, $p = .001$; 95% CI, -.435 to -.495). The results of these additional findings indicate that there is a need to further examine the relationships among physical environmental barriers, attitudes about neighborhood, and body image.
Theoretical Framework

Bandura’s self-efficacy was utilized as the theoretical framework for this study. Self-efficacy theory has been used to change as well as to maintain health behaviors, and was utilized previously to study physical activity and other health-related behaviors in diabetic as well as non-diabetic populations (Gallagher, et al., 2006; Litt, et al., 2002; Sarkar, et al., 2006; Skelly, et al., 1995; Wilbur, et al., 2003; Young and Stewart, 2006). Results of these studies suggested that self-efficacy was one of the primary determinants of behavioral change, and resulted in increased physical activity levels. In the current study, significant relationships were observed between self-efficacy for exercise, total frequency of physical activity, and total caloric measurement of physical activity. These findings, along with those from previous studies, suggest that increased levels of self-efficacy may be a significant factor for increasing physical activity levels in African American females with type 2 diabetes.

Conclusions

Results of this study indicated that there were significant relationships between self-efficacy for exercise, physical environmental barriers, and physical activity. Self-efficacy for exercise explained approximately 12% of the variance for increased frequency of physical activity and approximately 8.6% of the variance for increased caloric expenditure for physical activity. These results support that self-efficacy for exercise is an important predictor of physical activity levels in African American females with type 2 diabetes. Another significant finding was that an increase in physical environmental barriers resulted in a decrease in frequency of physical activity and caloric
expenditure. Physical environmental barriers were perhaps the most important predictors for physical inactivity and explained approximately 15% of the variance for decreased frequency of physical activity and 9.6% of the variance for decreased caloric expenditure for physical activity. While findings were significant for physical environmental barriers, they were not significant for other exercise barriers including sense of community, social roles, and social issues.

With respect to social support for exercise, there were no significant relationships for friend social support for exercise, frequency of physical activity, and physical activity caloric expenditure. Findings were significant for family social support for exercise and frequency of physical activity, and accounted for approximately 10% of the variance. However, while no significant relationship was observed for family social support for exercise and physical activity caloric expenditure, a trend was observed between the two. These study findings suggest that family social support for exercise may also be an important predictor of physical activity.

Other variables including body image discrepancy, level of education, and household income were also examined. Despite the fact that all of the study participants desired a smaller body size, this factor was not significant for increasing physical activity levels in this group of participants. In addition, level of education and household income did not appear to have any effect on physical activity levels in this sample. In conclusion, findings from this study suggest that physical environmental barriers, self-efficacy for exercise, and family social support for exercise may act as significant predictors of physical activity in African American females with type 2 diabetes.
Study Limitations

Several factors limited the generalizability of the study results. First of all, this study sample was limited to African American females with type 2 diabetes who attended diabetes classes at one diabetes center in Northwest Indiana. This diabetes center was located in an urban area and was affiliated with a mid-sized hospital system in Northwest Indiana. The self-selection of subjects from one setting limits the generalization of the findings. Other limitations of this study were that (a) all subjects at the diabetes center had to be referred by their physicians for diabetes education, and (b) all subjects were members of an existing group. The sample was homogenous with respect to the variables of interest that included being an African American female and having a diagnosis of type 2 diabetes. Homogeneity was established by these inherent traits as well as those that were set forth in the inclusion/exclusion criteria (Appendix K).

Other limitations were the type of design and methods used to examine the relationships between the independent variables and physical activity level. The design for this study was a correlational design. This limits the generalizability of findings as this type of design lacks a control group. In addition, it is not possible to arrive at any conclusions with a correlational design since there was no manipulation of an intervention in the study. Measurements in this study were taken on variables that have already occurred using a series of self-report questionnaires. Self-report using a set of instruments and a demographic questionnaire was utilized to examine the relationships between the independent variables and physical activity levels. Extraneous variables such as the participants' possible discomfort with some of the questions, fatigue, decay of memory, lack of understanding of the questions, and response bias may have influenced
the self-report results (Whitley, 2002). In addition, participants may have overestimated their total weekly minutes of activity as well as their total weekly minutes of moderate activity given the range and mean values reported for BMI, weight, and glycosylated hemoglobin. Limitations of physical activity questionnaires such as the one that was used in this study include low test-retest reliability, response bias, reporting higher levels of physical activity when physical activity patterns are low, and the inability to quantify amounts of physical activity (Lamonte & Ainsworth, 2001; Tudor-Locke & Myers, 2001).

Recommendations for Nursing Practice

The results of the present study call attention to the importance of numerous variables that influence physical activity levels in African American females with type 2 diabetes. Clinicians working with these women need to derive interventions that are based on individual assessment of social support from family and friends, exercise self-efficacy, exercise barriers, socioeconomic status, and body image. This would allow for psychosocial as well as socioeconomic considerations of the individual.

Exercise programs should incorporate the four principles of self-efficacy: that include performance attainment, vicarious experience, verbal persuasion, and emotional arousal or physiological feedback (Bandura, 1986). Staff may increase the participant’s exercise self-efficacy by having them watch videos of other African American females with type 2 diabetes exercising (vicarious experience), by providing encouragement during the exercise program (verbal persuasion), by helping them to achieve realistic goals and build upon their accomplishments (performance attainment), and by providing
feedback through such things as “weigh-ins”, and exercise logs (emotional arousal).

Increases in physical activity levels and weight loss should be encouraged for better glucose control and not for aesthetic purposes; females should be told that a 10% weight loss may result in a one percent decrease of their glycosylated hemoglobin. Recognizing and minimizing exercise barriers is also important; the elimination of such barriers may serve to increase physical activity levels in this population. A thorough understanding of the relationship of body image and weight loss from increased physical activity may lead to a greater understanding of the influence of body image integration on health behaviors. Findings from this discovery may serve to drive interventions aimed at increasing physical activity and reducing obesity in this population with the aim of achieving better glucose control and decreasing the risks of complications that are associated with type 2 diabetes.

Recommendations for Future Research

This study supports the importance of further evaluation of the influence of culture and body image on physical activity in African American females with type 2 diabetes. Results of this study indicated that in a sample of African American females with type 2 diabetes, body image discrepancy (difference between current body image and ideal body image) was not associated with an increase in physical activity. This is similar to previous study findings that suggest that body image is culturally defined, may differ across age groups, and that African American females are more satisfied with their bodies despite having a larger body size.

Further study is warranted in that the relationship between body image
discrepancy and physical activity among African American females with type 2 diabetes remains unclear. The current literature does not explore if satisfaction with a larger body size may offer an explanation for physical inactivity in this population despite their knowledge that physical activity helps achieve better glucose control and reduce the risk of complications that are associated with type 2 diabetes. Further study that examines this relationship may lead to a greater understanding of the influence of culture on body image and health behaviors such as physical activity. In turn, the findings from this discovery may drive interventions aimed at increasing physical activity in this population.

To enhance the generalizability, this study should be replicated with a sample of African American females with type 2 diabetes from different geographic areas of the country, and who have a greater variety of demographic characteristics including varying levels of income and education. The sample may be followed longitudinally to determine if physical activity levels change over time with respect to several variables of interest, e.g., social support, self-efficacy, body image, etc. A longitudinal study is also necessary to examine if larger body size acceptance by African American females occurs with age. Such a study may offer some explanation of what occurs during an internalization of one’s body image during different ages and the chance to develop test interventions that result in more positive attitudes towards a smaller body image size. Such a discovery may promote the development of strategies aimed at reducing obesity in this population. Such a strategy may also decrease the risk of the development of type 2 diabetes and chronic illnesses that are attributed to obesity.

The design for this study was a correlational design. An experimental design that utilizes a larger sample size and control group is needed to examine an intervention that
includes the enhancement of exercise self-efficacy, friend and family social support for exercise, exercise barriers, and acceptance of a smaller body size on physical activity levels. Measurements to examine the effects of the intervention on physical activity levels should be conducted at baseline and at conclusion of the study, in addition to self-report instruments that measure exercise efficacy, friend and family social support for exercise, exercise barriers, and body image.

**Summary**

Results of this study support that higher levels of self-efficacy, family social support for exercise and a decrease of physical environmental barriers may serve to increase physical activity levels in African American females with type 2 diabetes. To assist African American females with type 2 diabetes to increase their physical activity levels, nursing interventions should be directed toward designing a physical activity program that encourages family participation and support and that utilizes appropriate strategies to increase participants' exercise self-efficacy. Such a program should also attempt to recognize and minimize physical environmental barriers as well as other things that may hinder physical activity or exercise. In addition, longitudinal studies and replication of this study using a larger sample size, recruiting participants who have a greater variety of demographic characteristics, and recruiting those who come from different geographic areas are needed to better understand how these and other variables affect physical activity levels in this population.
References


Whitley, B.E. (2001). *Principles of research in behavioral medicine*. New York:


Appendix A

Consent
Title of Study: Variables that May Influence Physical Activity Levels in African American Females with Type 2 Diabetes

Investigator: Melanie Komar Samardzija
Contact Information: Home:
Sponsors: Joyce Keithley, DNSc, RN and Lynne T. Braun, PhD, RN

METHODIST HOSPITALS

Subject Information Sheet and Consent Document

Introduction
This form provides you with information so you can understand the possible risks and benefits of participating in this study; so that you can decide whether or not you want to be a part of this research study. Before deciding whether to participate in this study, you should read the information provided on this document and ask questions regarding this study. Once the study has been explained and you have had all your questions answered to your satisfaction, you will be asked to sign this form if you wish to participate.

Why are you invited to participate in this study?
You are being asked to take part in this study because you are an African American female with type 2 diabetes.

Research studies include only people who choose to take part. Please take your time to make your decision and discuss it with your friends, family and/or physician. Remember that your participation is completely voluntary. There is no penalty if you decide not to take part in this study or decide later that you want to stop participating in this research study. Your care at Methodist Hospital will not be affected if you decide not to participate.

What is the purpose of this study?
The purpose of this study is to examine how certain variables such as family/friend social support, exercise self-efficacy, body image discrepancy, exercise barriers such as physical environment, sense of community, social issues and roles, level of education, and household income influence physical activity levels in African American females with type 2 diabetes.

How many people are expected to take part in the study?
Approximately 50 African American females with type 2 diabetes will be asked to participate in this study from the Methodist Hospitals Midlake Campus Diabetes Clinic 2269 West 25th Avenue Gary, IN 46404. None of the participants will be enrolled at Rush University Medical Center.
What will you be asked to do?
You will be asked to meet for approximately 45 to 50 minutes in a private area of the clinic site that you attend. You will be asked to fill out a series of surveys and a demographic sheet. In addition, the principle investigator will ask you what things may have helped you to exercise or be physically active on a given day, what things got in the way on a given day that prevented you from exercising, and what have you been told about physical activity and diabetes; this information will be documented on paper by the principal investigator.

How long will you be in the study?
You will be in the study until which time the study is completed, you decide to leave the study, or the study is canceled.

What are the possible risks of the study?
There are no physical, emotional, or financial risks or discomforts.

Are there any anticipated pregnancy risks?
There are no anticipated pregnancy risks. If you are pregnant, you cannot take part in this study.

Are there benefits to taking part in the study?
There may or may not be direct benefit to you for participating in this study. However, you have an opportunity to help identify how family/friend social support, exercise self-efficacy, body image discrepancy, exercise barriers such as physical environment, sense of community, social issues, and social roles, level of education, and household income influence physical activity levels in African American females with type 2 diabetes. This information may help lead to a better understanding of how these variables influence physical activity levels in order to possibly help plan interventions in the future that may serve to increase physical activity in African American females with type 2 diabetes.

What other options are there?
The only alternative to participating in this study is not to participate.

What about confidentiality of your information?
Records of participation in this research study will be maintained and kept confidential as required by law. People participating in the research will not have their names recorded on any of the forms, but will be identified by a randomly drawn identification number.
Confidentiality and disclosure of your personal information is further described in the attachment to this form. The attachment is entitled HIPAA Authorization to Share Personal Health Information in Research (2 pages).
Your identity will not be revealed on any report, publication, or at scientific meetings.

The Methodist Hospitals Institutional Review Board (IRB) and the Rush Institutional Review Board (IRB) will have access to your files as they pertain to this research study. The IRB is a special committee that reviews human research to protect your rights, as well as check that the rules and regulations are followed.

**What are the costs of your participation in this study?**
There will be no cost to you for participating in this study.

**Will you be paid for being in the study?**
Upon completion of the survey instruments and interview, you will receive payment in the amount of $20.00 for your time and effort.

**What happens if you experience a research related injury?**
It is not expected that you will experience a research related injury. Methodist Hospitals has no program for financial compensation or other forms of compensation for injuries which you may incur as a result of participation in this study.

**What happens if you need emergency care?**
If you need emergency care while you are participating in this study, you and/or your insurance company will be responsible for this emergency treatment. It is not necessary that you inform emergency personnel of your participation in this study.

**Whom do you call if you have questions or problems?**
Questions are encouraged. If there are any questions about this research study, please contact the researcher, Melanie Samardzija, at [blank]. Questions about the rights of research subjects may be addressed to the Methodist Hospital Institutional Review Board at [blank].

By signing below, you are consenting to participate in this research study. You have read the information or someone has read it to you. You have had the opportunity to ask questions, which have been answered by the study personnel. You do not waive any of your legal rights by signing this consent document. You will be given a copy of the signed and dated consent document for your records.
Signature

I will receive a copy of this form. I have read it or it has been read to me. I understand the information and have had my questions answered. I agree to take part in this study.

(Patient's Signature) (Date)

(Witness Signature) (Date)

SIGNATURE BY THE INVESTIGATOR/INDIVIDUAL OBTAINING CONSENT:
I attest that all the elements of informed consent described in this document have been discussed fully in non-technical terms with the subject. I further attest that all questions asked by the subject were answered to the best of my knowledge.

Signature of Individual Obtaining Consent Date of Signature
Appendix B

HIPAA Authorization
HIPAA AUTHORIZATION TO SHARE PERSONAL HEALTH INFORMATION IN RESEARCH

Variables That May Influence Physical Activity Levels in African American Females with Type 2 Diabetes

Name of the Principle Investigator: Melanie Komar Samardzija, MSN, RN

The word "you" means both the person who takes part in the research, and the person who gives permission to be in the research. This form and the attached research consent form need to be kept together.

We are asking you to take part in the research described in the attached consent form. To do this research, we need to collect health information that identifies you. We may collect the results of tests, questionnaires and interviews. We may also collect information from your medical record. We will only collect information that is needed for the research. This information is described in the attached consent form. For you to be in this research, we need your permission to collect and share this information. We will protect the information and keep it confidential.

We will share your health information with people at the hospital who help with the research. We may share your information with other researchers outside of the hospital. We may also share your information with people outside of the hospital who are in charge of the research, pay for or work with us on the research. Some of these people make sure we do the research properly. The Confidentiality section of this form (below) says who these people are. Some of these people may share your health information with someone else. If they do, the same laws that this hospital must obey may not protect your health information.

If you sign this form, we will collect your health information until the end of the research. We may collect some information from your medical records even after your direct participation in the research project ends. We will keep all the information forever, in case we need to look at it again for this research study. If you sign this form, we may continue to share the health information collected for this study with the people listed below, without any time limit. This authorization has no ending date.

Your information may also be useful for other studies. We can only use your information again if a special committee in the hospital gives us permission. This committee may ask us to talk to you again before doing the research. But the committee may also let us do the research without talking to you again if we keep your health information private.

You do not have to sign this form. If you decide to NOT sign this form, you cannot be in the research study. We cannot do the research if we cannot collect, use and share your health information.
If you sign this form, you are giving us permission to collect, use, and share your health information. You need to sign this form and the attached consent form (both forms) if you want to be in the research study.

If you change your mind later and do not want us to collect or share your health information, you need to send a letter to the researcher listed above. The letter needs to say that you have changed your mind and do not want the researcher to collect and share your health information. If we cannot collect and share your health information, we may decide that you cannot continue to be part of the study. We may still use the information we have already collected. We need to know what happens to everyone who starts a research study, not just those people who stay in it.

CONFIDENTIALITY
We may share your information with other researchers outside of the hospital. We may also share your information with people outside of the hospital who are in charge of the research, pay for, or work with us on the research. Some of these people make sure we do the research properly. For this study, we will share information with:

Lynne T. Braun, PhD, RN
Lou Fogg, PhD
Joyce Keithley, DNSc, RN
Beth Staffileno, DNSc, RN
Lauretta Quinn, PhD, RN
The Methodist Hospitals Institutional Review Board (a group of individuals that reviews the research to protect your rights) and the Rush Institutional Review Board (a group of individuals that reviews the research to protect your rights)

If you have any questions, please ask the researcher or a member of the research staff. The phone numbers appear in the attached consent form. You may also call the Methodist Hospitals Institutional Review Board at [redacted] with general questions about your rights and the research use of your health information. The researcher will give you a signed copy of this form.

SIGNATURE, DATE, AND IDENTITY OF PERSON SIGNING

The health information about ____________________________ can be collected and used by the researchers and staff for the research study described in this form.

Signature: ____________________________ Date: ____________________________

Print name: ____________________________ Legal authority: ____________________________
Appendix C

Social Support and Exercise Survey
Social Support and Exercise Survey

Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question.

Please rate each question twice. Under family, rate how often anyone living in your household has said or done what is described during the last three months. Under friends, rate how often your friends, acquaintances, or coworkers have said or done what is described during the last three months.

Please write one number from the following rating scale in each space:

<table>
<thead>
<tr>
<th>none</th>
<th>rarely</th>
<th>a few times</th>
<th>often</th>
<th>very often</th>
<th>does not apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

During the past three months, my family (or members of my household) or friends:

<table>
<thead>
<tr>
<th>Family</th>
<th>Friends</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exercised with me.</td>
<td>1.</td>
</tr>
<tr>
<td>2. Offered to exercise with me.</td>
<td>2.</td>
</tr>
<tr>
<td>3. Gave me helpful reminders to exercise (“Are you going to exercise tonight?”)</td>
<td>3.</td>
</tr>
<tr>
<td>4. Gave me encouragement to stick to my exercise program.</td>
<td>4.</td>
</tr>
<tr>
<td>5. Changed their schedule so we could exercise together.</td>
<td>5.</td>
</tr>
<tr>
<td>6. Discussed exercise with me.</td>
<td>6.</td>
</tr>
<tr>
<td>7. Complained about the time I spend exercising.</td>
<td>7.</td>
</tr>
<tr>
<td>8. Criticized me or made fun of me for exercising.</td>
<td>8.</td>
</tr>
<tr>
<td>9. Gave me rewards for exercising (bought me something or gave me something I like).</td>
<td>9.</td>
</tr>
<tr>
<td>10. Planned for exercise on recreational outings.</td>
<td>10.</td>
</tr>
</tbody>
</table>

Please write one number from the following rating scale in each space:
During the past three months, my family (or members of my household) or friends:

11. Helped plan activities around my exercise.

12. Asked me for ideas on how they can get more exercise.

13. Talked about how much they like to exercise.

Date entered: ________________________

The Social Support and Exercise Survey should be scored differently for friends and family as follows:

In scoring scales “8” should be recoded to “1”.

Family Participation: sum items 1-6 and 10-13.
Family Rewards and Punishment: sum items 7-9
Friend Participation: sum items 1-6 and 10-13.

*Items 7-9 (Rewards and Punishment subscale) should not be scored for friends because it did not emerge in the factor analysis.

Appendix D

Body Image Instrument for African American Females
ID# ___________________  Date ______________

Appendix E

Body Image Discrepancy Conversion Scoring
Questions to determine body image discrepancy (BD)

1. Please choose the figure that looks most like you:
   (current body image [CBI])
   Letter: _____  Number: (______)

2. Please choose the body shape that you most desire:
   (ideal body image [IBI])
   Letter: _____  Number: (______)

CBI (# score _____) – IBI (# score _____) = BD score

Conversions:

A = 1  D = 4  G = 7
B = 2  E = 5  H = 8
C = 3  F = 6  I = 9

Score interpretations:
A “BD” score of greater than zero (>0) indicates a CBI that is heavier than her ideal.

A “BD” score of less than zero (<0) indicates a CBI that is lighter than her ideal.

A “BD” score of zero (0) indicates that CBI and IBI are the same.
Appendix F

Demographics, Personal, and Health History Questionnaire
Date: _______  
ID# ________

DEMOGRAPHICS/ PERSONAL/ HEALTH HISTORY QUESTIONNAIRE

Date: _______  
HbA1C results: ________

Height: ______ Ft. ______ in. (______ cm.)  
BMI: ________

Weight: ______ lbs. (______ kg.)

The following questions are about you. Please answer each as best you can.

1. Age ________

2. Marital status (please check one)
   - Married ________
   - Partnered ________
   - Single ________
   - Divorced ________
   - Separated ________
   - Widowed ________

3. Do you have children?
   - Yes ________  
     How many? ________  
     Ages? ________________
   - No ________

4. Do you work outside of the home?
   - Yes ________
   - No ________
     If you work outside of the home, how many hours per week do you work? ________
     If you work outside of the home, what is your occupation? ________________

5. Highest level of education (please check one)
6th grade or less  
Some high school  
High school graduate  
Some college  
College graduate  
Graduate school  

6. Total household income (please check one)

Less than $12,000 per year  
$12,000 - $20,000 per year  
$20,001 - $30,000 per year  
$30,001 - $40,000 per year  
Greater than $40,000 per year

How many people including yourself live in your household?  

7. How long ago were you diagnosed with type 2 diabetes?  

8. Which of the following medications do you take to control your blood sugars? (please check all that apply)

Insulin  
Pills  
Both insulin and pills

9. Do you check your blood sugars on a regular basis?

Yes  
No
Appendix G

Modified CHAMPS Physical Activity Questionnaire
Modified CHAMPS Physical Activity Questionnaire

Instructions: Think about the past 2 weeks. The next few pages list various activities that you might have done. Before you begin, please review the following example.

Step #1: Number of time each week
For each activity, write in the box how many times, on average you did that activity. If you did that activity less than once a week or not at all, please write "0" on the line provided and go to the next question.

Step #2: Total time, on average, each week
If you did the activity at least once a week, place an "X" next to the total time on average you spent doing it each week.

For example, if you did the activity on average 3 times a week for a total of 1½ hours each week:

EXAMPLE QUESTION

Walking

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1-2½ hours per week (duration variable = 1.75)</th>
<th>3-4½ hours per week (duration variable = 3.75)</th>
<th>5-6½ hours per week (duration variable = 5.75)</th>
<th>7-8½ hours per week (duration variable = 7.75)</th>
<th>9 or more hours per week (duration variable = 9.75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Step #1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Time</td>
<td>Less than 1 hour per week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step #2 ➔</td>
<td>(duration variable = 0.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* If variable is not answered, score = 0

Date_________________________    ID#_________________________
Walking and Jogging (including treadmill)
1. Walk leisurely (MET value = 2.5)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>Total Time</th>
<th>Less than 1 hour per week</th>
<th>1-2½ hours per week</th>
<th>3-4½ hours per week</th>
<th>5-6½ hours per week</th>
<th>7-8½ hours per week</th>
<th>9 or more hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>4*</td>
<td></td>
<td>1-2½ hours per week</td>
<td>3-4½ hours per week</td>
<td>5-6½ hours per week</td>
<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1a. I walk leisurely...

☐ mostly at work  ☐ mostly outside of work

2. Walk to do errands (such as to/from a store or to take children to school) count walk time only (MET value = 2.5)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>Total Time</th>
<th>Less than 1 hour per week</th>
<th>1-2½ hours per week</th>
<th>3-4½ hours per week</th>
<th>5-6½ hours per week</th>
<th>7-8½ hours per week</th>
<th>9 or more hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&gt;</td>
<td></td>
<td>1-2½ hours per week</td>
<td>3-4½ hours per week</td>
<td>5-6½ hours per week</td>
<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Walk fast or briskly (MET value = 3.5)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>Total Time</th>
<th>Less than 1 hour per week</th>
<th>1-2½ hours per week</th>
<th>3-4½ hours per week</th>
<th>5-6½ hours per week</th>
<th>7-8½ hours per week</th>
<th>9 or more hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&gt;</td>
<td></td>
<td>1-2½ hours per week</td>
<td>3-4½ hours per week</td>
<td>5-6½ hours per week</td>
<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3a. I walk fast or briskly...

☐ mostly at work  ☐ mostly outside of work

4. Walk uphill or hike uphill (count only uphill part) (MET value = 6.0)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>Total Time</th>
<th>Less than 1 hour per week</th>
<th>1-2½ hours per week</th>
<th>3-4½ hours per week</th>
<th>5-6½ hours per week</th>
<th>7-8½ hours per week</th>
<th>9 or more hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-2½ hours per week</td>
<td>3-4½ hours per week</td>
<td>5-6½ hours per week</td>
<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Jog or run (MET value = 7.0)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1-2½ hours per week</th>
<th>3-4½ hours per week</th>
<th>5-6½ hours per week</th>
<th>7-8½ hours per week</th>
<th>9 or more hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Time</td>
<td>Less than 1 hour per week</td>
<td>1-2½ hours per week</td>
<td>3-4½ hours per week</td>
<td>5-6½ hours per week</td>
<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
</tr>
</tbody>
</table>

Work Around the House

6. Do light work around the house (such as sweeping, vacuuming, laundry) (MET value = 2.5)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1-2½ hours per week</th>
<th>3-4½ hours per week</th>
<th>5-6½ hours per week</th>
<th>7-8½ hours per week</th>
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<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
</tr>
</tbody>
</table>

6a. I do light housework...

☐ mostly at work  ☐ mostly outside of work

7. Do heavy work around the house (such as washing windows, cleaning gutters, mowing the lawn) (MET value = 3.0)

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<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1-2½ hours per week</th>
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<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
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</tbody>
</table>

7a. I do heavy housework...

☐ mostly at work  ☐ mostly outside of work

8. I do heavy gardening (such as spading, raking) (MET value = 4.0)

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<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1-2½ hours per week</th>
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<td>7-8½ hours per week</td>
<td>9 or more hours per week</td>
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</tbody>
</table>
8a. I do heavy gardening...

☐ mostly at work ☐ mostly outside of work

9. I do light gardening (such as watering plants) (MET value = 2.25)

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<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
<th>3- 4½ hours per week</th>
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<td>9 or more hours per week</td>
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</tbody>
</table>

9a. I do light gardening...

☐ mostly at work ☐ mostly outside of work

Other Types of Activity

10. Ride a bicycle or stationary cycle using legs only (MET value = 4.0)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
<th>3- 4½ hours per week</th>
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<td>7- 8½ hours per week</td>
<td>9 or more hours per week</td>
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</table>

10a. I ride a bicycle

☐ mostly at work ☐ mostly outside of work

11. Do aerobic machines involving arms and legs (such as rowing, cross country ski machines, elliptical machines) (MET value = 5.0)

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<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
<th>3- 4½ hours per week</th>
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<td>9 or more hours per week</td>
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12. Do stair or step machine (MET value = 5.0)

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<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
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<td>7- 8½ hours per week</td>
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</table>
13. Climb stairs (MET value = 5.0)

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<th>Times per week</th>
<th>If zero, go to the next question</th>
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<th>7- 8½ hours per week</th>
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14. Swim gently (MET value = 3.0)

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<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
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<th>Less than 1 hour per week</th>
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15. Swim moderately or fast (MET value = 5.0)

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<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>Total Time</th>
<th>Less than 1 hour per week</th>
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16. Do water exercises (do not count other swimming) (MET value = 3.0)

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<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>Total Time</th>
<th>Less than 1 hour per week</th>
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</table>
17. Do stretching or flexibility exercises (do not count yoga or Tai-chi) (MET value = 2.0)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>Total Time</th>
<th>Less than 1 hour per week</th>
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18. Do yoga or Tai-chi (MET value = 2.0)

<table>
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<tr>
<th>Times per week</th>
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</table>

19. Do aerobics or aerobic dancing (step aerobics, afro-aerobics, hi-low impact aerobic videos) (MET value = 3.5)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
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20. Dance (African, gospel, liturgical, praise) (MET value = 3.0)

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<tr>
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</thead>
</table>
21. Dance during church services or swaying to the music of the choir (MET value = 3.0)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
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<td>Less than 1 hour per week</td>
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22. Do light strength training (such as hand held weights of 5 pounds or less or elastic bands) (MET value = 3.0)

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<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
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23. Do moderate to heavy strength training (such as hand-held weights of more than 5 pounds, weight machines, or push-ups) (MET value = 4.5)

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<th>Times per week</th>
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24. Do general conditioning exercises such as light calisthenics or chair exercises (do not count strength training) (MET value = 2.5)

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</table>
25. Play basketball, soccer, or racquetball (do not count time on the sidelines) (MET value = 5.0)

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<thead>
<tr>
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<th>If zero, go to the next question</th>
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26. Play golf, riding a cart (count walking time only) (MET value = 2.0)

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<thead>
<tr>
<th>Times per week</th>
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27. Play golf, carrying or pulling your equipment (count walking time only) (MET value = 3.0)

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<tr>
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28. Play singles tennis (do not count doubles) (MET value = 6.0)

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<thead>
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</table>
29. Play doubles tennis (do not count singles) (MET value = 4.0)

<table>
<thead>
<tr>
<th>Times per week</th>
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<th>1- 2½ hours per week</th>
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<td>7-8½ hours per week</td>
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30. Take care of an older or disabled person (lifting, pushing a wheelchair) (Not scored)

<table>
<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
<th>3-4½ hours per week</th>
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<td>7-8½ hours per week</td>
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31. Childcare (lifting, carrying, pushing a stroller) (Not scored)

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<thead>
<tr>
<th>Times per week</th>
<th>If zero, go to the next question</th>
<th>1- 2½ hours per week</th>
<th>3-4½ hours per week</th>
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List sports or other activities not previously mentioned

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Appendix H

Narrative Questions
Physical activity is any bodily movement of your skeletal muscles that uses energy. Examples of physical activity include walking, doing light or heavy housework, working in your garden, and dancing.

Exercise is a form of physical activity, but it is made up of planned and structured body movements that are repetitive or repeated over and over again. Examples include riding a stationary bicycle, aerobic dancing like step aerobics or afro-aerobics, and weight training.

The next two questions that I am going to ask are about physical activity and exercise, and refer to the previous two weeks.

**Narrative Questions**

1. Think about the past two (2) weeks. On a day that you were most physically active and which may have included exercise, what were some of the things that helped you to do these activities?

2. Think about the past two (2) weeks. On a day that you were not physically active or did not exercise, what were some of the things that got in the way of your being able to exercise or be physically active?

3. What have you been told about physical activity and diabetes?
Appendix I

Inclusion/Exclusion Criteria
Inclusion/Exclusion Criteria

Inclusion Criteria:

- African American female over 18 years of age with a diagnosis of type 2 diabetes

- Ability to legally consent for self and does not lack decisional capacity

- Ability to read, write, and understand English

Exclusion Criteria:

- Diagnosis of end-stage renal disease necessitating hemodialysis or peritoneal dialysis, retinopathy resulting in blindness, lower extremity amputations, inability to ambulate without assistance or use of an assistive device such as a walker or wheelchair, severe neuropathy, or severe cardiovascular disease that prohibits the subject from participating in physical activity

- Inability to give legal consent and/or lacks decisional capacity

- Pregnancy
Appendix J

Recruitment Flyer
Are you an African American female with type 2 diabetes?

Research that evaluates factors that may affect physical activity levels in African American females with type 2 diabetes is being conducted at Methodist Hospitals Midlake Campus Diabetes Clinic. African American females who are 18 years of age or older, have a documented diagnosis of type 2 diabetes, and have received education on physical activity benefits are needed to participate in this study.

- Participants will be asked to answer a series of questions related to physical activity.
- Study participation will require approximately 45 minutes of your time and will take place at the clinic.
- Subjects will be financially compensated for their participation and time; subjects will receive $20.00.

For additional information, please contact:
Melanie Komar Samardzija, MSN, RN
Doctoral student, Rush University, College of Nursing
Contact phone: [redacted]
Email: [redacted]

Study title: Variables That May Influence Physical Activity Levels in African American Females with Type 2 Diabetes
IRB Project #: 08042901
Version date: 10/2007
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March 24, 2009
Date

Author’s Signature