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Physical Activity Levels In Obese And Non-Obese Women And Their Relationship With Body Mass Index, Perceived Self-Efficacy, Perceived Benefits And Barriers Of Exercise, And Commitment To A Plan Of Action

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PHYSICAL ACTIVITY LEVELS IN OBESE AND NON-OBESE WOMEN AND THEIR RELATIONSHIP WITH BODY MASS INDEX, PERCEIVED SELF-EFFICACY, PERCEIVED BENEFITS AND BARRIERS OF EXERCISE, AND COMMITMENT TO A PLAN OF ACTION

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DEDICATION

To my loving husband Gary, my daughter Julia, son Theodore, whose love has taught me about the preciousness and enjoyment of life. To my parents, Ed and Rose, whose support and love inspired me to dream and learn the value of education. And in memory of my baby "Grace", even though you were with me for such a short time, you will be in my heart forever.

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CHAPTER I

INTRODUCTION

The percentage of adults who engage in regular, consistent physical activity in the United States is dramatically low. The Centers for Disease Prevention and Control (CDC) estimates that in 2007 only 49% of adults attained the recommended levels of 30 minutes of physical activity at least 5 times a week (CDC, 2010). Physical activity levels in more than 50% of U.S. adults are too low to provide any health benefits (CDC, 2007). Activity levels are shown to decrease with age (CDC, 2008). Reaching sufficient activity levels for health benefits are less common among women than men. And, among those with lower incomes and less education physical activity levels are very low (CDC, 2007). In 2008, one quarter of all U.S. adults (25.4%) do not participate in any form of leisure time physical activity (CDC, 2010). These poor levels of physical activity in both structured and leisure time activities are key reasons for the current obesity epidemic in the United States.

The incidence of obesity in the United States is at epidemic levels (CDC, 2009). Currently in the U.S., more than 68% of adults are overweight or obese as defined by the National Health and Nutrition Examination Survey (NHANES) of 2007-2008 (CDC, 2010). In the United States, there has been a marked increase in the prevalence of obesity over the past 30 years, especially in individuals with a BMI greater than 35 (Leermakers et al., 2000). In comparing data from the National Health and Nutrition Examination Surveys (NHANES) collected between 1999-2000 and 2007-2008, the percentage of adults with a BMI greater than 30 increased from approximately 27.5% to 32.2% (Flegal et al., 2010). The prevalence of obesity has increased in U.S. adults in the past 30 years from 15% to 32.9% (CDC, 2007). While, in November of 2007, the CDC reported that the prevalence of obesity had not increased

significantly between 2003-2004 and 2005-2006, still more than 1/3 of U.S. American are obese of which 33.3% are men and 35.3% are women. Currently, over 34 percent of US Adults have a body mass index (BMI) greater than 30 (CDC, 2007). This statistic equates to over 72 million obese Americans (CDC, 2007). The estimated cost of obesity in the United States in 2000 was about $117 billion (CDC, 2007). Traditionally, an increase in physical activity has been identified as an important factor for weight loss and weight maintenance (USDHHS, 2008). This suggests our current approaches to increasing physical activity in non-obese and obese individuals have been less than effective.

Michigan is rated as the 9th fattest state in the United States, tied with Oklahoma and Missouri (CalorieLab, 2008). In 2007, 64.3% of Michigan adults were overweight or obese, compared to 63% of U.S. adults (CDC, 2010). Similarly to national figures, 21% of Michigan residents were inactive in 2007 and 50% did not meet recommended physical activity levels. In 2007, 35.7% of the Michigan population had a normal weight (BMI <24.9); 36.1% were overweight (BMI of 25.0-29.9); and 28.2% were obese (BMI >30) (CDC, 2010). The economic costs of physical inactivity for residents in the state of Michigan are staggering. It is estimated that $8.9 billion dollars (including direct and indirect costs) were associated with the lack of physical activity (Dejong, Sheppard, Chenoweth, 2003).

Unfortunately, physical activity statistics are even worse for women. Large percentages of U.S. women (>60%) do not engage in the recommended amount of physical activity and more than 25% of U.S. women are not active at all (CDC, 2007). In Michigan, only 48.7% of women engaged in the recommended amount of physical activity. Many Michigan women have insufficient (38.3%) levels of physical activity and 13.0% are classified as inactive (CDC, 2007).

In addition, 23.8% of Michigan women reported no leisure-time physical activity in the past month.

The obesity epidemic in adult women spans across the all age groups. Women in the 40-59 age groups had the greatest percentage of obesity (41%) (CDC, 2007). Younger women (age 20-39) and older women (>65 years of age) have similar rates of obesity (~31%) in both groups (CDC, 2007). Among these women, race-ethnic disparities also exist in the prevalence of obesity. In middle aged women (40-59 years of age), over half of non-Hispanic black (53%) and Mexican-American (51%) women are obese (CDC, 2007). In comparison, only 39% of non-Hispanic white, middle aged women are obese. In older women (≥60 years of age), similar race-ethnic differences in obesity statistics are seen (61% non-Hispanic black; 37% of Mexican-American; 32% non-Hispanic white) (CDC, 2007).

The consequences of obesity are devastating to individuals and society as a whole. Obese individuals place themselves at risk for a greater number of health threats, including, physical disease and psychological issues. Physical complications of obesity have been shown to increase cardiovascular disease risk factors such as hypertension and high cholesterol (McInnis, Franklin, & Rippe, 2003; CDC, 2007). In addition, obese individuals have a higher risk of osteoarthritis, diabetes, stroke, gallbladder disease, and respiratory problems such as sleep apnea (CDC, 2007). Depression and feelings of low self-esteem can be psychological effects of obesity (CDC, 2007). With the current rates of obesity, the economic effects to society are becoming overwhelming. Finkelstein, Fiebelkorn, and Wang (2003) estimate health care expenditures related to obesity in 1998 were between $26.8 billion and $47.5 billion dollars. Obesity and its consequences can be economically, physically, and psychologically devastating to individuals, families and communities if not taken seriously.

STATEMENT OF PROBLEM

Healthy People 2010, a national health promotion and disease prevention agenda, seeks to improve quality of life and eliminate health care disparities in U.S. adults (USDHHS, 2000). The obesity epidemic and lack of physical activity have grown to such proportions that obesity and physical activity were identified as two of the ten leading health indicators for the Healthy People 2010 initiative (USDHHS. 2000). Even though increasing physical activity levels and decreasing weight has been a focus of this project, only slight improvements have been made in the past 10 years. Regular physical activity, as measured by the 2001 and 2003 Behavioral Risk Factor Surveillance System (BRFSS), showed a small increase (0.6%) in the number of US adults participating in the minimum recommended level of physical activity (CDC, 2005). In addition, prevalence of lifestyle inactivity on a national level remained nearly the same (CDC, 2005). In Michigan, there was a 2% increase in the number of adults participating in recommended levels of physical activity and a 2% decrease in the number of inactive adults (CDC, 2005). It appears in a comparison of the 2001 to 2003 BRFSS surveys that the objectives for increasing physical activity are improving, but objective measures fell short of showing substantial improvement. The overall progress towards the objectives of Healthy People 2010 has not been released, but objectives for Healthy People 2020 include nutrition and weight status and physical activity (USDHHS, 2010). Obesity and lack of physical activity continue to be two major health issues of U.S. Americans.

The question of the etiology of obesity is one that continues to be debated. Is the intake of too many calories or the reduction in physical activity the root cause? McInnis and coworkers (2003) stated the imbalance of calorie intake and reduced energy expenditure are influencing the prevalence of obesity. Diet has been shown to be effective in initial weight loss (Larson-Meyer

et. al, 2009) and physical activity assists more with weight maintenance (Fogelholm, et. al, 2000). Obese individuals can reduce their weight with physical activity alone. Donnelly et al. (2009) in a review of evidence based research found that physical activity and weight loss are dose dependent and higher levels are able to provide 3% or greater weight loss. Larson-Meyer et al. (2009) found no differences in fat loss between a diet and diet and exercise group, but did find physical benefits of decreased diastolic blood pressure, improved insulin sensitivity, and low-density lipoprotein cholesterol in the exercising group. Beyond weight loss, additional benefits of regular physical activity for obese individual include some of the following: decrease cardiovascular morbidity and mortality, decrease risk of hypertension, dyslipidemia, loss of muscle during weight loss, decreased stress, anxiety, improved sleep and decreased levels of depression (McInnis et al., 2003; CDC, 2007).

Inactivity and improper eating habits may lead to many physical complications such as obesity, cancer, diabetes, metabolic syndrome, and cardiovascular disease (CDC, 2010, USDHSS, 2008). One of the most widely noted complications of inactivity is obesity. The cost of obesity on society is estimated to be 117 billion dollars for health related costs in the United States (CDC, 2009). It is estimated that minimally, 9.4% of all direct costs incurred in delivering health care in the U.S. are related to inactivity and obesity (Colditz, 1999). Medical costs have continued to increase in the United States, obesity related diseases accounts for 27% of the increases between 1987 and 2001 (CDC, 2009). Does the increase in obesity and decrease in activity predict poor health status? When examining mortality data from the NHANES 1971-1975, NHANES 1976-1980, and NHANES 1988-1994, Flegal et. al, (2005) found that obese individuals had increased mortality in comparison to normal weight individuals. It is extremely difficult to determine if the morality rates are caused by obesity or by the lack of adequate

physical activity. Previous research studies have shown obese individuals who are inactive and unfit have higher levels of disease and death than obese individuals who are active and fit (Blair & Brodney, 1999, Grudy et al., 1999). In a recent longitudinal study conducted by Sui et al. (2008), fitness was a more significant mortality predictor than abdominal adiposity in older adults. The key to assisting obese individuals in becoming more active and fit appears to be physical activity promotion.

The benefits to exercise have been well reported in the literature and include: losing weight, maintaining muscle tone, increasing metabolism, improving circulation, improving heart and lung function, increasing sense of self-control, stress reduction (McKesson Corporation, 2007). In addition, evidence suggests that exercise decreases an individual's risk of specific chronic diseases such as diabetes, hypertension, and high cholesterol.

Research in examining obesity and the barriers to exercise have explored many factors including personal factors such as gender and age. In one study, Ball, Brown, and Crawford (2002) completed a longitudinal study examining weight maintenance in 8,726 Australian women aged 18-23 years old. It was found that single women who were students, in prestigious occupations, and/or who had no children were more likely to maintain their weight over the four year period. One limitation of this study was that data collected was only at two time periods during the four-year time period, and therefore weight fluctuations during the interval could have been undetected. Even with this significant limitation, these data assist us in understanding how the roles women have may affect weight maintenance over time.

Neighborhood environments can be a barrier to exercise. In many low-income neighborhoods, there are fewer walking trials and recreational facilities (Wilson et al., 2004). In a recent study by Jilcott and colleagues (2007), focus was on increasing physical activity by

modifying a nationally known cardiovascular disease (CVD) risk reduction program to address environmental and community-level factors. The study proved beneficial in assisting communities to become aware of and use existing resources. Increased physical activity occurred through the development of a community resource guide. Potential drawbacks to a community regarding this approach (development of a resource guide) are the readability for different education levels, accessibility, and keeping the community resource guide current.

Another current barrier of obesity and exercise is a term scientists call the built environment. The built environment focuses on assessing the land use, transportation, urban design, as well as recreational opportunities in communities (Booth et. al, 2005). For example, one may find increased obesity rates in a neighborhood that has a large number of fast-food restaurants or decreased recreational opportunities. There is significant need for more research in this area that targets communities and individual factors decreasing barriers to healthy living (Booth et. al, 2005).

Self-efficacy is a factor that has been widely researched in the exercise arena. Self-efficacy has been identified as one of the most predictive measures of exercise participation. Using a sample of 249 Korean adults with chronic illnesses, exercise self-efficacy was found to be significantly correlated with gender, education, regular exercise, and frequency of exercise (Shin, Jang, & Pender, 2001).

One of the reasons our nation is experiencing an obesity epidemic is from our lack of physical activity, especially structured exercise. Many obese individuals engage in exercise programs only to return to unhealthy behaviors. These unhealthy behaviors suggest a person's ability to change and maintain health behaviors is affected by a multitude of factors. The literature reports information regarding benefits and barriers to exercise, and self-efficacy,

specifically in women. However, there is notable deficiency in the literature regarding specific benefits and barriers, self-efficacy and plan of action commitments for obese women. Very few studies specifically address the barriers to exercise participation among overweight and obese women. This suggests exploration of the following question: How do we effectively design exercise programs that will increase exercise in non-obese and obese women?

STATEMENT OF THE PURPOSE

The purpose of this study was to examine relationships among concepts in the Health Promotion Model in obese and non-obese women with a focus on the behavioral outcome of exercise (Pender, 2002). The examination of selected concepts (body mass index, perceived benefits and barriers to exercise, self-efficacy, commitment to action, and current physical activity levels) will assist future researchers in developing exercise interventions.

Benefits and barriers to exercise has been a focus of research for many years. Interventions to increase exercise have focused on decreasing barriers for individuals and assisting them in capitalizing on benefits. Nursing research related to physical activity and exercise has examined differences among specific characteristics of populations such as race, age, and gender but is very limited related to body mass index. The long-term objective of this study is to identify physical activity interventions that would be effective in improving self efficacy, strengthening commitment to action, decreasing barriers and capitalize on the benefits of exercise for women, especially obese women.

RESEARCH QUESTIONS AND HYPOTHESES

The main objectives of this research were to describe the relationship among the personal factor of body mass index (BMI) and the variables of interest including perceived benefits, perceived barriers, perceived self-efficacy, commitment to action, and physical activity (leisure

physical activity & lifestyle physical activity). The following research questions and hypotheses were addressed in this study:

Research Question #1

What is the relationship between the personal factor of body mass index and a woman's perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action and physical activity level (leisure physical activity and lifestyle physical activity)?

Hypothesis 1A: There will be a positive relationship between the personal factor of BMI and perceived barriers to action.

Hypothesis 1B: There will a negative relationship between the personal factor of BMI and a) perceived benefits to action, b) perceived self efficacy, c) commitment to action, d) leisure physical activity level (exercise) and e) lifestyle physical activity.

Research Question #2

Can the health promoting behavior of leisure physical activity (exercise) in women be predicted by the personal factor of body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action?

Hypothesis 2A: Exercise levels will be predicted by the personal factor of BMI, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action.

Research Question #3

Can the health promoting behavior of lifestyle physical activity in women be predicted by the personal factor of body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action?

Hypothesis 3A: Lifestyle physical activity levels will be predicted by the personal factor of BMI, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action.

Research Question #4

Are there differences in perceived benefits, perceived barriers, perceived self-efficacy, commitment to action, leisure physical activity (exercise) and lifestyle physical activity between obese and non-obese women controlling for all personal factors (age, sex, race, educational level, income level, chronic illnesses, personal health status) except BMI?

Hypothesis 4A: There will be a significant difference in perceived self-efficacy levels between non-obese and obese women.

Hypothesis 4B: There will be a significant difference in the perceived benefits to exercise between non-obese and obese women.

Hypothesis 4C: There will be a significant difference in perceived barriers to exercise between non-obese and obese women.

Hypothesis 4D: There will be a significant difference in commitment to a plan of exercise between non-obese and obese women.

Hypothesis 4E: There will be a significant difference in leisure time physical activity (exercise) between non-obese and obese women.

Hypothesis 4F: There will be a significant difference in lifestyle physical activity between non-obese and obese women.

SIGNIFICANCE FOR NURSING

Integral to nursing practice has been the attempt to engage women in higher levels of physical activity. Previous research has identified women's benefits and barriers to exercise

(Genkinger et al., 2000; Jurarbe, Turok, & Perez-Stable, 2002; Gordon-Larsen et al., 2004; Wilcox, 2006; Williams et al., 2006; Kaewthummanukul et al., 2006; Gallagher et al., 2006; Black et al., 2007). Research has assisted health professionals in creating more appropriate health interventions regarding exercise in women. Even though the literature has explored benefits and barriers of exercise for women, due to the current obesity epidemic, researchers need to focus on how perceptions may change based on body mass index. Is there a relationship between women's self efficacy, benefits and barriers to exercise, BMI and their level of exercise participation? This research will assist in beginning discussions for describing exercise benefits and barriers for obese and non-obese women. These discussions will further provide richer understanding of the role of exercise in women.

In addition, information gained from this study will assist nurses in creating physical activity interventions to assist obese and non-obese women. Logically, the author assumes that additional knowledge regarding obese and non-obese women perceptions will provide a baseline framework that can be used in the development of exercise interventions for these populations. In addition, information generated from this study can help in developing community-based interventions for specific aggregate groups such as assisting obese individuals in becoming more physically fit. Focusing research on the benefits and barriers of physical activity for women of all weight classifications will assist in determining the values, attitudes, and beliefs that underlie the ability or inability of women of various sizes to maintain healthy physical activity levels.

The Health Promotion model has assisted nurse researchers in investigating an array of health behaviors. The concepts of self-efficacy, perceived benefits, and perceived barriers have provided information about many health behaviors. This study will expand our existing knowledge regarding exercise to account for one's body mass index. It provides a beginning

discussion as to whether the relationships of the identified constructs change based on an individual's body mass index.

Obesity is an epidemic that does not appear to be resolving in the United States population. Researchers need to examine factors in our society that can decrease or eliminate the impact of obesity issues. Physical activity is one factor that can decrease or eliminate someone's risk of obesity related illnesses. By investigating physical activity in obese and non-obese women, the scientific knowledge base is increased.

CHAPTER II

THEORETICAL FRAMEWORK

Health promotion in the areas of physical activity, weight loss and maintenance continue to need urgent attention from health professionals. Health professionals need theoretical frameworks to assist them in guiding positive health changes in their clients. The Health Promotion Model (HPM) (Pender, 2002) provides a framework for examining health promotion concepts such as exercise levels, benefits and barriers, commitment to action, self efficacy, and BMI. The HPM model will be used as the organizing framework for this study.

Theoretical Background – Health Promotion Model

The initial version of the HPM was developed in the early 1980's (Pender, 1982). Using the existing health behavior research (Health Belief Model (HBM), Social Cognitive Theory, Expectancy-Value Theory), Pender created a framework to understand health promoting behaviors. Although Pender utilized constructs within the HBM, Pender stated that the HBM was a health protection model while the HPM proposes moving towards a health promoting paradigm. Instead of preventing disease, the premise of the model is to have individuals focus on increasing their well-being (Pender, 2002).

In addition to existing behavior research of the time, the writings and research of Albert Bandura assisted in shaping the concept of self-efficacy. Albert Bandura has been one of the pioneering researchers in the area of self-efficacy. In his early work, he states that perceived self-efficacy was a better predictor of behavior than past performance (Bandura, 1977). Bandura (1997) defines perceived self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments." Bandura has been instrumental in the development of self-efficacy scales. He cautions researchers that there is no "one measure

fits all" scale when examining the concept of perceived self-efficacy (Bandura, 2006). In studying perceived self-efficacy and exercise, many researchers have used Bandura's Exercise Self-Efficacy scale to measure their perceived self-efficacy towards exercise including utilizing the Health Promotion Model (Shin, Jang, and Pender, 2000; Shin et al., 2004).

The Health Promotion Model was updated in 2002 and Pender recommends researchers focus their investigative efforts towards testing the revised version. When making revisions to the HPM, Pender examined a number of studies that tested different constructs within the initial model. Research utilizing the HPM supports keeping many of the constructs in the revised model. Variables in the HPM that will be used in this study were found to be significant in predicting health promotion behaviors in the previous studies in which they were tested: Demographics-59%, biological characteristics-0%, perceived benefits-61%, perceived barriers-79%, perceived self efficacy-86% (Pender, 2002, p 67). Even though, biological factors (i.e. BMI) were not supported by research, the construct was retained in the model for further testing. The commitment to a plan of action construct and activity-related affect, were newly added with the latest version of the model, thus limited empirical data is available. Figure 1 shows the revised version of the health promotion model (Pender, 2002):

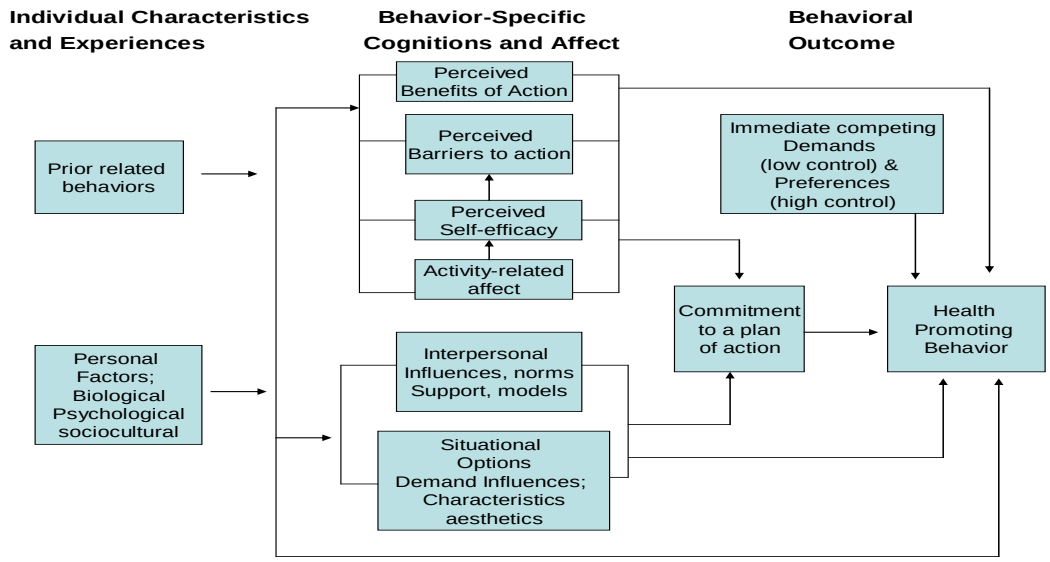

Figure 1: Health Promotion Model (Pender, 2002)

Assumptions and Theoretical Propositions

This HPM views an individual as one that actively participates in health behavior processes. Individuals determine and maintain their health behaviors by making active decisions and changing the environment to support their health behaviors. The HPM is based on the following assumptions, which reflect both nursing and behavioral science perspectives (Pender et al., 2002, p 63):

- Persons seek to create conditions of living through which they can express their unique human health potential.
- Persons have the capacity for reflective self-awareness, including assessment of their own competencies.
- Persons value growth in directions viewed as positive and attempt to achieve a personally acceptable balance between change and stability.
- Individuals seek to actively regulate their own behavior.

- Individuals in all their biopsychosocial complexity interact with the environment, progressively transforming the environment and being transformed over time.
- Health professionals constitute a part of the interpersonal environment, which exerts influence on persons throughout their lifespan.
- Self-initiated reconfiguration of person-environment interactive patterns is essential to behavior change.

Theoretical statements derived from the model provide a basis for investigative work on health behaviors. The HPM is based on the following theoretical propositions (Pender et al., 2002, p. 63):

- Prior behavior and inherited and acquired characteristics influence beliefs, affect, and enactment of health-promoting behavior.
- Persons commit to engaging in behaviors from which they anticipate deriving personally valued benefits.
- Perceived barriers can constrain commitment to action, a mediator of behavior as well as actual behavior.
- Perceived competence or self-efficacy to execute a given behavior increases the likelihood of commitment to action and actual performance of the behavior.

Health Promotion Model and Physical Activity

The Health promotion model has been used in many research studies examining the health promoting behavior of physical activity. Pender (1990, as cited in 2002) used the HPM to study exercise in white-collar workers and found that demographic, behavior factors, self-efficacy, and perceived benefits were significant in predicting 59% of the variance. Other studies utilizing the HPM have found both benefits and barriers and self-efficacy to be a strong

predictor of exercise (Garcia et. al, 1995; Shin et al., 2004). In addition, the HPM has been used in exercise research using different cultural populations, such as in Korea (Shin et al., 2004) and Thailand (Kaewthummanukul et al., 2006). The HPM has been used in exercise research with many different racial groups, such as African Americans, Caucasian, and Native Americans (Cuaders, Parker, and Burgin, 2004; Johnson & Nies, 2005; Nies et al., 1998 & 1999). The HPM model has also been used to study gender (Johnson, 2005) and age differences (Robbins et al., 2003). In a study focusing on gender differences in health-promoting lifestyles of African Americans, women were found to be significantly different than men in the areas interpersonal relationships, health responsibility, and nutrition (Johnson, 2005). This work is consistent with previous research regarding the finding that African American women were not found to have higher health-promoting lifestyles then men.

This model has received limited testing with obese populations. One study was related to weight loss activities using Optifast (Tober, 1996), and perception of weight in army personnel (Hudak, 1988). It was found that this model served as an excellent model to investigate the perceived benefits and barriers to exercise, perceive self-efficacy, and commitment to a plan of action in obese and non-obese women.

CONCEPTUAL DEFINITIONS

This section outlines the definitions of concepts within the HPM utilized in this study. Figure 2 depicts the conceptual framework used to describe relationships between concepts in this study using the context of the Health Promotion Model:

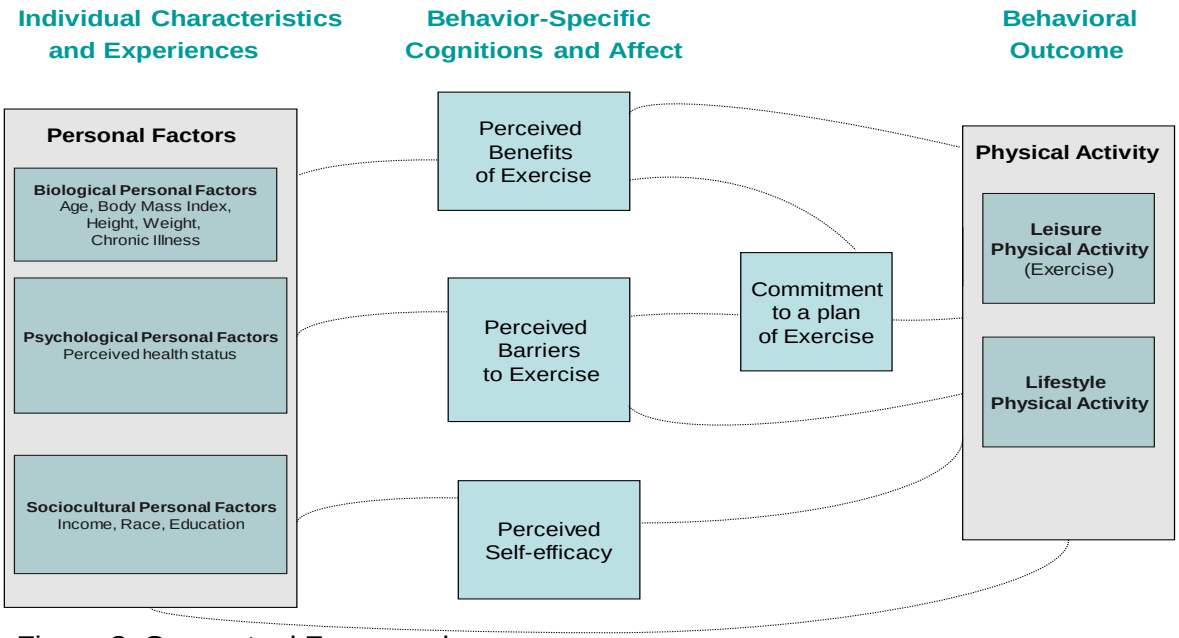

Figure 2: Conceptual Framework

Individual Characteristics and Experiences

Personal Factors

According to Pender's Model, personal factors are biological, psychological, and socio-cultural. In this study, demographic information and anthropometric measures were collected to address each type of personal factors. Personal factors studied include: BMI (biological factor), age (biological factor), perceived health status (psychological), race (sociocultural), education level (sociocultural), and socioeconomic status (sociocultural).

BMI is the major personal factor of interest in this study. Body Mass Index (BMI) was used as an indicator of obesity. BMI was calculated by dividing weight in kilograms by height in meters squared (kg/m^2). Measure of BMI was appropriate for this study because it provided an excellent categorical structure to evaluate the relationship between weight and reported benefits and barriers of physical activity. For purposes of this study, obese women were defined as any woman with a BMI of 30 or greater. Non-obese women were defined as any woman with a BMI between 18.5 and 29.9. Biological characteristics are being assessed to determine if they should be maintained in the model. One may question why keep the biological characteristics construct since it has not shown significance in any of the studies reviewed by Pender. This author believes that biological factors are ones collected and used as a filtering device for other constructs such as age and perceived barriers.

Behavior-Specific Cognitions and Affect

Perceived Benefits to Action

Perceived benefits of action are motivating behaviors (direct and indirect) that determine the extent which one commits to a plan of action to engage in behaviors from which anticipated benefits will result (Pender et al., 2002, p. 70). Beneficial expectations of an activity serve as motivating factors for an individual to engage in a health behavior. For example, regarding the health behavior of exercise, individuals may view increased energy levels from exercise as a benefit to exercising.

Perceived Barriers to Action

Pender states "perceived barriers of action affect health promoting behavior directly by serving as blocks to action as well as indirectly through decreasing commitment to a plan of action (p. 70)." Negative outcomes of an activity can decrease an individual's motivation to

engage in a health behavior. Using the example of exercise again, one may view cold weather as being a barrier to exercise.

Perceived Self-Efficacy

The concept of Self-Efficacy is considered by Pender to be a central construct in her model (p. 62). Perceived self efficacy is defined as "a judgment of one's ability to carry out a particular course of action. (p. 62)." Previous research has shown that when someone has a high perceived self-efficacy, they will be more persistent in engaging in the health behavior even during difficult times (Bandura, 1997).

Behavior-specific cognitions (perceived benefits and barriers to action, perceived self-efficacy), have been found to be significant predictors of exercise participation. In arthritic patients, perceived self-efficacy for exercise was related to exercise levels (Lim & Suh, 2001). In addition, it was found that perceived benefits directly affected perceived self-efficacy. Lim & Suh's study supports the relationships within the HPM but is limited to the Korean population.

In one study, self-motivation, physical self-efficacy, and perceived barriers were found to be significant in predicting exercise in Native American adults (Cuaderes et al., 2004). "Exercise is hard work" and "exercise is tiring" were identified as the most cited barriers to exercise. In Cuaderes's study, BMI was not a predictor of exercise for women. This finding related to BMI could be influenced by the self-reporting of height and weight by participants.

Shin, Jang, and Pender (2001) found that exercise self-efficacy was significantly correlated with gender, education, regular exercise, and frequency of exercise in a large sample (n=249) of Korean adults with chronic illnesses. It is uncertain if these results would be similar in other cultural groups, since the study has a well defined population (adult Koreans with chronic illnesses).

Using the HPM and social cognitive theory as a guide for their study, Kaewthummanukul and co-workers (2006) examined the predictors of exercise in 970 nurses living in Thailand. It was found that perceived self-efficacy, perceived barriers to exercise, and perceived social support were independent predictors of exercise participation. Job demands (physical and psychological) were not significant predictors of exercise participation. Motivation was found to have predictive ability for exercise participation.

Commitment to a Plan of Action

Commitment to a plan of action indicates that an individual is making first steps towards initiating a health behavior. Pender (2002, p 73) indicates that commitment to a plan of action implies two underlying cognitive processes: 1) commitment to carry out a specific plan at a given time and plan with specified persons or alone, irrespective of competing preferences; and 2) identification of definitive strategies for eliciting, carrying out, and reinforcing behavior. An example would be an individual signing a contract with a physical trainer to exercise on a weekly basis with a back-up plan for sick days.

Theorists have offered different explanations to why people pledge themselves to a certain action. Johnson (1973) offers a two-dimensional framework to describe commitment. He states that there are two main forms of obligation: personal and behavioral. The personal aspect is viewed as intense devotion to a personal decision. Behavioral commitment occurs when one must continue an action based on the fact that previous circumstances force one to continue even when one is not invested in continuing the action. Arriaga & Agnew (2001) present a similar opinion as Johnson in that commitment has a psychological attachment (personal) and intention to persist (behavioral). An additional component of commitment is added by Arriaga & Agnew called "Long Term Orientation". This component suggests that individuals who maintain

obligations are ones that can see their pledge being intact in the future. The addition of this component further explains the breadth of the concept of commitment.

The psychological model for physical activity participation was the first to predict exercise participation (Dishman, 1988). Key constructs of this model include self-esteem/self perceptions and attraction. Dishman (p. 127) states "In predicting exercise participation, the model posits that self-perception of physical activity (estimation) influences an individual's interest in physical activity (attraction) and that attraction provides the greater influence on exercise participation." The constructs of estimation and attraction are similar to measures of commitment in other contexts such as attraction being a component of commitment in marriage.

The concept of investments can distinguish differences between someone dropping out and burning out. Schmidt & Stein (p. 261) states "long-term commitments are characterized by frequent reinvestment; as one set of initial investments are producing benefits, another round of investments must be made (or already made). This pattern of escalating commitment virtually guarantees there is never a good time to leave an activity and provide a ready justification for continued involvement." This process of continued commitment to an activity will allow a person to develop a history of experiences that can be drawn upon when they feel like abandoning an activity. The person may think about quitting because they are having a negative experience with exercise, but because they have history with the activity they can also remember positive experiences. This ability to draw on past experiences assists the individual in remaining committed to the activity.

The concept of commitment to a plan of action within the HPM has thus far, has had limited empirical studies focusing on this construct. When examining a sample of Korean women with osteoporosis and osteoarthritis, Shin and co-workers (2004) found exercise self-

efficacy had the most influence on commitment to a plan of exercise. Women with osteoporosis were found to have more commitment to a plan of exercise than subjects with osteoarthritis. Further research studies need to measure this variable to continue to provide empirical data to support this concept.

Behavioral Outcome

Health Promoting Behavior (Physical Activity)

Health promoting behaviors are considered the outcome of the Health Promotion Model. These behaviors are positive actions to improve an individual's health. Physical Activity (PA) is the overarching concept that incorporates exercise. As defined by Pender (2002, p. 170), PA is any movement produced by skeletal muscles resulting in the expenditure of energy. Physical activity is composed of both leisure physical activity and lifestyle physical activity. Lifestyle physical activity, according to Pender, is characterized by integration of numerous short bouts of moderate activity into daily living (Pender, 2002, p 170). Conversely, leisure physical activity is any physical activity done during discretionary time (p. 170). Exercise is leisure physical activity that is specifically designed to increase physical fitness by developing endurance, strength, or flexibility (p. 170). This broad definition of physical activity provides the overarching framework for exercise, with "exercise" being a subset of physical activity because it describes leisure time physical activity that is conducted to promote physical fitness (p. 170). This board definition of physical activity (lifestyle and leisure) was used in this study.

CHAPTER III

LITERATURE REVIEW

Physical activity is an important health promoting intervention for obese individuals involved in a weight loss or weight maintenance program. The U.S. Department of Health and Human Services (2008) recommends adults need to participate in at least 2 hours and 30 minutes per week of moderate-intensity or 1 hour and 15 minutes per week of vigorous-intensity aerobic activity to obtain substantial health benefits. In addition to aerobic activities, individuals should participate in muscle strengthening at least two days per week. Exercise levels in women, especially obese women, continue to fall short of these recommendations. Current interventions to increase exercise in women have focused on the relationship of benefits and barriers to exercise and self-efficacy, but the relationship to BMI has not been adequately addressed. Therefore, to assist in enhancing exercise levels in women, this study focused on examining the relationships among perceived benefits and barriers to action, self-efficacy, and commitment to action among obese and non-obese women. A review of literature will focus on the literature pertinent to this study, using the HPM constructs of individual characteristics and experiences, behavior-specific cognitions and affect, and the behavior outcome of exercise as an organizing framework.

Individual Characteristics and Experiences (Personal Factors)

BMI

This section examines the personal factors of body mass index and obesity or non-obesity, as it relates to exercise. Exercise is essential for obese individuals to lose weight, but to gain health benefits of exercise, an exercise plan must be adopted and maintained. According to Johansson and Sundquist's (1999) research on lifestyle factors, it was found that lack of

physical activity, obesity (women only), and smoking history significantly increased an individual's risk of poor health. Leermakers et al. (2000, p. 426) stated, "lifestyle activity, which can be accumulated through daily activities at home and at work, may be a better approach for promoting regular physical activity in overweight individuals than the traditional structured exercise approach." As health professionals, an effective realistic strategy to promote weight loss with clients would be to promote small changes in their activity level throughout the day instead of promoting increases in duration of planned activity sessions (Timperio, Cameron-Smith, Burns, Salmon, & Crawford, 2000). Dunn et al. (1999) also confirmed in research of lifestyle versus structured interventions, that lifestyle changes to assist sedentary individuals in increasing physical activity are as effective over a 24 month period of time as traditional structured exercise approaches. Wenche et. al. (2002), in a longitudinal study of 9357 women, found the entire sample gained weight over the 11 year study period. Leisure activity did not eliminate weight gain but did have a moderate positive effect on the amount of weight gained. Women who changed from a high level of leisure activity at base line to low levels in the 11 year follow up had significantly higher BMIs.

The risk of cardiovascular disease in an unfit individual increases as he/she becomes overweight or obese (Jakicic, 2003). In a review, Jakicic (2003) encourages clinicians to counsel patients regarding participating in cardiorespiratory fitness regardless of the effects on weight loss and initial body weight. Jakicic further recommends clinicians assess the following areas before making an exercise recommendation: current activity level, medical clearance, and barriers to exercise participation. Barriers to exercise participation addressed in this article are briefly presented as work-related, personal, and environmental barriers (Jakicic, 2003). No exercise barriers for specifically obese or overweight exercise clients were mentioned.

What are the benefits and barriers to physical activity that obese individuals have? Ball, Crawford and Owen (2000) completed a survey of 2,298 Australian adults examining their attitudes and barriers to physical activity. They incorporated barriers into their scale that would be considered weight related, such as "I'm too fat", and "I have an injury or disability that stops me." The results of their study show need for further research in this area, especially with women. Being too fat was identified by 100 participants as a barrier to physical activity (4.4%) Women reported being too fat more often than men (6.2%, 2.2% respectively) even though the sample had more obese/overweight men than women. A question remains: Are weight-related barriers common among women and/or increased in obese women? A limitation of Crawford and Owen's (2000) work was in the self-reporting of both height and weight. In addition, a sampling bias could have occurred because participants were notified of the need to participate in fitness tests during the informed consent. Participants that were not as active or fit may have declined to be in the study.

Ball, Crawford and Owen stated (p. 332) "we are aware of no other studies which have examined weight-related impediments to physical activity participation." Additionally, the authors stressed "further research is needed to better understand the barriers to activity faced by the overweight, it is important that public health interventions address not only structural, but also interpersonal factors that influence physical activity participation (p. 333)." This study was fundamental in laying groundwork for further exploration into the barriers of exercise in women, especially obese women. Research regarding women's specific exercise barriers needs to be examined further to compliment and strengthen current exercise recommendations for overweight and obese individuals.

Numerous exercise intervention studies regarding weight loss, weight maintenance and obesity have been completed using populations of obese women. Andersen et al. (1999), in their research on obese women, divided participants into two treatment groups. One group received a diet plus structured aerobic exercise and the other group received a diet plus lifestyle activity. This sixteen week, randomized control study was completed with a follow up after one year. When examining weight loss between the two treatment groups after the initial sixteen weeks, there was no significant difference. A follow-up after one year, however, did show a significant reduction in cardiovascular risks (cholesterol level, blood pressure, etc.) occurred in both groups. This study showed that both forms of treatment were effective in weight loss efforts and provided lifestyle options for obese subjects. One area of possible concern with this study is in its small sample size (n=40). Further studies are needed to reconfirm these findings.

In addition, Lamert and co-workers (2005) studied 25 overweight/obese postpartum WIC participants for their perceived benefits and barriers to postpartum weight loss. Through focus groups, research participants cited "obtaining greater self-esteem", "ability to be more physically active", "better health and less societal prejudices" as the benefits to losing weight. The respondents indicated "lack of personal effort", "lack of social support", "inadequate finances", and "low self-esteem" as barriers to weight loss.

In another study focusing on weight loss, Fogelholm, Kukkonen-Harjula, Nenonen, & Pasanen (2000), studied premenopausal obese women to determine if a walking treatment plan established after weight loss would improve long-term weight loss maintenance. The study showed a moderate walking training program after weight reduction had a small but positive effect on weight maintenance.

The role of counseling by health care professionals is another area of research that has been examined regarding the obese population. Forman-Hoffman, Little & Wahls (2006) found clinicians who were diet conscious were more likely to calculate BMIs on patients in comparison to clinicians who were not diet conscious. In addition, lack of obesity training in medical school was associated with lower rates of exercise counseling. The generalizability of this study is limited because it was only completed among physicians in the Veteran's Health Administration setting.

Steptoe and co-workers (2000) examined the psychosocial predictors of change related to physical activity in sedentary, overweight adults following counseling in primary care. At baseline, physical activity was associated with education level, perceived barriers, perceived self-efficacy and having an exercise companion. Education level was significant at baseline but did not remain significant after the educational intervention was implemented with subjects. This study was consistent with other studies in showing individuals that had lower number of barriers exercised more. Ball and co-workers (2001) investigated associations between leisure-time physical activity (LTPA), occupation physical activity, BMI and body fat among normal weight and overweight men and women. This study found women with higher levels of LTPA were more likely to have a normal BMI and lower body fat. This association was not found in the male sample. The authors suggest the disparity in BMI readings could have been confounded by the muscle mass differences between the sexes. Occupation physical activity was not significant in men or women. The authors stress that occupation physical activity needs replicated studies that provide more objective data then self reported occupational activity.

Research has shown individuals with higher levels of self-efficacy had lower BMIs. In a sample of 137 adults, benefits and barriers, and self-efficacy of physical activity were examined

(Stutts, 2002). Self-efficacy was the only variable that predicted physical activity. BMI was able to explain 8.2% of the variance in perceived self-efficacy. Participants with higher BMIs were found to have lower self-efficacy. In addition, BMI and race were significantly correlated with perceived barriers of physical activity. Caucasian subjects with higher BMIs perceived more barriers to physical activity. Unlike other studies, perceived benefits were not correlated with physical activity. One limitation in this work was the uneven sample of men (20%) and women (80%) in this study. This uneven mixing of genders could have misrepresented the BMI findings of this study. The author stated that the men had a significantly higher BMI (M=30.7) than women (M=27.2), and hence, gender could also be a confounding factor in this study. This study does suggest further research in a uni-sex population to confirm or refute the BMI results regarding self-efficacy.

Wilbur and co-workers (2005) in an intervention study related to a home based walking program, found that women (n=102) who completed the maintenance phase of the program had greater adherence and higher exercise self-efficacy scores than women who did not complete the maintenance phase. In addition, women who completed the maintenance phase had a greater positive change in self-efficacy scores over the course of the 24 month program.

Gender

Gender differences related to exercise participation do exist. Women report lower levels of exercise then men but the types of physical activity women engage in are different and may also account for the lower levels (Belza & Warms, 2004). Men report more sport and leisure time activity than women. Women reported more time in activities such as household and child care duties. Women attempting to lose weight were more likely than men to believe they should be participating in higher intensity exercise over moderate intensity exercise (Timperio et al., 2000).

Age

In the past few years, obesity research among adolescents has focused on exercise levels relating to factors such as weight and gender. For example, Ward and co-workers (2006) examined physical activity in normal, overweight and obese adolescent girls. In addition to classification via BMI categories, the sample of 1015 girls were also divided into high active and low active groups. It was found that Caucasian girls in the active group scored higher on perceived self-efficacy, perceived behavior control, and enjoyment of physical activity than the low active group. Girls of African American decent were more greatly affected by environmental factors than Caucasian girls.

In another study using adolescents, Taylor and co-workers (2002) examined activity patterns across normal, overweight and obese youth, and found correlates of physical activity did vary by weight status. Participation by non-overweight youth in activity was related to the factors of greater family support, greater peer support, fewer barriers, and greater athletic coordination than overweight youth. Studies structured like the above need to be conducted examining obese and non-obese women.

Deforche, DeBourdeaudhuij, and Tanghe (2006) examined attitudes towards physical activity among normal-weight, overweight and obese adolescents. Sports participation was higher in the normal weight adolescents and predicted by both the perceived benefit of "pleasure" and the perceived barrier of "not liking it." The perceived benefits of each group did not vary but the normal weight adolescents had fewer perceived barriers to exercise compared to the obese and overweight adolescents. Another study found that adolescent girls identified "I am self-conscious about my looks when I exercise" and "I am not motivated to be active" as barriers to physical activity (Robbins, Pender, and Kazanis, 2004).

Floriani and Kennedy (2007), in a review of literature regarding promoting physical activity to prevent/treat obesity in children, found that family-based activity provides children with positive role models and a motivational support system. In addition, it was found that integrating exercise into daily life can be an alternative to participation in sports.

In comparing non-obese and obese children it was found that obese children completed significantly lower levels of physical activity and had lower exercise self-efficacy and were involved in fewer organized community resources (Trost et al., 2001). Lack of parental role modeling was another significant finding in the obese children. Body related barriers, such as feeling self-conscious, were found to be significant among overweight children, especially girls (Zabinski, et. al, 2003).

Physical activity in older adults, even simply increasing leisure activity levels, can have profound effects on the incidence of type II diabetes. Folsom, Kushi, & Hong (2000), in their 12-year research study of older adults, found greater leisure time activity was directly related to a reduced incidence of type II diabetes. As leisure activities increase, risks for obesity and feelings of stress decrease (Boutelle, Murray, Jeffery, Hennrikus, & Lando, 2000).

Scharff and co-workers (1999) examined women across the lifespan, and older women were found to be less active than younger women. In addition, women (49 years or younger) with family responsibilities were found to perform less structured and intense physical activity. Younger women were found to have the higher levels of self-efficacy than older women even though they reported the most barriers to physical activity. Barriers varied by age with younger women reporting “no time” as the main barrier compared to older women who reported “bad weather” as their main barrier. In addition women across the lifespan varied in their motivator for physical activity, younger women reported “weight maintenance” and older women reported

"health." Scharff and co-workers recommend that future work should "…focus more intently on the factors currently studied and other characteristics that my uniquely affect physical activity in women (p130)." As changes are seen in women across lifespan, body mass index, could influence physical activity levels in women.

Rural, older African American and Caucasian women identified the risk of "overdoing it" and "being too old" in addition to the barriers described in other research (Wilcox et al., 2005). Exercise facilitators were similar to other studies except this rural population identified church as an important facilitator.

Income Level

Medically underserved and low-income individuals are a vulnerable population that can have difficulty accessing primary care to receive counseling regarding exercise. In a study of 126 medically underserved individuals, Schrop and colleagues (2006) found that women were more likely to be inactive than men. Demographic variables including age, race, marital status, and employment status did not predict exercise. Individuals not exercising in this population reported lack of access to exercise equipment, lack of time, and expense as their top barriers to exercise. Of the individuals that intended to exercise, feeling more comfortable with their body, improving overall health, and lowering the risk of heart attack were motivators to exercise. Individuals that were currently exercising indicated that improving overall health, lowering the risk of heart attack, and feeling better about themselves were motivators for exercise. In addition, this study found that individuals with children under the age of 18 were less likely to exercise or intend to begin exercising. Data collection occurred through face-to-face interviews in the waiting rooms of clinics. The authors believed this method of data collection assisted in decreasing bias created by paper/pencil surveys because of the lower literacy levels in this

population. The reliance on self-reported data is a limitation of this study. Participant's answers could have been influenced by the setting and concerned about other's waiting in the interview room could potentially hear their answers.

Family responsibilities and schedule conflicts were most frequently cited as barriers to attending an exercise program for low income women (French et al., 1998). Low income mothers reported that being teased by other children and the developing of limitations regarding physical activity are indicators that their child is overweight (Jain et al., 2001). Mothers in these focus groups felt their children would probably inherit overweight characteristics regardless of the environment around them.

Race

Race/Ethnicity remains a common predictor of activity levels. In the 1996 BRFSS, self reported activity levels were significantly lower by race. Whites reported less inactivity (26.8%) and more total activity (29.0%) than either blacks (38.9% and 22.0%) or Hispanics (38.9% and 22.3%) (Pratt et al., 1999, p. S528). In a study by Nies (1998), comparing lifestyles in obese and non-obese African Americans and European Americans, results suggest race influences obesity and is associated with health-promoting behaviors. These characteristics of the general population about inactivity need to be further explored and population-based strategies developed to address this epidemic of inactivity.

The facilitators and barriers in African American women were similar, but differences were found from a previous study of European American women. Nies et al. (1999, p. 25), found the following major facilitators of physical activity in African American women: 1) daily routine, 2) practical and convenient activities, 3) personal safety, 4) child care, 5) weight loss, 6) stress reduction, 7) knowledge and commitment, 8) enjoyment, 9) pets, 10) family and peer

support, 11) home and work facilities, and 12) daylight and climate conditions. Barriers to physical activity in African American women were: 1) lack of child care, 2) no person to exercise with, 3) competing responsibilities, 4) lack of space in home, 5) inability to use exercise facilities at work, 6) lack of understanding and motivation, 7) fatigue, and 8) unsafe neighborhood (p. 28). In another study focusing on African American women, it was found that contextual factors such as neighborhood safety, and adequate facilities were identified as barriers to exercise (Jones & Nies, 1996). These research findings suggest when developing exercise interventions targeted at African American women, close attention should be given to contextual factors, such as day care, neighborhood facilities, and safety (Nies et al., 1999). Using a qualitative format, Johnson & Nies (2005) explored the barriers to health promoting behaviors for African Americans. Three themes emerged in this study: cost, lack of discipline versus not having enough time, and lack of motivation. These themes were consistent with other research studies.

Wankco (2004) examined exercise preferences and barriers in large (n=605) sample of African American diabetics. Walking outdoors, gardening, bicycling, sports and athletics, and swimming were the top options for exercise. Interestingly, pain was the most frequently cited barrier among this diabetic population. In addition, "no will power," "health not good enough," "don't know what kind to do", and "no exercise companion" were other significant barriers for this sample. The variable of BMI and older age increased the likelihood that someone would report a barrier to exercise.

In a sample of 120 African American women, Genkinger and co-workers (2006) examined barriers to physical activity across into normal weight, overweight and obese groups. The most common barrier indicated by participants was "no time" and "lack of motivation."

Barriers related to the environment such as weather and safety were not found in this sample. Obese participants report "lack of motivation" as a barrier more often than normal weight participants. African American women with lower BMIs were more likely to report no barriers to exercise than participants with higher BMIs. Genkinger and co-workers report that "the comparison of reported barriers stratified by BMI has not been previously reported to our knowledge (p 82)." This study provided initial scientific knowledge related to barriers and BMI differences. Unfortunately, since these participants were only obtained from a church exercise intervention program, the group may not be representative of the general African American population. In addition, no measures were taken to ensure that equal numbers of subjects were in the normal (n=13), overweight (n=29) and obese (n=78) categories.

Williams and co-workers (2006) examined if perceived benefits and barriers to exercise would be influenced by a walking program for postmenopausal African American women. It was found that after a seven week walking program, benefits to exercise did not change. The perceived barriers did not change as a result of participation in the program but the barrier of "lack of time" was a common barrier found on post-intervention interviews among women who did not engage in recommended levels of brisk walking.

In an effort to analyze the benefits and barriers of aging Latina women, Juarbe, Turok, and Perez-Stable (2002) conducted a study using a qualitative design examining these areas. Semi-structured interviews were used to obtain the data from 143 Latina women, aged 40 to 79 (M=55). Four categories of barriers to physical activity were found to be "time constraints and women's roles," "personal health," "internal factors" and "external factors." Three categories of benefits for Latina women were found to be "health promotion," "improved roles (home and work)," and "physical fitness."

Lack of time is a barrier that is frequently mentioned as a barrier to exercise. Heesch (2004) studied this barrier in a sample of 249 African American and Hispanic women. The perception of lack of time was not supported when actual sedentary leisure-activity time was evaluated. On average, women spent 28 hours per week in sedentary leisure-activities. This perception of "lack of time" may be the barrier to women exercising and clinicians should assist individuals in getting an accurate perception of their time to exercise.

Health Status

Obese individuals are often encouraged to make smaller losses of 5 to 10% of their body weight and counseled to maintain these losses, major health gains can be reached with small weight losses (Hannah et al., 2002). Exercise has shown to make a difference in the development and stabilizing of chronic illnesses. Higher levels of daily physical activity among patient with peripheral arterial disease reduced mortality and cardiovascular events in comparison to similar patients with lower levels of daily physical activity (Garg, et. al, 2006). In another study, medically underserved individuals with lung problems or diabetes were significantly less likely to intend to exercise and be a part of an exercise program (Schrop, et. al, 2006).

Chronic illnesses such as heart failure can affect an individual's ability to exercise. Exercise self-efficacy in older women participating in a 12-week home based walking program was improved (Gary, 2006). In addition physical function, depressive symptoms and quality of life were also increased in comparison to the control group. The small sample size (N=38) was a limitation to this study, because only 19 participants were in the control and intervention group.

Health related Quality of Life indicators were lower in obese women who did not get regular physical activity compared to normal weight women (Ko, 2006). The participants

consisted of 588 Hong Kong Chinese women. One possible bias in these data collected may be the culture's view of obesity and weight. In addition, BMI cutoffs were changed to mirror the Chinese culture so the information may not be applicable to Caucasian populations.

An individual's perception of their health risk related to obesity is another factor in one's decision making related to physical activity. Gregory et. al, (2008) conducted a study to examine the perceived health risk among varying weight sizes. They found that men had higher levels of disagreement regarding their body weight being a health risk. Women with lower education and income levels were found to have higher levels of disagreement with the health risk of excess weight. Similar findings regarding were found by Withall, Jago and Cross (2009), in which, low socioeconomic individuals were interviewed regarding diet and activity levels. It was found that high optimistic bias many provide rationalizations that undermine behavior change in these individuals (p. 1078).

Behavior Specific Cognition and Affect

Exercise Benefits and Barriers

In a 2004 randomized telephone survey (Jackson-Elmoore, 2007), Michigan residents were asked about exercise barriers. A flaw of the study is that two different subsets of questions were used. In the sample using the first subset of questions, 29% of the respondents indicated that costs and/or time constraints prohibited them from being physically active. In the sample using the second subset of questions, 36% indicated they had too many obligations at home to have time to exercise. A large portion of the second subgroup (73%) stated they would exercise more if they had an exercise partner. Weight was not seen as a barrier to exercise with 85% of the second group strongly disagreeing with the statement that "I am too out of shape or too overweight to exercise." Michigan residents were more likely to believe they exercised enough if

they perceived themselves as underweight or normal weight. Since this was at telephone survey, these self-reported perceptions of weight could not be validated for accuracy. In addition, Michigan residents without telephones would not be included in this sample. Jackson-Elmoore (2007) indicated that her research shows the need for improve individual and community support structures to assist in decreasing barriers to physical activity.

Qualitative methods have been used to examine the benefits and barriers of exercise in women. One such study conducted by Nies, Vollman, & Cook (1998) used focus groups to examine barriers and benefits of exercise in a general population sample of European American women. The following five areas were identified as facilitators of exercise: 1) social support, 2) accommodating schedule, 3) self improvement, 4) environmental characteristics, and 5) individual factors.

Nies et al. (1999, p. 25), found the following major facilitators of physical activity in African American women: 1) daily routine, 2) practical and convenient activities, 3) personal safety, 4) child care, 5) weight loss, 6) stress reduction, 7) knowledge and commitment, 8) enjoyment, 9) pets, 10) family and peer support, 11) home and work facilities, and 12) daylight and climate conditions.

Brown (2005) examined the benefits and barriers of exercise in a college-aged students (n=398). The Exercise Benefits scale accounted for only 4% of the variance in physical activity whereas the Exercise Barriers scale of exercise did not show statistical significance. This finding differs from previous research using the Exercise Benefits and Barriers scale in which benefits and barriers should reliable association of benefits and barriers to exercise. Brown theorizes this difference could be related to the different populations being studied (adults vs. college-aged) or even possible age differences. These findings continue to support that research regarding

perceived benefits and barriers of exercise could be different within population groups thus supporting examination of the differences within obese and non-obese women could produce different findings.

Exercise intentions of pregnant Latina women were predicted by subjective benefits of exercise, ability to overcome environmental barriers, and ability to overcome personal barriers (Black et al., 2007). A sample of 334 Kuwaiti adult males and females provided similar results to barriers research done in the United States (Serour et al., 2007). Barriers to maintaining exercise were lack of time, coexisting diseases, and adverse weather conditions.

Qualitative methods have been used to examine the benefits and barriers of exercise in women. One such study conducted by Nies, Vollman, & Cook (1998) used focus groups to examine barriers and benefits of exercise in a general population sample of European American women. The focus groups identified the following barriers to exercise: 1) time constraints, 2) unaccommodating schedule, 3) consequences from exercise, 4) environment, and 5) individual factors. Barriers to physical activity in African American women were: 1) lack of child care, 2) no person to exercise with, 3) competing responsibilities, 4) lack of space in home, 5) inability to use exercise facilities at work, 6) lack of understanding and motivation, 7) fatigue, and 8) unsafe neighborhood (p. 28). In another study focusing on African American women, it was found contextual factors such as neighborhood safety, and adequate facilities were also identified as barriers to exercise (Jones & Nies, 1996).

Obese women have been found to have increased functional limitations and pain. In a study completed by Larsson and Mattsson (2001), obese women were less likely to complete specific activities of daily living such as cut toe nails, and rise from squat then a normal weight reference group. In addition, the obese group reported more pain while completing activities of

daily living than the reference group. Pain should be assessed when establishing an exercise plan with an obese patient because it could be a barrier to their adhering or maintaining an exercise program.

In a sample of African American girls and their female caregivers, barriers to exercise included perceived lack of affordable and accessible recreation facilities and low caregiver motivation (Gordon-Larsen et al., 2004). Girls participated and enjoyed being involved in sedentary behaviors mainly watching television.

Focus groups of exercising and non exercising arthritic individuals revealed pain, fatigue, impaired mobility and co-morbid conditions as physical barriers to exercise (Wilcox et al., 2006). While not a factor to be specifically addressed in the research study presented in this dissertation, the increasing population of patients with arthritis also needs further study in this area.

In the 2002 paper utilizing the transtheoretical model, Prochaska, Redding & Evers (2002) state that individuals in the earlier stages of change perceive a greater number of barriers as compared to individuals in the later stages of change who perceive a greater number of benefits to the change (Prochaska, Redding & Evers, 2002). Tung, Gillett, and Pattillo (2005) examined physical activity in family caregivers in Taiwan and found that individuals in the later stages of change (action or maintenance) had significantly higher rates of self-efficacy compared to subjects in the precontemplation or contemplation stage. This study did not find any differences in the benefits or barriers to physical activity across the stages of change.

Exercise and self-efficacy research

One factor that can contribute to the ability to maintain an exercise program is self-efficacy. Self-Efficacy in exercise research has been viewed as the participant's belief in his/her

capabilities to complete consistent physical activity over a period of time (McAuley et al., 1999; Katula et al., 1999). McAuley et al. (1999) found that college-aged women exposed to high efficacy conditions chose more positive responses than women exposed to low efficacy conditions. The results of this research suggests that "feelings of mastery or self-efficacy are important contributors to the effects of acute physical activity on psychosocial responses and are further evidence to suggest that such responses are not solely physiologically dependent (McAuley, 1999, p. 292)." Exercise self-efficacy was found to be significant in predictor of maintenance of exercise behaviors in older adults (McAuley et al., 2003). In addition, social support around exercise created positive feelings regarding exercise.

Another study, Katula et al. (1999), examined exercise efficacy in older adults. The authors found participants involved in light intensity exercise had reduced anxiety. As the intensity of anxiety increased to higher levels, participants reported increased anxiety. Explanation for this increase was related to the arousal level a participant experienced when exercising at maximal potential. Findings suggest research must continue to investigate the link between a patient's sense of efficacy and the psychosocial responses that affect their ability to participate in physical activity.

In a study examining exercise self-efficacy, enjoyment, and feeling states among adolescents, Robbins et al. (2004) found that adolescents with higher levels of self-efficacy before physical activity had more positive feeling states during physical activity ($p=0.009$). The findings of this study are consistent with similar studies in adults. Jette et al. (1998) found that adult individuals with a strong sense of control over exercise and positive attitudes towards exercise had higher levels of adherence to a home exercise program. One of the limitations related to generalizability of this study is the fact that each participant had a trainer come in to

the home and give them personalized instruction on the exercise routine and provided them with the proper equipment. Marquez et al. (2002) examined anxiety states of low active women after having a manipulation to the individual's self-efficacy to exercise. Anxiety was reduced after the manipulation of exercise self-efficacy. Self-efficacy is a strong predictor of many variables related to initiating and maintaining exercise, including the commitment to an action plan.

In a study of 1,411 California adults, it was found that 50% of vigorous exercisers and 25-35% of moderate exercisers abandoned their exercise routine within one year of beginning (Sallias et al., 1986). This study also found that self-efficacy was a predictor for adopting vigorous activity levels, and attitudes were predictors of maintenance in men and women. Moderate activity levels were initiated by health knowledge and maintained by self-efficacy or self control. Thus, self-efficacy was a strong determinant for both vigorous and moderate levels of activity. Activity research has shown self-efficacy to be an adequate predictor of initiating a health behavior but does not provide a clear picture of who will adhere to a program (Dishman, 1982; King, 1993).

Boudreau and Godin (2007) examined the theory of planned behavior to predict exercise intention in obese adults. The sample consisted of 92 participants with an average age of 47.7. This study showed a positive correlation between intention and attitude ($r=.65$, $p<.01$), perceived behavior control ($r=.72$, $p<0.1$) and past behavior ($r=.62$, .01). No correlation was found between intention and age, gender or BMI. Attitude and perceived behavior control accounted for 66% of the variance in intention. Past behavior added 7% to the explained variance in intention. Self-efficacy in this study was encompassed into the perceived behavior control category. This study showed that self-efficacy and a sense of control places a part in predicting exercise intention in obese adults. There were many limitations in this study, such as self-

reported height and weight, secondary analysis of a larger CVD study which warrants further research that is done with the specifically with an obese population.

McAuley & Jacobson (1991) studied self-efficacy and exercise participation in sedentary adult females. A sample of 58 females participated in an eight week aerobic class. Biometric and psychosocial variable were assess prior, on completion, and 3 months after the program ended. Self-efficacy was found to be a significant predictor of overall exercise levels. In addition, the researchers found instructor influence and self-efficacy explained a large portion of variance in the participant's attendance in the program. Replication of this information would be beneficial since the sample size was small and the sample was not diverse as all of the subjects were university employees.

In a large sample of Korean adults (N=246) with chronic illness, Shin, Jang & Pender (2001) found that exercise self-efficacy was significantly correlated with gender. Korean men had higher self-efficacy levels than Korean women. Individuals with higher level of education were found to have higher levels of self-efficacy. In addition, regular exercisers had higher levels of self-efficacy.

Gallagher and co-workers (2005) examined physical activity in a group of overweight women before and after a 6-month behavioral weight loss program. The findings showed increases in physical activity self-efficacy and a reduction in barriers to physical activity. The study showed an improvement in psychosocial factors related to physical activity but it is difficult to assess if the improvements were from the increase in physical activity, the weight loss, or a combination of both factors. The authors indicated that "future studies should examine whether a similar pattern of results is observed in overweight and obese adults when the target of the intervention is physical activity rather than weight loss (p. 979)." In addition, the intervention

was only assessed at the end of the intervention and no long-term effects of the intervention were evaluated. It is difficult to know if the effects to self-efficacy and barriers would remain overtime.

Commitment to a plan of exercise

Commitment to action can be viewed on a continuum, with excessively committed one extreme. As previously discussed, excessive perfectionism can lead to self destruction and diseases such as anorexia. Committed runners have a higher risk of becoming obsessively addicted to exercise thus creating a potentially stressful situation for their health. Thornton and Scott (1995) conducted a study examining the negative aspects of excessive commitment in runners. A majority of the runners (77%) whose activity levels are elevated would be considered moderately or highly addicted to this health behavior. The subjects identified mastery, competition and weight regulation as the main incentives for them to run. The action of perfectionism in running appears to be self imposed just like perfectionism in anorexia nervosa (Bastini et al., 1995) and binge eating disorders (Pratt et al., 2001). On the other extreme of the commitment continuum, an individual would exhibit low levels of action toward exercise. The issue that emerges for health care professionals at this end of the continuum becomes "drop out" rates. Within six months of beginning a program in a clinical setting, dropout rates can be estimated to be at least 50% (Dishman, 1982). Individuals that drop out of sport activities usually have a decreasing sense of rewards, satisfaction, and investment while their sense of costs and alternative activities are increasing (Schmidt & Stein, 1991).

In a study focusing on obese women, it was found that commitment to achieving an established goal was a motivating factor in their ability to complete the program (Gillett, 1988). Expressions of goal commitments can be statements such as "I want to go to any aerobics

program in town and survive"; "I gave my word" were antecedents to the success of these exercisers (p 28). This study had a very high rate of adherence (94%). Gillett believes that because the obese women were exercising in a group of individuals with similar weight issues that the women felt comfortable and bonded strongly thus increasing their ability to commit to their exercise regimen.

Commitment to an exercise plan is a major factor that influences someone to exercise (Nies et. al., 1998). European American women, in the study by Nies and co-workers, identified "lack of time" to be the major factor influencing a woman's commitment to exercise. Attempting to meet the demands of day-to-day life, many obese women perceived a decreased amount of time for exercise. Zaravar & Nies (1997) found that as a woman's daily personal life hassles increased, her exercise level decreased. Commitment to a "plan of action" can be a very difficult task for obese women.

Shin, et. al (2006) studied exercise self-efficacy, exercise benefits and barriers and commitment to a plan for exercise in 154 Korean women with a diagnosis of osteoporosis and osteoarthritis. The mean score for the variable of commitment to a plan of exercise differed significantly between the two groups. (OP M= 1.71 and OA M=1.49). Perceived self-efficacy (27% of variance-OP group and 53% of the variance OR group) was found to have the most influence on the variable of commitment to a plan of exercise. This study did not find "perception of benefits" explained commitment to a plan of action as other research has in the past (Jones and Nies, 1996). Barriers to action were only a factor in commitment to action in the osteoarthritis group. This study used a convenience sample of patients from hospitals and clinics in various locations in Korea (both rural and urban). The generalizability of the study is affected by the sampling techniques. In another study, commitment to action was found to be the variable

that explained health-promoting behaviors in women workers at a manufacturing industry (Yun and Kim, 1999). The concept, commitment to action needs further studies to continue to explain its role in predicting exercise levels.

PHYSICAL ACTIVITY SUMMARY

Physical activity literature regarding behavior specific cognitions (perceived benefits and barriers, self-esteem) has consistently been associated with exercise levels. These variables have been widely researched across genders, racial and ethnic backgrounds, and in chronic illness. Limited studies, mainly done with adolescents, have examined the relationship of obesity with the behavior specific cognitions. This proposed research will assist in providing information that will be beneficial in determining interventions or programs to improve physical activity levels in obese and non-obese women.

CHAPTER IV

METHODS

Research Design

The purpose of this descriptive correlational study was to examine relationships among selected variables in the Health Promotion Model (Pender, 2002) in obese and non-obese women with focus on the behavioral outcome of exercise. Figure 3 represents a modified version of theoretical framework adapted for this study.

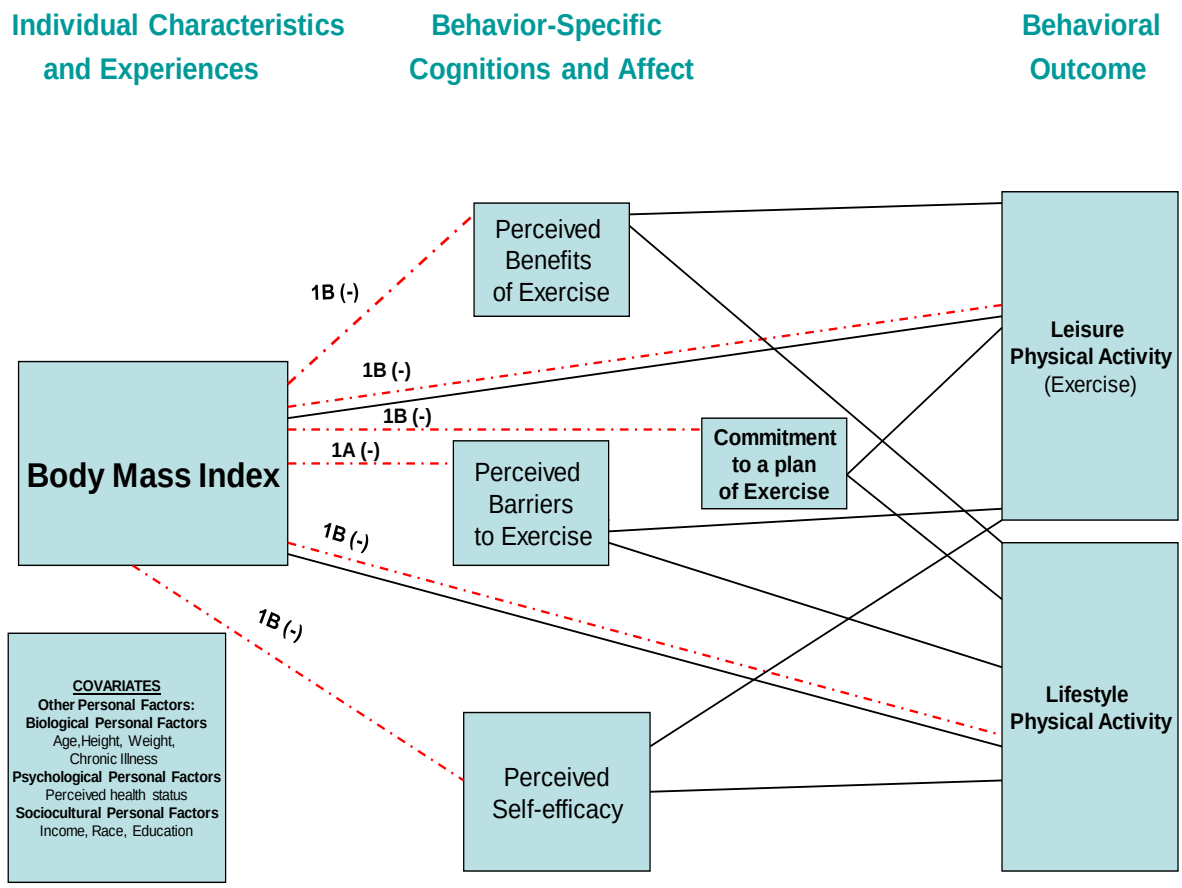

Figure 3: Modified Theoretical Framework using concepts from the Health Promotion Model

Dashed lines in the figure depict hypothesized relationships examined in research question 1 and compares concepts of BMI to perceived benefits of exercise, perceived barriers to exercise,

perceived self-efficacy, commitment to a plan of exercise, leisure and lifestyle physical activity. Solid lines represent each concept's relationship to leisure physical activity and lifestyle physical activity. Hypothesized relationships depicted by solid lines are explored in research questions 2 and 3 where comparisons are made between leisure or lifestyle physical activity and BMI, perceived benefits of exercise, perceived barriers to exercise, perceived self-efficacy, and commitment to a plan of exercise. In research question 4, all concepts within this theoretical framework are examined for differences between obese and non-obese women.

The results and reports of this study will valuable information to the nursing literature regarding the relationship of perceived self-efficacy, benefits and barriers of exercise and commitment to action in women of varying weight (BMI). Information of this sort is lacking in the current nursing literature and is needed to assist in developing appropriate community based interventions, especially interventions that will help decrease obesity and/or obesity complications in women.

Sample and Setting

This study sought to recruit non-obese, overweight, and obese women of all ethnic backgrounds. The participants were recruited in Saginaw County, Michigan. Saginaw County is located in the East Central region of the State of Michigan. The county is comprised of both rural and urban areas. According to the U.S. Census Bureau (2006), Saginaw County has a population of 206,300 with 52% (106,530) being female. The investigator anticipated the participants to consist mainly of African American and Caucasian females since 94.7% of the population in Saginaw County fall within these two race categories.

Selection criteria were established to assist in obtaining the target population. Inclusion criteria for women participating in this study included: 1) being 18-50 years old, and b) having

the ability to speak and read English. Limiting inclusion of women in this age group is important to decrease possible age related physical complications such as menopause. Jones (2003, p. 25) indicated that women aged 20-50 represent a "key window during which women tend to be in systems of care (primarily around their reproductive health needs) and before their risk of cardiovascular disease, diabetes, and other conditions might be predicted to rise."

The capacity of a study to detect differences or relationships that exist in a population is referred to as power (Burns & Grove, 2003, p. 251). Power Analysis was completed to determine an adequate sample size for this study. Based on a formulation of 80 percent power, an effect size of 0.15 (R Square = 0.13), at least 10 predictors, and a significance level of 0.05 for a two tailed test, a sample of 118 participants was deemed sufficient to address the research questions (Faul et al., 2007). The researcher sought to recruit a minimum of 130 participants to offset any loss of participants from incomplete coding or lack of participation. In summary, the participant population for this study was 137 women, aged 18-50.

Recruitment of participants from the general population was completed at a local mall in Saginaw, Michigan. The investigator ensured privacy of the participants by having a screened area to complete height and weight measurements and a private area to complete questionnaires. Flyers at public location indicated the investigator was recruiting women aged 18-50 to participate in a study examining health behaviors including physical activity. The signs indicated the location and time in which the investigator was on site. An adequate number of women were obtained from Saginaw County, so the investigator did not expand the study into surrounding counties in the Central Eastern region. An incentive for participation was provided, a $10.00 mall gift card.

Quota sampling was used to recruit an equal proportion of women who have a BMI >30 and <30. Polit and Beck (2006, p. 263) states that quota sampling enhances the representativeness of a convenience sample. The use of this type of convenience sampling will also assist in decreasing biases that could occur when looking at the subgroups of obese and non-obese women. In 2006, the CDC reported Michigan had 43.2 % adult women with a normal BMI, 29.6% overweight (BMI>25 - <29.9) and 27.2% obese (BMI>30). An adequate number of obese and non-obese women were obtained.

Protection of Human Subjects

The protection of the welfare of participants is essential in any human subjects research. The concept of beneficence, minimizing harm and maximizing benefit, was a guiding principle for this researcher. All potential participants were aware of potential risks and benefits to participating in this study. The information sheet (See Appendix A) was provided to and reviewed with each of the participants. Participants were informed of their right to refuse to answer any questions on the questionnaire and their right to withdraw at any point from the study. Wayne State University IRB and Saginaw Valley State University IRB approval was obtained (Appendix B). In addition, the primary investigator completed research training (human subject modules and research misconduct modules) provided by Wayne State University.

There was minimal risk of physical harm or discomfort for participants. The study questionnaires and measurements were completed in approximately 30-45 minutes. The amount of time required to complete the necessary data collection did not lead to participant exhaustion. The questions were not invasive and did not create psychological distress. Participants were not asked to disrobe for anthropometric measurements, only heavy weight coats and shoes were removed. Overall, risk to participants was minimal, no more than normally encountered in daily

life. The findings of this study provide valuable data to assist in creating health promotion and health prevention activities for the reduction of obesity and should be beneficial to all the participants. All participants in the study received a gift card ($10) to a local mall to compensate them for their time. In addition, all participants were offered educational materials about exercise benefits upon completion of the study questionnaires. This information would be beneficial to assisting participants in beginning or maintaining an exercise paradigm. This information was also provided to anyone that was found to be ineligible to participate.

VARIABLES AND MEASUREMENTS

Variables of interest for this study, including their theoretical and operational definitions are outlined in Table 1.

Table 1: Theoretical, Study, and Operational Definitions in Relation to Health Promotion Model

	Theoretical Definition (Pender, Murdaugh, & Parsons, 2005)	Study Definition and Variables	Operational definition
Individual Characteristics and Experiences	**Unique personal characteristics & experiences that affect subsequent actions.** **Include: Prior Related Behaviors & Personal factors**	**Personal factors** • **Biologic factors** • **Psychological factors** • **Sociocultural factors**	**Biological** **BMI, Ht, Wt, Age** **Psychological** **Perceived Health Status** **Sociocultural** **Income level, Education, Race**
Behavior-Specific Cognitions and Affect	**These behavior-specific cognitions and affects provide major motivational significance to assisting an individual in changing a health behavior.** **Concepts include:** **Perceived benefits to action:** **Anticipated positive outcomes that will occur from a health behavior.** **Perceived barriers to action:** **Anticipated, imagined, or real blocks and personal costs of undertaking a given behavior** **Perceived self-efficacy: A judgment of one's ability to carry out a particular course of action.**	**Perceived benefits to exercise:** **Anticipated positive outcomes that will occur from participating in exercise.** **Perceived barriers to exercise:** **Anticipated, imagined, or real blocks and personal costs of participating in exercise** **Perceived self-efficacy:** **A judgment of one's ability to carry out exercise**	**Perceived benefits to exercise:** **EBBS: Benefits Score** **(Sechrist, Walker, & Pender, 1987)** **Perceived barriers to exercise:** **EBBS: Barrier Score** **(Sechrist, Walker, & Pender, 1987)** **Perceived self-efficacy:** **Exercise Self-Efficacy Scale** **(Albert Bandura, 1997; 2006)**
	Commitment to a Plan of Action **Two underlying cognitive processes: 1) commitment to carry out a specific plan at a given time and plan with specified persons or alone, irrespective of competing preferences; and 2) identification of definitive strategies for eliciting, carrying out, and reinforcing the behavior**	**Commitment to a plan of exercise:** **1) commitment to carry out a specific exercise plan at a given time and plan with specified persons or alone, irrespective of competing preferences; and 2) identification of definitive strategies for eliciting, carrying out, and reinforcing the behavior of exercise**	**Commitment to a plan of exercise:** **Planning for Exercise Scale (Pender, 1996)**
Behavioral Outcome	**Health Promoting Behavior:** **Positive actions to improve an individual's health**	**Health Promoting Behavior Physical Activity:** **Positive actions of physical activity to improve one's health**	**Health Promoting Behavior of Physical Activity:** **Leisure Activity: Health Promotion Lifestyle Profile II** **(Walker, S. & Hill-Polrecky, D., 1996)** **Lifestyle Activity & Leisure Activity:** **Physical Activity Scale** **(Albert Bandura, 1997; 2006)**

Summarized below are the instruments and measures in relation to the variable they address. Samples of the instruments can be examined in Appendix C.

Demographic Variables

Personal Factors

The following demographic information was collected using the demographic form: Age, marital status, race, employment status, highest educational level, and income level. According to Pender's Health Promotion Model (2002), these demographic measures are considered personal factors that influence an individual's ability to engage in health promoting behaviors. A general question regarding participation in an exercise program was asked to assess previous experience with physical activity. The question read "Have you ever participated in an exercise program?" If yes, the participant was asked to identify a time frame since this occurred (currently, within the last year, within two years, greater than two years ago). A copy of the Demographic form can be found in Appendix C.

Major Study Variables

Anthropometric Measures

Height and weight was recorded using standardized measures. Weights were obtained by using a Seca Model 882, standardized balance scale (NorthShore Care Supply, Northbrook, IL) with measurements recorded in kilograms. The Seca Model 882 has 440lb capacity with 2 oz increments. Height was obtained using the Seca Model 214 standardized metric measurement tool (NorthShore Care Supply, Northbrook, IL). Heavy outerwear and footwear was removed before weight was obtained. Height and weight were measured with shoes off. Body size was determined by body mass index (BMI). BMI was calculated by dividing weight in kilograms by height in meters squared (kg/m^2). BMI was applicable to this study because it provided an

excellent categorical structure to describe the relationship between weight and reported benefits and barriers of physical activity. BMI classifications as defined by the National Institutes of Health [NIH] (2002) will serve as a guide for this study. Table 2 outlines the NIH BMI classifications:

Classification	BMI
Underweight	<18.5
Normal weight	18.5-24.9
Overweight	25-29.9
Obesity (Class 1)	30-34.9
Obesity (Class 2)	35-39.9
Extreme obesity (Class 3)	≥ 40

For purposes of this study, obese women were classified as any woman with a BMI of 30 or greater. A non-obese woman was classified as a woman with a BMI of <30.

Exercise Benefits and Barriers

The Exercise Benefits and Exercise Barriers Scale (EBBS) (Sechrist, Walker, & Pender, 1987) for adults measures the participants' perceived barriers and benefits of exercise. The EBBS scale assesses 29 benefit items and 14 barrier items. The items are ranked by the participant, using a 4-point scale ranging from (1) strongly agree to (4) strongly disagree. Sub-scale scores (benefits, barriers) are obtained by summing item responses for the scale. Barrier items are reverse-scored. Scores on the total instrument can range from 43 to 172. The higher the participant scores, the more positively the participant perceives exercise. Perceived benefits and barriers were included in the same scale to avoid response-set bias. Sechrist and coworkers (1987) examined the internal consistency of the scale, using a sample of 650 participants. The

EBBS scale had the following standardized alpha coefficients of 0.95 (total scale), 0.95 for benefits and 0.86 for the barrier scale (Sechrist et al., 1987). Test-retest reliability was measured on a group of individuals from the community (n=63). The test-retest reliability was found to be 0.89 for the total scale, 0.89 for benefits, and 0.77 for barriers (Sechrist et al., 1987). For purposes of this study, the Exercise Benefits and Barrier Scale (See Appendix C) including all 43 items from the original scale with the addition of the following 7 barriers:

44. I am too fat to exercise.
45. My health is not good enough to exercise.
46. I have an injury or disability that stops me from exercising.
47. I am not motivated to exercise.
48. I am too lazy to exercise.
49. I am athletic enough to exercise
50. Pain stops me from exercising.

These additional seven questions are a modified version of questions presented in the pilot survey of the Fitness of Australians (Ball, Crawford, & Owen, 2000). Scores for questions 1-43 were computed as previously discussed for the EBBS scale. For purposes of this study, two scores were calculated (benefits, and barriers). These two scores were correlated to their current exercise level. Scores for questions 44-50, each item was scored individually and a reliability analysis will be completed.

Exercise Self-Efficacy

As indicated by Bandura (1997, p. 44), "self–efficacy scales should measure people's beliefs in their abilities to fulfill different levels of task demand within the psychological domain

selected for study." Since this study focuses on the health promoting behavior of exercise, the Exercise Self-Efficacy Scale Bandura, 1997; 2006) was utilized for this study. This scale consists of 18 statements about difficult situations related to adhering to a regular exercise routine of 3 or more time s a week. The subject rates their self efficacy beliefs for each of the statements on a 100-pt scale, ranging in 10 point intervals from 0 ("Cannot do"); to complete assurance, 100 ("Highly certain can do"). The Exercise Self efficacy scale has been used in many research studies. Shin, Jang and Pender (2001) completed a psychometric evaluation of the Exercise Self-efficacy scale among Korean adults with chronic diseases. The study reported a standardized alpha coefficient of 0.94. Setting a standard of >.3 for correlating items with total score, all of the item-total correlation were between 0.57 and 0.72. Test-retest reliability was measured on a group of individuals from the community (n=14). The test-retest reliability was found to be 0.77 for the total scale.

Commitment to a Plan of Action

Commitment to physical activity was measured using the Planning for Exercise measure that directly measures the construct "Commitment to Plan of Action" in the Health Promotion Model. The Planning for Exercise scale assesses 11 different questions regarding commitment to action. The items were ranked by the participant, using a 3-point scale ranging from (1) Never; (2) Sometimes and (3) Often. Participants were given a point value for all eleven questions (1=Never; 2=Sometimes; 3=Often). The scores for all the questions were added and the total divided by the number of items to obtain a mean score for the instrument. The Commitment to a Plan for Exercise scale had a standardized alpha coefficient of 0.90 (Pender, 2007). The test-retest reliability was found to be 0.82 for the scale.

Physical Activity Level

The first measure of a participant's current physical activity level was obtained from the physical activity sub-scale of the Health Promotion Lifestyle Profile II (HPLP II). HPLP II is an updated version of the Health-Promoting Lifestyle Profile originally developed by Walker and coworkers in 1987. The profile consists of 52 items scored on a 4- point Likert scale, including (1) never, (2) sometimes, (3) often, and (4) routinely. These items measure the frequency of health promoting behaviors. The HPLP consists of six sub-scales: health responsibility, physical activity, nutrition, interpersonal relations, spiritual growth, and stress management. Scores on the sub-scales are computed as means. In 1995, Walker & Hill reported that the alpha coefficient for the Health Promotion Lifestyle profile II was 0.94 indicating high internal consistency and the test-retest was 0.89, indicating stability (Berger & Walker, 2004). Internal consistency of the sub-scales was determined from a sample of 712 respondents resulting in alpha coefficients ranging from 0.79 to 0.87.

The second measure of a participant's physical activity level was the Physical Activity Scale developed by Aadahl & Jorgensen (2003) (Appendix B). This scale was shown to highly correlate with self reported activity diaries ($r=0.74$, $p=.000$). Participants self-report their 24 hour physical activity level for an average week day across nine metabolic equivalents. The range of metabolic equivalents (MET) begins with Sleep/rest (0.9) METs to high-intensity physical activities (> 6 METs). This scale allowed the researcher to calculate the MET-time for 24 hours. The MET-time for 24 hours was calculated by multiplying the MET value against the time reported for each of the activity categories. Then the calculated MET time for each category is added together to get the 24 hour MET time for an average week day. Twenty four

hour MET values for non-obese and obese were compared as a whole and by each activity category.

Reliability and Readability of Instruments

The internal consistency of instruments used in this study was measured using Cronbach's alphas. Calculation of the Cronbach's alpha for each instrument was completed. Table three summarizes the reliability of the instruments used in this study. Cronbach's alpha for instruments used in this study were all above 0.80. A higher coefficient value reflects a higher internal consistency. A coefficient value of 0.80 and above is considered an accepted value for a well-developed psychosocial measurement instrument (Burns & Grove, 2005, p. 374). A Cronbach alpha was not calculated for the Physical Activity Scale because the scale measures total overall physical activity level across different MET values. The individual questions do not measure the same construct.

Table 3: Range and Cronbach's alpha among instruments.

	Exercise Benefits Subscale	Exercise Barriers Subscale	Exercise self-efficacy	Commitment to a plan of exercise	Healthy Lifestyle Profile II-Physical activity subscale
Number of items	29	14	18	11	8
Cronbach's alpha	0.947	0.856	0.925	0.881	0.835

The table four summarizes the established psychometric evaluation of the instruments by the authors of the instruments used in this study:

Table 4: Established Psychometric Evaluation of Instruments

Instrument	Test-Retest Reliability	Cronbach's Alpha	Validity	Readability Flesch-Kincaid Grade Level
Demographics				7.4
Exercise Benefits and Barriers	0.89 (total) 0.89 (benefits) 0.77 (barriers)	0.95 (total) 0.95 (benefits) 0.86 (barriers)	Construct (factor analysis)	9.7 (original scale) 8.6 Added Questions **Original with added: 9.5**
Exercise Self-Efficacy Scale	0.77	0.94	Content (face) Construct (factor analysis)	7.9
Planning for Exercise	0.90	0.82	Content Construct	8.7
HPLP – II	0.89	0.94 Subscale 0.79-0.87	Content Construct	8.0
Physical Activity Scale		Correlation between diary and activity scale was high (r=0.74; p=0.000)	Content (face)	Information not available but scale uses pictures to assist individuals in understanding the exercise categories.

DATA COLLECTION PROCEDURES

Informed consent

Upon inquiring about the study, the information sheet (See Appendix A) was reviewed with all potential subjects. Participation by the participant in the study was considered consent. Each participant was notified of their right to withdraw from the study at any time. Upon agreement to participate in the study and selection criteria were met, the participant's height and weight were measured. A screened area was used to complete the height and weight of the subject to ensure privacy and confidentiality. After height and weight were completed, the participant was provided an area with a table to complete the study surveys. The investigator

minimized noise and distractions and ensured privacy/confidentiality for the completion of study tools. The investigator recognized that minimizing noise and distractions may be difficult based on the public location used for this study but remained a goal for the investigator. The investigator randomized the order of administering the tests to decrease potential biases. Total time to complete the instruments and measures was approximately 30-45 minutes.

Selection Criteria

Upon inquiring about the study, the information sheet was provided to and reviewed with each participant. Potential subjects were screened to see if they meet selection criteria. Potential participants were asked their age. At any point, if a potential participant did not meet selection criteria, the researcher thanked them for their willingness to participate and provide them with a package of health promoting brochures about exercise. The brochures were developed by the Michigan Department of Community Health and the Center for Disease Control. All participants completing the study had access to these brochures after completing the study.

Data Management

All of the participant's data was coded with a number rather than name to ensure confidentiality of participants. All data collected during the study were computer recorded with the identifying code number. Data and reports collected from this study were locked in a file cabinet in the primary investigator's office. The primary investigator was the only person with access to the office file cabinet. In addition, the source of recruitment for this study was coded to test whether any systematic differences between subjects based on recruitment source were identified. In addition, recruitment source coding allowed the investigator to provide an additional benefit to the recruitment source. The investigator could provide the source (organization, church, etc) with an aggregate report, following acceptance of this dissertation.

This report may assist the source in providing health promoting activities for their group. The aggregate report will not allow the agency to identify participants or their individual responses. The report will maintain confidentiality of all individuals. The following data were obtained in aggregate form (averages, % reporting): exercise levels, perceived self-efficacy, perceived barrier & benefits scores, 24 hour MET time, and BMI.

Data was checked for completeness at the time of collection while participants were still available. Data collected off-site was secured in a locked briefcase and transported to the project office where it was checked in and filed in locked cabinets. Data entry was conducted by the primary investigator using SPSS, version 14 data entry software. Data was stored in a specified password protected directory on the project computer, which was located in the investigator's office (a secure facility) and backed up regularly. The investigator monitored the status of data entry, rate of recruitment, and other variables relevant to project management.

Integrity of data entry was monitored by checking the entry of every 10th questionnaire. If the error rate exceeds 1%, all data entered since the previous check was examined for accuracy. All data was screened for appropriate value ranges. Simple imputation was used for missing data on the Exercise Benefits and Barriers scale and the Healthy Lifestyle Profile II scale. The use of simple imputation was in keeping with Pender's instruction on the EBBS scale instrument development and scoring information. Yarandi (2002, p. 360) states if the portion of missing data is small (less than 5%) then a simple imputation method may be considered to be accurate. In this study, any subject with greater than 5% of missing data on either of these instruments was omitted from data analysis. For subjects with less than 5% of missing data on either instrument, simple imputation using the median was completed. For the Exercise Benefits and Barriers scale, 9 subjects had greater than 5% of the data missing and were omitted from

data analysis. Thirty eight subjects had less than 5% missing data on the EBBS and simple imputation completed. On the HPLP II, 5 subjects had greater than 5% of missing data and were omitted from data analysis. Thirteen subjects had less than 5% of missing data simple imputation was completed. Data analysis was done using SPSS, version 14.

DATA ANALYSIS

The purpose of this descriptive correlational study was to examine the relationships among selected concepts in the Health Promotion Model (Pender, 2002) in obese and non-obese women with a focus on the behavioral outcome of exercise. The long-range goal of this study is to develop, implement, and evaluate health promotion interventions that could improve healthy life styles in obese women and decrease the overall prevalence of obesity among women. The SPSS-X statistical program was used to complete data analysis. Data analysis occurred in the following fashion:

Data Analysis for Research Question #1:

What is the relationship between the personal factor of body mass index and a woman's perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action and physical activity level (leisure PA and lifestyle PA)?

Figure 4 depicts the relationships that were explored in Research Question 1.

Research Question 1

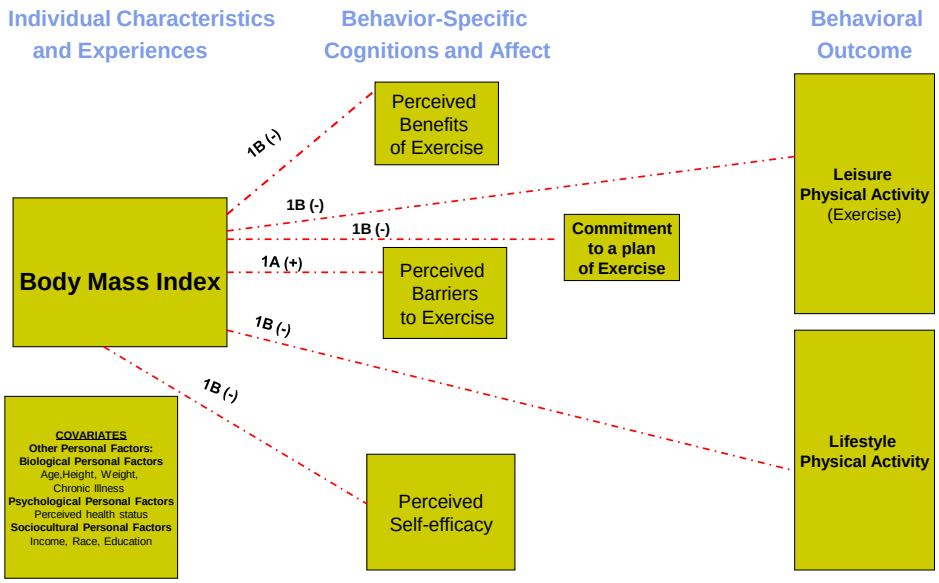

Figure 4: Hypothesized relationships in research question one

This research question was analyzed using correlations between the identified variables. Correlation analysis provided the researcher with the nature of the relationship (positive or negative) and the magnitude of the relationship (Burns & Grove, 2005). Correlational analysis does not prove causation between variables. Pearson's product-moment correlation was the test used to determine the relationships among the variables following a scatter plot test for evidence of non-linear relationships. Correlation coefficients (*r*) were computed for the linear relationship between any two variables. Percentage of the variance explained by the relationship between any two variables is explained by squaring the correlation coefficient (R^2). P value was set at 0.05.

Data Analysis for Research Question #2

Can the health promoting behavior of leisure physical activity (exercise) in women be predicted by the personal factor of body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action?

Figure 5 illustrates the hypothesized relationships in research question 2.

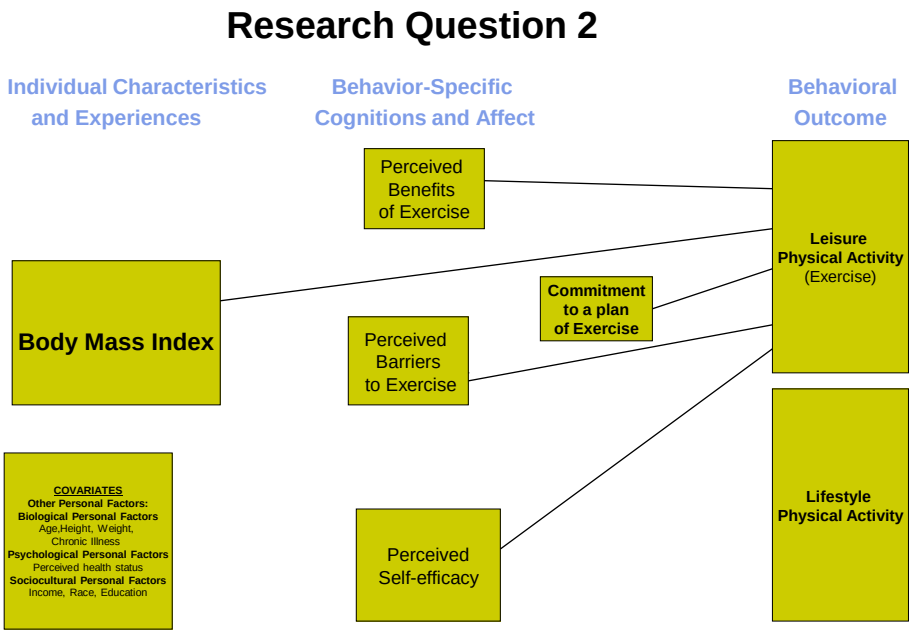

Figure 5: Hypothesized relationships in research question two

In the second analysis, exercise level was predicted by variables of interest using multiple regressions. A correlation matrix was completed before regression to check for multicollinearity. If independent variables in an equation are strongly correlated, it does not affect predictive power but causes problems with generalizability. Tests to validate the assumptions of regression (normal distribution and lack of homoscedasticity) were completed. Stepwise regressions were used so that predictors were entered into the regression equation in the order that produces the greatest increments to R2 (Polit &

Beck, 2008, p. 620). One of the limitations of using stepwise regression was that all the shared variance was assigned to the first variable entered into the regression.

Based on a formulation of 80 percent power, an effect size of 0.15 (R Square = 0.13), at least 10 predictors, and a significance level of 0.05 for a two tailed test, a sample of 118 participants was deemed sufficient to address the research questions (Faul et al., 2007).

Data Analysis of Research Question #3:

Can the health promoting behavior of lifestyle physical activity in women be predicted by the personal factor of body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action?

Figure Six outlines the hypothesized relationship between variables and lifestyle physical activity in research question three.

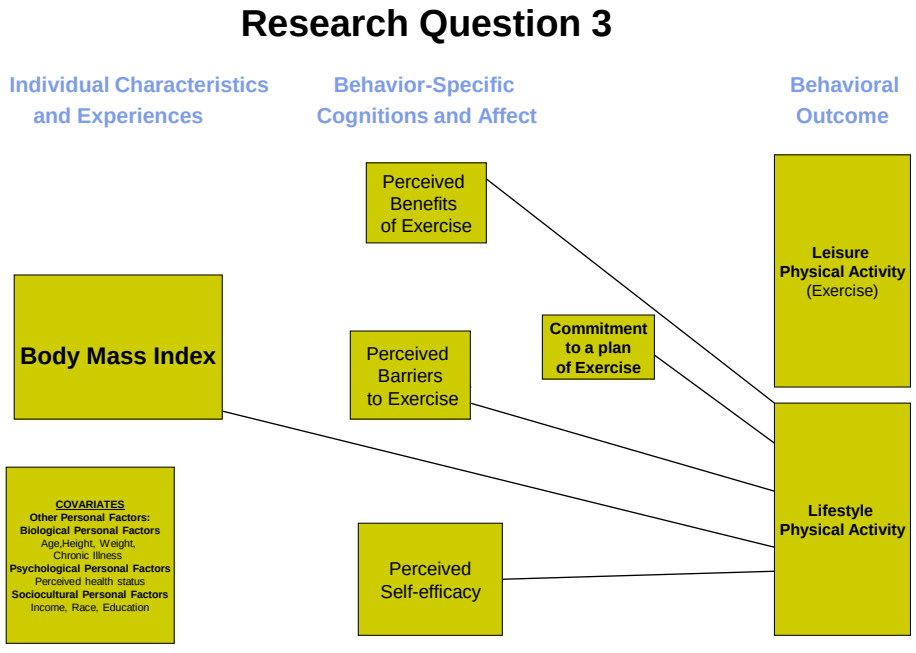

Figure 6: Hypothesized relationships in research question three

In the third analysis, lifestyle physical activity levels were predicted by variables of interest using multiple regressions. A correlation matrix was completed before regression to check for multicollinearity. If independent variables in an equation are strongly correlated, it does not affect predictive power but causes problems with generalizability. Tests to validate the assumptions of regression (normal distribution and lack of homoscedasticity) were completed. Stepwise regression was used so that predictors are entered into the regression equation in the order that produces the greatest increments to R2 (Polit & Beck, 2008, p. 620). One of the limitations of using stepwise regression is that all the shared variance is assigned to the first variable entered into the regression.

Based on a formulation of 80 percent power, an effect size of 0.15 (R Square = 0.13), at least 10 predictors, and a significance level of 0.05 for a two tailed test, a sample of 118 participants was deemed sufficient to address the research questions (Faul et al., 2007).

Data Analysis of Research Question #4:

Is there a difference in perceived benefits, perceived barriers, perceived self-efficacy, commitment to action, leisure physical activity (exercise) and lifestyle physical activity between obese and non-obese women controlling for all personal factors (age, sex, race, educational level, income level, chronic illnesses, personal health status) except BMI?

Figure 7 depicts the hypothesized relationship regarding each variable in the non-obese and obese individuals when controlling for covariates.

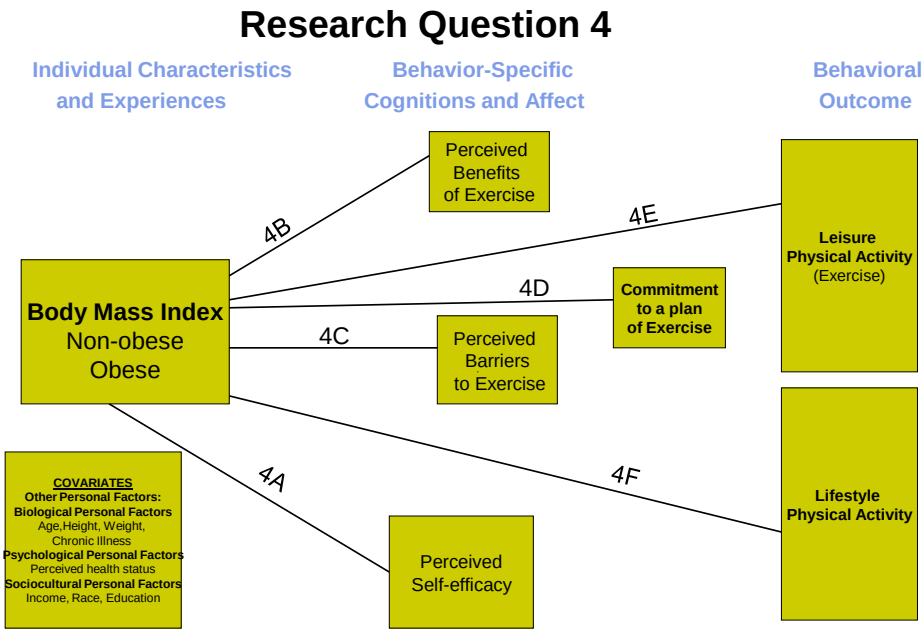

Figure 7: Hypothesized relationships in research question four

In the fourth analysis, analysis of covariance was utilized to analyze if there was a difference in perceived self-efficacy (hypothesis 4A), perceived benefits (hypothesis 4B), perceived barriers (hypothesis 4C), commitment to action (hypothesis 4D), leisure physical activity (exercise) levels (hypothesis 4E) and lifestyle physical activity (hypothesis 4F) in obese and non-obese women when controlling for personal factors other than BMI. ANCOVA allows for these controlling of covariates. This test assumes that each dependent variable has similar variances for all groups. The Levene's test was used to test this assumption. If the Levene is statistically significant at 0.05 or better, the null hypotheses that the groups have equal variances is rejected. Again, a p value of 0.05 was used to determine if there is a statistically significant difference between the two groups.

SUMMARY OF METHODS

This descriptive correlational study recruited 137 women, aged 18-50 from a local shopping mall to participate in this study. Women were asked to complete six surveys regarding selected concepts within the Health Promotion model (perceived self efficacy, perceived benefits and barriers, commitment to plan of action) and physical activity measures. Heights and weights were completed on all the women to determine their BMI. Descriptive statistics, independent t t-tests, correlations, regressions, and ANCOVA statistics were utilized to answer research questions.

CHAPTER V

RESULTS

INTRODUCTION

The purpose of this study was to describe relationships among the personal factor of body mass index (BMI) and the variables of interest including, perceived benefits, perceived barriers, perceived self-efficacy, commitment to action, and physical activity (leisure physical activity & lifestyle physical activity). This chapter addresses data analysis and results of each research question and hypotheses. The findings in this chapter are organized into three sections: 1) participant characteristics 2) comparison of a non-obese (BMI <30) and obese (BMI >30) group related to major study variables and 3) results of the inferential analysis of each of the research questions and hypothesis. Each section also addresses the statistical analysis utilized.

PARTICIPANT CHARACTERISTICS

A convenience sample of 137 women was recruited from a local mall to participate in this study between September 2008 and October 2008. Characteristics of the participants in this study are summarized in Table 5. The racial background of participants was largely African American (n=56, 41%) and Caucasian (n=37, 41%). Participants ranged in age from 18 to 50 years of age with a mean age of 29.5 (SD=9.7). The non-obese women (M=27.74, SD=8.98) were younger than the obese women (M=31.15, SD=10.14). The difference between the two means is statistically significant at the 0.05 level *(t*=-2.079, df=135). Eighty one percent of the participants had a high school degree or higher. Forty-one participants (29.9%) were married, 76 (55.5%) were never married, 8 (5.8) had a non-marital union, 6 (4.4%) were divorced and 3 (2.2%) separated. The participants had a low household income with 72 (52.6%) reporting a household income of less than $20,000, and 25 (18.2%) earned between $20,000 and 34,999, 17

(12/4%) earned between 35,000 and 49,999, 10 (7.3%) earned between $50,000 and $74,999, 7 (5.1%) earned between $75,000 and $99,999, 6 (4.4%) earned $100,000 or more.

Table 5: Demographic Characteristics of Participants

Characteristic	**Non-obese Group**		**Obese Group**		**Total Participants1**		**Chi Square (X^2)**
	N	**%**	**N**	**%**	**N**	**%**	
Group	66	48.2	71	51.8	137	100	
Race							
African American	26	40.0	30	42.3	56	41.2	**X^2 = 4.47**
Caucasian	26	40.0	21	29.6	47	34.6	df = 6
Asian	1	1.5	0	0	1	.7	Sig. = .613
American Indian/Alaska Native	1	1.5	1	1.4	2	1.5	
Hispanic	7	10.8	13	18.3	20	14.7	
Mixed Ethnicity	4	6.2	5	7.0	9	6.6	
Other	0	0	1	1.4	1	.7	
Education Level							
8th grade or less	1	1.5	2	2.8	3	2.2	
Some high school	9	13.6	11	15.5	20	14.6	**X^2 = 7.525**
High school diploma or GED	23	34.8	21	29.6	44	32.1	df = 6
Some college (no degree)	20	30.3	24	33.8	44	32.1	Sig. = .583
Associate degree	5	7.6	6	8.5	11	8.0	
Bachelor's degree	5	7.6	2	2.8	7	5.1	
Course beyond Bachelors; no graduate level degree	0	0	2	2.8	8	1.5	
Master's Degree	1	1.5	2	2.8	3	2.2	
Doctorate Degree	2	3.0	0	0	2	1.5	
Other	0	0	1	1.4	1	.7	
Household Income							
Less than $20,000	34	51.5	38	53.5	72	52.6	**X^2 = .343**
$20,000-$34,999	14	21.2	11	15.5	25	18.2	df = 5
$35,000-$49,999	5	7.6	12	16.9	17	12.4	Sig. = .343
$50,000-&74,999	4	6.1	6	8.5	10	7.3	
$75,000-$99,999	5	7.6	2	2.8	7	5.1	
$100,000 or more	4	6.1	2	2.8	6	4.4	

Chi Square Test was completed examining demographic characteristics of the non-obese and obese group. No statistically differences in the groups regarding race, economics or

educational level. Correlations among the variables: age, education level, household income, BMI and physical activity levels (leisure and lifestyle) were completed. Table 6 provides a summary of the correlation results among demographic variables and physical activity measures. Age between the two groups was significantly different and found to be correlated with household income, BMI, and total MET time. As age increased, one's BMI increased and total MET time decreased.

Table 6: Correlation Matrix of Demographic Variables and Physical activity measures

	1	2	3	4	5	6	7
1. BMI	1						
2. Age	.178*	1					
3. Education Level	-.038	.145	1				
4. Household Income	-.079	.399**	.383**	1			
5. Overall Health Rating	-.276**	-.111	.087	-.080	1		
6. HPLP Physical Activity	-.009	-.111	.073	-.050	.138	1	
7. Total MET time	-.028	-.219*	-.187*	-.249**	.144	.302**	1

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Body Mass Index

Body mass index was used as the criteria to group participants in the study. Height and weight was recorded using standardized measures. BMI was calculated by dividing weight in kilograms by height in meters squared (kg/m^2). BMI of the total sample ranged from 13.70 to 59.89, with a mean of 31.43 (SD = 8.41). Sixty six (48.2%) of the respondents had a BMI less than 30 placing them in the non-obese category. Seventy-one (51.8%) of respondents had a BMI greater than 30 placing them in the obese category. The mean BMI of the non-obese group was

24.75 (n=66, SD=3.5) with an average height of 165 cm and 149 pounds. The mean BMI of the obese group was 37.65 (n=66, SD=6.7) with an average height of 163cm and 222 pounds.

Overall Health Rating

Participants were asked to rate their overall health by selecting one of the following choices: poor, below average, average, above average, and excellent. Eight percent (8%) of the participants rated their health as excellent. Ten percent (10%) of the participants rated their health as above average. Sixty percent (60%) of the participants rated their health as average. Four percent (4%) of the respondents rated their health as poor. Seventeen percent (16.8%) rating their health as below average. The non-obese women (M=3.18, SD=.858) rated their overall health higher than the obese women (M=2.85, SD=.873). The difference between the two means is statistically significant at the 0.05 level (t=2.276, df=135).

Exercise Participation

Participants answered one yes/no question on the demographic questionnaire indicating whether or not they had ever participated in an exercise program. Fifty percent (N=69) stated that they had participated in an exercise program. As a follow up question to individuals indicating they had participated in an exercise program, they were asked to indicate their level of participation as currently, within the last year, within two years, or greater than two years ago. Of those 69 respondents, 26 (38%) indicated that they were currently involved in an exercise program, 19 (28%) reported participating in an exercise program within the last year, 6 (9%) participated within two years, and 18 (26%) participated in an exercise program greater than two years ago. Fifty percent (n=68) of the participants indicated that they never participated in an exercise program. Table 7: summarizes the data regarding health rating and exercise participation.

Table 7: Health Rating and Exercise Participation

Characteristic	Non-obese Group		Obese Group		Total Participants	
	N	%	N	%	N	%
Group	66	48.2	71	51.8	137	100
Overall Health Rating						
Poor	1	1.5	5	7.0	6	4.4
Below Average	9	13.6	14	19.7	23	16.8
Average	40	60.6	43	60.6	83	60.6
Above Average	9	13.6	5	7.0	14	10.2
Excellent	7	10.6	4	5.6	11	8.0
Ever Participate in an Exercise Program						
No	31	47.0	37	52.1	68	49.6
Yes	35	53.0	34	47.9	69	50.4
Participation History in Exercise Program						
Greater than 2 yrs ago	9	13.6	9	12.9	18	13.2
Within two yrs	3	4.5	3	4.3	6	4.4
Within the last yr	10	15.2	9	12.9	19	14.0
Currently	14	21.2	12	17.1	26	19.1
Not Applicable	30	45.5	37	52.9	67	49.3

Chronic Conditions of Participants

The participants were asked to indicate if whether or not they have a medical condition and to specify the condition. The participants were provided a list of diseases on the demographic form and asked to check all that apply. Table 8 summarizes the conditions indicated by obese and non-obese women. Women in the obese group had higher rates of hypertension (21% vs. 4.5%), diabetes (15.5% vs. 7.6%) and back problems (29.6% vs. 16.7%) than non-obese women.

Table 8: Chronic conditions of participants

Characteristic	Non-obese Group		Obese Group		Total Participants	
	N	%	N	%	N	%
Group	66	48.2	71	51.8	137	100
Heart Disease						
No	66	100	65	91.5	131	95.6
Yes	0	0	6	8.5	6	4.4
Hypertension						
No	63	95.5	56	78.9	119	86.9
Yes	3	4.5	15	21.1	18	13.1
Back Problems						
No	55	83.3	50	70.4	105	76.6
Yes	11	16.7	21	29.6	32	23.4
Cancer						
No	63	95.5	69	97.2	132	96.4
Yes	3	4.5	2	2.8	5	3.6
Asthma/Lung Disease						
No	52	78.8	58	81.7	110	80.3
Yes	14	21.2	13	18.3	27	19.7
Diabetes						
No	61	92.4	60	84.5	121	88.3
Yes	5	7.6	11	15.5	16	11.7
Bone/Joint Disease						
No	64	97.0	66	93.0	130	94.9
Yes	2	3.0	5	7.0	7	5.1
High Cholesterol						
No	63	95.5	63	88.7	126	92.0
Yes	3	4.5	8	11.3	11	8.0
Other health conditions						
No	62	93.9	69	97.2	131	95.6
Yes	4	6.1	2	2.8	6	4.4

MAJOR STUDY VARIABLES: COMPARISON OF GROUPS

Perceived Barriers to Exercise

Data from the EBBS resulted in a mean barrier score of 30.2 for non-obese participants (n=63) and 32.51 for obese participants (n=65). The top five barriers reported by non-obese women were: 1) Exercise tires me, 2) Exercise is hard work for me, 3) I am fatigued by exercise, 4) My family members do not encourage me to exercise and 5) Exercise takes too much

of my time. The top five barriers reported by the obese women were: 1) Exercise tires me, 2) Exercise is hard work for me, 3) Exercise facilities do not have convenient schedules for me, 4) I am fatigued by exercise and 5) Exercise takes too much time.

Non-obese women (M=30.27, SD=6.56) reported less barriers to exercise than obese women (M=32.51, SD=7.03). The differences between the two means were not statistically significant at the .05 level (t = -1.860, df=126). T-tests were examined for each of the barriers to determine any significant differences between the two groups. Two barrier items were statistically significant between non-obese and obese women. Obese women (M=2.12, SD=.96) reported being "too embarrassed to exercise" more as a barrier than non-obese women (M=1.76, SD=.75). The differences between the two means is statistically significant at the 0.05 level (t = -2.410, df=133). Obese women (M=2.32, SD=.92) reported "It costs too much money to exercise" as more of a barrier to exercise than non-obese women (M=1.85, SD=.78). The differences between the two means is statistically significant at the .001 level (t = -3.254, df=134). Table 9 summarizes the Mean scores on the Barrier Scale.

Table 9: Mean Scores on Barrier Scale

Exercise Perceived Barrier Question	Non-obese Group Mean	Obese Group Mean
Q4. Exercise takes too much of my time.	2.30	2.39
Q6. Exercise tires me.	2.71	2.73
Q9. Places for me to exercise are too far away	2.20	2.25
Q12. I am too embarrassed to exercise.*	1.76	2.12
Q14. It costs too much money to exercise. **	1.85	2.32
Q16. Exercise facilities do not have convenient schedules for me.	2.21	2.48
Q19. I am fatigued by exercise.	2.42	2.43
Q21. My spouse (or significant other) does not encourage exercise.	1.94	2.22
Q24 Exercise takes too much time from family relationships	2.03	2.23
Q28. I think people in exercise clothes look funny.	2.05	2.09
Q33. My family members do not encourage me to exercise.	2.32	2.28
Q37. Exercise takes too much time from my family responsibilities.	2.02	2.11
Q40. Exercise is hard work for me.	2.57	2.50
Q42. There are too few places for me to exercise.	2.26	2.34

*significant at the p <0.50 level **significant at the p<0.01 level

Additional Exercise Barriers

In addition to the exercise benefits and barriers scale, individuals were asked to rate 6 additional barriers and one benefit that were piloted in this study based on previous research. Six of the benefit and barrier questions are a modified version of questions presented in the pilot survey of the Fitness of Australians (Ball, Crawford, & Owen, 2000). One additional barrier question was developed based on pain as a perceived barrier to exercise for obese individuals

(Wanko, 2004). These seven items were measured on the same Likert scale as the Benefits and Barrier Scale. Table 10 summarizes the means for each additional barrier question.

The first additional barrier question examined if the participant believed being "too fat to exercise" was a barrier to exercise. Ninety two percent of the non-obese respondents disagreed or strongly disagreed with this statement. In comparison, 77% of obese respondents disagreed or strongly disagreed with this statement. One should note that 9.3% of non-obese women and 23% of obese women did see being "too fat to exercise" as a barrier. Non-obese women (M=1.69, SD=.78) had higher levels of disagreement to the perceived exercise barrier "I am too fat to exercise" than obese women (M=1.97, SD=.82). The differences between the two means is statistically significant at the 0.05 level (*t*=-2.101, df=132.78, p=.038). Because the variances were significantly different, a t test that did not assume equality of variances was conducted.

A barrier regarding their "health not good enough" to exercise was asked to all the participants. Ninety two percent of the non-obese respondents disagreed or strongly disagreed with this statement. In comparison, 78.5% of obese respondents disagreed or strongly disagreed with this statement. Non-obese women (M=1.69, SD=.75) had higher levels of disagreement to the exercise barrier "My health is not good enough to exercise" than non-obese women (M=2.01, SD=.84). The differences between the two means is statistically significant at the 0.05 level (*t*=-2.341, df=133, p=.021).

Eighty eight percent of the non-obese respondents disagreed or strongly disagreed with the barrier statement about having an injury or disability that keeps them from exercising. In comparison, 72.5% of obese respondents disagreed or strongly disagreed with this statement. Injury or disability is not considered a barrier to exercise for this group of women. One should note though that 27.5% of obese women did agree or strongly agree that injury or disability was

a barrier to exercise. Obese women (M=2.14, SD=.89) reported "I have an injury or disability that stops me from exercising as more of a barrier to exercise than non-obese women" (M=1.73, SD=.72). The differences between the two means is statistically significant at the 0.01 level (*t*=-2.996, df=132, p=.003).

The next question examined the barrier "I am not motivated to exercise." Forty seven percent of the non-obese respondents agreed or strongly agreed with this statement. In comparison, 50% of obese respondents agreed or strongly agreed with this statement. The findings indicate that almost half of each group found motivation to be a barrier to exercise. Upon examination of the means of all the barrier questions, "I am not motivated to exercise" would rate in the top five barriers for both obese and non-obese participants. There was no statistical difference between the means for non-obese women (M=2.39, SD = .91) and obese women (M=2.44, SD=.92) related to this barrier (*t* = -.299, df=131.96; p=.766). Because the variances were significantly different, a *t*-test that did not assume equality of variances was conducted.

"Too lazy to exercise" was an additional barrier added to this study based on Ball's findings. In this study, only 36% percent of the non-obese respondents agreed or strongly agreed with this statement. In comparison, 43.5% of obese respondents agreed or strongly agreed with this statement. There was no significant difference at 0.05 level between non-obese and obese women in their perception of being "too lazy to exercise" (*t* = -8.72, df=133, p=.385) as a barrier to exercise.

For the barrier, "I am athletic enough to exercise", 62% of the non-obese respondents agreed or strongly agreed with this statement. In comparison, only 44.3% of obese respondents agreed or strongly agreed with this statement. There was no significant difference at a 0.05 level

between non-obese and obese women in their perception of "I am athletic enough to exercise" (*t*=1.558, df = 134, p=.122) as a barrier to exercise.

Pain as a barrier to exercise was also examined in this study. Twenty seven percent of the non-obese respondents agreed or strongly agreed with this statement. In comparison, only 38.6% of obese respondents agreed or strongly disagreed with this statement. There was no significant difference between the non-obese and obese group in their perception of "Pain stops me from exercising" (*t* = -1.468, df = 134, p=.144) as a barrier to exercise.

Table 10: Additional Benefit and Barrier Questions: Means

Additional Benefit and Barrier Questions	Non-obese participants	Obese Participants
I am too fat to exercise*	1.69	1.97
My health is not good enough to exercise.*	1.69	2.01
I have an injury or disability that stops me from exercising. **	1.72	2.14
I am not motivated to exercise.	2.39	2.44
I am too lazy to exercise.	2.23	2.36
I am athletic enough to exercise.	2.67	2.44
Pain stops me from exercising.	2.00	2.23

*significant at the p <0.50 level **significant at the p<0.01 level

Perceived Benefits to Exercise

The mean benefit score for non-obese participants (M=90.54, SD =12.37) was not significantly different than obese participants (M=90.46, SD=12.55). The differences between the benefit scale means for non-obese and obese women were not significantly significant at the 0.05 level (*t* = 0.035, df=126, p=.972). T-tests were examined for each of the individual items on the benefits scale and three items showed a significant difference between the non-obese and obese women. Obese women (M=2.91, SD=.78) reported "Exercise lets me have contact with friends and persons I enjoy" more as a benefit of exercise than non-obese women (M=2.62, SD=.91). The difference between the two means is statistically significant at the 0.05 level (*t* =

-2.022, df=126.19, p=0.45). Because the variances were significantly different, a t test that did not assume equality of variances was conducted. Non-obese women (M=3.36, SD=0.57) reported "My muscle tone is improved with exercise" more as a benefit of exercise than obese women (M=3.13, SD=0.56). The difference between the two means is statistically significant at the 0.05 level (*t*=2.414,df=133.23, p=0.017). Because the variances were significantly different, a t test that did not assume equality of variances was conducted. Non-obese women (M=3.38, SD=0.65) reported "Exercising improves functioning of my cardiovascular system" more as a benefit of exercise than obese women (M=3.16, SD=0.66). The difference between the two means is statistically significant at the 0.05 level (*t* = 1.954, df = 131, p=0.053). Table 11 presents the data regarding benefits of exercise.

Table 11: Benefits of Exercise Questions: Means

Benefit Question	Non-Obese Mean	Obese Mean
1. I enjoy physical exercise	3.14	3.08
2. Exercise decreases feelings of stress and tension for me	3.15	3.21
3. Exercise improves my mental health.	3.18	3.15
5. I will prevent heart attacks by exercising.	3.17	3.07
7. Exercise increases my muscle strength.	3.30	3.32
8. Exercise gives me a sense of personal accomplishment.	3.33	3.15
10. Exercise makes me feel relaxed.	3.02	3.04
11. Exercising lets me have contact with friends & persons I enjoy.*	2.62	2.91
13. Exercise will keep me from having high blood pressure.	3.18	3.21
15. Exercise increases my level of physical fitness.	3.30	3.27
17. My muscle tone is improved with exercise.*	3.36	3.12
18. Exercising improves functioning of my cardiovascular system.*	3.38	3.16
20. I have improved feelings of well being from exercise.	3.15	3.14
22. Exercise increases my stamina.	3.12	3.20
23. Exercise improves my flexibility.	3.19	3.16
25. My disposition is improved by exercise.	3.00	3.02
26. Exercise helps me sleep better at night.	3.12	3.11
27. I will live longer if I exercise.	3.26	3.14
29. Exercise helps me decrease my fatigue.	2.91	3.04
30. Exercise is a good way for me to meet new people.	2.82	2.99
31. My physical endurance is improved by exercising.	3.26	3.16
32. Exercise improves my self-concept.	3.20	3.09
34. Exercise increases my mental alertness.	3.09	3.04
35. Exercise allows me to carry out normal activities without becoming tired.	3.08	3.13
36. Exercise improves the quality of my work.	3.03	3.14
38. Exercise is good entertainment for me.	2.88	3.09
39. Exercise increases my acceptance by others.	2.63	2.80
41. Exercise improves overall body function for me.	3.19	3.17
43. Exercise improves the way my body looks.	3.28	3.26

*significant at the $p < 0.05$ level

Exercise Self-Efficacy

The mean exercise self-efficacy score for non-obese participants was 46.63 (n=66) and 43.19 (n=69) for obese participants. The total participants exercise self-efficacy mean score was 44.87. Exercise self-efficacy for non-obese women was not significantly different than (M=46.64, SD = 17.11) than obese women (M=43.19, SD=22.80) at the 0.05 level (t = .975, df=129, p=.329). T-tests were run on the individual exercise self-efficacy items and three items showed a significant difference between non-obese and obese women. Non-obese women (M=63.03, SD=29.56) had higher levels of exercise self efficacy during or after experiencing personal problems than obese women (M=47.57, SD=32.54) at the 0.01 level (t = 2.894, df=134, p=0.004). Non-obese women (M=58.79, SD=32.23) had a higher exercise self efficacy on the item "when I am feeling depressed" than obese women (M=46.93, SD=29.63) at the 0.05 level (t = 2.081,df=134, p=0.039). Non-obese women (M=65.15, SD=29.63) reported a higher exercise self exercise on the item "when I am feeling anxious" than obese women (M=49.50, SD=32.57) at the 0.01 level (t=2.926, df=134, p=0.004). Table 12 presents the mean scores for the exercise self-efficacy items.

Table 12: Exercise Self-Efficacy: Mean Scores

Exercise Self Efficacy	Non-Obese Groups Mean	Obese Groups Mean
When I am feeling tired	42.69	37.35
When I am feeling under pressure from work	57.69	51.00
During bad weather	47.88	42.43
After recovering from an injury that caused me to stop exercising	35.30	30.51
During or after experiencing personal problems**	63.03	47.57
When I am feeling depressed*	58.79	46.93
When I am feeling anxious**	65.15	49.50
After recovering from an illness that caused me to stop exercising	39.92	39.00
When I feel physical discomfort when I exercise	37.80	34.36
After a vacation	53.33	54.57
When I have too much work to do at home	31.74	32.07
When visitors are present	32.12	32.29
When there are other interesting things to do	44.09	44.14
If I don't reach my exercise goals.	52.94	54.06
Without support from my family or friends	62.50	54.26
During a vacation	39.09	35.36
When I have other time commitments	31.89	32.80
After experiencing family problems	51.89	44.14

*significant at the p <0.05 level **significant at the p<0.01 level

Commitment to a Plan of Exercise

The mean scores on the Planning for Exercise instrument was 1.64 for non-obese participants and 1.61 for obese participants with an overall mean of 1.62 for all participants. Table 13 summarizes the mean scores for participants, non-obese and obese on the Planning for Exercise scale. Non-obese women had more commitment to a plan of action (M=1.64, SD=0.45) than obese women (M=1.62, SD=0.47). The difference between the two means was not statistically significant (t = 0.353, df=133, p=.725). T-tests were run on the individual questions to determine if there was any significant difference between the two groups. There were no

individual questions on the Planning for exercise instrument that were significantly different between the non-obese and obese groups as indicated by t-test results.

Table 13: Planning for Exercise Mean Scores

Planning for Exercise Scale	Non-obese Group		Obese Group		Total Participants	
Group	N	Mean	N	Mean	N	Mean
I plan specific times for exercise or active sports in my weekly schedule	66	1.88	71	1.86	137	1.87
I lay out exercise shoes and clothes to remind me to exercise	66	1.32	71	1.32	137	1.32
I exercise in a specific location or facility	66	1.98	71	1.90	137	1.94
I keep written record of my exercise activity	66	1.23	70	1.36	136	1.29
I reward self for exercising	66	1.45	71	1..54	137	1,50
I post notes where I can see them to remind me to exercise	66	1.21	71	1.21	137	1.21
I vary my exercise routine to avoid boredom	66	1.68	70	1.60	136	1.64
I work toward exercise goals that are progressively more challenging	66	1.79	71	1.77	137	1.78
I consider exercise so important in my life that I allocate time for it	66	1.83	71	1.69	137	1.76
I let people know about my commitment to exercise	66	1.71	71	1.69	137	1.70
I encourage my friends to exercise	66	1.97	71	1.92	137	1.94

Leisure Physical Activity Levels (Exercise)

Leisure time physical activity levels for non-obese women (M=2.16, SD=.679) was not significant different than obese women (M=2.19, SD=.655) at the 0.05 level (t = -.322, df=131, p=.748). T-tests were run on the individual items of the physical activity subscale and one item showed a significant difference between non-obese and obese women. Obese women (M=1.93, SD=1.00) were significantly more likely to "check their pulse rate when exercising" than non-

obese women (M=1.59, SD=0.877) at a 0.05 level (*t* = -2.071, df=133, p=0.40). Table 14 summarizes the mean scores for participants, non-obese and obese on the HPLPII physical activity subscale.

Table 14: HPLP II Physical Activity Subscale: Means

HPLP II Physical Activity Subscale Question	Non-Obese Group Mean	Obese Group Mean
4. Follow a planned exercise program	1.94	1.93
10. Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).	2.26	2.19
16. Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week)	2.45	2.34
22. Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	2.44	2.26
28. Do stretching exercises at least 3 times per week	2.12	2.01
34. Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).	2.53	2.71
40. Check my pulse when exercising*	1.59	1.93
46. Reach my target heart rate when exercising	1.92	2.06

*significant at the p <0.05 level

Lifestyle Physical Activity

The total 24 hour met-time for non-obese women (M=50.28, SD=12.97) was not significantly higher than obese women (M=47.55, SD=10.10) at the 0.05 level (t = 1.363, df=122.810, p=0.172). Because the variances were significantly different, a t-test that did not assume equality of variances was conducted. Table 15 summarizes the MET-time means for both groups. Independent sample t-tests were analyzed for each of the physical activity levels. Three physical activity levels showed significant differences between the obese and non-obese women. Obese women's Physical activity level E (light cleaning, sweeping floors, food

shopping with grocery chart, slow dancing or walking downstairs) (M=7.70, SD=3.98) were higher than non-obese women (M=5.99, SD=3.72). The differences between the two means is statistically significant at the 0.05 level (t = -2.593,df=134, p=0.011). The MET-time mean for physical activity level H (aerobics, health club exercise, chopping wood or shoveling snow) for Non-obese women (M=5.27, SD=5.90) is significantly higher than for obese women rates (M=3.24, SD=4.21) at the 0.05 level (*t* = 2.307, df=117.012, p=0.023). Because the variances were significantly different, a t-test that did not assume equality of variances was conducted. The MET-time mean for physical activity level I (More effort than H: running, riding on a bicycle, playing soccer, handball or tennis) for Non-obese women (M=5.86, SD=6.99) is significantly higher than for obese women rates (M=2.73, SD=4.39) at the 0.01 level (*t* = 3.109., df=108.10, p=0.002). Because the variances were significantly different, a t-test that did not assume equality of variances was conducted.

Table 15: Mean metabolic equivalent (MET) scores for participants

Physical Activity Level	Non-obese group's mean MET time (N=66)	Obese group's mean MET time (N=70)	Total group's mean MET time (N=136)
Level A: sleep rest	6.53	6.61	6.57
Level B: sitting quietly, watching TV, listening to music or reading	3.54	3.65	3.60
Level C: Working on the computer or desk sitting in a meeting	5.78	5.43	5.61
Level D: Standing, washing dishes or cooking, driving a car or truck	5.71	6.38	6.05
Level E: Light cleaning, sweeping floors, food shopping with grocery cart, slow dancing, or walking downstairs. *	5.98	7.70	6.87
Level F: Bicycling to work or for pleasure, brisk walking, painting or plastering	5.65	6.60	6.13
Level G: Gardening, carrying, loading or stacking wood, carrying light objects upstairs	5.93	5.19	5.55
Level H: Aerobics, health club exercise, chopping wood or shoveling snow *	5.27	3.23	4.22
Level I: More effort than H. Running, racing on bicycle, playing soccer, handball or tennis **	5.85	2.72	4.24
Total Met time	50.27	47.54	48.87

*significant at the $p < 0.05$ level **significant at the $p < 0.01$ level

REASEARCH QUESTIONS AND HYPOTHESES

Research Question #1

What is the relationship between the personal factor of body mass index and a woman's perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action and physical activity level (leisure PA and lifestyle PA)?

Hypothesis 1A: There will be a positive relationship between the personal factor of BMI and perceived barriers to action.

Hypothesis 1A was supported by the findings of this study. A Pearson correlation coefficient was calculated for the relationship between participant's body mass index and barrier score. A weak significant positive correlation was found ($r(126)=.180$, $p=<.05$), indicating a significant positive linear relationship between the two variables. This finding suggests that as one's BMI increases their perception of barriers to exercise increases.

Hypothesis 1B: There will a negative relationship between the personal factor of BMI and a) perceived benefits to action, b) perceived self efficacy, c) commitment to action, d) leisure physical activity level (exercise) and e) lifestyle physical activity.

Hypothesis IB was not supported by this study. Table 16 summarizes the Pearson correlation coefficients calculated for the relationship between BMI, perceived benefits to action, perceived self efficacy, commitment to action, leisure physical activity level and lifestyle physical activity. The hypothesis was not supported. Pearson correlations calculated showed weak negative correlations that were not significant. BMI, in this sample, was not related to perceived benefits to action, perceived self efficacy, commitment to action, leisure physical activity level, and lifestyle physical activity.

Table 16: Correlation Matrix of Variables in Study

	1	2	3	4	5	6	7
1. BMI	1.00						
2. Commitment to a Plan of action	-.032	1.00					
3. Exercise Self-Efficacy	-.148	.578**	1.00				
4. HPLP Physical Activity	-.009	.765**	.499**	1.00			
5. Perceived Barriers to Exercise	.180*	-.184*	-.381**	-.285**	1.00		
6. Perceived Benefits to Exercise	-.029	.414**	.394**	.358**	-.405**	1.00	
7. Total MET Physical Activity	-.028	.263**	.185**	.302**	-.078	.098	1.00

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Research Question #2

Can the health promoting behavior of leisure physical activity (exercise) in women be predicted by the personal factor of body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action?

Hypothesis 2A: Exercise levels will be predicted by the personal factor of BMI, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action.

In the second analysis, a multiple regression was used to determine if exercise levels as measured by Health-Promoting Lifestyle Profile Physical activity subscale are predicted by BMI, perceived benefits of exercise, perceived barriers of exercise, perceived self-efficacy and commitment to action. Stepwise regression was used so that predictors were entered into the regression equation in the order that produces the

greatest increments to R2 (Polit & Beck, 2008, p. 620). One of the limitations of using stepwise regression is that all the shared variance is assigned to the first variable entered into the regression, therefore, a multiple linear regression was calculated to predict a participant's leisure physical activity (exercise) based on their perceived benefits, perceived barriers, personal factor of BMI, perceived self-efficacy and commitment to action. A significant regression equation was found ($F(1, 117)=164.249$, $p <.001$) with an R^2 of 0.584. Commitment to a plan of action ($p<.01$) was a significant predictor of leisure physical activity. Table 17 presents the regression results regarding leisure physical activity (exercise).

Table 17: Stepwise Multiple Linear Regression: Leisure Physical Activity (Exercise)

Predictor Variable	Beta	t-Value	Sig
Included Variables	.764	12.816	.000
Commitment to Plan of Action			
Excluded Variables			
BMI	.020	.331	.741
Exercise Self-Efficacy	.063	.882	.379
Perceived Barriers to Exercise	- .114	- 1.901	.060
Perceived Benefits to Exercise	.032	.476	.635

Multiple R	.764
Multiple R^2	.584
F Ratio	164.25
DF	118
Sig	.000

Research Question #3

Can the health promoting behavior of lifestyle physical activity in women be predicted by the personal factor of body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action?

<u>Hypothesis 3A:</u> Lifestyle physical activity levels will be predicted by the personal factor of BMI, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action.

A multiple regression was used to determine if lifestyle physical activity levels are predicted by the personal factor of body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to action. Stepwise regression was used so that predictors were entered into the regression equation in the order that produces the greatest increments to R2 (Polit & Beck, 2008, p. 620). A multiple linear regression was calculated to predict a participant's lifestyle physical activity levels based on their perceived benefits, perceived barriers, personal factor of BMI, perceived self-efficacy and commitment to action. A significant relationship was found ($F(1, 119)=7.430$, $p<0.001$) with an R^2 of 0.059. Commitment to a plan of action ($p<.01$) was a significant predictor of leisure physical activity. Table 18 presents the regression results regarding lifestyle physical activity (exercise).

Table 18: Stepwise Multiple Linear Regression Analysis: Lifestyle Physical Activity

Predictor Variable	Beta	t-Value	Sig
Included Variables	.242	2.726	.007
Commitment to Plan of Action			
Excluded Variables			
BMI	-.068	-.763	.447
Exercise Self-Efficacy	.104	.967	.335
Perceived Barriers to Exercise	-.059	- .655	.514
Perceived Benefits to Exercise	.044	.443	.659

Multiple R	.242
Multiple R^2	.059
F Ratio	7.430
DF	120
Sig	.000

Research Question #4

Is there a difference in perceived benefits, perceived barriers, perceived self-efficacy, commitment to action, leisure physical activity (exercise) and lifestyle physical activity between obese and non-obese women controlling for all personal factors (age, sex, race, educational level, income level, chronic illnesses, personal health status) except BMI?

Figure 8 provides a summary of the ANCOVA results regarding the hypothesized relationships in research question 4.

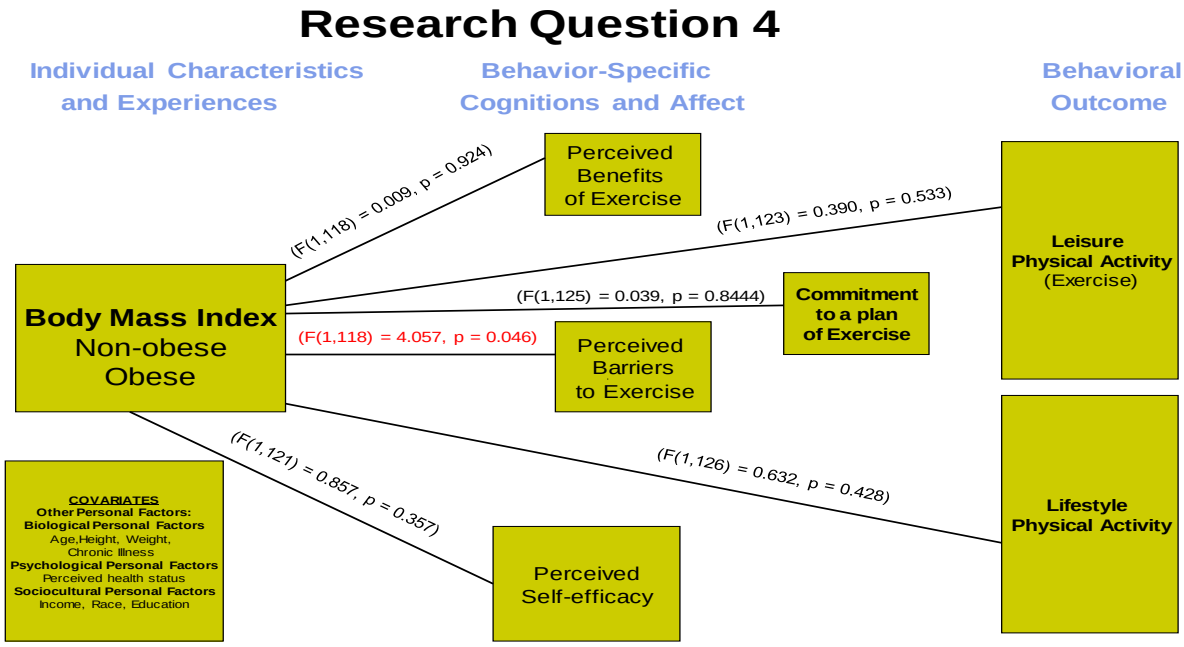

Figure 8: Summary of ANCOVA results for research question 4

<u>Hypothesis 4A:</u> There will be a significant difference in perceived self-efficacy levels between non-obese and obese women.

A one-way between subjects ANCOVA was calculated to examine the effect of BMI on perceived self-efficacy levels, covarying out the effect of age, sex, race, education level, income level, and personal health status. ANCOVA results did not support this hypothesis. There was no significant difference in perceived self efficacy levels between non-obese and obese women ($F(1,121)=0.857$, $p=0.357$) when controlling for age, race, marital status, education level, income, and overall health rating.

<u>Hypothesis 4B:</u> There will be a significant difference in the perceived benefits to exercise between non-obese and obese women.

The hypothesis was not supported. There was no significant difference in perceived benefits to exercise for non-obese and obese women (F (1,118)= 0.009, p=0.924) when controlling for age, race, marital status, education level, income, and overall health rating.

Hypothesis 4C: There will be a significant difference in perceived barriers to exercise between non-obese and obese women.

ANCOVA results support this hypothesis. There was a significant difference in perceived barriers to exercise for non-obese and obese women (F (1,118)= 4.057, p=0.046) when controlling for age, race, marital status, education level, income, and overall health rating.

Hypothesis 4D: There will be a significant difference in commitment to a plan of exercise between non-obese and obese women.

The hypothesis was not supported. There was no significant difference in commitment to a plan of exercise for non-obese and obese women (F (1,125) = 0.039, p=0.844) when controlling for age, race, marital status, education level, income, and overall health rating.

Hypothesis 4E: There will be a significant difference in leisure time physical activity (exercise) between non-obese and obese women.

ANCOVA results did not support this hypothesis. There was no significant difference in leisure physical activity (exercise) for non-obese and obese women (F (1,123)= 0.390, p=0.533) when controlling for age, race, marital status, education level, income, and overall health rating.

Hypothesis 4F: There will be a significant difference in lifestyle physical activity between non-obese and obese women.

ANCOVA results did not support this hypothesis. There was not a significant difference in lifestyle physical activity for non-obese and obese women (F (1,126) = 0.632, p=0.428) when controlling for age, race, marital status, education level, income, and overall health rating.

CHAPTER VI

DISSCUSSION OF RESULTS

INTRODUCTION

The objective of this research was to describe the relationship among the personal factor of body mass index (BMI) and variables of interest including, perceived benefits, perceived barriers, perceived self-efficacy, commitment to action, and physical activity (leisure physical activity & lifestyle physical activity). A descriptive, cross-sectional study of 137 women was conducted. Discussion of findings are presented in this chapter including: discussion of significant and non-significant findings according to the sample, variables of interest, research questions and hypothesis, strengths and limitations of the study; and recommendations for the development of nursing science and future research.

PARTICIPANT CHARACTERISTICS

The racial makeup of participants in this study was consistent with the population of the greater Saginaw region. Eighty two percent of the participants were African American (N=56) or Caucasian (N=37). This racial makeup is similar to previous studies completed in the area of benefits and barriers and exercise (Nies, 2006; Stutts, 2002). Even though this group of participants was fairly homogeneous, one should note that 6.6% of the population did identify themselves as "mixed" ethnicity. As health professionals, when developing health promotion programs for improving physical activity, cultural competency needs to be taken into consideration.

Non-obese women were significantly younger than obese women in this study. One consideration to have regarding the age difference of the groups in this study is related to the inclusion criteria of this study. There was a portion of the participants found at the mall that

were 18 years old but still in high school. The younger age groups in women have been found to be more physically active. In 2007, the percentage of women, aged 18-24, getting the recommended physical activity was 6.6% higher than women aged 25-34 (CDC, 2007). This decrease in physical activity can contribute to the development of obesity.

The household income of this sample was similar to the population living in the greater Saginaw region. Over half of the participants had household incomes of less than $20,000. Over 83% of the participants, had incomes of less than $50,000 a year. This finding decreases the generalizability of this data to all women but definitely is representative of low-income women. Parks, Housemann, and Brownson (2003) found that lower income individuals were less likely to meet physical activity recommendations then higher income individuals.

RESEARCH QUESTION #1

BMI and Perceived Barriers to Physical Activity

The relationship of BMI with selected variables from the HPM was the focus of this research question. The first hypothesis examined the relationship between BMI and perceived exercise barriers. Findings from this study significantly supported the hypothesis that as BMI increases an individual's perceived barriers to action increases. This finding is not surprising because women with higher BMIs experience many physical and psychosocial issues related to obesity that can hinder their ability to engage in physical activity. For example, many obese women feel self-conscious working out in a gym setting. Similar findings were found in a previous study by Stutts (2002) in which body mass index was significantly correlated with perceived barriers. The method of collecting BMI's in this study was different than Stutt's study because actual weights and

heights were performed on all the subjects instead of self-reported weights. The population of this study focused on women whereby Stutt's study focused on both genders.

BMI & Perceived Benefits of Physical Activity

As health professionals, our professional standards encourage us to counsel individuals on the benefits of physical activity. The data did not support the hypothesis that there would be a negative relationship between BMI and perceived benefits to action. There was a weak negative relationship between the two variables but it was not statistically significant. With the emphasis on obesity in our society, many messages regarding the benefits of exercise are readily professed in our society. The proliferation of various types of media (print, web, radio, etc.) and health promotion teachings from health professionals could be a factor in the education of exercise benefits for the general population.

BMI and Perceived Self-efficacy

Self-efficacy related to our ability to exercise has been frequently studied but few studies have examined the relationship of this concept with one's BMI. Earlier studies have indicated perceived self-efficacy is a key factor in promoting exercise (Stutts, 2002; Shin, 2004). Contrary to previous studies (Stutts, 2002; Shin, 2004), perceived self-efficacy did weakly decrease (but not significantly) as body mass index increased in the participants. One potential reason for differences between earlier projects and the present study is the average age of the participants. This study had a lower average age (m=29.5) of participants in comparison to other studies that used population, reporting mean ages greater than 39 (Stutts, 2002) or 64 years old (Shin, 2004). These findings may reflect the age of these participants. The younger participant's view of their situation may be different than previous studies that had higher average ages of women. The

lack of significance in this finding could indicate confidence levels in completing exercise may change with age.

Another possible explanation for the finding of a non-significant negative relationship between BMI and perceived self-efficacy may be related to the racial composition of this sample. A large portion of the participants were African American and the findings may be related to higher positive body images. In a previous research study examining weight related attitudes and behaviors of African Americans, it was found that an absence of strong negative social pressure about obesity and positive body image limited weight loss efforts such as exercise (Kumanyika, S., Wilson, J., & Guilford-Davenport, M, 1993).

BMI and Commitment to a plan of action

Commitment to a plan of action was added to the Health Promotion Model in 1996. The author is unaware of any known studies that have examined commitment to a plan of action and the personal factor of body mass index. The hypothesis that a participant's level of commitment to a plan of exercise decreases as BMI increases was not supported. The relationship appears negative but is not statistically significantly. Additional research needs to be completed in this area to further explore the concept of commitment to actions. Findings related to a commitment to a plan of exercise and physical activity levels did significantly change when examining the differences between the non-obese and obese groups. These findings will be discussed further in Research Question 4.

BMI and Physical Activity

Leisure Physical Activity (exercise) levels in the participant's of this study did decrease as body mass index increased but the change did not reach statistical significance. This finding is not surprising based on the overall activity levels of women in the United States. The CDC

(2010) indicates that 60% of women do not engage in recommended levels of physical activity and more than 25% of women are not active at all. The fact that large segments of the population with various BMIs have difficulty with completing leisure physical activity could contribute to the lack of significant difference in these findings.

There was an inverse relationship between lifestyle physical activity level and body mass index, but the findings did not reach statistical significance. These findings, as with leisure physical activity levels, could be related to the overall physical activity levels of American women (CDC, 2010). The CDC (2010) estimates that 25% of women are not active at all. That a quarter of American women, regardless of BMI, are inactive could blur the relationship between BMI and lifestyle physical activity levels. Also, the method of collecting lifestyle physical activity levels could have influenced insignificance of the findings. Participant's completed a self-reported instrument in which they recalled physical activity levels for 24 hours for one week day. Self-reporting can lead to an under or overestimate of physical activity levels.

In summary, findings of the relationships between BMI, perceived exercise benefits, perceived exercise barriers, perceived self-efficacy, and commitment to a plan of exercise assist us to reexamine our approach to developing exercise programs for women with higher BMIs. Perceived barriers should be a focal area for assessment and intervention activities with our clients as health professionals. This information leads one back to the thought that health care professionals need to focus on decreasing barriers to exercise so that actual exercise can occur. One could postulate that perception of multiple barriers could stagnate an individual's efforts or create such a miserable picture in their mind that actual exercise does not occur. All of these areas (benefits, barriers, self-efficacy, and commitment to plan of exercise) are important to

address in the development of physical activity programs for women with weight issues but the relationship with perceived barriers needs special attention.

RESEARCH QUESTION #2

This research question examined if leisure physical activity (exercise) could be predicted by the personal factor of BMI, perceived benefits, perceived barriers, perceived self efficacy and commitment to a plan of action. Data from this study supports the hypothesis that leisure time activity (exercise) can be predicted by body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to a plan of exercise. Fifty-eight percent (58%) of the variance in exercise levels was predicted by this model. In previous studies using the HPM model to examine exercise, the variance explained by selected variables was smaller. Stutts (1999) used the variables demographic characteristics, perceived self-efficacy, perceived benefits and perceived barriers to exercise from the HPM as a model to examine physical activity. Their model explained 10% of the variance. Wu and Pender (2002) studied similar variables as Stutts but included interpersonal influences and behavioral factors. In Taiwanese adolescents, their model explained 30% of the variance. In this research, the addition of BMI and commitment to a plan of action greatly increased the amount of explained variance.

Commitment to a plan of exercise was the most influential variable on leisure physical activity. The Health Promotion Model proposes that commitment to a plan of action is determined by the individual's beliefs concerning their self-efficacy, benefits, and barriers to action (Shin, 2004, p. 5). The findings of this study would be consistent with the HPM in that commitment to a plan of action would be the strongest predictor because of shared variance with the other variables. This author is only aware of this study that has used commitment to a plan of

action as a predictor of physical activity. This study supports the need for further exploration of this variable, especially with obese individuals.

RESEARCH QUESTION #3

The results showed that lifestyle physical activity levels can be predicted by body mass index, perceived benefits, perceived barriers, perceived self-efficacy, and commitment to a plan of exercise. Six percent of the variance in lifestyle physical activity levels was predicted by this model. Commitment to a plan of exercise was the most influential variable on lifestyle physical activity. Other variables in this study may not have been strong predictors of exercise because of the type of statistical analysis chosen. One of the limitations of using stepwise regression is that all the shared variance is assigned to the first variable entered into the regression. Interestingly, in this study commitment to a plan of exercise was the only significant predictor for both forms of physical activity. One of the next steps in research in this area should be to determine the variables that best predict commitment to a plan of action for exercise in non-obese and obese women.

RESEARCH QUESTION #4

Perceived Self-efficacy: Non-obese and obese women

Self efficacy levels did not significantly differ between non-obese and obese women thus not supporting the hypothesis. Stutts (2002) in a study of 137 adults found that as BMI increased self-efficacy decreased. This research found that perceived self-efficacy levels were not significantly different between the groups. One explanation of this finding may be related to the racial breakdown of the participants. There was a large portion of the participants that were African American and previous research has reported a higher level of acceptance of body size, especially among obese African American women (Kumanyika, S; Wilson, J., & Guilford-

Davenport, M., 1993). This acceptance could create more confidence in their ability to complete exercise in difficult situations.

In the detailed analysis of each item on the perceived self efficacy scale, it revealed some interesting differences between the areas of lower perceived self-efficacy levels. Non-obese women reported higher levels of exercise self-efficacy than obese women on all of the questions except: 1) after a vacation; 2) when I have too much work to do at home; 3) when visitors are present; 4) when there are other interesting things to do; 5) if I don't reach my exercise goals; and 6) when I have other time commitments. These areas of lower self-efficacy for non-obese women seem to be surrounded around time commitments and interruptions in everyday life compared to the obese participants.

The obese participants reported lower levels of perceived self-efficacy in areas of depression, anxiety and recovering from illness and disability. These findings indicate that obese women may need additional assistance in developing strategies to combat emotional issues (depression, anxiety) and physical issues (illness, disability) when determining an exercise plan for themselves. This finding is supported by recent published research indicates the degree of obesity is an independent risk factor for depression in women (Ma & Xiao, 2010). In a meta-analysis examining depression and obesity, it was found that depression increases the odds of an individual to develop obesity (Luppino, et. al, 2010). These new studies are beginning to shed light on the relationship of depression and obesity. This current study indicates the relationship between depression and obesity has an influence on the health promoting behavior of physical activity. Replication of this study with a larger number of obese and non-obese women needs to be done to further confirm these findings and better understand the differences and similarities of these groups.

Perceived Benefits of Exercise: Non-obese and obese women

The findings did not support the hypothesis that perceived benefits of exercise would be different between non-obese and obese women. Even though, the overall benefits to exercise scores did not differ, there was some information that this researcher found to be very interesting. When doing an item analysis on the perceived benefits scale, there were three questions that the two groups significantly differed in. Physical benefits of exercise (improved muscle tone and cardiovascular system) were seen as more of a benefit to the non-obese group then the obese group. One social statement "spending time with friends I enjoy" was seen as more of a benefit to the obese group compared to the non-obese group. Further research needs to be done to evaluate which types of benefits each group prefers. If non-obese groups tend towards obtaining physical benefits, whereas, obese groups prefer the social benefits of physical activity, our development of exercise intervention programs should change to use the best motivator of benefits for the group.

Perceived Barriers to Exercise: Non-obese and obese women

In the examination of the types of barriers reported by the obese and non-obese women, the mean barrier scores did not differ significantly and the hypothesis was rejected. Upon further examination of the barrier individual t-tests for both groups, "being too embarrassed to exercise" and "it costs too much money to exercise" were more of a barrier to exercise for obese women than for non-obese women. These findings could be areas to assess with individual clients to assist them in getting the support and appropriate resources to establish an exercise regimen.

In Genkinger's study (2006), the primary barrier for normal BMI individuals was lack of time in comparison to lack of motivation indicated by obese and overweight women. These findings differ from this study. In this study, the non-obese women rated "exercise tires me" as their top barrier to exercise, lack of time was rated as their 5th

highest barrier to exercise. In this study, "I am not motivated to exercise" when added to the Exercise Benefits and Barriers scale would be in the top five barriers for both obese and non-obese women but not significantly different between the two groups.

Wanko (2004) found obese women to rate pain as their top barrier to exercise. As a barrier, pain was not found to be significantly different between the obese and non-obese group in this study. This barrier may have been more prominent in the Wanko study because the participants were older diabetic individuals. The lack of significance of this barrier in this study may be related to the relativity healthy young age of the participants. Obese women in this study did indicate "I have an injury or disability that stops me from exercising" significantly more than the non-obese group. This may be indicative of the joint/back issues indicated by the obese participants.

The findings of this study are consistent with findings from a recent qualitative study of factors contributing to women's ability to maintain a walking program by Nies and Motyka (2006). In their sample of 97 women, they identified four main barriers/hassles (personal and professional obligations, weather, injuries and illness and psychosocial issues). The findings of this present study are consistent with Nies & Motyka's study. This study identified similar barriers but indicates that non-obese women experience more of the personal and professional barriers in comparison to the injuries, illnesses, and psychosocial issues of the obese participants. This study further delineates the four areas of barriers Nies and Motyka found into two categories specific to non-obese and obese women. Further investigation into this area is needed to confirm these results and gain a fuller understanding of these differences.

Ball (2000) in a sample derived from a pilot study of fitness in Australians found several barriers to be weight related barriers to exercise. This study piloted some of these questions with

a US population to see if barriers were similar. Ball's study found "I'm too fat"; "My health is not good enough"; "I have an injury or disability that stops me" to all be significantly different between females with a BMI < 25 and > 25. This study's findings were consistent will Ball's research findings. The same three weight-related barriers were significantly different between the non-obese and obese groups.

The weight related barrier "too fat to exercise" was suggested by Ball to be viewed similarly among the normal weight and overweight individuals in his study. Ball suggested that in his study "It is noteworthy that being too fat was more often reported as a barrier to physical activity among women than it was among men. Since there were proportionally fewer overweight or obese women than men these data reflect the fact that women tend to view themselves as overweight when in fact they are not (p.3)." The data from this study was not consistent with Ball's study. Over 90% of the non-obese group and 77% of the obese group strongly disagreed or disagreed with the weight related barrier "I'm too fat to exercise." The difference in data from Ball's study to this study may be related to data collection methods. In Ball's study, each participant was interviewed regarding their barriers whereas in this study the participants completed a survey. Also in Ball's study, the participants were aware they would also be receiving a physical measure of their fitness which may have influenced their answers. One should note that 9.3% of non-obese women and 23% of obese women did see being "too fat to exercise" as a barrier. This finding may warrant the need to assess this barrier individually when establishing a person's physical activity program.

Commitment to a Plan of Exercise: Non-Obese and Obese Women

The data did not support the hypothesis that commitment to a plan of exercise differed between non-obese and obese women. Even though, commitment to a plan of action was not

significantly different between the two groups, it was found to be a significant predictor of both forms of physical activity (leisure and lifestyle) for the total sample. This concept within the Health promotion model has not been widely research. This is one of the few studies that have used Pender's commitment to plan of exercise tool. The few published articles that have used this tool were used in populations outside the United States (Shin, 2004). This study assists in providing data that commitment to a plan of exercise is an important aspect of the health promoting behavior of exercise. The act of having a plan may be a central concept to physical activity interventions. Having a clear plan assists individuals in securing their goals and provides a way for them to be successful.

Physical Activity Levels: Non-Obese and Obese Women

Leisure activity was measured by the physical activity subscale from the Health-Promoting Lifestyle Profile II. The amount of leisure activity did not significantly differ related to the two groups. This finding may continue to highlight the issue of the lack of physical activity among women in the United States. As health professionals, strategies to improve exercise levels need to continue to be at the forefront of our health promoting activities for women.

Overall, the metabolic equivalents (METS) for each of the groups were similar (50.27 non-obese vs. 47.54 obese). So what other factors, besides nutrition, could be the reason for the weight differences? When comparing the total METS for each of the activity levels, there is a trend that the obese group spends more of their time in exercise levels A- H in comparison to the non-obese individuals whose activity levels appeared to be more even out with the addition of higher levels of activity in Exercise levels H and I. This observation may point to a factor that the level of intensity of exercise does matter. Since the overall 24 hr METS was similar for the

groups, intensity in the higher levels of activity may be a factor in the weight determination of being obese and non-obese. A possible explanation for lower weight gain in the non-obese group could be that having a portion of time daily in higher intensity physical activity may increase their metabolism overtime which then increases the rate of fat burning for the non-obese women. Ohkawara et al. (2008) in a study examining the effect of elevated energy expenditure after physical activity found that there is a small effect on 24 hour energy expenditure post-physical activity. In addition, they suggest that people with low physical fitness levels could improve their elevated post-physical activity energy expenditure by increasing their vigorous-intensity daily physical activity. A weakness of Ohkawara's study was that it was completed on a small group of Japanese men. Further intervention research needs to be completed to examine the role of daily levels of higher intensity activity on an individual's BMI level.

STRENGTHS AND LIMITATIONS

The strengths of this study are related to theoretical and methodological aspects. This study analyzed the role of body mass index and how it relates to perceived self-efficacy, perceived benefits and barriers, commitment to a plan of exercise and physical activity levels. It is the only known study to this author that compared perceived benefits and barriers of exercise and commitment to plan of exercise in an obese and non-obese group that was not involved in a physical activity intervention study. This study provides additional support for the concepts within the Health Promotion model, especially the concept of commitment to a plan of action.

An additional strength of this study was the close adherence to the Health Promotion Model by using instruments created by Pender (Sechrist, Walker, & Pender, 1987; Pender 2007) to measure the variables in this study. These instruments have been used in other studies

measuring these variables but with different populations. The instruments have been reliable in previous studies and found to be reliable in this study.

The methods used in this study strengthened and reconfirmed previous information regarding body mass index and variables in this study. Many of the previous studies that have reported information regarding BMI have used participants that were involved in exercise intervention studies or were recruited from clinics (ex. diabetic). This is one of the only studies known to this author that recruited from the general population. An additional strength of this study in comparison to other studies was that anthropometric measures were actually completed on all the subjects instead of relying on self-reported heights and weights.

The use of a cross-sectional design is a limitation of this study. This data provides the researcher with a onetime limited look into the differences between a non-obese and obese group of individuals. The use of a longitudinal or experimental design comparing the two groups may provide additional insights into the variables examined in this study.

The method of administering instruments could also have been a limitation or bias of this study. The tools were administered to each participant in a random order to decrease the potential bias between the tools. Even though these actions were taken, participants could still have been influenced by answers from one of the tools on another set of physical activity questions.

The generalizability of the findings of this study is limited. The purpose of this study was to examine the relationships of factors that affect physical activity comparing obese and non-obese women. The findings can be generalized to community dwelling obese and non-obese individuals but the generalizabilty is limited by economic status. These results are reflective of low-economic non-obese and obese women. In addition, the location and hours of recruitment

could be a limitation of this study. Recruitment of participants from the mall found women in a public location and provided a sample from the general population. All participants were recruited from one local mall during day time hours. Because of these factors, the generalizability could be decreased.

The definition of obese and non-obese was an excellent starting point for this investigation of the differences experienced between these two groups. The non-obese group's BMI was at the higher range of normal weight and close to being overweight. This finding could influence the findings towards differences between overweight individuals and obese individuals. This researcher would propose that another study be done with a larger number of women with equal numbers of non-obese, overweight, and obese groups. This type of study would assist us in further differentiating the experiences of perceived self-efficacy, perceived barriers, perceived benefits of exercise and commitment to a plan of exercise.

IMPLICATIONS FOR UTILIZING HPM

The findings of this study assist in providing additional knowledge and significance regarding the concept of commitment of a plan of action in the Health Promotion Model. Few published studies have examined this concept. In this study, the commitment to a plan of exercise was the strongest predictor of both leisure time physical activity and lifestyle physical activity. This author is only aware of one study (Shin, 2004) that examines the predictors of commitment of action in a sample of Korean individuals with chronic illness. Self efficacy was the strongest predictor of commitment of action in this sample. The findings of this study indicate that commitment to a plan of exercise should be further studied with non-obese and obese women to investigate the predictors of commitment to a plan of exercise.

IMPLICATIONS FOR NURSING RESEARCH

This study provides foundational knowledge into the similarities and differences of non-obese and obese women regarding the health promoting area of physical activity and concepts within the Health Promotion Model. This study has provided the needed foundational information regarding benefits and barriers of physical activity in obese and non-obese women. The data supporting the possible differences in perceived exercise barriers and benefits of obese and non-obese women warrants further investigation. The possibility that obese women have more psychosocial and physical barriers to physical activity than non-obese women is knowledge that needs further exploration. The knowledge gained from this study can be the stepping stone for specific physical exercise interventions specific to obese and non-obese groups.

In addition, the relationship between depression and obesity and the effects on engaging in physical activity needs further exploration. Overweight and obese women may need specific education and counseling on how to deal with depression and the effect it could have on their overall health including physical activity levels.

IMPLICATIONS FOR NURSING PRACTICE

Even though further research into the special needs of non-obese and obese women related to increasing physical activity is needed, a few areas could be implemented into clinical practice. In the assessment of perceived barriers to physical activity, clinicians should be aware that non-obese women may have more professional and personal barriers compared to psychosocial barriers for obese individuals. This research supports the importance of identifying and assisting individuals in setting up physical activity programs that assist them in overcoming barriers to physical activity. In addition, a thorough assessment of depressive symptoms should

be completed with overweight and obese women. Early identification of these symptoms in women could be key in assisting them in beginning and maintaining a physical activity program.

CONCLUSION

When examining the current literature regarding perceived benefits, perceived barriers, perceived self-efficacy, commitment to a plan of action and BMI, a foundational study was needed to begin the exploration into the differences of non-obese and obese women. This study has provided the foundational knowledge to assist researchers in further exploring these areas and to take into consideration the needs of non-obese and obese women.

APPENDIX A: INFORMATION SHEET

RESEARCH INFORMATION

Title of Study: Exercise Levels in Obese and Non-obese women and their relationship with Body Mass Index, Perceived Self-Efficacy, Perceived Benefits and Barriers of Exercise, and Commitment to a Plan of Action

Principal Investigator (PI): Rose M. (Schliska) Lange, PhDc, RN
Wayne State College of Nursing
(989)964-2720

Purpose:
You are being asked to be in a research study of health behaviors, specifically physical activity, because you are a women aged 18-50. The purpose of this study is to further understand factors affecting physical activity levels in women of all sizes. Community locations, such as shopping malls and churches, will be used to enroll approximately 130 women in this study. This study is being conducted by Rose (Schliska) Lange, R.N., a doctoral student at Wayne State University.

Study Procedures:
If you take part in this study, you will be asked to have your weight and height measured. In addition, you will be asked to complete six surveys asking about your thoughts and participation in health behaviors, including questions regarding physical activity. It will take less than 45 minutes to complete the surveys and have your weight and height measured.

Benefits
As a participant in this research study, there may be no direct benefit for you; however, information from this study may benefit other people now or in the future.

Risks
There are no known risks at this time to participation in this study. It is possible that completing the surveys may make you feel a little tired. You may stop or take a break at any point during the surveys.

Costs
There will be no costs to you for participation in this research study.

Compensation
For taking part in this research study, you will be paid for your time and inconvenience by receiving a $10.00 gift card for a local shopping facility.

Confidentiality
You will be identified in the research records by a code number. There will be no list that links your identity with this code.

Voluntary Participation /Withdrawal:
Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time.

Your decisions will not change any present or future relationship with Wayne State University or its affiliates, or other services you are entitled to receive.

Questions:
If you have any questions about this study now or in the future, you may contact Rose (Schliska) Lange at the following phone number (989) 964-2720. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

Participation:
By completing the questionnaires, you are agreeing to participate in this study.

APPENDIX B: HIC APPROVAL – WAYNE STATE UNIVERSITY

WAYNE STATE UNIVERSITY

HUMAN INVESTIGATION COMMITTEE
101 East Alexandrine Building
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
http://hic.wayne.edu

Full AAHRPP Accreditation

NOTICE OF EXPEDITED APPROVAL

To: Rose Schliska
College of Nursing
4350 Persimmon Drive

From: Ellen Barton, Ph.D. E. Barton
Chairperson, Behavioral Institutional Review Board (B3)

Date: June 03, 2008

RE: HIC #: 058008B3E

Protocol Title: Exercise Levels in Obese and Non-Obese Women and their Relationship with Body Mass Index, Perceived Self-Efficacy, Perceived Benefits and Barriers of Exercise, and Commitment to a Plan of Action

Sponsor:

Coeus #: 0805006038

Expiration Date: June 02, 2009

Risk Level/Category: No greater than minimal risk.

The above-referenced protocol and items listed below (if applicable) were **APPROVED** following *Expedited Review* (Category 7*) by the Chairperson/designee *for* the Wayne State University Behavioral Institutional Review Board (B3) for the period of 06/03/2008 through 06/02/2009. This approval does not replace any departmental or other approvals that may be required.

- Flyer
- Information Sheet (dated 5/29/08)

- Federal regulations require that all research be reviewed at least annually. You *may* receive a *"Continuation Renewal Reminder"* approximately two months prior to the expiration date; however, it is the Principal Investigator's responsibility to obtain review and continued approval ***before*** the expiration date. Data collected during a period of lapsed approval is unapproved research and can ***never*** be reported or published as research data.
- All changes or amendments to the above-referenced protocol require review and approval by the HIC **BEFORE** implementation.
- Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the HIC Policy (http://www.hic.wayne.edu/hicpol.html).

NOTE:

1. Upon notification of an impending regulatory site visit, hold notification, and/or external audit the HIC office must be contacted immediately.
2. Forms should be downloaded from the HIC website at each use.

*Based on the Expedited Review List, revised November 1998

APPENDIX B: IRB APPROVAL – SAGINAW VALLEY STATE UNIVERSITY

SVSU SAGINAW VALLEY STATE UNIVERSITY. MEMO

TO: Rose M. (Schliska) Lange

FROM: Dr. Francis C. Dane, Chair
Institutional Review Board (IRB)

DATE: June 30, 2008

RE: 2008D036, Exercise Levels in Obese and Non-obese Women and Their Relationship with Body Mass Index, Perceived Self-Efficacy, Perceived Benefits and Barriers of Exercise, and Commitment to a Plan of Action

I am pleased to report that the above-named research project has been approved. You may implement your research protocol at your convenience.

Please note that IRB approval is valid only for one calendar year. At least one month prior to June 30, 2009, you must complete a renewal form, a copy of which may be found at and downloaded from our website, http://www.svsu.edu/sponsoredprograms/policies.cfm?doc_id=1182.

Your project has been approved by the Wayne State IRB, so please use stamped consent forms and/or information sheets you received from that Board.

If you make any changes to your protocol, or if any unforeseen risks develop in your project, please inform the IRB as soon as possible. Presenting such information to the IRB in a timely fashion is a continuing condition of the project's approval.

I wish you well in your research efforts.

APPENDIX C: RESEARCH INSTRUMENTS - SAMPLE OF INSTRUMENTS

ID #:_____
Location Code:_____

Demographics Questionnaire

1. Date of Birth_____

2. What is your age? (in years): _____
Mm/dd/yyyy

3. What is your race? Choose one of the following categories that applies to you.
__Black or African American
__Asian
__White
__American Indian or Alaska Native
__Native Hawaiian or Pacific Islander
__Other:_____ (please specify)

4. What is your martial status?
__Married
__Separated
__Never Married
__Widowed
__Divorced
__Non-Marital union (living with romantic partner but not married, common-law marriage, living together)

5. What is the highest degree or level of school you have completed? (Select one)
__8th grade or less
__Some high school
__High school diploma or GED
__Some college (no degree)
__Associate degree
__Bachelor's degree
__Courses beyond bachelor's, but no graduate level degree
__Master's degree
__Doctorate degree
__Other

6. What is your total annual household income? (Select one)
__Less than $20,000
__$20,000 – $34,999
__$35,000 – $49,999
__$50,000 – $74,999
__$75,000 – $99,999
__$100,000 or more

7. How would you rate your overall health? (Select one)
__Poor __Below Average __Average __Above Average __Excellent

8. Have you ever participated in an exercise program? ____No ____Yes
If yes, please mark when you participated:
__Currently
__Within the last year
__Within two years
__Greater than two years ago

9. Please indicate if you had or have any of the following conditions (check all that apply):
____ Heart Disease
____ High Blood Pressure
____ Back Problems
____ Cancer
____ Other:_____
____ Asthma/Lung Disease
____ Diabetes
____ Bone or Joint Disease
____ High Cholesterol
____ Other:_____

ID#:_____
Location Code:_____

EXERCISE BENEFITS AND BARRIERS SCALE

DIRECTIONS: Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements by circling SA for strongly agree, A for agree, D for disagree or SD for strongly disagree.

	Strongly Agree	Agree	Disagree	Strongly disagree
1. I enjoy physical exercise	SA	A	D	SD
2. Exercise decreases feelings of stress and tension for me	SA	A	D	SD
3. Exercise improves my mental health.	SA	A	D	SD
4. Exercise takes too much of my time.	SA	A	D	SD
5. I will prevent heart attacks by exercising.	SA	A	D	SD
6. Exercise tires me.	SA	A	D	SD
7. Exercise increases my muscle strength.	SA	A	D	SD
8. Exercise gives me a sense of personal accomplishment.	SA	A	D	SD
9. Places for me to exercise are too far away.	SA	A	D	SD
10. Exercise makes me feel relaxed.	SA	A	D	SD
11. Exercising lets me have contact with friends & persons I enjoy.	SA	A	D	SD
12. I am too embarrassed to exercise.	SA	A	D	SD
13. Exercise will keep me from having high blood pressure.	SA	A	D	SD
14. It costs too much money to exercise.	SA	A	D	SD
15. Exercise increases my level of physical fitness.	SA	A	D	SD
16. Exercise facilities do not have convenient schedules for me.	SA	A	D	SD
17. My muscle tone is improved with exercise.	SA	A	D	SD
18. Exercising improves functioning of my cardiovascular system.	SA	A	D	SD
19. I am fatigued by exercise.	SA	A	D	SD
20. I have improved feelings of well being from exercise.	SA	A	D	SD
21. My spouse (or significant other) does not encourage exercise.	SA	A	D	SD
22. Exercise increases my stamina.	SA	A	D	SD
23. Exercise improves my flexibility.	SA	A	D	SD
24. Exercise takes too much time from family relationships.	SA	A	D	SD
25. My disposition is improved by exercise.	SA	A	D	SD
26. Exercise helps me sleep better at night.	SA	A	D	SD
27. I will live longer if I exercise.	SA	A	D	SD
28. I think people in exercise clothes look funny.	SA	A	D	SD
29. Exercise helps me decrease my fatigue.	SA	A	D	SD
30. Exercise is a good way for me to meet new people.	SA	A	D	SD
31. My physical endurance is improved by exercising.	SA	A	D	SD
32. Exercise improves my self-concept.	SA	A	D	SD
33. My family members do not encourage me to exercise.	SA	A	D	SD
34. Exercise increases my mental alertness.	SA	A	D	SD
35. Exercise allows me to carry out normal activities without becoming tired.	SA	A	D	SD
36. Exercise improves the quality of my work.	SA	A	D	SD

ID#:_____
Location Code:_____

	Strongly Agree	Agree	Disagree	Strongly disagree
37. Exercise takes too much time from my family responsibilities.	SA	A	D	SD
38. Exercise is good entertainment for me.	SA	A	D	SD
39. Exercise increases my acceptance by others.	SA	A	D	SD
40. Exercise is hard work for me.	SA	A	D	SD
41. Exercise improves overall body function for me.	SA	A	D	SD
42. There are too few places for me to exercise.	SA	A	D	SD
43. Exercise improves the way my body looks.	SA	A	D	SD
44. I am too fat to exercise.	SA	A	D	SD
45. My health is not good enough to exercise.	SA	A	D	SD
46. I have an injury or disability that stops me from exercising.	SA	A	D	SD
47. I am not motivated to exercise.	SA	A	D	SD
48. I am too lazy to exercise.	SA	A	D	SD
49. I am athletic enough to exercise	SA	A	D	SD
50. Pain stops me from exercising.	SA	A	D	SD

Note: From K. Sechrist, S. Walker, N. Pender (1985). Exercise benefits and Barriers scale. Adapted with permission.

ID#:____
Location Code:____

EXERCISE SELF-EFFICACY SCALE

DIRECTIONS:
A number of situations are described below that can make it hard to stick to exercise regularly (3 or more times a week). On the items below, please rate your confidence that you can perform exercise on a regular basis. Please rate your degree of confidence by recording in each of the blank spaces a number from 0 to 100 using the scale below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately Certain can do					Certain can do

		(0-100)
1.	When I am feeling tired	_____
2.	When I am feeling under pressure from work.	_____
3.	During bad weather.	_____
4.	After recovering from an injury that caused me to stop exercising.	_____
5.	During or after experiencing personal problems.	_____
6.	When I am feeling depressed.	_____
7.	When I am feeling anxious.	_____
8.	After recovering from an illness that caused me to stop exercising.	_____
9.	When I feel physical discomfort when I exercise.	_____
10.	After a vacation.	_____
11.	When I have too much work to do at home.	_____
12.	When visitors are present.	_____
13.	When there are other interesting things to do	_____
14.	If I don't reach my exercise goals.	_____
15.	Without support from my family or friends.	_____
16.	During a vacation.	_____
17.	When I have other time commitments.	_____
18.	After experiencing family problems.	_____

Note: From Bandura, A. (2006) Guide for constructing self-efficacy scales. In Pajares & Urdan (eds.), Self Efficacy Beliefs of Adolescents: Vol V. Adolescence and Education. Connecticut: Information Age Publishing. Reprinted with permission.

ID#:____
Location Code:____

PLANNING FOR EXERCISE

DIRECTIONS:
Please think carefully about each statement below and indicate how often you do each of the following activities related to exercise (never, sometimes, or often).

1. **I plan specific times for exercise or active sports in my weekly schedule.**

   Never Sometimes Often

2. **I lay out my exercise shoes and clothes to remind me to exercise.**

   Never Sometimes Often

3. **I exercise in a specific location or facility.**

   Never Sometimes Often

4. **I keep written record of my exercise activity.**

   Never Sometimes Often

5. **I reward myself for exercising.**

   Never Sometimes Often

6. **I post notes where I can see them to remind me to exercise.**

   Never Sometimes Often

7. **I vary my exercise routine to avoid boredom.**

   Never Sometimes Often

8. **I work toward exercise goals that are progressively more challenging.**

   Never Sometimes Often

9. **I consider exercise so important in my life that I allocate time for it.**

   Never Sometimes Often

10. **I let people know about my commitment to exercise.**
    Never Sometimes Often

11. **I encourage my friends to exercise.**

    Never Sometimes Often

Note: Reprinted with permission of author from
http://www.nursing.umich.edu/faculty/penderinstruments/researchinstruments.html

ID#:____
Location Code:____

Physical Activity Scale

How physically active are you? In the physical activity scale, you see some examples of different levels of physical activity. Try to assess how much time you send on each level on an **average weekday**. Start with level A and continue downward. If you normally sleep 7 h, you should mark the 7-h box of level A. If you watch TV for an hour an a half, you should mark the 30-min box and the 1-h box of level B. If you are not active on all activity level, you show leave levels unmarked. Please note that the total number of minutes and hours should amount **to 24 hr = an average weekday and night**. You may find the column on the right helpful when adding the minutes and hours together.

	Examples	Minutes	Hours	Time:
A	 Sleep, rest	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
B	 Sitting quietly, watching television, listening to music or reading	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
C	 Working at a computer or desk, sitting in a meeting, eating	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
D	 Standing, washing dishes or cooking, driving a car or truck	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
E	 Light cleaning, sweeping floors, food shopping with grocery cart, slow dancing or walking downstairs	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
F	 Bicycling to work or for pleasure, brisk walking, painting or plastering	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
G	 Gardening, carrying, loading or stacking wood, carrying light object upstairs	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
H	 Aerobics, health club exercise, chopping wood or shoveling snow	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	
I	 More effort than level H: Running, racing on bicycle, playing soccer, handball or tennis	☐☐☐ 15 30 45	☐☐☐☐☐☐☐☐☐☐ 1 2 3 4 5 6 7 8 9 10	

Note: From Aadajl, M. & Jorgensen, T. (2003). Validation of a new self-report instrument for measuring physical activity. *Medicine and Science in Sports and Exercise, 35*(7), 1196-1202. Reprinted with permission.

LIFESTYLE PROFILE II

DIRECTIONS: This questionnaire contains statements about your *present* way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the frequency with which you engage in each behavior by circling:

N for never, **S** for sometimes, **O** for often, or **R** for routinely

		NEVER	SOMETIMES	OFTEN	ROUTINELY
1.	Discuss my problems and concerns with people close to me.	N	S	O	R
2.	Choose a diet low in fat, saturated fat, and cholesterol.	N	S	O	R
3.	Report any unusual signs or symptoms to a physician or other health professional.	N	S	O	R
4.	Follow a planned exercise program.	N	S	O	R
5.	Get enough sleep.	N	S	O	R
6.	Feel I am growing and changing in positive ways.	N	S	O	R
7.	Praise other people easily for their achievements.	N	S	O	R
8.	Limit use of sugars and food containing sugar (sweets).	N	S	O	R
9.	Read or watch TV programs about improving health.	N	S	O	R
10.	Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).	N	S	O	R
11.	Take some time for relaxation each day.	N	S	O	R
12.	Believe that my life has purpose.	N	S	O	R
13.	Maintain meaningful and fulfilling relationships with others.	N	S	O	R
14.	Eat 6-11 servings of bread, cereal, rice and pasta each day.	N	S	O	R
15.	Question health professionals in order to understand their instructions.	N	S	O	R
16.	Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).	N	S	O	R
17.	Accept those things in my life which I can not change.	N	S	O	R
18.	Look forward to the future.	N	S	O	R
19.	Spend time with close friends.	N	S	O	R
20.	Eat 2-4 servings of fruit each day.	N	S	O	R
21.	Get a second opinion when I question my health care provider's advice.	N	S	O	R
22.	Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	N	S	O	R
23.	Concentrate on pleasant thoughts at bedtime.	N	S	O	R
24.	Feel content and at peace with myself.	N	S	O	R
25.	Find it easy to show concern, love and warmth to others.	N	S	O	R
26.	Eat 3-5 servings of vegetables each day.	N	S	O	R

		NEVER	SOMETIMES	OFTEN	ROUTINELY
27.	Discuss my health concerns with health professionals.	N	S	O	R
28.	Do stretching exercises at least 3 times per week.	N	S	O	R
29.	Use specific methods to control my stress.	N	S	O	R
30.	Work toward long-term goals in my life.	N	S	O	R
31.	Touch and am touched by people I care about.	N	S	O	R
32.	Eat 2-3 servings of milk, yogurt or cheese each day.	N	S	O	R
33.	Inspect my body at least monthly for physical changes/danger signs.	N	S	O	R
34.	Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).	N	S	O	R
35.	Balance time between work and play.	N	S	O	R
36.	Find each day interesting and challenging.	N	S	O	R
37.	Find ways to meet my needs for intimacy.	N	S	O	R
38.	Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.	N	S	O	R
39.	Ask for information from health professionals about how to take good care of myself.	N	S	O	R
40.	Check my pulse rate when exercising.	N	S	O	R
41.	Practice relaxation or meditation for 15-20 minutes daily.	N	S	O	R
42.	Am aware of what is important to me in life.	N	S	O	R
43.	Get support from a network of caring people.	N	S	O	R
44.	Read labels to identify nutrients, fats, and sodium content in packaged food.	N	S	O	R
45.	Attend educational programs on personal health care.	N	S	O	R
46.	Reach my target heart rate when exercising.	N	S	O	R
47.	Pace myself to prevent tiredness.	N	S	O	R
48.	Feel connected with some force greater than myself.	N	S	O	R
49.	Settle conflicts with others through discussion and compromise.	N	S	O	R
50.	Eat breakfast.	N	S	O	R
51.	Seek guidance or counseling when necessary.	N	S	O	R
52.	Expose myself to new experiences and challenges.	N	S	O	R

APPENDIX C: RESEARCH INSTRUMENTS–AUTHOR'S PERMISSION FOR USE

University of Nebraska Medical Center

COLLEGE OF NURSING
Community-Based Health Department

985330 Nebraska Medical Center
Omaha, NE 68198-5330
402/559-6382
Fax: 402/559-6379

Dear Colleague:

Thank you for your interest in the *Health-Promoting Lifestyle Profile II*. The original *Health-Promoting Lifestyle Profile* became available in 1987 and has been used extensively since that time. Based on our own experience and feedback from multiple users, it was revised to more accurately reflect current literature and practice and to achieve balance among the subscales. The *Health-Promoting Lifestyle Profile II* continues to measure health-promoting behavior, conceptualized as a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization and fulfillment of the individual. The 52-item summated behavior rating scale employs a 4-point response format to measure the frequency of self-reported health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations and stress management. It is appropriate for use in research within the framework of the Health Promotion Model (Pender, 1987), as well as for a variety of other purposes.

The development and psychometric evaluation of the English and Spanish language versions of the original instrument have been reported in:

Walker, S. N., Sechrist, K. R., & Pender, N. J. (1987). The Health-Promoting Lifestyle Profile: Development and psychometric characteristics. Nursing Research, 36(2), 76-81.

Walker, S. N., Volkan, K., Sechrist, K. R., & Pender, N. J. (1988). Health-promoting lifestyles of older adults: Comparisons with young and middle-aged adults, correlates and patterns. Advances in Nursing Science, 11(1), 76-90.

Walker, S. N., Kerr, M. J., Pender, N. J., & Sechrist, K. R. (1990). A Spanish language version of the Health-Promoting Lifestyle Profile. Nursing Research, 39(5), 268-273.

A copy of the instrument (English and Spanish versions), scoring instructions, an abstract of the psychometric findings, and a list of publications reporting research using all versions of the instrument are available for download.

Sincerely,

Susan Noble Walker, EdD, RN, FAAN
Professor Emeritus

From: Kylie Ball <kylie.ball@deakin.edu.au>
To: "Rose Lange" <schliska@svsu.edu>
Date: 3/11/2008 5:38 pm
Subject: Re: Research Question

Dear Rose,
Thank you for your email and interest in our paper. Yes now that the barriers items are published you can certainly use them and simply cite the source.
I'd be very keen to hear about your research findings - sounds like an interesting study!
Best wishes,
Kylie

At 02:36 AM 12/03/2008, you wrote:
>Dear Dr. Ball,
>
>I am a nursing PhD student at Wayne State University in Detroit,
>Michigan, USA. I found your article "Too Fat to Exercise" very
>interesting. My dissertation research will be examining physical
>activity in obese and non-obese women. I am curious to find out if
>the barrier of "too fat" is similar here in the U.S. I am using an
>exercise benefit and barrier scale developed by Nola Pender and
>Susan Walker. In addition, I would like to use some of the barriers
>that you present in your article (I am too fat to exercise, My
>health is not good enough to exercise, I have an injury or
>disability that stops me from exercising, I am not sporty enough to
>exercise, I am too lazy to exercise and I am not motivated to
>exercise). I feel these barriers will provide valuable information
>regarding my area of research interest. I plan to reword a few of
>them to fit the American culture. I know the questions are apart of
>a National Australian Study. Do I need to gain special permission
>to use a variation of these questions? Please feel free to contact
>me if you have any questions regarding the research study. I look
>forward to your response.
>
>Thank you,
>Rose M. (Schliska) Lange
>Wayne State University PhD Candidate

Associate Professor Kylie Ball
Centre for Physical Activity and Nutrition Research
School of Exercise and Nutrition Sciences,
Deakin University,
221 Burwood Highway, Burwood Victoria 3125
AUSTRALIA
Phone: +61 3 9251 7310
Fax: +61 3 9244 6017
email kylie.ball@deakin.edu.au
http://www.deakin.edu.au/ens/

Supported by a NHMRC Senior Research Fellowship

****

From: <npender@umich.edu>
To: Rose Lange <schliska@svsu.edu>
Date: 3/11/2008 10:17 pm
Subject: Re: Permission to use research tools

Dear Rose:

You have my permission to use the Exercise Benefits/Barriers Scale and the Planning for Exercise Instrument in your dissertation research. Please see that the source of the instruments is acknowledged.

I wish you well with your research. I am on travel in Florida so am responding via e-mail.

Wishing You Good Health,

Nola Pender

Quoting Rose Lange <schliska@svsu.edu>:

> March 11, 2008
>
> Dear Dr. Pender,
>
> I am a nursing PhD student at Wayne State University. I am writing for
> permission to use your research tools entitled ?Exercise Benefits and
> Barriers Scale? and ?Planning for Exercise? in my dissertation
> research examining physical activity in obese and non-obese women. I
> feel your tools will provide valuable information regarding my area of
> research interest. Please supply a statement granting me permission to
> use your research tools. You can mail, email or FAX the permission to
> Rose (Schliska) Lange, 4350 Persimmon Dr. Saginaw, MI 48603;
> schliska@svsu.edu; fax-(989)964-4925. Please feel free to contact me
> if you have any questions regarding the research study.
>
> Thank you,
> Rose M. (Schliska) Lange
> Wayne State University PhD Candidate
>
>
>
>

From: "Mette Aadahl" <MEAA@glo.regionh.dk>
To: "Rose Lange" <schliska@svsu.edu>
Date: 3/12/2008 7:44 am
Subject: SV: Self-Report Instrument for measuring Physical Activity

Dear Ms. Rose M. Lange
Thank you for your request regarding the use of our physical activity questionnaire. You are very welcome indeed to use the questionnaire ("Physical activity scale", MSSE 2003;35(7): 1196-1202) in your study on obese and non-obese women. Good luck with your studies!
Yours sincerely,
Mette Aadahl

Mette Aadahl
PT, MPH, ph.d.
Research Centre for Prevention and Health
Building 84/85
Glostrup Hospital, Ndr. Ringvej 57
DK- 2600 Glostrup
tlf: +45 43 23 21 97
Denmark

-----Oprindelig meddelelse-----
Fra: Rose Lange [mailto:schliska@svsu.edu]
Sendt: 11. marts 2008 17:06
Til: Mette Aadahl
Emne: Self-Report Instrument for measuring Physical Activity

Dear Dr. AADAHL,

I am a nursing PhD student at Wayne State University in Detroit, Michigan, USA. I am writing for permission to use your research tool entitled "Physical Activity Scale" (self report instrument) in my dissertation research examining physical activity in obese and non-obese women. I feel your tool will provide valuable information regarding my area of research interest. Please supply a statement granting me permission to use your research tools. You can mail, email or FAX the permission to Rose (Schliska) Lange, 4350 Persimmon Dr. Saginaw, MI 48603; schliska@svsu.edu; fax-(989)964-4925. Please feel free to contact me if you have any questions regarding the research study.

Thank you,
Rose M. (Schliska) Lange
Wayne State University PhD Candidate

From: Albert Bandura <bandura@psych.stanford.edu>
To: Rose Lange <schliska@svsu.edu>
Date: 3/12/2008 3:20 pm
Subject: Re: Exercise Self-Efficacy Scale

Ms. Rose:
You have my permission to use the exercise self-efficacy scale.

Albert Bandura

Rose Lange wrote:
> Dear Dr. Bandura,
>
> I am a nursing PhD student at Wayne State University in Detroit,
> Michigan. I am writing for permission to use your research tool entitled
> "Exercise Self-Efficacy Scale" in my dissertation research examining
> physical activity in obese and non-obese women. I feel your tools will
> provide valuable information regarding my area of research interest.
> Please supply a statement granting me permission to use your research
> tools. You can mail, email or FAX the permission to Rose (Schliska)
> Lange, 4350 Persimmon Dr. Saginaw, MI 48603; schliska@svsu.edu;
> fax-(989)964-4925. Please feel free to contact me if you have any
> questions regarding the research study.
>
> Thank you,
> Rose M. (Schliska) Lange
> Wayne State University PhD Candidate
>
>
>

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ABSTRACT

PHYSICAL ACTIVITY LEVELS IN OBESE AND NON-OBESE WOMEN AND THEIR RELATIONSHIP WITH BODY MASS INDEX, PERCEIVED SELF-EFFICACY, PERCEIVED BENEFITS AND BARRIERS OF EXERCISE, AND COMMITMENT TO A PLAN OF ACTION

by

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The purpose of this descriptive correlational study was to examine relationships among selected variables and concepts within the Health Promotion Model (perceived benefits, perceived barriers to exercise, self-efficacy, commitment to plan of action) in non-obese and obese women with a focus on the behavioral outcome of physical activity (leisure & lifestyle). A group of 137 women, aged 18-50 participated in this study. BMI was found to be positively correlated to an individual's perceived barriers to action. Findings did not support the hypothesis that as BMI increases perceived benefits, self-efficacy, commitment to a plan of action and physical activity levels would decrease. Commitment to a plan of action was found to be a significant predictor of both types of physical activity. Commitment to a plan of action predicted 58% of the variance in leisure physical activity (exercise) and 6% of lifestyle physical activity.

Non-obese women had lower levels of self-efficacy related to exercise in areas surrounding time commitments and interruptions in everyday life compared to the obese participants. The obese participants significantly reported lower levels of self-efficacy related to

exercise in areas of depression, anxiety and recovering from illness and disability than the non-obese women. Physical benefits of exercise (improved muscle tone and cardiovascular system) were seen as more of a benefit to the non-obese group then the obese group. Obese women tended to see the social aspects of physical activity to be a benefit.

The barrier "too fat to exercise", "health not good enough" and "having an injury or disability", and "Pain stops me from exercising" were also examined. Non-obese women had higher levels of disagreement to the statement "too fat to exercise" and "health not good enough" over the obese women. Obese women reported "having an injury or disability" that stops me from exercising as more of a barrier to physical activity than non-obese women. Pain was not found to be a significant barrier to exercise for either group.

This study provides foundational knowledge into the similarities and differences of non-obese and obese women regarding the health promoting behavior of physical activity. The findings of this study assist in providing additional knowledge and significance regarding the concept of commitment to a plan of action in the Health Promotion Model. The findings related to psychosocial barriers to exercise for obese individuals suggests the need for a thorough assessment of depressive symptoms in overweight and obese women. Overweight and obese women may need specific education and counseling on how to deal with depression and the effects it could have on their overall health including physical activity.

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