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Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting

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APPLICATION OF THE TRANSTHEORETICAL MODEL: ASSESSING EXERCISE
BEHAVIOR IN AFRICAN AMERICANS IN A CHURCH-BASED SETTING

By

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A dissertation submitted in partial fulfillment of the requirements for the

Doctor of Philosophy - Nursing

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ABSTRACT

Application of the Transtheoretical Model: Assessing Exercise Behavior in African

Americans in a Church-based Setting

By

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Sedentary behavior rates are higher among African-American men and women than in other American races and ethnicities, placing them at greater risk for chronic illness. Routine physical activity reduces the risk of chronic health problems such as: (a) overweight and obesity, (b) type 2 diabetes, (c) hypertension, (d) coronary artery disease, (e) stroke, (f) congestive heart failure, and (g) cancers. Assessment of African-Americans' exercise attitudes in a church-based setting may provide information with which to develop effective interventions to improve physical activity. This descriptive, cross-sectional study used components of the Transtheoretical Model (TTM) to assess whether any associations exist between TTM constructs and regular exercise in African Americans. This exercise assessment included some environmental and cultural factors. Participant surveys included: (a) demographics, (b) stage of change for exercise, (c) decisional balance for exercise, (d) self-efficacy for exercise, and (e) current physical activity.

Data were collected on 200 participants ranging in age from 18 to 85 years ($M = 53.17$), 69% were female. The most frequent stage of change was the preparation stage

(34%). Hours of total physical activity were 1.45 per week of combined vigorous activity, moderate activity, and walking. ANOVAs showed statistical significance in decisional balance across stages of change, but no statistical significance in self-efficacy by stage of change. ANOVA results conducted to determine any differences in IPAQ total by stage of change showed statistical significance, suggesting a difference in the weekly amount of exercise by stage of change.

Correlational analyses and ANOVAs showed correlations between stage of change and age, age and self-efficacy, education and stage of change, and income and self-efficacy, IPAQ and employment, and self-efficacy and IPAQ. Chi square tests showed “I don’t have time” and “I am too tired” as statistically significant exercise deterrents associated with exercise stage of change. Chi square tests were also used to determine associations between exercise stage of change and exercise promoters. Both “I am in a better mood if I exercise” and “I sleep better if I exercise” showed statistically significant associations.

Health care professionals, especially nurses, are in an optimal position to assess at-risk populations and assist them to initiate and maintain routine physical activity by developing effective interventions. Traditional exercise surveys such as the decisional balance and self-efficacy surveys in the TTM may need to be revised to include psychobehavioral and environmental factors to provide a more comprehensive assessment of attitudes of African Americans toward physical activity. Tailoring interventions to individuals’ stage of change and emphasizing the pros of exercise may produce more positive results.

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American church pastors, office personnel, and congregants was instrumental; without your support, completion of this project would never have been possible!

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CHAPTER 1

INTRODUCTION

This chapter provides information about the study and includes the following sections: (a) background and significance of the study; (b) statement of the problem; (c) statement of the purpose; (d) variables; (e) operational definitions; and (f) the research questions.

Background and Significance of the Study

Assessment of African-Americans' exercise attitudes in a church-based setting may provide information with which to develop effective interventions to improve physical activity in the future. Researchers recommended routine physical activity to reduce the risk of chronic health problems such as: (a) overweight and obesity, (b) type 2 diabetes, (c) hypertension, (d) coronary artery disease, (e) stroke, (f) congestive heart failure, and (g) cancers (Adler & Stewart, 2009; Rowland & Chappel-Aiken, 2012). Low levels of physical activity foster weight gain, often leading to a higher incidence of overweight and obesity (Cowart et al., 2010; Peterson & Cheng, 2011). Because this risk for chronic illnesses is modifiable, there is a need to identify successful interventions.

Although health promotion strategies have been effective with some ethnic groups, strategies with African Americans have not experienced the same positive results (Cowart et al., 2010). The use of church-based organizations as an effective community partner for health promotion activities has shown some promise, especially with support from church leaders (Carter-Edwards et al., 2011; Webb, Bopp, & Fallon, 2013). In addition, Lumpkins, Daley, and Greiner (2013) encouraged the church and its leaders to become an integral part of health promotion activities in the church-based setting, as

clergy have a strong influence on both the social and physical environment in their churches and serve as role models in the faith community (Bopp, Peterson, & Webb, 2012).

Nursing's initiatives have historically focused on efforts of improving human health within physical, economic, and social environments (St. Pierre-Schneider et al., 2009). Nursing must take a leadership role to ensure that human health is at the core of sustainability, for "without human health, cities will not survive for future generations" (St. Pierre-Schneider et al., 2009, p. 281). Nursing is therefore the discipline that can place human health in this core position by acting in diverse ways, ensuring that human health is a key issue of the sustainability movement. Nursing researchers can use increased knowledge about cultural and environmental influences on health-promoting behaviors of African Americans to develop additional evidence-based approaches to healthy lifestyles (Baker, 2011; McAlexander, Banda, McAlexander, & Lee, 2009).

The physical environment is an important component of health sustainability and often a key component of active lifestyles. In addition, healthy people are a paramount resource in achieving sustainable development in health and their participation in improvements in education, health, and nutrition allow communities to better use the resources they have available to them (St. Pierre-Schneider et al., 2009). Physical, social, and economic environments that support exercise and an active lifestyle can have a positive, sustainable impact on health (St. Pierre-Schneider et al., 2009).

To date, nursing has not had a significant presence in the sustainability movement and therefore must "raise its voice and profile in this global movement to ensure human health has a core position" (St. Pierre-Schneider et al., 2009, p. 287). By doing so,

nursing will contribute significantly in the health sustainability movement (St. Pierre-Schneider et al., 2009).

A theory-based assessment of African Americans and their attitudes about physical activity as well as readiness to perform exercise is therefore needed. This descriptive, cross-sectional study used components of the Transtheoretical Model (TTM) to assess whether any associations exist between TTM constructs and regular exercise in African Americans in a church-based setting. This exercise assessment of African Americans through the use of TTM included the following participant surveys: (a) demographics, (b) stage of change for exercise, (c) decisional balance for exercise, (d) self-efficacy for exercise, and (e) current physical activity.

Through theory-based approaches, health care professionals, especially nurses, are in an optimal position to assist at-risk populations to assess populations' physical activity patterns, and then initiate and maintain routine physical activity by developing effective, evidence-based interventions (Kim, Kim, & Chae, 2010). Nurses have access to the population in a variety of settings, allowing them to begin provider-client discussions focusing on the benefits of routine physical activity (Prochaska & Velicer, 1997).

Problem Statement

Although Church and Blair (2009) described routine physical activity as the best prescription that can be taken to improve health, physical activity involvement has remained very low in industrialized nations, especially among minorities. Routine physical activity helps to reduce cardiovascular disease risk (Bell, Lutsey, Windham, & Folsom, 2013). While participation in routine physical exercise has been correlated with the reduction of chronic disease risk associated with obesity, African Americans have

low participation (Bopp et al., 2007; Bopp, Wilcox, Laken, & McClorin, 2009; Bungum, Pharr, Pinheiro, & Azzarelli, 2013; Dodani & Fields, 2010).

Sedentary behavior rates are higher among African-American men and women than in other American races and ethnicities, nearing 60%, therefore placing them at greater risk for chronic illness (Komar-Samardzija, Braun, Keithley, & Quinn, 2012; Pekmezi & Jennings, 2009; Whitt-Glover & Kumanyika, 2009). In the African-American population, the disparately high chronic disease burden and lower physical activity rates demonstrate the need to develop effective strategies that increase routine exercise participation (Blaney et al., 2012; Paschal, Lewis-Moss, Sly, & White, 2010; Terre, 2009). Further, when eminent disease burdens are revealed by groups in need, health disparities are present (Centers for Disease Control and Prevention, 2011); eliminating these disparities by targeting African Americans with physical activity interventions is a primary goal of public health (Healthy People 2020).

Trended data from 1990 to 2004 on the Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System (CDC BRFSS) showed an increase in Americans reporting no leisure-time physical activity (Haskell et al., 2007). Researchers reported that while Caucasians were more likely to meet physical activity recommendations (51.1%), African Americans were less likely (41.8%) (Haskell et al., 2007). Haskell et al. (2007) reported the following:

Because of the dose-response relation between physical activity and health, persons who wish to further improve their personal fitness, reduce their risk of chronic diseases and disabilities, or prevent unhealthy weight gain may benefit by exceeding the minimum recommended amounts of physical activity. (p. 1423)

To date, design and implementation strategies of health promotion programs have been unsuccessful with African Americans (Baker, 2011; Cowart et al., 2010; Terre, 2009). These strategies have historically targeted Caucasian, higher income adults while African Americans have not been studied as extensively. They often fall into lower income brackets, making exercise interventions a challenge (Baker, 2011). Baker (2011) found researchers must incorporate cultural factors with population differences such as ethnicity, education, and socioeconomic aspects in order to better represent study participants. In addition, Ding and Gebel (2012) suggested investigating the increasing influence of the built environment on physical activity levels in African Americans. In order for disease prevention strategies to be effective, at-risk individuals must be empowered to take part in developing the interventions while also engaging these populations in participating in the strategies.

Terre (2009) reported “attitudes about physical activity often are rooted in broader social and cultural traditions that may or may not coincide with professional health recommendations” (p. 196). Terre (2009) stressed the high rates of poverty in minority populations and the “corrosive role of social disadvantage as one prime suspect at or near the epicenter of disproportionate minority risk” of health problems (p. 195). Research has uncovered the complicated processes in which socioeconomic status is intertwined at the biological, psychological, and social levels (Terre, 2009). In addition, because minority populations often access health care on an emergent basis, lifestyle modification advice is frequently delivered during this crisis time, which may not be optimal (Terre, 2009).

Social disadvantage of minority populations may act as an activity risk factor due to the following: (a) low socioeconomic status may affect physiological maturation; (b)

poverty may affect the psychological mediators of active lifestyle; and (c) other disparities may affect educational opportunities, health literacy, resource access, limited exercise role modeling, and insufficient encouragement for routine exercise (Terre, 2009). Investigators have reported additional barriers for physical activity in minorities such as (a) low exercise self-efficacy, (b) negative emotions (e.g., depressed mood, perceived hopelessness), and (c) high risk behaviors that often deter routine physical activity (Baker, 2011; Terre, 2009).

Purpose Statement

The purpose of this descriptive, cross-sectional, correlational study was to examine TTM-related variables to determine associations with regular exercise behavior in African-American adults in a church-based setting. The specific aims of this study were: (a) to describe the stages of change for exercise and TTM-related constructs in African Americans in a church-based setting; (b) to examine promoters and deterrents of routine physical activity across the stages of change that may influence exercise attitudes of African Americans; and (c) to determine associations between TTM constructs with routine exercise behavior in African-American adults in a church-based setting using a summary of the study results. An attitude assessment of African-American routine physical activity was performed through the use of TTM constructs with participant surveys, including: (a) demographics, (b) stage of change for exercise, (c) decisional balance for exercise, (d) self-efficacy for exercise, and (e) current physical activity participation.

Creating recruitment and intervention strategies that are culturally-appropriate to both the social and behavioral beliefs of African Americans involving people, places, and

language in relation to health promotion must be incorporated into research (Fitzgibbon et al., 2005; Paschal et al., 2010; Terre, 2009). Researchers have recommended the continued need for culturally-appropriate health promotion strategies through church-based organizations for use with at-risk populations to promote healthy lifestyles, including routine physical activity in order to provide a significant degree of social support (Baker, 2011; Cowart et al., 2010; Debnam, Holt, Clark, Roth, & Southward, 2012; Fallon, Bopp, & Webb, 2013; McDowell, Wallace, Tillery, & Cencula, 2011; Williamson & Kautz, 2009). Therefore, the student researcher (SR) conducted this study assessment in a church-based setting involving church leadership to determine African-American attitudes toward and participation in physical activity.

Variables

The variables for this study included: (a) exercise stages of change, (b) exercise decisional balance, (c) exercise self-efficacy, (d) routine physical activity, and (e) demographic information.

Exercise Stages of Change

The stages of change for exercise was assessed using the short-form stage of change survey, requesting participants to choose one of five statements that best describes current exercise patterns. In this survey, each statement corresponded with one of the five stages of change: (a) precontemplation stage, (b) contemplation stage, (c) preparation stage, (d) action stage, and (e) maintenance stage (Velicer, Prochaska, Fava, Norman, & Redding, 1998) (Appendix B).

Exercise Decisional Balance

Decisional balance for exercise is one's weighing the pros and cons of making a behavior change as measured by 10 items that address the pros and cons of routine exercise and the decision-making process used when deciding whether or not to exercise. (Velicer et al., 1998) (Appendix C).

Exercise Self-efficacy

Self-efficacy for exercise is a construct derived from Social Cognitive Theory and refers to an individual's ability to perform a specific behavior in a specific situation (Pekmezi, Barbera, Marcus, 2010). More specifically, self-efficacy is one's successful execution of physical activity behavior to achieve an active lifestyle (Bandura, 1986). Self-efficacy has been found to be a good predictor of physical activity (Pekmezi et al., 2010). This scale consists of six items that address confidence in exercise-specific situations an individual may have to cope with in a high-risk situation without relapsing back to an unhealthy or high-risk habit (Velicer et al., 1998) (Appendix D).

Routine Exercise

The short form of the International Physical Activity Questionnaire (IPAQ) measures physical activity of study participants in the past seven days (Appendix D) from four categories: (a) vigorous physical activity, (b) moderate physical activity, (c) walking, and (d) sitting. The questionnaire is composed of seven categories, each measured in number of days per week, as well as minutes or hours per day. Information in the questionnaire will assist in determining the amount and kinds of physical activities that people participate in (Appendix E).

Demographic Data and Information Sheet

Demographic data and general information were collected through a survey (Appendix F). This survey included: (a) age, (b) gender, (c) current health issues, (d) self-reported health rating, (e) annual household income, (f) education, (g) employment status, (h) marital status, (i) number of children in household under the age of 18 years, (j) risk for falls, (k) smoking habits, (l) factors that prevent exercise, and (m) factors that encourage exercise.

Operational Definitions

Several terms were used throughout the research study. These constructs were related to the assessment of physical activity in the African-American population.

Church-based Study

This referred to the physical location where the health promotion assessment took place. Surveys were completed by study participants at the church in conjunction with a church service or other church-related activity.

Culturally-appropriate Interventions

These were health promotion interventions that integrated patterns of human behavior including the language, thoughts, communications, actions, customs, beliefs, values, and traditions of racial, ethnic, religious, or social groups in an effective manner within the context of the cultural beliefs, behaviors, and needs of the African-American community (USDHHS, 2001). These interventions may include: (a) researchers' previous experiences working with the target group; (b) the linguistic and literacy skills of the population; (c) cultural or religious beliefs of the population; and (d) adaptations of

typical health education delivery methods for the community (Hawthorne, Robles, Cunnings-John, & Edwards, 2010).

Decisional Balance

This theoretical construct weighed the advantages and disadvantages of adopting a health behavior (Pekmezi et al., 2010). This concept involved weighing the pros and cons of making a behavioral change within the decision-making process.

Empowerment

This construct embodied health education, skills, and resources provided to program participants to encourage them to take an active role in managing their own health promotion and disease prevention efforts (Peek et al., 2012).

Routine Physical Activity for Adults

This was defined as participating in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week (or a combination of these) spread throughout the week (ACS, 2012; Haskell et al., 2007; Nelson et al., 2007).

Self-efficacy

This theoretical construct represented one's confidence or belief in his/her ability to make a lifestyle change despite barriers (Pekmezi et al., 2010).

Stages of Change

This is a cyclical model represented by five distinct stages of motivational readiness with each stage reflecting one's personal interest and motivation to change problematic health actions (Velicer et al., 1998). These stages included (a) precontemplation, (b) contemplation, (c) preparation, (d) action, and (e) maintenance (Velicer et al., 1998). First, the pre-contemplation stage consisted of an unwillingness to

change a problem behavior, sometimes including a lack of recognition that a problem exists. Next, the contemplation stage involved “weighing the consequences of action or inaction of a problem behavior” (Bosworth et al., 2009, p. 4). Third, in the preparation stage, one made a commitment to make changes in the near future (defined as within one month), making the initiation of new behavior more likely. Fourth, in the action stage, active modification of behavior was taking place, but for a time period of less than six months. Finally, the maintenance stage occurs when one has engaged in a new behavior for a minimum of six months, focusing on lifestyle modification and relapse prevention (Bosworth et al., 2009).

Transtheoretical Model

This was an integrative model developed by Prochaska and DiClemente from several other psychological theories, focused on motivational readiness along the path to behavioral change (as cited in Pekmezi et al., 2010). It included the constructs of the stages of change, decisional balance, processes of change, and self-efficacy. Historically, it has been applied to numerous health behaviors, including weight control, nutrition management, medical compliance, and exercise (Pekmezi et al., 2010).

Research Questions

The SR used the following research questions to guide and implement this study.

1. What are the stages of change for exercise behavior in African-American adults in a church-based setting?
2. What is the perceived physical activity behavior as measured by the IPAQ of African-American adults in a church-based setting?

3. Are there differences in IPAQ total, decisional balance, and self-efficacy across the stages of change for exercise behavior in African-American adults in a church-based setting?
4. What associations exist among the demographic characteristics (age, gender, education, income, and employment status) and the surveys (stages of change, decisional balance, self-efficacy, and routine exercise) in African-American adults in a church-based setting?
5. Are there statistically significant associations between perceived physical activity behavior and decisional balance, self-efficacy, and stages of change in African-American adults in a church-based setting?
6. Are there statistically significant associations between health conditions and perceived physical activity behavior (IPAQ) in African-American adults in a church-based setting?
7. What associations exist between factors that prevent participants from exercising and the stage of change survey results in African-American adults in a church-based setting?
8. What associations exist between factors that promote exercise and the stage of change survey results in African-American adults in a church-based setting?

Summary

Chapter 1 introduced the focus of this dissertation, which was the need to assess physical activity levels, stage of change, as well as decision-making factors on exercise in African Americans. Background of the problem, significance of the study, and purpose of the study in relation to the health of the African-American community was described. Variables and operational definitions used in the study were described for better understanding of key terms and concepts. Finally, research questions were itemized.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Introduction

For the review of the literature, the SR explored previous studies that related to the research questions for this study. This chapter begins with a description of the relationship of sedentary lifestyle to chronic illness and related health issues. Following is a discussion of previous studies, including the following sections: (a) relationship between sedentary behaviors and chronic disease, (b) physical activity recommendations, (c) physical activity in African Americans, (d) use of TTM constructs to assess behavioral change, (e) additional research focusing on physical activity in African Americans, (f) incorporation of *Healthy People 2020*, (g) church and clergy as an integral part of this study, (h) importance of health promotion assessment of African Americans to the nursing profession, (i) effective strategies to improve physical activity in African Americans, and (j) gaps in knowledge with suggestions for future research.

Sedentary Behaviors and Chronic Disease

African Americans report high rates of sedentary behavior and associated chronic illnesses (Pekmezi, Barbera, Bodenlos, Jones, & Brantley, 2009). African Americans are often less likely than Caucasians to exercise regularly (46.4% versus 52.8%) (Faridi et al., 2010). Routine physical activity and a healthy diet may decrease the risk of some chronic diseases; therefore, emphasizing exercise and healthy eating with African Americans may help reduce health disparities (Paschal et al., 2010). Researchers have found that insufficient physical activity (and low fruit and vegetable consumption) contributed to the health disparities and poor health outcomes of African Americans

(Baranowski, 2011; Lucan, Barg, & Long, 2010; Paschal et al., 2010; Thomson & Ravia, 2011).

The development of chronic illness is often precipitated by unhealthy behavioral patterns and excess weight, leading to poor health outcomes and decreased longevity (Coward et al., 2010; Moore, Harris, & Wimberly, 2010; Parra-Medina et al., 2010; Peterson & Cheng, 2011). These health outcomes were found to be inversely related to routine physical activity in a number of studies and included: (a) cardiovascular disease; (b) stroke; (c) hypertension; (d) type 2 diabetes; (e) osteoporosis; (f) obesity; (g) colon and breast cancers; (h) anxiety; and (i) depression (Haskell et al., 2007). In a recent study on the science of fitness, Ling investigated how exercise changed fat and muscle cells. Data suggested exercise may affect the human body even at the DNA level, decreasing the risk for diabetes type 2 and obesity by changing DNA methylation of those genes (Reynolds, 2013).

There are chronic disease and mortality disparities specifically among African Americans. According to the American Cancer Society (ACS) (2011), the overall life expectancy trend for African Americans is shorter than Caucasian men (69.7 versus 75.7 years) and women (76.5 versus 80.6 years). In addition, Faridi et al. (2010) found being overweight or obese affects more than three in four African-American adults (76.7 %). Diabetes disparities between African Americans and Caucasians (12.6% versus 7.1% respectively) were attributed in part to the higher incidence of overweight and obesity in African Americans (Williams et al., 2013). Significantly important modifiable determinants of cancer risks, according to Kushi et al. (2012), were (a) routine physical

activity, (b) nutrition, and (c) weight control, to which one-third of all cancer deaths in the United States were attributed.

Physical Activity Recommendations

Physical activity recommendations of the ACS (2012) for adults included: (a) participating in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week (or a combination of these) spread throughout the week; (b) limiting sedentary behavior such as sitting, lying down, watching television, and other forms of screen entertainment; and (c) performing physical activity above usual activities, no matter what one's baseline level of activity, to maximize health benefits. In addition, the ACS (2012) recommended public, private, and community organizations work together at all levels to apply policy and environmental changes that provide safe, enjoyable, and accessible environments for physical activity in the workplace, for transportation, and for recreation in communities.

The American College of Sports Medicine (ACSM) (Haskell et al., 2007) also recommended adults (ages 18 to 65 years) participate in at least 150 minutes of moderate-intensity exercise per week. This exercise recommendation can be met through 30 to 60 minutes of moderate-intensity exercise (five days per week) or 20-60 minutes of vigorous-intensity exercise (three days per week). One continuous session and multiple shorter sessions (at least 10 minutes each session) are both acceptable to accrue the recommended amount of daily exercise (Haskell et al., 2007).

The ACSM reported these guidelines are the "minimum" requirements for preventing disease and strongly encourages adults to work toward greater amounts of physical activity to gain advanced protection against "inactivity related chronic disease"

(Haskell et al., 2007). In addition, physical activity guidelines presented for older adults (men and women over the age of 65) and adults over age 50 years of age with chronic conditions or functional limitations included (a) taking into account the individual's aerobic fitness, (b) activities to maintain or improve flexibility, and (c) balance exercises for individuals at risk for falls (Nelson et al., 2007). The ACSM (Nelson et al., 2007) recommended very light or light intensity exercise for older persons or previously sedentary adults starting exercise. Further, adults unable to meet the minimum recommendations can still benefit from some activity.

Physical Activity in African Americans

Sedentary lifestyle is a major public health problem associated with health disparities in the United States today, especially among African Americans (Paschal et al., 2010; Terre, 2009; Zunker et al., 2008). Further, low income African Americans have demonstrated high rates of sedentary behavior, leading to a higher incidence of chronic illness (Cowart et al., 2010; Pekmezi et al., 2009). Approximately 49% of African Americans reported no leisure physical activity, with only 24.9% reporting regular physical activity (Blaney et al., 2012).

Weight misperceptions (discordance between one's perceived weight and one's actual weight) were high with African Americans. These misperceptions showed strong associations with low participation in physical activity and the diminished adoption of healthy behaviors (Duncan et al., 2011; Komar-Samardzija et al., 2012; Moore et al., 2010). Routine physical activity represented a significant behavior modification that can reduce chronic disease risk when continued long term, although over 50 % of those who began an exercise program stopped within three to six months (Kim et al., 2010).

In addition, hair care practices have been implicated as a deterrent for some African-American women to participate in routine physical activity. Hall et al. (2013) found nearly 40% of African-American women avoid exercise due to hair-related issues showing that they were 2.9 times less likely to exercise the recommended 150 minutes per week because of their hair (N = 103). The development of hair strategies during exercise and education on these strategies may help to improve physical activity participation in these women (Hall et al., 2013). The authors suggested more research in this area.

Use of TTM Constructs to Assess Behavior Change

In the past decade, many studies were aimed at increasing physical activity in various populations with varying results, but to date, little is known about the decision-making strategies of African Americans and physical activity. Theoretical models provide a framework to use when assessing populations and designing effective health promotion programs (Raingruber, 2014). The TTM specifically provided a framework to (a) identify stage of change in exercise behaviors, (b) monitor the dynamic movement through these stages, and (c) explain how this movement occurs through the constructs of decisional balance, self-efficacy, and processes of change. A description of recent studies involving the TTM and physical activity with a variety of populations follows.

Kim et al. (2010) (N = 210) used the TTM to assess exercise behavior in Korean adults with metabolic syndrome. The purpose of the study was to identify stages of change, processes of change, decisional balance, and self-efficacy to determine predictors of regular exercise behavior. Fifty-two percent of Korean adults in the action and maintenance stages of change participated in regular exercise (Kim et al., 2010). Korean

adults who routinely participated in exercise (action and maintenance stages) also demonstrated the following: (a) higher high density lipoprotein cholesterol levels; (b) using consciousness raising, self-evaluation, and self-liberation strategies; and (c) lower likelihood of weighing the pros and cons of exercise. In contrast, demonstration of the decisional balance (pros and cons) of exercise was found to be essential in earlier stages of change (precontemplation, contemplation, and preparation), where the cons of exercise outweighed the pros of exercise in this sample. In this way, Korean adults in the earlier stages of change were more likely to refrain from participating in routine exercise due to greater decisional balance con ratings.

Kim et al. (2010) suggested the significance of each TTM-related variable may be distinct in different populations. In addition, study results with this sample may offer useful approaches in developing effective exercise programs specific to the stages of change in Korean adults. Researchers found a positive association between consciousness raising, self-reevaluation, and self-liberation with regular exercise behavior. Prospective intervention studies should be conducted to investigate the association of routine exercise on reducing cardiovascular disease risk in at-risk populations (Kim et al., 2010). A study limitation was generalizability of study results beyond this specific sample (Kim et al., 2010).

A descriptive study was conducted by Hoke and Timmerman (2011) with a convenience sample of 30 overweight, rural Mexican American women. The TTM was used to describe participants' stage of change, processes of change, and decisional balance to lose weight. Results indicated the importance of stage of change assessment (60% in contemplation stage) in order to tailor the health intervention to the individuals'

needs. The authors recommended further research to explore methods to incorporate emotional aspects into stage-related interventions for healthy behaviors. The small sample size of the study was a limitation, as was the use of only English or bilingual speaking participants (Hoke & Timmerman, 2011).

Karteroliotis (2008) tested a short version of the decisional balance scale (DBS) for exercise in Greek adults (N = 258) using an exploratory study design. The revised DBS had a satisfactory factor validity and internal consistency in a Greek adult population in both the pros scale (Cronbach's $\alpha = .79$) and the cons scale (Cronbach's $\alpha = .71$), which were consistent with previous research and TTM theory. Study limitations included: sample selected only from suburban Athens, Greece area so findings may not be generalizable to adults in other regions. Researchers recommended replication of this study with different populations and settings and with a larger sample size to strengthen scale validity (Karteroliotis, 2008).

Paschal et al. (2010) applied the Stages of Change Model to address health disparities among African Americans by examining the decision-making process about physical activity and nutrition. Using a cross-sectional study design (N = 242), the researchers determined the majority of study participants was in the contemplation stage for physical activity. Recommendations for future research were to: (a) place a significant emphasis on creating an environment that would support and promote healthy lifestyle changes; (b) include culturally relevant approaches; and (c) examine the association of race, income, and education levels to healthy behavior choices. Study limitations included (a) the use of self-report surveys for data collection, as well as (b) unclear

sample composition due to an “other” choice for ethnicity on the data form (Paschal et al., 2010).

Researchers studied self-efficacy and barriers to multiple behavior changes in low-income African Americans (N = 185) (Mansyur, Pavlik, Hyman, Taylor, & Goodrick, 2013). Higher self-efficacy levels were helpful for smoking reduction and improved physical activity, but not for following a sodium-restricted diet. The most common barriers to exercise included time conflicts and comorbidities, with neither associated with self-efficacy (Mansyur et al., 2013). This suggested an emphasis on self-efficacy alone may be insufficient for overcoming the barriers of African Americans to practice certain healthy behaviors long-term. Study limitations included the use of spring-loaded pedometers, which did not provide accurate readings for the elderly and obese participants and inconsistent counseling of study participants (Mansyur et al., 2013).

Pekmezi et al. (2009) conducted a randomized, controlled study promoting physical activity in low income African Americans with high rates of chronic diseases (N = 214), examining the efficacy of a home-based physical activity intervention. This home-based intervention included self-help printed materials, five monthly newsletters, and two telephone counseling sessions, as compared with an attention control condition that promoted healthy diet (Pekmezi et al., 2009). The study also measured the theoretical constructs of TTM and Social Cognitive Theory at baseline and six months. Individuals’ baseline stages of change data was used to tailor exercise information for the intervention group. Self-efficacy and decisional balance constructs were also used. Results indicated the intervention did not yield an increase in physical activity compared to the control group. In addition, this study determined that low income African Americans face many

barriers to physical activity that can be challenging and culturally specific. For example, African-American women in the study described not being active due to limited safe places to walk. The researchers stressed the importance of cultural relevance in the intervention, as well as including proactive retention strategies, as they had an attrition rate of 55.2% (Pekmezi et al., 2009).

Use of the TTM to create stage-matched interventions has shown some promise in several specific at-risk populations including Korean adults, Iranian women, Greek adults, African-American adults, Mexican American women, older adults, and diabetic patients in a variety of settings (Blaney et al., 2012; Greaney et al., 2008; Hoke & Timmerman, 2011; Karteroliotis, 2008; Lin & Wang, 2012; Pekmezi et al., 2010).

Pekmezi et al. (2010) described the TTM-related constructs to promote physical activity, along with its potential application to assess motivational readiness for behavior change. According to the authors, exercise goals and health promotion interventions should vary depending on an individual's stage of motivational readiness. Once he/she reached the action stage, the focus was to maintain this healthy habit.

Tual et al. (2012) performed a review of interventional studies using the TTM for physical activity and dietary modification in weight loss with overweight adults to determine their effectiveness. Five studies met inclusion criteria, with interventions varying in length from six weeks to 24 months. Although there was only minimal weight loss in these studies, the use of TTM coupled with physical activity, dietary, and other interventions did produce significant changes by increasing participation in routine exercise and improving nutritional intake (Tual et al., 2012).

Blaney et al. (2012) conducted a cross-sectional study (N = 521) validating constructs of the TTM using telephone surveys in an African-American adult sample. Results for the pros of decisional balance, self-efficacy, and processes of change for routine exercise by stage of change were consistent with findings from previous studies. In earlier studies, the pros of the decisional balance scale increased by one standard deviation (SD) while the cons decreased by one SD. In this study, the cons of routine exercise did not vary significantly across the stages of change. Blaney et al. (2012) suggested further investigation of the cons in the African-American population by adding statements regarding the “costs” of increasing routine exercise in order to obtain a more comprehensive measure of the cons of exercise (p. 324). Study limitations included: (a) cross-sectional nature of data collection; (b) study results need to be validated in other African-American samples, as well as across different ethnic groups; (c) original item development was conducted with Caucasian samples; and (d) it was primarily a female sample from one small geographic region, limiting the generalizability of study results (Blaney et al., 2012).

Paxton et al. (2008) conducted a cross-sectional study examining the TTM-related constructs for physical activity using a multi-ethnic sample (N = 700). The majority of the sample was composed of Asians and native Hawaiian/Pacific Islanders (53.8%). The measurement tools studied among subgroups of gender, age groups, and ethnicities included (a) self-efficacy, (b) temptation, (c) processes of change, and (d) decisional balance. The researchers found the TTM constructs were valid measures in groups of differing gender, age, and ethnicity when applied to physical activity. The revised decisional balance tool did not demonstrate validity among age groups, therefore

requiring additional study. Study limitations included: (a) generalizability of study results may be difficult; and (b) greater than 50% of participants self-reported being in the maintenance stage of exercise. The researchers suggested future studies examine the stability of these constructs over time (Paxton et al., 2008).

A randomized, multi-ethnic, longitudinal cohort study (N = 497) was performed using the constructs of the TTM to predict stages of change in routine physical activity (Dishman, Vandenberg, Motl, & Nigg, 2010). The TTM constructs (processes of change, decisional balance, self-efficacy, and temptations) and the IPAQ were measured at six month intervals for two years. Multinomial logistic regression was used to determine relationships among variables. The TTM was found to be useful in predicting both the maintenance of as well as increases in physical activity in this population (Dishman et al., 2010). The study also showed people use both experiential and behavioral processes when attempting to either improve or maintain physical activity levels (Dishman et al., 2010). Study limitations were the results did not address TTM usefulness in predicting early stage adoption with sedentary participants and the results also did not apply to walking activity, which was measured separately by the physical activity survey. The authors encouraged further research efforts to explain longitudinal transitions between sedentary and activity habits at lower levels of physical activity (Dishman et al., 2010).

The TTM was applied to a study (N = 317) with type 2 diabetics to evaluate key factors that promoted behavioral change (Lin & Wang, 2012). The behaviors measured were blood glucose monitoring, regular exercise, and diet control. Self-report surveys (stages of change, self-efficacy, and social support) and HbA1C laboratory values were evaluated. Multinomial logistic regression was used to determine key factors that

influenced stages of behavior changes. Lin and Wang (2012) found routine management of diabetes to be the key factor that influenced the stages of behavioral change, having a direct, positive effect on compliance, which was positively affected by social support (Lin & Wang, 2012). Regular exercise and diet control were higher in other stages of change than in the precontemplation stage. In addition, the factors that influenced the maintenance stage were self-treatment, exercise intention, and diet management (Lin & Wang, 2012). Study limitations included: (a) selection bias in sampling, (b) questionnaire may have been biased despite expert review, and (c) study findings may not be generalized to a larger population since only one hospital was used, and (d) the time effect of the HgA1C was not considered in the study (Lin & Wang, 2012).

Astroth, Fish, Mitchell, Bachman, and Hsueh (2010) studied the construct validity of four TTM measures including stage of change, self-efficacy, decisional balance pros and cons, and processes of change using common response formats (true/false, ladder, 5-choice Likert-scale, and interview). A one-group, cross-sectional research design with convenience sampling of adults (N = 95) was used. The researchers surveyed participants using three instruments and an interview to measure exercise stage of change (Astroth et al., 2010). The majority of participants were classified in the maintenance stage on each of the four TTM measures, while the fewest were classified in the precontemplation stage. Only 60% of participants were classified in the same stage of change on all four measures (Astroth et al., 2010). The true/false measure was most strongly recommended for use, although all measures demonstrated some construct validity. Two items on the decisional balance cons scale, “too much to learn” and “exercise putting an extra burden on significant other” did not reach criterion and therefore were not used.

Study limitations included: (a) cross-sectional design did not allow for an estimation of predictive validity; (b) physical activity was measured through self-report only; (c) conclusions on the decisional balance scale could not be drawn; and (d) limited generalizability due to the majority of participants being women, Caucasian, and highly educated (Astroth et al., 2010). Additional studies were recommended with diverse samples and greater representation across the stages of change. In addition, the researchers recommended two of the decisional balance scale items be re-evaluated or reworded for future use (“There is too much I would have to learn to exercise” and “Exercise puts an extra burden on my significant other”) (Astroth et al., 2010).

Casey, DeCivita, and Dasgupta (2010) conducted focus groups with participants diagnosed with type 2 diabetes (N = 16) to determine facilitators and barriers of physical activity. Although the researchers did not specifically state using the TTM as a study framework, they researched the facilitators and barriers of physical activity which closely align with the decisional balance scale of the TTM. Facilitators for exercise included: (a) motivation, (b) support, (c) supervision while exercising, and (d) exercise opportunities available in one’s geographic area. Exercise barriers identified included: (a) lack of supervision while exercising, (b) difficulty in transitioning from a structured exercise program into a public program, and (c) derailment of exercise (due to health problems and inclement weather). A study limitation included small number of focus groups (N = 3) with only 16 study participants total (Casey et al., 2010).

Additional Research Focusing on Physical Activity in African Americans

Over the past decade, multiple studies have been conducted on improving physical activity levels in African Americans with varying results, thereby indicating a

need to more thoroughly assess the health promotion needs of this population.

Assessment data can form the basis for more effective, culturally-appropriate interventions (Bopp et al., 2009; Friedman, Hooker, Wilcox, Burroughs, & Rheame, 2012; Greaney et al., 2008; Wilcox et al., 2013).

Bopp et al. (2007) assessed physical activity participation in African-American church members (N = 44), identifying the need to incorporate interventions that included spiritual and cultural interventions supported within the church. Peterson and Cheng (2011) concurred, finding African-American women believed their physical activity levels would improve with enhanced social support from family, friends, and church peers. In addition, women expressed incorporating spiritual messages into a physical activity program would have positive effects.

McAlexander, Banda, McAlexander, and Lee (2009) measured the direct associations of physical activity attributes with body mass index (BMI) and body fat in African Americans (N = 216). A physical activity resource (PAR) assessment was developed to measure accessibility, incivility, and the quality of physical activity resources surrounding public housing developments in the study area. Unexpectedly, the researchers found sidewalk connectivity (total number of connections of one sidewalk to other sidewalks on each side of a street segment, suggesting a designated pedestrian pathway) and PAR accessibility were positively correlated with BMI and body fat in this population. They also determined lower individual and environmental socioeconomic status and an unfriendly built environment were negatively related to health attitudes and behaviors.

Other factors affecting exercise include neighborhood safety and attractiveness. Studies with African Americans in low socioeconomic status areas regarding activity and health behaviors should include perceived neighborhood safety and crime rates, according to the researchers' recommendations (McAlexander et al., 2009). Study limitations included the cross-sectional nature of the study and the limited inclusion of other individual variables (perceived safety, crime rates, and psychological factors) that could affect health behaviors and outcomes (McAlexander et al., 2009). In addition, Lee, Mama, Medina, Ho, & Adamus (2013) found community members residing in an attractive neighborhood were more likely to report greater participation in outdoor physical activities than communities with low perceived neighborhood attractiveness.

Researchers developed a decisional balance sheet to promote healthy behavior in a randomized study with ethnically diverse older adults from more than seven different ethnicities (N = 21) (Geller, Mendoza, Timbobolan, Montjoy, & Nigg, 2012). This single-day health promotion tool targeted the perceived pros and cons of behaviors such as physical activity and fruit and vegetable intake, designed to empower individuals to take control over their health behaviors (Geller et al., 2012). The study also assessed participants' baseline routine physical activity through the IPAQ short form. After being randomly assigned to either the physical activity program or the fruit and vegetable program, participants were surveyed initially and then two weeks later with a follow-up health behavior survey. While participant physical activity improved with use of the decisional balance sheet, the sheet for fruit and vegetable intake was less effective. Study limitations included using a small but diverse sample and having a limited sample size

did not allow for the exploration of potential factors controlling the impact of the intervention (Geller et al., 2012).

Whitt-Glover and Kumanyika (2009) conducted a systematic review of interventions to improve physical activity in African Americans. They specifically identified 29 studies (Ns = 21 to 1060) with African-American adults, most using a randomized, controlled trial design. Seventy-nine percent of the studies showed significance within group pre- to post-test improvements in physical activity, with approximately 33% demonstrating differences between control and intervention groups. The most successful intervention included structured exercise programs. The authors suggested future studies identifying characteristics that may improve intervention effectiveness in increasing physical activity (Whitt-Glover & Kumanyika, 2009).

Bopp et al. (2012) conducted a literature review of faith-based and church-based physical activity interventions with varying results. Common characteristics of the studies (N = 27; faith-based n = 19 and church-based n = 11) included: (a) many were randomized, controlled trials (n = 16); (b) many used validated self-report physical activity surveys (n = 12); (c) many lacked a theoretical framework to shape the intervention (n = 16); and (d) while the majority of the studies targeted African Americans, the samples were predominantly women (78%). Greater than one-half of the studies evaluated reported an increase in physical activity after the interventions were employed. Recommendations for future studies included (a) more rigorous study designs, (b) improved measures of physical activity, and (c) use of a theoretical design to guide each study (Bopp et al., 2012).

Fitzgibbon et al. (2012) conducted a systematic review of the behavioral weight loss intervention literature between 1990 and 2010 in African-American women; many studies included physical activity (n = 22). Twenty-five studies were selected for inclusion, with sample sizes ranging from 21 to 2921. Researchers determined African-American women lose less weight than other subgroups in behavioral weight loss interventions. Authors stressed the inclusion in future studies of individual-level approaches that incorporate biological, social, and environmental factors that affect obesity to better enable the adoption of healthier behaviors (Fitzgibbon et al., 2012).

Limitations of the Fitzgibbon et al. (2012) literature review included: (a) the majority of the studies (68%) involved sample sizes fewer than 100 participants in small, non-randomized trials; (b) the exclusion of studies not published in English; (c) the exclusion of studies predating 1990; and (d) the review focused on initial weight loss rather than maintenance of weight loss (Fitzgibbon et al., 2012). The studies in this review also focused on individual behavior change, with none of the studies mentioning socio-environmental influences on eating and physical activity behaviors (Fitzgibbon et al., 2012).

Incorporation of Healthy People 2020

The goals of *Healthy People 2020* encourage health promotion interventions that foster a “social and physical environment” to motivate healthy lifestyles changes and improve the health of all Americans (USDHHS, 2012). According to *Healthy People 2020*, more than 80 % of adults do not meet the recommended guidelines for both aerobic and muscle-strengthening activities (USDHHS, 2013). Communities, organizations, and individuals working together to meet *Healthy People 2020* physical activity targets

through a multidisciplinary approach are critical to increasing the levels of physical activity and improving health in the United States. The church is an example of a social and physical environment that can promote health, especially among minority populations and may therefore serve as a means of reaching African Americans (Baruth, Wilcox, & Saunders, 2013; Bopp et al., 2012; Cowart et al., 2010; Dodani & Fields, 2010; Fitzgibbon et al., 2005; Hardison-Moody, Dunn, & Hall, 2011; Rowland & Chappel-Aiken, 2012). In addition, *Healthy People 2020* objectives were created to “empower individuals toward making informed health decisions” and to “encourage collaborations across communities and sectors” (USDHHS, 2012).

Church and Clergy as an Integral Part of Studies

Religion/spirituality may be a positive influence in health promotion with African Americans because the church, with its congregants and clergy, is a strong component in their culture which provides a solid support system (Bopp et al., 2012; Cowart et al., 2010; Dodani & Fields, 2010; Fitzgibbon et al., 2005; Hardison-Moody et al., 2011; Komar-Samardzija et al., 2012; Rowland & Chappel-Aiken, 2012). The church serves as a partner in encouraging healthy lifestyles in African Americans in a culturally sensitive way due to (a) long-standing relationships with congregational members, (b) physical spaces needed for activities are generally accessible, and (c) community support that often provides spiritual care for its members (Bopp & Webb, 2012). The church in the African-American community has been studied as an important component for both faith-based and church-based health promotion activities. In fact, many African Americans were found to regard their faith and spirituality as a means of connection and guidance that has been successfully linked to improved health outcomes. In addition, active

pastoral involvement in primary, secondary, and tertiary levels of prevention has the potential to stimulate African Americans to positive health behavior change (Levin, 1986).

Health Promotion Assessment of African Americans

Karteroliotis (2008) suggested the first step in intervention development consist of measuring and identifying the transitions and motivating factors that contribute to behavior change. A thorough population assessment has been found to be an essential component in effective health promotion strategy formation, especially when working with multicultural groups to create environments supportive of exercise behavioral change (Baker, 2011; Dishman et al., 2010; Karteroliotis, 2008; Kim et al., 2010; Paschal et al., 2010).

Effective Strategies to Improve Physical Activity in African Americans

Blaney et al. (2012) reported that although theory-based interventions are beneficial in increasing physical activity, many of the studies performed have been with Caucasian samples. With heightened risk factors for chronic illness, African Americans have a need for successful theory-based interventions derived from evidence-based research. DeVet, De Nooijer, DeVries, and Brug (2008) reported the more people became engaged in the processes of change through independent variables, the more motivated they were for change to occur. Further, as individuals learned more advantages to nutrition and physical activity, they began to notice more benefits and fewer disadvantages to healthy lifestyle practices (Pekmezi et al., 2010).

Minority-focused research has shown social disadvantage may be associated with causes of decreased physical activity, ultimately leading to low levels of self-efficacy,

perceived hopelessness, and low levels of self-esteem (Terre, 2009). In addition, socioeconomic and sociocultural status may contribute to decreased educational opportunity, health illiteracy, and decreased access to resources (Terre, 2009). Physical activity levels can be challenged due to social policy and the built environment, contributing to a lack of walking and bike trails, and unsafe environments (stray dogs and high crime rates). Inclusion of potential barriers of the exercise decisional process offers a more culturally-specific assessment of African Americans' decisions to engage in routine physical activity, providing a more substantive foundation for health promotion strategy development (Terre, 2009). This assessment data clarifying cultural influence on health-promoting behaviors of African Americans can be used in nursing to develop educational and evidence-based approaches to healthy lifestyles for this at-risk population (Baker, 2011; Hawthorne, Robles, Cannings-John, & Edwards, 2010).

Although studies historically looked at health promotion interventions, recent studies showed vulnerable groups such as African Americans often have a different perspective concerning health promotion; therefore, health education with this group must include cultural content (Baker, 2011; Johnson, 2005; Terre, 2009). Some evidence-based health education programs have been created specifically for African Americans but have shown varying results, often with only short-term effectiveness (Dodani, Kramer, Williams, Crawford, & Kriska, 2009; Fitzgibbon et al., 2005; Wilcox et al., 2013; Yanek, Becker, Moy, Gittelsohn, & Koffman, 2001).

In the state of the science, the constructs of stages of change, decisional balance, processes of change, and self-efficacy in the TTM have been found to play an important role in the adoption and maintenance of healthy behaviors (Pekmezi et al., 2010).

Researchers have reported individuals use different strategies and techniques depending on their stage in the change process (DeVet et al., 2008; Pekmezi et al., 2010). Health promotion intervention approaches are more likely to be beneficial if directed toward individuals' specific levels of readiness for physical activity change (Pekmezi et al., 2010). Further, in order for effective strategies to be designed and implemented, it is critical to first assess cultural groups' attitudes and decision-making processes on health behaviors (Paschal et al., 2010).

Research Gap

Health care providers are in great need of determining effective theory-driven, evidence-based, culturally-appropriate interventions to increase routine physical activity behaviors of African-American adults. In order for effective strategies that promote and sustain participation in routine physical activity in African Americans to be developed and implemented, individuals' exercise stage of change, confidence on making a change, and attitudes on the exercise decision-making processes must be more thoroughly assessed (Kim et al., 2010; Paschal et al., 2010).

Nurses make up the largest sector of health care providers, and therefore play a vital role in health promotion and disease prevention services, especially in underserved and vulnerable populations (Pender, Murdaugh & Parsons, 2011). Lifestyle and behavior modification are essential to health, and nurses are on the front lines encouraging these healthy behaviors and developing effective health promotion strategies. Health care professionals, especially nurses, are in a position to assess populations, as well as to initiate and maintain routine physical activity at all levels (primary, secondary, and tertiary) and in a variety of settings (Kim et al., 2010).

Gaps in Knowledge

To date, little is known about the specific motivators and deterrents to routine physical activity in African Americans, yet this assessment data is essential in health program development. Effective psychobehavioral strategies are needed to ensure greater effectiveness in improving routine exercise and overall health-promoting behaviors in African Americans, taking into account their cultural influences. Previously, researchers have investigated use of the decisional balance tool to determine the pros and cons of decision-making but with inconsistent results, especially in minority populations. Suggestions have been made for the revision of the constructs of the TTM to more effectively apply the model to African Americans and ultimately develop more culturally competent interventions (Baker, 2011; Bleaney, 2012; Terre, 2009). The identification of successful health promotion interventions and health promotion education to increase physical activity in African Americans is one step toward decreasing their high risk of chronic illness (Friedman et al., 2012).

Pekmezi and Jennings (2009) summarized recent research to promote physical activity interventions among African Americans. Although current research improvements have included (a) larger sample sizes, (b) an increase in randomized controlled trials, (c) greater use of reliable and valid self-report tools, and (d) interventions based on theoretical frameworks, additional exploration is needed to fill research gaps. Future research should include (a) diverse samples of African Americans (including more male participants and younger participants), (b) examining the development of culturally-tailored interventions, (c) further examination of church-based

interventions, and (d) examination of the built environment (Pekmezi & Jennings, 2009; Sallis, Floyd, Rodriguez, & Saelens, 2012).

Suggestions for Future Research

Validation of TTM-related constructs with minority populations can assist in ensuring health promotion interventions are tailored to improve routine physical activity in African Americans and create supportive environments that might make behavioral change more effective (Paschal et al., 2010). Blaney et al. (2012) suggested continued replication studies with African Americans through the use of TTM as a framework for tailoring interventions to increase and sustain recommended physical activity behaviors, as the results of the decisional balance scale in this study did not effectively replicate results of other studies (Greaney et al., 2008; Hoke & Timmerman, 2011; Kim et al., 2010). Blaney et al. (2012) suggested further research is needed to determine if the decisional balance scale needs to be more culturally adapted.

In addition, an essential step to enhancing the physical activity behavior of any at-risk population is to identify adaptable behavioral correlates for that particular group (Bungum et al., 2013). Previous research showed psychosocial and demographic factors to be associated with physical activity, while more recent findings show the built environment as being an important predictor of physical activity levels of a community (Bungum et al., 2013; Sallis, et al., 2012). Sallis et al. (2012) reported disadvantaged neighborhoods had less supportive ecological conditions, poorer environmental appeal, and inferior conditions related to traffic safety and crime. Although tailoring health promotion interventions to cultural norms and preferences of populations is important, more empirical evidence is needed to justify these efforts (Pekmezi & Jennings, 2009).

Bungum et al. (2013) suggested evaluating at-risk populations using eight items focused on neighborhood characteristics which have been hypothesized to influence physical activity in African-American adults, providing a more complete assessment. These items included: (a) the presence of neighborhood sidewalks, parks, and recreation facilities; (b) the presence of a nearby grocery store or church; (c) the prevalence of neighborhood crime; (d) unleashed dogs; (e) neighborhood traffic; (f) neighbor trustworthiness; (g) friends and relatives living within walking distance; and (h) the appeal of the neighborhood for walking (Bungum et al., 2013).

According to Holt et al. (2011), the intention of the church-based approach to health education was to work within the spiritual support system and to use the existing aspects of the African-American culture to support health promotion education in a culturally appropriate manner. Pekmezi and Jennings (2009) reported churches have shown potential as culturally sensitive settings for physical activity, as they are often “the social hub of the community and committed to service and outreach” (p. 174); research findings to date have varied. These authors therefore suggested conducting additional assessments with African Americans in convenient locations, such as churches, to determine culturally appropriate interventions because more research is needed.

Additional recommendations for future studies included: (a) more rigorous study designs; (b) improved measures of physical activity; (c) the use of a theoretical design to guide research studies (Bopp et al., 2012); (d) continued validation of the TTM-related constructs with minority populations (Hoke & Timmerman, 2011; Kim et al., 2010; Paschal et al., 2010; Paxton et al., 2008; Pekmezi et al., 2009); (e) continued research to explain longitudinal transitions between sedentary behavior and active lifestyles

(Dishman et al., 2010; Kim et al., 2010); and (f) identification of characteristics that may improve intervention effectiveness in increasing physical activity (Blaney et al., 2012; Pekmezi et al., 2009; Whitt-Glover & Kumanyika, 2009).

Blaney et al. (2012) stressed the need to continue research using the decisional balance scale (specifically cons) with minority populations to determine if this scale may need additional development to adequately assess the decision-making process of physical activity participation. Fuehmeier et al. (2006) suggested interventions include social support and self-efficacy. Lucan et al. (2010) encouraged identification of promoters and barriers to healthy behaviors in African Americans to more effectively improve these behaviors. A summary of research studies focusing on physical activity based on the TTM is in Appendix A.

Barriers in Previous Research

Barriers to health promotion programming featuring physical activity with African Americans in a church-based setting often have included: (a) limited health literacy, (b) competing priorities, (c) limited congregational interest, (d) difficulty motivating participation in research studies, (e) pastors' non-support of wellness assessments and programs being addressed in the church, and (f) competition for time and space with other church activities (Bopp et al., 2009; Bopp et al., 2012; Cowart et al. 2010; Lucan et al., 2010; Peek et al., 2012; Resnicow et al., 2004; Wilcox et al., 2013; Yanek et al., 2001). Culturally-specific appraisals of the barriers to routine physical activity in African Americans were seldom described in the literature, prompting a more thorough, culturally-focused approach.

Limitations in Previous Research

Through previous health promotion research studies featuring physical activity, limitations have included: (a) small sample size in some studies (smallest N = 11) (Coward et al., 2010; Dodani & Fields, 2010; Hoke & Timmerman, 2011); (b) missing clinical data on surveys and questionnaires (Coward et al., 2010); and (c) self-report of surveys for physical activity and stages of change, which may be subject to recall bias (Coward et al., 2010; Fitzgibbon et al., 2005; Paschal et al., 2010). Researchers have reported limited generalizability of study findings due to the majority of participants being female (Dodani & Fields, 2010; Friedman et al., 2012; Kim et al., 2010). In addition, some of the samples were very specific and limiting (e.g., overweight, rural, Mexican American women; Korean adults with metabolic syndrome) (Hoke & Timmerman, 2011; Kim et al., 2010). Further, some potential culturally-based exercise barriers (e.g., cost, neighborhood safety, weight misperception, perception of health risk factors, neighborhood walkability and available physical activity resources, and injury due to exercise) have not been included in previous studies with African Americans (Blaney et al., 2012; Duncan et al., 2011; Moore et al., 2010; Terre, 2009). Inclusion of these potential barriers in the exercise decisional balance survey provides a more culturally-specific assessment of the readiness of African Americans to engage in routine physical activity.

Summary

Strategies that promote improved and sustained participation in routine physical activity in African Americans have been thwarted by insufficient knowledge of the readiness of these adults to engage in regular exercise (Kim et al., 2010). Relatively little

research has been conducted on the relations of environment and culture with exercise decision-making with African Americans. This study afforded a theory-based assessment with the inclusion of environmental and cultural factors of African-American exercise behaviors to provide a starting point for creating practical strategies aimed at promoting and increasing physical activity. It also encourages and supports nurses to increase their knowledge of exercise behaviors, psychological attributes, and risks of inactivity in African-American adults by providing theory-based nursing research with a vulnerable population.

Chapter 2 described the relationship between sedentary behavior and high rates of chronic illness in African Americans (Pekmezi et al., 2009). Specific physical activity recommendations were delineated. Previous research studies conducted to assess the physical activity of African Americans and other minority populations were discussed, as well as the studies using TTM constructs. Current *Healthy People 2020* physical activity targets were described. A variety of previous research studies demonstrating the church as an integral part of the support system for the African-American community was provided. In the state of the science, the TTM was described as a valuable tool in the development of effective strategies aimed at improving physical activity levels in African Americans. Research gaps focused on specific motivators and deterrents to routine exercise were described, along with suggestions for future research.

CHAPTER 3

THEORETICAL FRAMEWORK: THE TRANSTHEORETICAL MODEL

Introduction

Theoretical frameworks provide a roadmap of factors to consider when designing, implementing, and evaluating a health promotion program (Raingruber, 2014). The framework that guided this research study was the Transtheoretical Model of Change (TTM), developed by Prochaska and Velicer (1998). This chapter describes the concepts of TTM used in this study and includes information about the following: (a) background of the Transtheoretical Model, (b) stage of change, (c) decisional balance, (d) self-efficacy, (e) application of the TTM, and (f) research questions and instruments in the application of the TTM for exercise behavior.

Background of the Transtheoretical Model

Effective strategies are needed to encourage routine physical activity regimens in at-risk populations. While theoretical models provide structure when creating health promotion strategies (Raingruber, 2014), the TTM specifically offers a framework for providing support to individuals through the various stages of change in exercise behaviors (Kim et al., 2010; Velicer et al., 1998). The TTM focuses on movement through these stages, explaining how this dynamic movement occurs through the inclusion of decisional balance and self-efficacy scales.

In the TTM, behavior change is theorized to be a process that evolves over time with movement through the five stages. The theoretical constructs of decisional balance and self-efficacy play an important role in the implementation and sustainability of health behaviors (Pekmezi et al., 2010). The TTM has been applied to exercise behaviors in

both healthy populations, as well as those with chronic illness, to facilitate the understanding of exercise behavior or to evaluate programs in clinical trials (Kim et al., 2010). There is limited research, however, using the TTM with the African-American population in a church-based setting to determine associations with exercise behavior. The TTM, developed by Prochaska and Velicer in 1997, was a pivotal development that provided an assembly of concepts integrated from several other theories describing behavioral change and the decision-making process involved. The components of the TTM used in this study included the stages of change for exercise as the central organizing construct, as well as decisional balance and self-efficacy for exercise (Velicer et al., 1998). The TTM is assessed through an individual's self-report, involving one's emotions, cognitions, and behavior, while recognizing individuals are at different stages (Velicer et al., 1998). In addition, the stages of changes are on a continuum, with changes occurring at different points in one's life.

The TTM has previously been applied to a wide variety of problem behaviors including smoking cessation, exercise, nutritional intake, weight control, drug abuse, and mammography screening (Velicer et al., 1998). It is important to develop effective strategies to address at-risk behaviors in vulnerable populations, and it is essential to evaluate the attitudes and decision-making processes of individuals with a theoretical framework as a guide. The TTM will be used to assess study participants' stage of change, decisional balance, and self-efficacy for exercise with African Americans as well as associations between these TTM-related constructs.

Exercise Stages of Change

The TTM has been applied to challenging health behaviors, including nutritional habits and participation in physical activity (Paschal et al., 2010). It has five distinct stages, referred to as the Stages of Change (SOC), with each stage reflecting one's personal interest and motivation to change problematic health actions (Velicer et al., 1998).

First, the pre-contemplation stage consists of an unwillingness or lack of intention to change a problem behavior within a certain time frame, generally measured as the next six months (Velicer et al., 1998). Individuals at this stage may be uninformed or under-informed about the consequences of their actions, may lack recognition that a problem exists, or may have unsuccessfully tried to change their behavior in the past. People in the pre-contemplation stage have been described as unmotivated to make a change, lacking the readiness needed to successfully change, or being in denial about needing to make a change (Paschal et al., 2010).

Next, according to Bosworth et al. (2009), the contemplation stage involves “weighing the consequences of action or inaction of a problem behavior” (p. 4). In this stage, people intend to make a change within the next six months. They are generally aware of both the pros and cons of making a behavioral change, which may produce ambivalence. People in this stage are often not yet prepared for an action-oriented program (Velicer et al., 1998).

In the preparation stage, people make a commitment to make changes in the near future (usually within the month), making the initiation of new behavior more likely. Individuals in this stage have begun to make changes and have made a plan of action to

change their behaviors. At this stage, they are often prepared for an action-oriented program (Velicer et al., 1998).

In the action stage, active behavior modification is taking place but has been sustained for fewer than six months. The individual is actually engaged in the desired behavioral change, which must satisfy a criterion sufficient to reduce disease risk (Paschal et al., 2010); therefore, not all behavior modifications count as progression to the action phase. In this stage, it is crucial to monitor closely for signs of relapse (Velicer et al., 1998).

Finally, the maintenance stage occurs when one has engaged in a new behavior focusing on lifestyle modification and relapse prevention for a minimum of six months (Bosworth et al., 2009). The individual is less tempted to relapse and demonstrates confidence in his/her new behaviors (Velicer et al., 1998).

At the various stages of change in the TTM, health promoters may use different methods to prompt movement to the next stage (Velicer et al., 1998). The movement between stages is influenced by (a) problem pro and con ratio, (b) self-efficacy, (c) temptations, and (d) coping mechanisms (Bosworth et al., 2009).

Exercise Decisional Balance

The TTM also reflects decisional balance, which is one's weighing the pros and cons of making a behavior change (Velicer et al., 1998). This construct was originally derived from the Janis and Mann (1977) model of decision making, comprised of four categories of pros (gains for self and others and approval for self and others), as well as four categories of cons (costs to self and others and disapproval of self and others) (Velicer et al., 1998). Through empirical testing, the TTM was developed into a two-

dimensional structure involving only two factors, the pros and the cons of decisional balance; exercise decisional balance consists of statements on the pros and cons of exercise. Each of the items is measured using a 5-point Likert scale ranging from “not important at all” (1) to “extremely important” (5), where the higher score represents a stronger positive or negative emotion (Velicer et al., 1998).

An expected pattern has been determined as to the relationship of pros and cons with the stages of change involving the acquisition of healthy behaviors. In the precontemplation stage, the pros of exercise tend to be low, while the cons tend to be high. In the contemplation and preparation stages of change, the pros increase while the cons remain stable. In the action and maintenance stages of change, as healthy behaviors are acquired, the cons tend to diminish while the pros remain high (Velicer et al., 1998).

Exercise Self-Efficacy

The self-efficacy construct, developed from Bandura’s self-efficacy theory, embodies the confidence one has to cope with high-risk circumstances that may lead to a relapse back to unhealthy habits (Velicer et al., 1998). This construct has recently become a component of the TTM, determining an individual’s confidence level related to a specific situation. Self-efficacy can be represented as an increasing function across the stages of change, for as the stages progress from precontemplation to contemplation to preparation and so on, the level of self-efficacy generally increases as well (Velicer et al., 1998).

Determining self-efficacy is important in developing strategies for health promotion, for if an individual thinks change is beyond his/her capabilities, he/she may not try to change. Individuals who rank low on self-efficacy need encouragement that

making a change is possible and often need specific strategies about how to make the change. The TTM scale that addresses exercise self-efficacy consists of the following six items: (a) negative affection toward exercise; (b) excuse making for not exercising; (c) must exercise alone; (d) inconvenient to exercise; (e) resistance from others about exercise; and (f) bad weather (Velicer et al., 1998). Each of the six items will be measured using a 5-point Likert scale ranging from “not confident at all” (1) to “extremely confident” (5), where the higher score represents more confidence to engage in the exercise behavior (Velicer et al., 1998).

Application of the Transtheoretical Model

The TTM can be applied to health promotion assessment, intervention development, and intervention implementation, also impacting the areas of recruitment, retention, progress, process, and outcome. In addition, health programs based on the TTM have had higher participant retention rates than other models used and is useful in measuring progression in healthy behaviors (Greaney et al., 2008). Researchers reported the theoretical constructs of the stages of change, decisional balance, and self-efficacy have played an important role in the implementation and sustainability of health behaviors (Greaney et al., 2008; Pekmezi et al., 2010). The constructs of the TTM were used in this descriptive, cross-sectional study to improve knowledge about exercise behavior in African Americans in a church-based setting because there has been limited research conducted on this topic. Results of the TTM surveys may help tailor effective interventions to seek to improve physical activity participation in African Americans.

Summary

In Chapter 3, the Transtheoretical Model of Change (TTM), developed by Prochaska and Velicer, provides a framework for providing support to individuals through the various stages of change in exercise behaviors (Velicer et al., 1998). This model also includes the constructs of decisional balance (pros and cons of decision-making) and self-efficacy (confidence to make a change) for exercise. The TTM was applied to an assessment of African Americans in this study, specifically as it related to physical activity with stages of change, physical activity motivators and deterrents, and confidence in the decision on whether or not to exercise.

CHAPTER 4

RESEARCH METHODOLOGY

Introduction

In this chapter, details of the methodological procedures used to examine variance in the stages of change are described. The following sections will be included: (a) study design, (b) setting and sample, (c) ethical considerations for protection of research participants, (d) study procedure, (e) budget, (f) study measurement tools, (g) study variables, (h) and research questions.

Study Design

After obtaining approval through the Institutional Review Board (IRB) at the University of Nevada, Las Vegas (UNLV), the student researcher (SR) used a descriptive, cross-sectional research design with a convenience sample of 200 African Americans from multiple predominantly African-American churches in northwest Ohio (Appendices J, K, L). This study used components of the TTM to determine associations of routine physical activity in African Americans in a church-based setting. A cross-sectional study was appropriate because it examined groups of subjects in stages of development (i.e., the five different stages of change). This type of design involves study participants who are likely to be at various different stages in the exercise stages of change. Participants were categorized by groups (exercise stage of change), and data on the selected variables (decisional balance, self-efficacy, IPAQ, and demographics) was collected at one time point. This data collection was conducted in seven African-American churches in early 2014 after facility authorization forms were obtained and continued until an adequate sample size was obtained (Appendix I) (N = 200).

Setting and Sample

This study enrolled a convenience sample of African-American adults who were members of designated churches in low-income, inner city census tracts in a west central Ohio urban area. The SR met with local African-American church pastors in the project planning phase to determine an optimal recruitment strategy to obtain study participants. Local African-American church pastors supported and assisted with recruitment from the various churches by announcing the project in church through pulpit messages, during church events, in church bulletins and newsletters, to encourage congregant participation. The SR also posted flyers as well as making announcements at each church for at least two weeks prior to the in-person survey dates (Appendix O).

Participants' inclusion criterion consisted of (a) self-identified as African American, (b) a minimum age of 18 years, and (c) willing to participate in the study. Exclusion criterion consisted of self-reported pregnant females. The ANOVA required the most stringent sample size. G*Power 3.1.2 was used to calculate sample size with a medium effect size of .25, a generally accepted power of .80, and a significance level of .05 (Pallant, 2010). This program recommended a desired sample of 200 participants to achieve validity for ANOVA with five groups (stage of change) (Faul, Erdfelder, Buchner, & Lang, 2013).

Ethical Considerations

After the UNLV IRB gave exempt approval for the study to commence, the SR discussed study details with pastors of all potential churches. Interested churches prepared and signed a facility authorization form, agreeing to allow their congregants to participate in the study (Appendix I). Once the pastors committed their churches to

participate, the SR recruited participants as described above. The SR obtained informed consent from study participants by providing a study information sheet stating that completion of the survey provided consent to participate in the study, thereby preserving anonymity. Prior to collecting study data, three participants from the churches were asked to complete the survey as a pilot. This was conducted to trial survey readability and time to complete the surveys. The study then took place at each of seven different local churches either after church service, before bible study, or in conjunction with a church gathering such as a congregant celebration with food served. More specifically, data collection took place in church lobbies and church recreation halls. Once study data was collected and analyzed, the SR provided both written and verbal aggregate results to pastors that were then shared with congregants.

Study Procedure

On the designated survey dates, the SR discussed the project in more detail to interested congregants and provided informed consent information along with the surveys. The study was deemed exempt by UNLV IRB (Appendix J). Through verbal questioning, the SR screened out those who did not self-identify as African American, those who were not at least 18 years old, those who were not interested in participating in the study, or those who reported pregnancy. A research assistant was obtained and trained to assist on site with handing out of surveys and receiving completed surveys. She was a nurse who completed the required Collaborative Institutional Training Initiative (CITI) requirements to assist with data collection (Appendices M, N).

Participants then completed the demographic data and information sheet, and other surveys (stage of change for exercise survey, decisional balance for exercise survey,

self-efficacy for exercise survey, and the IPAQ) on site and submitted these to the SR and research assistant during that session. Congregants were informed that they would need an estimated 20 minutes to complete all the forms. When the surveys were handed out to participants, they were asked if they would like any assistance in completing the surveys. Those participants who were illiterate, stated difficulty with reading, or stated difficulty with their vision were taken to a private area where survey questions were individually read to them and their responses completed according to their desired answer choices. The SR was available during the survey sessions to answer any questions regarding the surveys. Data were entered into the SPSS version 21.0 for windows for analysis.

Study Budget and Timeline

Incentives were used to encourage participation in the study and obtain an adequate sample size. A pedometer (provides an inexpensive, objective measure of physical activity patterns in steps per day) was distributed to all study participants after they submitted their completed survey. A drawing was performed at the end of data collection for various gift prizes for those completing the surveys. Drawing prizes included: two physical fitness memberships, water bottles, various store gift certificates (Walmart and Subway), and sports clothing donated by a local sporting goods store (t-shirts, sports socks, and baseball hats). In addition, the contact person at each church was given a gift in appreciation for their assistance in organizing the survey event. This gift was a water bottle and a Subway gift certificate.

Table 1

Budget for Study Materials and Incentives

Item	Cost per Item	Number of Items	Total Cost
Printing costs for surveys/consents	.04	13 pages X 200 = 2600	\$104
Advertisement flyers for churches	.04	1 page X 500 = 500	\$20
Clipboards for survey completion	\$1.50	50	\$75
Trifold poster with study information	\$10	1	\$10
Pedometers with straps (incentive)	\$5	200	\$1,000
Water bottles (drawing and appreciation gifts)	\$10	31	\$310
Subway gift cards (drawing and appreciation gifts)	\$10	12	\$120
Walmart gift cards (drawing)	\$25	2	\$50
		Total	\$1,679

The total cost of study materials and incentives are shown in Table 1. Several additional drawing prizes were donated by local businesses: various sports clothing; one six-month local gym membership; and one 12-month local gym membership. The total cost for the project was \$1,679.

After analysis of the study data, the SR disseminated the research findings to individual participating church pastors by setting up a meeting with each pastor or church

representative. A written summary of aggregate study results was briefly shared verbally, as well as a short written summary. These summaries included: (a) study findings on stages of change, decisional balance, self-efficacy, and current activity patterns of participants; (b) associations between surveys and demographics/ baseline data; promoters and deterrents of exercise for study participants.

Study Measurement Tools

Study participants completed a demographic survey and information sheet to determine sample characteristics. Participants also completed a physical activity survey (IPAQ) to determine routine exercise levels. Several TTM-related surveys were completed to measure dependent variables in the study: (a) stage of change for exercise, (b) pros and cons of making a behavioral change for exercise (decisional balance), and (c) self-efficacy for exercise. Data was obtained through paper and pencil surveys on-site at seven different churches using the survey tools shown in Appendices B through F. Participants were told the survey could take 20 minutes to complete, although most participants took between five and 15 minutes to complete the surveys.

Study Variables and Measurement Tools

All study participants completed five surveys as described below.

Exercise stages of change survey. The stages of change for exercise were assessed using the short-form survey, requesting participants to choose one of five statements that best described current exercise patterns (Appendix B). In this survey, each statement corresponded with one of the five stages of change: (a) precontemplation stage (“I currently do NOT engage in physical exercise, and I am NOT thinking about starting.”); (b) contemplation stage (“I currently do NOT engage in physical exercise, but

I am thinking about starting in the next 6 months.”); (c) preparation stage (“I currently do engage in some physical exercise, but not regularly.”); (d) action stage (“I currently do engage in regular physical exercise, but I only started within the last 6 months.”); and (e) maintenance stage (“I currently do engage in regular physical exercise, and I have done so for longer than 6 months.”) (Velicer et al., 1998).

Each study participant chose one of the five stages of change choices that determined their current stage of change. Each participant’s stage of change was compared with the other components of the TTM, such as decisional balance and self-efficacy. By accurately assessing stage of change for exercise, researchers may be able to gain useful insight on ways to improve physical activity efforts. A reliability of 0.78 for stage of readiness for exercise using the short scale has been reported. A hallmark study by Cardinal (1997) demonstrated a test-retest reliability value of $r = 1.0$. Various studies have shown construct and face validity of the exercise stages of change model (Cardinal, 1997; Fallon, Hausenblas, & Nigg, 2005).

Exercise decisional balance survey. The decisional balance survey used in this study consisted of the 10 items from the original survey that addressed the pros and cons of routine exercise and the decision-making process used when deciding whether or not to exercise (Appendix C). This decisional balance scale consisted of items that addressed the decision-making process of exercise, weighing the importance of pros and cons (five of each), while providing a predictable pattern from previous studies of how decisional balance related to the stages of change (Velicer et al., 1998). Content areas of the pros scale for regular exercise in the original scale included: (a) having more energy, (b) feeling less stressed, (c) being in a better mood, (d) feeling more comfortable with one’s

body, and (e) having a more positive outlook on life. Content areas of the cons scale for regular exercise in the original scale included: (a) feeling embarrassed if people saw me; (b) keeping one from spending time with friends; (c) feeling uncomfortable or embarrassed in exercise clothes; (d) is too much to learn; and (e) putting an extra burden on one's significant other (Velicer et al., 1998).

The 10 items in the survey were measured on a 5-point Likert scale using the following answer choices: (a) Not important at all (1), (b) Slightly important (2), (c) Moderately important (3), (d) Very important (4), and (e) Extremely important (5). On this Likert scale, a lower score represented weaker positive or negative feelings, whereas a higher score represented stronger positive or negative feelings (Velicer et al., 1998). Psychometrics from previous studies for the exercise decisional balance scales showed the following: (a) Blaney et al. (2012) reported a Cronbach alpha for the pro scale of .85 and for the con scale .74 with African Americans; (b) Karteroliotis (2008) reported a Cronbach alpha for the pro scale of .84 and .81 for the con scale with Greek adults; (c) Hoke and Timmerman (2011) reported a total Cronbach alpha of .91, .89 for the pro scale, and 0.87 for the con scale with Mexican women; (d) Lee, Park, and Kim (2006) reported a Cronbach alpha of .86 for the pro scale and .70 for the con scale with Korean women; and (e) Kim et al. (2010) reported a total Cronbach alpha of .80 in Korean adults with metabolic syndrome. The combined pros and cons decisional balance scale had an acceptable Cronbach's alpha for an existing tool above .80 (Burns & Grove, 2009).

Exercise self-efficacy survey. This survey is a construct derived from Social Cognitive Theory and refers to an individual's ability to perform a specific behavior in a specific situation (Pekmezi et al., 2010). Self-efficacy has been found to be a good

predictor of physical activity; for example, if an individual has high self-efficacy for a situation (such as bad weather), he/she is more likely to be physically active in rain or snow than an individual who has low self-efficacy for that same situation who does not exercise due to the weather (Pekmezi et al., 2010). This scale consisted of six items that addressed confidence in exercise-specific situations an individual may have to cope with in a high-risk situation without relapsing back to an unhealthy or high-risk habit (Velicer et al., 1998).

The exercise self-efficacy survey items addressed the following situations: (a) Negative affect (“I am under a lot of stress”), (b) Excuse making (“I feel I don’t have the time”), (c) Must exercise alone (“I have to exercise alone”), (d) Inconvenient to exercise (“I don’t have access to exercise equipment”), (e) Resistance from others (“I am spending time with friends and family who do not exercise”), and (f) Bad weather (“It’s raining, snowing, hot or cold”). The SR modified the survey item addressing bad weather from the original scale to include hot or cold, therefore more comprehensively listing potential factors that affect physical activity participation.

These six items in the survey were measured on a 5-point Likert scale using the following answer choices to show confidence in exercising under described conditions: (a) Not at all confident (1), (b) Somewhat confident (2), (c) Moderately confident (3), (d) Very confident (4), and (e) Completely confident (5). On this Likert scale, a lower score represented a lower level of confidence, whereas a higher score represented greater confidence to change exercise behavior (Kim et al., 2010). Construct validity, test-retest reliability ($r = .90$ to $.94$), and internal consistency reliability (0.73 to 0.85) have been reported (Astroth et al., 2010) (Appendix D). The reliability coefficient for the exercise

self-efficacy survey has been reported as a Cronbach's alpha coefficient of: 0.96 in adults, 0.96 in diabetic adults, and 0.86 in Korean adults with metabolic syndrome (Kim et al., 2010).

Routine exercise survey. The short form of the International Physical Activity Questionnaire (IPAQ) was used to measure self-reported physical activity of study participants in the past seven days (Appendix E). Completion of this questionnaire assisted in determining the amount and intensity of physical activities that people recently have performed as part of their everyday lives. The questionnaire was comprised of seven questions, asking the amount of time (in minutes, hours, and days) spent being physically active in the last seven days. This questionnaire included a minimum of 10 minutes of consistent exercise and included activities done at work, activities done as part of housework and yard work, activity performed to get from place to place, and activity performed for recreation, exercise or sport.

The IPAQ divided the physical activity questions into four categories: (a) vigorous physical activity, (b) moderate physical activity, (c) walking, and (d) sitting. The categories were measured in number of days per week, as well as minutes or hours per day. This provided a self-report of both the level of physical activity or sedentary behavior performed, as well as the amount of time spent at each level throughout the past seven days. Hallal and Victora (2004) worked with the IPAQ in 12 different countries and reported Spearman's correlation coefficients of: (a) reliability of $r = 0.8$; (b) the short and long forms produce comparable results ($r = 0.67$); and (c) the criterion validity ($r = 0.30$), although low in magnitude, was comparable to most other self-report

questionnaires. This questionnaire has been widely used with multiple ethnic groups to determine recent routine physical activity (Hallal & Victora, 2004).

Although there has been limited information on the validity of the short form of the IPAQ in diverse U.S. populations, Wolin, Heil, Askew, Matthews, and Bennett (2008) determined its validity in a sample of low-income African Americans. In this study, there was moderate correlation between the IPAQ and accelerometers measuring physical activity ($r = .26$ for a 10-minute period and $r = .36$ for a 1-minute period), showing moderate association between self-reported physical activity in African Americans and a more objective measure, an accelerometer. Correlations were found to be higher among African American men than women (Wolin et al., 2008). This study validated the use of the IPAQ short form in this population. Further, both the short and long versions of IPAQ have been validated in 12 countries with a variety of populations (Craig et al., 2003).

Medina, Barquera, and Janssen (2013) found moderate to vigorous physical activity measures obtained from two IPAQ surveys were moderately correlated ($r = 0.55$) when repeated with the same sample one week apart. Further, when IPAQ results were compared with actual activity measured by an accelerometer, these results showed a small correlation ($r = 0.26$ to 0.31) and self-reported results were considerably higher than those measured by the accelerometer. Medina et al. (2013) suggested the differences might be explained by several factors: (a) true differences in the moderate to vigorous physical activity levels from week to week, (b) overestimation of the true moderate to vigorous physical activity level due to an incorrect perception of activity, (c) a

misinterpretation of the survey questions that led to measurement error, or (d) the inability of participants to correctly recall all activities performed to complete the survey.

The IPAQ survey results in this study were used to determine estimates of activity for African Americans in this study sample. Subtotals for each section as well as a total score were computed. Recommended routine physical activity for adults was defined as participating in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week (or a combination of these) spread throughout the week (ACS, 2012; Haskell et al., 2007; Nelson et al., 2007).

Demographic survey and information sheet. Demographic data and general information were collected through a survey (Appendix F). This survey asked participants information on the following: (a) age, (b) gender, (c) health issues, (d) health rating, (e) annual household income, (f) education, (g) employment status, (h) marital status, (i) number of children in household under age 18 years, (j) risk for falls, (k) smoking habits, (l) factors that encourage exercise, and (m) factors that deter exercise. This data was used to compile descriptive statistics and basic information from the participants.

Researchers in previous studies have suggested several factors that may affect African Americans in their exercise decision-making process. According to research, factors that have often not been addressed include: neighborhood safety, the costs of exercise, perception of weight, social isolation, and neighborhood walkability and activity resources (Baker, 2011; Blaney et al., 2012; Casey et al., 2010; Duncan et al., 2011; Moore et al., 2010; Terre, 2009). Therefore, the SR added these items to the demographic survey and information sheet.

More specifically, participants were asked to choose items on the demographic survey and information sheet that might prevent exercise including: time; family/friends do not exercise; costs of exercise clothes, shoes, and overall costs; tired; exercising alone; cannot get away from the kids; do not feel safe; too many health problems; no sidewalks or walking trails; happy with body as it is; afraid of getting hurt or falling; pain; do not trust neighbors; afraid of dogs; and traffic. Participants were then asked to choose items on the demographic survey that might promote exercise including: decreased health risks; weight loss; increased energy; better mood; neighborhood is a nice place to walk; decreased stress; improved sleep; and can easily walk to grocery store or church.

Research Questions and Hypotheses

The following research questions were used to guide this descriptive, cross-sectional study (Table 2).

Table 2

Research Questions in the Application of the TTM for Exercise Behavior in African Americans in a Church-Based Setting

Research Questions
What are the stages of change for exercise behavior in African-American adults in a church-based setting?
What is the perceived physical activity behavior as measured by the IPAQ of African-American adults in a church-based setting?
Are there differences in IPAQ total, decisional balance, and self-efficacy across the stages of change for exercise behavior in African-American adults in a church-based setting?
What relationships exist among the demographic characteristics (age, gender, education, income, and employment status) and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults in a church-based setting?
Are there statistically significant associations between perceived physical activity behavior (IPAQ) and decisional balance, self-efficacy, and stages of change in African-American adults in a church-based setting?
Are there statistically significant associations between health conditions and perceived physical activity behavior (IPAQ) in African-American adults in a church-based setting?
What relationships exist between factors that prevent participants from exercising and the stage of change survey results in African-American adults in a church-based setting?
What relationships exist between factors that promote exercise and the stage of change survey results in African-American adults in a church-based setting?

The research questions, analyses, and correlating hypotheses that guided this study are detailed below and summarized in Appendix G.

Research Question One

What are the stages of change for exercise behavior in African-American adults in a church-based setting? To assess research question one, descriptive statistics were conducted on the sample (African-American adults in a church-based setting).

Frequencies and percentages were calculated to describe the grouping of the five stages of change of exercise in the given demographic.

Research Question Two

What is the physical activity behavior as measured by the IPAQ of African-American adults in a church-based setting? To assess research question two, descriptive statistics were conducted for the sample (African-American adults in a church-based setting). The mean and standard deviation were calculated for IPAQ scores and indicated routine physical activity for the given demographic. The total physical activity score as well as the subscores (walking, moderate and vigorous activity, and sitting) were assessed. These descriptive statistics show walking, moderate and vigorous activity, and sitting both with the self-reported zero scores recorded and without the self-reported zero scores.

Research Question Three

Are there differences in IPAQ total, decisional balance, and self-efficacy across the stages of change for exercise behavior in African-American adults in a church-based setting? The null hypothesis (H_03) was: There are no statistically significant differences in TTM-related constructs (decisional balance and self-efficacy) across the stages of change for exercise behavior in African-American adults in a church based setting. The hypothesis (H_a3) was: There are statistically significant differences in TTM-related constructs (decisional balance and self-efficacy) across the stages of change for exercise behavior in African-American adults in a church based setting.

To assess research question three, a series of Analysis of Variance (ANOVAs) tests were conducted. The first ANOVA examined differences in mean values for

decisional balance scores across the five stages of change. The second ANOVA examined differences in mean values for self-efficacy scores across the five stages of change. The third ANOVA examined differences in mean values for IPAQ survey total scores (both with and without self-reported zero scores) across the five stages of change. The fourth and fifth ANOVAs examined differences in the decisional balance pro scale and con scale in relation to exercise stage of change. For the first ANOVA, the dependent variable was decisional balance as measured by the Decisional Balance Exercise Survey (2013), and was treated as continuous. For the second ANOVA, the dependent variable was self-efficacy as measured by the Self-Efficacy Exercise Survey (2013), and also was treated as continuous. The third ANOVA's dependent variable was the IPAQ total score, measured by the IPAQ. In all three ANOVAs, the independent (grouping) variables were included in one of the five stages of change. The independent variable was treated as nominal. For the fourth and fifth ANOVAs, the dependent variables were the decisional balance pros and cons as measured by the Decisional Balance Exercise Survey (2013), and were treated as continuous.

Prior to analyses, the assumptions of ANOVA were assessed. Assumptions of ANOVA include normality and homogeneity of variance. Homogeneity of variance was assessed using the Levene's test, and normality was assessed with the Kolmogorov-Smirnov (KS) test. In many cases, the ANOVA is considered a robust statistic in which assumptions can be violated with relatively minor effects (Howell, 2010). An alpha of .05 was used to determine significance.

Research Question Four

What relationships exist among the demographic characteristics (age, gender, education, income, and employment status) and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults in a church-based setting? The null hypothesis (H_04) was: No statistically significant relationship exists among the demographic characteristics and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults in a church-based setting. The hypothesis (H_a4) was: Statistically significant associations exist among the demographic characteristics and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults in a church-based setting.

To assess research question four, point biserial Spearman rank correlations and chi squares were conducted. Spearman correlations examined correlations between demographic data that are considered to be continuous or ordinal (age, education, and income) with decisional balance, self-efficacy, and IPAQ total scores (with and without self-reported zero scores). Decisional balance, self-efficacy, and IPAQ scores were all considered continuous, and stage of change was considered categorical. Cohen's standard (Cohen, 1988) was used to evaluate the correlation coefficient to determine the strength of the relationship, where coefficients between .10 and .29 represent a small association, coefficients between .30 and .49 represent a medium association, and coefficients above .50 represent a large association or relationship.

Prior to analysis, the assumptions of Spearman correlation were assessed. The assumption for a Spearman rank correlation was that all data is at least ordinal, and scores on one variable must be monotonically related to the other variable. This monotonic

relationship was assessed by examination of scatter plots (Morgan, Leech, Gloekner, & Barrett, 2007). An alpha of .05 was used.

Spearman correlations and chi squares were used to examine significant associations in decisional balance, self-efficacy, and the IPAQ total scores (both self-reported with and without zeroes) by the dichotomous demographics. The first independent (grouping) variable was gender, and was used to compare mean differences in three dependent variables. The second independent variable was employment which was dichotomized into employed full time versus not employed full time. Chi squares were conducted between gender, employment, age, education, income, and exercise stage of change, with age, education, and income dichotomized. An alpha level of .05 was used for the analyses.

Research Question Five

Are there statistically significant associations between physical activity behavior (IPAQ) and decisional balance, self-efficacy, and stages of change in African Americans in a church-based setting? The null hypothesis (H_0) was: There are no statistically significant associations between routine exercise behavior and the TTM in African-Americans in a church-based setting. The hypothesis (H_a) was: There are statistically significant associations between routine exercise behavior and the TTM in African-Americans in a church-based setting.

To assess research question five, two Pearson product-moment correlations and one chi square were conducted. The Pearson correlations examined the correlation between routine exercise behavior (as measured by the IPAQ), decisional balance, and self-efficacy. The chi square was conducted after the IPAQ total scores (with self-

reported zeroes) were dichotomized into no activity versus some activity to determine stage of change by activity level. Cohen's standard (Cohen, 1988) were used to evaluate the correlation coefficient to determine the strength of the relationship, where coefficients between .10 and .29 represent a small association, coefficients between .30 and .49 represent a medium association, and coefficients above .50 represent a large association or relationship.

The assumptions of Pearson correlation were assessed, including linearity and homoscedasticity. Linearity assumes a straight line relationship between the independent and dependent variables and homoscedasticity assumes that scores are normally distributed about the regression line. Linearity and homoscedasticity were assessed by examination of scatter plots (Stevens, 2009). An alpha of .05 was used.

Research Question Six

Are there statistically significant associations between health conditions and physical activity behavior (IPAQ) in African Americans in a church-based setting? The null hypothesis (H_{06}) was: There are no statistically significant associations between health conditions and the physical activity behavior (IPAQ) in African-Americans in a church-based setting. The hypothesis (H_{a6}) was: There are statistically significant associations between health conditions and the physical activity behavior (IPAQ) in African-Americans in a church-based setting. To assess research question six, a series of point biserial correlations were conducted to assess significant associations between IPAQ scores (both with and without self-reported zeros) by health conditions demonstrating adequate representation for "yes" and "no" groups.

Research Question Seven

What relationships exist between factors that prevent participants from exercising and the stage of change survey results in African-American adults in a church-based setting? The null hypothesis (H_{07}) was: There are no statistically significant associations between factors that prevent participants from exercising and the stage of change survey results in African-Americans in a church-based setting. The hypothesis (H_{a7}) was: There are statistically significant associations between factors that prevent participants from exercising and the stage of change survey results in African-Americans in a church-based setting. To assess research question seven, two chi square tests were conducted to assess any relationships existed in exercise stage of change by factors that prevent participants from exercising.

Research Question Eight

What relationships exist between factors that promote exercise and the stage of change survey results in African-American adults in a church-based setting? The null hypothesis (H_{08}) was: There are no statistically significant associations between factors that promote exercise in study participants and the stage of change survey results in African-Americans in a church-based setting. The hypothesis (H_{a8}) was: There are statistically significant associations between factors that promote exercise in study participants and the stage of change survey results in African-Americans in a church-based setting. To assess research question eight, chi square tests were conducted to assess if any relationships existed between exercise stage of change and promotion of exercise.

Summary

This chapter discussed the process through which IRB approval was attained and the study was performed. A convenience sample of 200 African Americans was surveyed at local churches on their current physical activity attitudes and practices. A study budget was detailed. Study measurement tools including a demographic survey, IPAQ, and three TTM exercise surveys were described. Finally, research questions, hypotheses, and null hypotheses were described.

CHAPTER 5

RESULTS

Introduction

In this chapter, details of the data analyses and results are described. The following sections are included: (a) data analyses, (b) results, (c) research questions, hypotheses, corresponding instruments, and specific data analyses.

Data Analyses

Descriptive statistics were conducted to describe the sample demographics and the research variables used in analyses. Frequencies and percentages were calculated for nominal data, such as stage of change. Means and standard deviations were calculated for continuous and ordinal data, such as self-efficacy and decisional balance (Howell, 2010). The presence of outliers was tested by the examination of standardized residuals. Standardized values was created for each subscale score and cases were examined for values that fell above 3.29 and values that fell below -3.29 (Tabachnick & Fidell, 2012). Outliers were removed from the dataset.

Results

Descriptive Statistics

Data were collected on 200 participants from February to April 2014. Nine participants were removed for not completing the decisional balance questions. An additional six participants were removed for only partially completing the decisional balance questions, and leaving out the exercise self-efficacy questions. Thus, 15 were removed for not completing large portions of the survey. Four participants completed

their surveys one-on-one with the SR in a private location due to poor vision, limited literacy, and “old age.”

Data analysis was performed on the 185 individuals, ranging in age from 18 to 84 years old ($M = 53.17$, $SD = 12.93$). Most of the participants were female ($n = 127$, 69%). The largest percentage of participants chose \$51,000 or above ($n = 45$, 24%) as their annual gross household income, followed by \$21,000 - \$30,000 ($n = 40$, 22%). Many of the participants had either a high school education ($n = 67$, 36%) or some college ($n = 51$, 28%). Almost half of the participants were employed full time ($n = 88$, 47%) followed by retired ($n = 41$, 22%). Participants tended to be either married ($n = 74$, 40%) or single ($n = 63$, 34%). The majority of the participants had no children ($n = 122$, 66%). Most of the participants did not smoke ($n = 124$, 67%) and felt that their health was “good” ($n = 97$, 52%). Frequencies and percentages for participant demographics are presented in Appendix H.

The majority of the participants felt as though they had health problems ($n = 112$, 61%). They were then asked to choose all specific health problems that applied. The most-common health problems were heart problems ($n = 72$, 39%) followed by overweight ($n = 51$, 28%). Frequencies and percentages for health problems are presented in Table 3.

Table 3

Frequencies and Percentages for Health Problems

Health problem	<i>N</i>	%
Any health problem		
Yes	112	61
No	65	35
Skipped question	8	4
Specific health problem*		
Heart problems	72	39
Overweight	51	28
Problems with bones	47	25
Diabetes	35	19
Breathing problems	17	9
Depression	12	7
Cancer	9	5
Kidney problems	3	2

Note. Percentages may not total 100 due to rounding error.

*Participants could specify more than one response.

Participants answered a question related to factors that prevented them from exercising. Participants were asked to select all the responses that applied. The most frequent responses were time ($n = 70, 38\%$) and tired ($n = 48, 26\%$). Frequencies and percentages for all responses are presented in Table 4.

Table 4

Frequencies and Percentages for Reasons for Not Exercising

Reason	<i>N</i>	%
Don't have time	70	38
Too tired	48	26
Don't like to exercise alone	30	16
Too much pain	25	14
Don't feel safe	12	6
Health problems	12	6
Afraid of dogs	11	6
Family/friends do not exercise	10	5
Afraid of getting hurt or falling	10	5
No sidewalks or walking trails	9	5
Exercise clothes cost too much	6	3
Costs too much to exercise	6	3
Don't trust people in my neighborhood	6	3
Too much traffic	5	3
Happy with body as is	4	2
Exercise shoes cost too much	3	2

Note. Percentages may not total 100 due to rounding error.

*Participants could specify more than one response.

Participants also chose responses that promoted physical activity. They were asked to choose all responses that applied. The most common responses were losing weight ($n = 141, 76\%$), increases energy ($n = 116, 63\%$), reduces stress ($n = 113, 61\%$), and reduces health risks ($n = 76, 41\%$). Frequencies and percentage for reasons for exercising are presented in Table 5.

Table 5

Frequencies and Percentage for Reasons for Exercising

Reason	<i>n</i>	%
Losing weight	141	76
Increases energy	116	63
Reduces stress	113	61
Reduces health risks	109	59
Better mood	95	51
Sleep better	90	49
Nice neighborhood to walk in	52	28
Can easily walk to grocery store/church	36	20

Note. Percentages may not total 100 due to rounding error.

*Participants could specify more than one response.

Cronbach’s alpha reliability testing was conducted on the decisional balance and exercise self-efficacy scales. The 10 items of decisional balance had a reliability of .75, suggesting acceptable reliability. Additionally, the six items of exercise self-efficacy had a reliability of .79, also suggesting acceptable reliability.

Research Question 1

What are the stages of change for exercise behavior in African American adults in a church-based setting?

To examine research question 1, frequencies and percentages were calculated to identify the stage of change for exercise that the participants were in. The range of stages of change included: 1 = “currently do NOT engage in physical exercise; NOT thinking about starting” (precontemplation stage); 2 = “I currently do NOT engage in physical exercise, but I am thinking about starting in the next six months” (contemplation stage); 3

= “I currently do engage in some physical exercise, but not regularly” (preparation stage); 4 = “I currently do engage in regular physical exercise, but I only started within the last six months” (action stage); and 5 = “currently engage in regular exercise longer than 6 months” (maintenance stage). The most frequent stage of change was 3 = “currently engage; not regularly” (preparation stage) (n = 62, 34%). There were eight participants (4%) that were in the precontemplation stage (1). There were 38 participants (21%) that were in the maintenance stage (5). Frequencies and percentages for stage of change for exercise are presented in Table 6.

Table 6

Frequencies and Percentages for Exercise Stages of Change

Stages of Change	n	%
Currently do NOT engage in physical exercise; NOT thinking about it (Precontemplation stage)	8	4
Currently do NOT engage; thinking of starting in 6 months (Contemplation stage)	39	21
Currently engage; not regularly (Preparation stage)	62	34
Currently engage in regular exercise within the last 6 months (Action stage)	18	10
Currently engage in regular exercise longer than 6 months (Maintenance stage)	38	21
Did not answer	20	11

Note. Percentages may not total 100 due to rounding error.

Research Question 2

What is the physical activity behavior as measured by the IPAQ of African-American adults in a church-based setting?

To examine research question 2, the number of hours of physical activity per week was examined using the short form of the IPAQ. The hours of vigorous physical activity ranged from 0.00 to 19.00 per week ($M = 0.66$, $SD = 2.60$). The hours of moderate physical activity ranged from 0.00 to 10.50 per week ($M = 0.43$, $SD = 1.56$). The hours of walking per week ranged from 0.00 to 19.00 ($M = 1.07$, $SD = 2.15$). The number of hours of sitting per week ranged from 0.00 to 18.00 ($M = 5.62$, $SD = 3.46$). The IPAQ total was created by the sum of the physical activity performed per week (vigorous, moderate, and walking). The hours of total physical activity ranged from 0.00 to 19.00 ($M = 1.45$, $SD = 3.36$). Values for physical activity were also calculated by removing participants who specified 0.00 for all three exercise types (vigorous, moderate, and walking). Additionally, all values of 0.00 were removed from sitting as well, as this was not a realistic survey answer. Descriptive statistics were recalculated. Table 7 presents the descriptive statistics for physical activity both with and without the zeroes.

Table 7

Means and Standard Deviations for Hours of Physical Activity per Week

Activity	<i>Min</i>	<i>Max</i>	<i>n</i>	<i>M</i>	<i>Median</i>	<i>SD</i>
With zeroes						
Vigorous	0.00	19.00	91	0.66	0.00	2.60
Moderate	0.00	10.50	83	0.43	0.00	1.56
Walking	0.00	19.00	106	1.07	0.00	2.15
Sitting	0.00	18.00	133	5.62	5.00	3.46
IPAQ total	0.00	19.00	145	1.45	0.00	3.36
Without zeroes						
Vigorous	0.00	19.00	69	0.87	0.00	2.96
Moderate	0.00	10.50	61	0.59	0.00	1.79
Walking	0.00	19.00	84	1.35	0.67	2.34
Sitting	0.08	18.00	131	5.70	5.00	3.41
IPAQ total	0.00	19.00	123	1.71	0.17	3.59

Research Question 3

Are there differences in IPAQ total, decisional balance, and self-efficacy across the stages of change for exercise behavior in African American adults in a church-based setting?

To examine the research question, an analysis of variance (ANOVA) was conducted to assess if there were differences in decisional balance by stage of exercise. In preliminary analysis, the assumption of normality was assessed with a Shapiro-Wilk test. The results of the test were significant, $p = .018$, violating the assumption. The assumption of equality of variance was assessed with a Levene's test. The results of the test were significant, $p = .043$, violating the assumption. In many cases, the ANOVA is

considered a robust statistic in which assumptions can be violated with relatively minor effects (Howell, 2010). The results of the ANOVA were significant, $F(4, 160) = 5.28, p < .001$, suggesting there was a difference in decisional balance by stage of exercise.

Post hoc pairwise comparisons were conducted to assess where the differences were. Participants in the contemplation stage scored significantly higher on the decisional balance survey ($M = 2.74$) than those participants in the precontemplation stage ($M = 1.88$). Participants in the maintenance stage scored significantly higher ($M = 2.80$) than those participants in the precontemplation stage ($M = 1.88$). Participants in the action stage scored significantly higher ($M = 2.75$) than those participants in the precontemplation stage ($M = 1.88$). Finally, participants in the preparation stage scored significantly higher ($M = 2.95$) than those in the precontemplation stage ($M = 1.88$). Although the preparation stage had the highest mean score ($M = 2.95$), contemplation ($M = 2.74$), action ($M = 2.75$), and maintenance stages ($M = 2.80$) were similarly rated. The exercise decisional balance rating for precontemplation was significantly lower ($M = 1.88$) than the other exercise stages of change. Results of the ANOVA are presented in Table 8. Means and standard deviations are presented in Table 9.

Table 8

Results of ANOVA for Exercise Decisional Balance by Exercise Stage of Change

Source	<i>SS</i>	<i>Df</i>	<i>MS</i>	<i>F</i>	<i>P</i>	Partial η^2
Stage of exercise	8.42	4	2.10	5.28	.001	0.12
Error	63.75	160	0.40			

Table 9

Means and Standard Deviations for Exercise Decisional Balance by Exercise Stage of Change

Stage of exercise	<i>M</i>	<i>SD</i>	<i>n</i>
Currently do NOT engage in physical exercise, NOT thinking about starting (precontemplation stage)	1.88	0.70	8
Currently do NOT engage; thinking of starting in 6 months (contemplation stage)	2.74	0.43	39
Currently engage; not regularly (preparation stage)	2.95	0.64	62
Currently engage in regular exercise within last 6 months (action stage)	2.75	0.54	18
Currently engage in regular exercise longer than 6 months (maintenance stage)	2.80	0.79	38

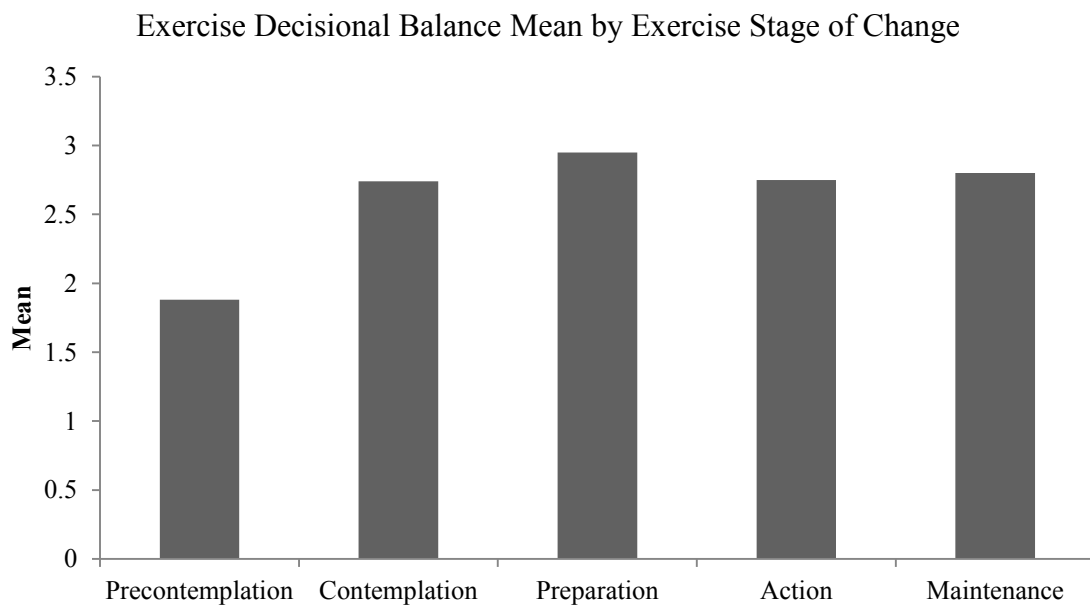


Figure 1. Exercise Decisional Balance Mean by Exercise Stage of Change.

Two additional ANOVAs were conducted to assess if there were differences in pro and con scales of decisional balance by stage of change. Results of the analysis showed differences in the pro scale by exercise stage of change, $F(4, 160) = 5.93, p < .001$, suggesting there were differences in the decisional balance pro scale by stage of change. Post hoc pairwise comparisons showed that the contemplation stage ($M = 2.45$,

$SD = 1.22$) was significantly lower than all four other stages. No other significant differences existed.

The ANOVA for the decisional balance con scale was not significant, $F(4, 160) = 1.92, p = .109$, suggesting that there were no differences in the decisional balance con scale by stage of change. Results of the ANOVA are presented in Table 10. Means and standard deviations are presented in Table 11. Figure 2 presents the averages for decision balance pro and con scales by exercise stage of change.

Table 10

Results of ANOVA for Exercise Decisional Balance Pros and Cons by Exercise Stage of Change

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	Partial η^2
Stage of exercise (pro)	19.75	4	4.94	5.93	.001	.13
Error	133.31	160	0.83			
Stage of exercise (con)	4.51	4	1.13	1.92	.109	.05
Error	93.73	106	0.59			

Table 11

Means and Standard Deviations for Exercise Decisional Balance Pros and Cons by Exercise Stage of Change

Exercise Stage of Change	Pro		Con		<i>n</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Currently do NOT engage in physical exercise, NOT thinking about starting (precontemplation stage)	2.45	1.22	1.30	0.40	8
Currently do NOT engage; thinking of starting in 6 months (contemplation stage)	3.95	0.78	1.52	0.63	39
Currently engage; not regularly (preparation stage)	4.08	0.89	1.80	0.77	62
Currently engage in regular exercise within last 6 months (action stage)	4.13	1.00	1.37	0.41	18
Currently engage in regular exercise longer than 6 months (maintenance stage)	4.01	0.97	1.56	1.03	38

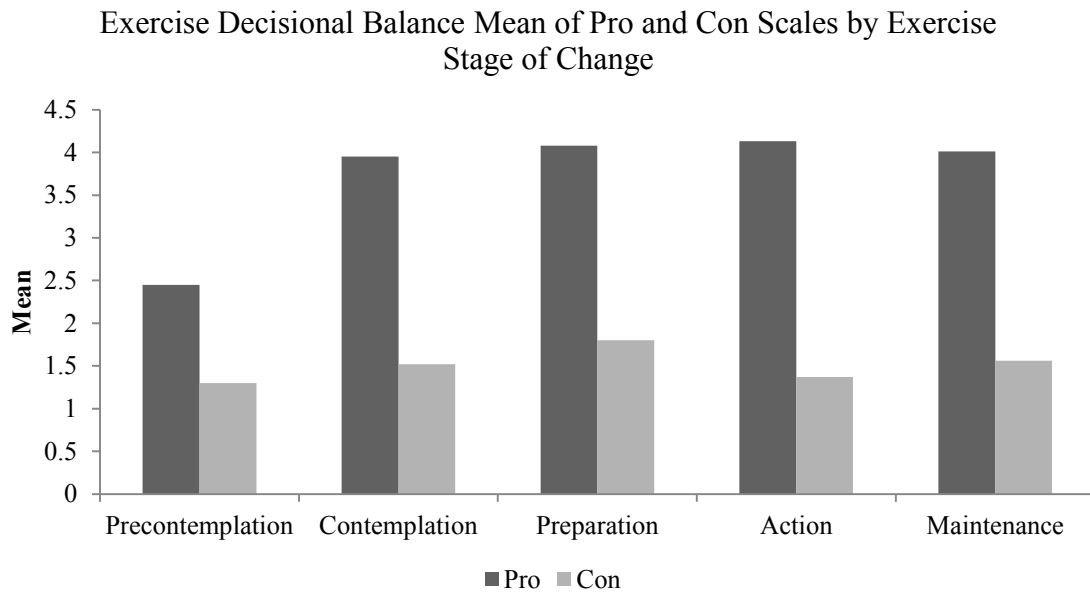


Figure 2. Exercise Decisional Balance Mean of Pro and Con Scales by Exercise Stage of Change.

An ANOVA was also conducted to assess if there were differences in exercise self-efficacy by stage of exercise. In preliminary analysis, the assumption of normality was assessed with a Shapiro-Wilk test. The results of the test were significant, $p = .003$, violating the assumption. The assumption of equality of variance was assessed with a Levene's test. The results of the test were significant, $p = .005$, violating the assumption. In many cases, the ANOVA is considered a robust statistic in which assumptions can be violated with relatively minor effects (Howell, 2010). The results of the ANOVA were not significant, $F(4, 155) = 2.09, p = .085$, suggesting there was no difference in Exercise self-efficacy by exercise stage of change.

Results of the ANOVA are presented in Table 12. Means and standard deviations are presented in Table 13. Figure 3 shows exercise self-efficacy means by exercise stage of change.

Table 12

Results of ANOVA for Exercise Self-Efficacy by Exercise Stage of Change

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P</i>	Partial η^2
Stage of change	9.30	4	2.32	2.09	.085	0.05
Error	172.53	155	1.11			

Table 13

Means and Standard Deviations for Exercise Self-Efficacy by Exercise Stage of Change

Stage of change	<i>M</i>	<i>SD</i>	<i>n</i>
Currently do NOT engage in physical exercise, NOT thinking about starting (precontemplation stage)	2.52	1.42	8
Currently do NOT engage; thinking of starting in 6 months (contemplation stage)	2.67	1.08	39
Currently engage; not regularly (preparation stage)	2.98	0.92	61
Currently engage in regular exercise within last 6 months (action stage)	2.33	0.66	17
Currently engage in regular exercise longer than 6 months (maintenance stage)	3.07	1.29	35

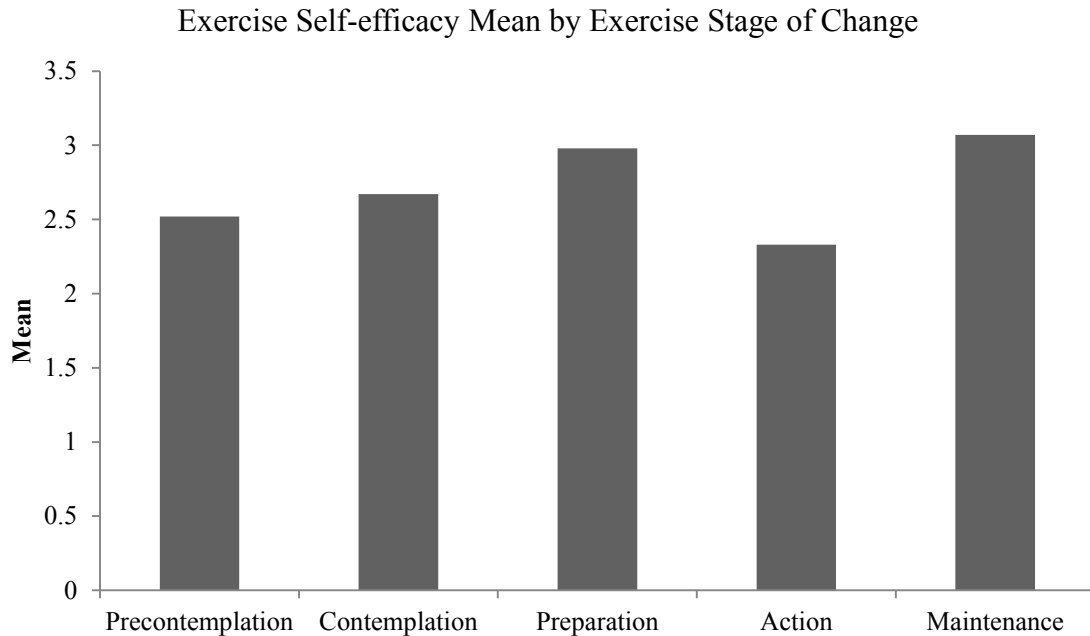


Figure 3. Exercise Self-efficacy Mean by Exercise Stage of Change.

An analysis of variance (ANOVA) was conducted to assess if there were differences in IPAQ total by exercise stage of change. In preliminary analysis, the assumption of normality was assessed with a Shapiro-Wilk test. The results of the test were significant, $p < .001$, violating the assumption. The assumption of equality of variance was assessed with a Levene's test. The results of the test were significant, $p < .001$, violating the assumption. In many cases, the ANOVA is considered a robust statistic in which assumptions can be violated with relatively minor effects (Howell, 2010). The results of the ANOVA were significant, $F(4, 127) = 4.43$, $p = .002$, suggesting there was a difference in IPAQ total by stage of exercise.

Post hoc pairwise comparisons were conducted to assess where the differences were. Participants in the maintenance stage scored significantly higher ($M = 2.88$) than those in the contemplation stage ($M = 0.26$). Participants in the action stage scored significantly higher ($M = 2.98$) than those in the contemplation stage ($M = 0.26$). The

ANOVA was repeated removing the zeroes from the IPAQ total scores. The ANOVA was still significant, $F(4, 105) = 3.13, p = .018$. However, when pairwise comparisons were conducted, no significant differences were found. Results of the ANOVA are presented in Table 14. Means and standard deviations are presented in Table 15. Figure 4 shows IPAQ total means by exercise stage of change.

Table 14

Results of ANOVA for IPAQ Total by Exercise Stage of Change

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	Partial η^2
With zeroes						
Exercise stage of change	159.69	4	39.92	4.43	.002	0.12
Error	1,143.55	127	9.00			
Without zeroes						
Exercise stage of change	133.43	4	33.36	3.13	.018	.11
Error	1117.52	105	10.64			

Table 15

Means and Standard Deviations for IPAQ Total by Exercise Stage of Change

Exercise Stage of Change	With zeroes			Without zeroes		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Currently do NOT engage in physical exercise, NOT thinking about starting (precontemplation stage)	0.17	0.37	7	0.23	0.43	5
Currently do NOT engage; thinking of starting in 6 months (contemplation stage)	0.26	0.60	37	0.43	0.73	22
Currently engage; not regularly (preparation stage)	1.14	2.88	46	1.22	2.96	43
Currently engage in regular exercise within last 6 months (action stage)	2.98	6.15	17	3.38	6.46	15
Currently engage in regular exercise longer than 6 months (maintenance stage)	2.88	2.52	25	2.88	2.52	25

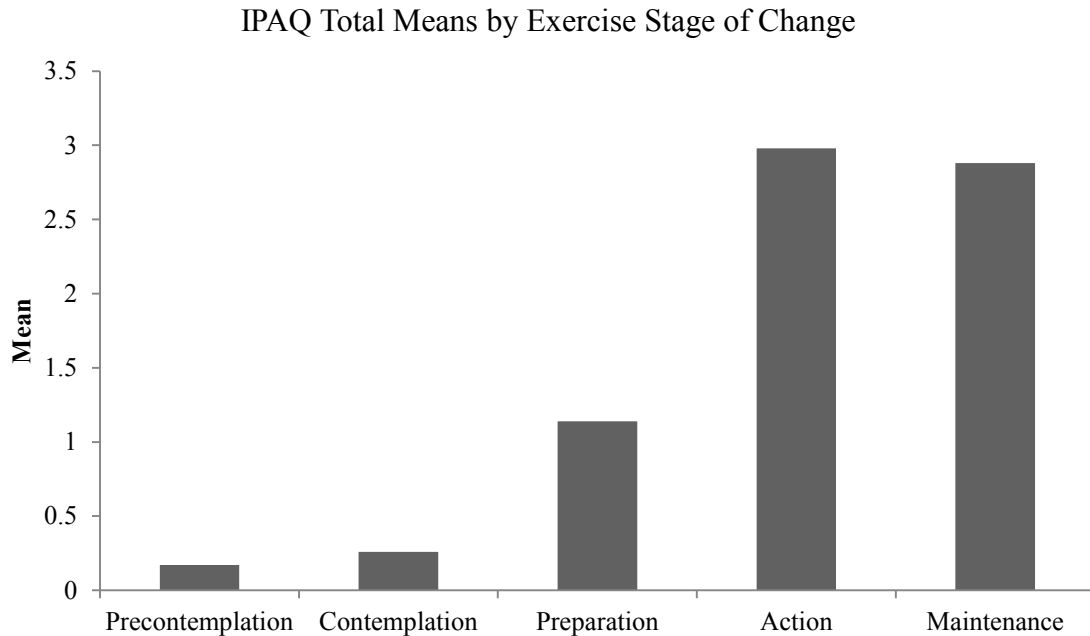


Figure 4. *IPAQ Total Means by Exercise Stage of Change.*

Research Question 4

What relationships exist among the demographic characteristics (age, gender, education, income and employment) and the surveys (stage of change, decisional balance, self-efficacy, and IPAQ) in African- American adults in a church-based setting?

To examine research question 4, point biserial Spearman correlations were conducted between IPAQ, decisional balance, and exercise self-efficacy with gender, employment, age, education, income, and self-rated health status. Employment was dichotomized into full time (1) vs. not full time (0). Employment was significantly related to the hours of physical activity per week ($r_{pb} = -.18, p = .028$ with zeroes and $r_{pb} = -.21, p = .021$ without zeroes), suggesting that those that were employed full time had significantly lower hours of physical activity per week. Age was related to exercise self-efficacy, $r_s = .18, p = .023$, suggesting that as age increased, exercise self-efficacy also tended to increase. Lastly, income was related to exercise self-efficacy, $r_s = .21, p = .007$,

suggesting that as income increased, exercise self-efficacy also increased. No other correlations were significant. Results of the correlations are presented in Table 16.

Table 16

Spearman Correlations between Surveys and Demographics

Survey	Gender	Employment	Age	Education	Income
IPAQ total (with zeroes)	.03	-.18*	-.01	.09	.01
IPAQ total (without zeroes)	.05	-.21*	.02	.07	.02
Decisional balance	.04	.09	-.01	.00	.12
Exercise self-efficacy	.06	.07	.18*	.08	.21**

Note. * $p < .05$. ** $p < .01$. Otherwise $p > .05$.

Additionally, chi squares were conducted between gender, employment, age, education, income and exercise stage of change. Prior to analysis, age, education, and income were dichotomized into two categories based on a median split. Results of the chi squares showed significance for gender, $\chi^2(4) = 13.05, p = .011$. Expected values were examined to determine the relationship. Expected values showed that there were fewer males in the contemplation and action stages while there were more males in the precontemplation, preparation, and maintenance stages than expected.

Results also showed significance for age, $\chi^2(4) = 9.96, p = .041$. Expected values showed a greater number of younger participants (51 years and below) in the action and maintenance stages than expected while there was a fewer number of younger participants in the precontemplation, contemplation, and preparation stages than expected.

Significance was also found for education, $\chi^2(4) = 19.00, p < .001$. There were more participants with a higher level of education (some college or above) in the

maintenance and preparation stages while fewer participants in the precontemplation, contemplation, and action stages than expected.

A significant relationship was not found for income with stage of change, $\chi^2(4) = 2.26, p = .668$. Results for the chi squares are presented in Table 17.

Table 17

Chi Squares between Exercise Stage of Change and Demographics

Demo	Exercise Stage of Change					$\chi^2(4)$	<i>p</i>
	Precontemp	Contemp	Prep	Act	Mainten		
Gender						13.05	.011
Male	5	5	21	2	12		
Female	3	33	41	16	24		
Employed						7.89	.096
Not full time	7	14	33	9	19		
Full time	1	25	29	9	18		
Age						9.96	.041
51 or below	2	12	26	13	20		
52 or above	5	25	33	5	16		
Education						19.00	.001
High school grad or less	8	22	24	8	9		
Some college or more	0	17	37	10	28		
Income						2.26	.688
30,000 or less	5	19	34	11	16		
31,000 or more	2	15	23	7	18		

Note. Demo = Demographics, Precontemp = Precontemplation, Contemp = Contemplation, Prep = Preparation, Act = Action, Mainten = Maintenance.

Research Question 5

Are there statistically significant associations between physical activities behavior (IPAQ) and decisional balance, self-efficacy, and stage of change in African Americans in a church-based setting?

To examine research question 5, two Pearson correlations and a chi square were conducted to assess if there were relationships between IPAQ total and exercise decisional balance, exercise self-efficacy, and exercise stage of change. Results of the Pearson correlations showed a statistically significant inverse relationship between exercise self-efficacy and IPAQ, $r = -.18$ ($p = .038$), suggesting that as IPAQ total increased (amount of time exercising per week), exercise self-efficacy tended to decrease. The analyses were repeated for the IPAQ scores without the zeroes included and results came out with similar significance and direction. Results of the Pearson correlations are presented in Table 18.

Table 18

Results of Pearson Correlations for IPAQ Total with Exercise Decisional Balance and Exercise Self-Efficacy

Variable	IPAQ (with zeroes)	IPAQ (without zeroes)
Decisional balance	.01	.02
Exercise self-efficacy	-.18*	-.20*

Note. * $p < .05$. Otherwise $p > .05$.

In order to conduct the chi square for exercise stage of change and the IPAQ total (zeroes included), the IPAQ scores were dichotomized into 0 = no activity and 1 = some activity. Any participant that had a score of 0 for IPAQ total was considered as having

“no activity” while the remaining participants had “some activity.” Results of the chi square were significant, $\chi^2(4) = 19.62, p = .001$. Expected values showed that there were more participants with some physical activity in the action and maintenance stages of change and fewer participants with some physical activity in the precontemplation, contemplation, and preparation stages of change. Results of the chi square are presented in Table 19.

Table 19

Chi Square between IPAQ Group and Exercise Stage of Change

Stage of Change	IPAQ Group		$\chi^2(4)$	<i>p</i>
	No activity	Some activity		
Precontemplation	5	2	19.62	.001
Contemplation	28	9		
Preparation	26	20		
Action	9	8		
Maintenance	5	20		

Research Question 6

Are there statistically significant associations between health conditions and physical activity behavior (IPAQ) in African Americans in a church-based setting?

To address research question 6, a series of point biserial correlations were conducted to assess if there were differences in IPAQ scores by health conditions on the information sheet. Health problems, heart problems, bone problems, and overweight were

the only health conditions used as these had adequate representation for both “yes” and “no” groups. Results of all four point biserial correlations did not show significant relationships in IPAQ total scores by health problem (yes vs. no) for all four health problems ($p > .050$ for all). The analyses were repeated for IPAQ scores without the zeroes. Results of the analyses came out similarly. Results of the correlations are presented in Table 20.

Table 20

Point Biserial Correlations for Differences in IPAQ Totals by Health Problems

Health condition	IPAQ (with zeroes)	IPAQ (without zeroes)
Health problem	.00	-.01
Heart problem	-.10	-.09
Bone problem	-.09	-.05
Overweight/Obese	-.11	-.10

Note. * $p < .05$. ** $p < .01$. Otherwise $p > .05$.

Research Question 7

What relationships exist between factors that prevent participants from exercising and the stage of change survey in African American adults in a church-based setting?

To examine research question 7, two chi square tests were conducted to assess if there were relationships in the exercise stage of change by conditions that prevent participants from exercising. Exercise deterrents were listed on the information sheet. Only time and tiredness were used to address differences, as these had adequate representation of both “yes” and “no” responses. Results of the chi squares showed significance for time, $\chi^2(4) = 13.04, p = .011$. There were fewer participants who said that time prevented them from exercising in the action and maintenance stages and more

participants who said time prevented them from exercising in the precontemplation, contemplation, and preparation stages. Results of the chi squares also showed significance for tired, $\chi^2(4) = 12.86, p = .012$. There were fewer participants who said that tiredness prevented them from exercising in the action and maintenance stages and more participants who said tiredness prevented them from exercising in the precontemplation, contemplation, and preparation stages. Results of the chi square tests are presented in Table 21.

Table 21

Chi Square Tests for Factors that Prevent Participation in Exercise and Exercise Stage of Change

Prevent Exercise	Exercise Stage of Change					$\chi^2(4)$	<i>p</i>
	Precontemp	Contemp	Prep	Act	Mainten		
Time						13.04	.011
No	4	20	32	12	32		
Yes	4	19	30	6	6		
Tired						12.86	.012
No	5	23	43	15	35		
Yes	3	16	19	3	3		

Note. Precontemp = Precontemplation, Contemp = Contemplation, Prep = Preparation, Act = Action, Mainten = Maintenance.

Research Question 8

What relationships exist between factors that promote exercise and the stage of change survey in African American adults in a church-based setting?

To examine research question 8, chi square tests were conducted to assess if there were relationships in the exercise stage of change by the promotion of exercise. Exercise deterrents were listed on the information sheet. The factors that promoted exercise were reduce risks, lose weight, have energy, better mood, nice neighborhood, reduce stress,

and better sleep, as these factors had adequate representation of both “yes” and “no” responses. Results of the chi squares showed significance for wanting a better mood, $\chi^2(4) = 15.71, p = .003$. There were more participants who said exercise promoted having a better mood promoted exercise that were in the preparation and maintenance exercise stages of change while fewer were in the precontemplation, contemplation, and action exercise stages of change. Significance was also found for wanting better sleep, $\chi^2(4) = 10.35, p = .035$. There were more participants who said that exercise promoted better sleep that were in the contemplation and maintenance stages of change while fewer were found in the precontemplation, preparation, and action stages of change. Results of the chi squares are presented in Table 22.

Table 22

Chi Square Tests for Factors that Promote Participation in Exercise and Exercise Stage of Change

Promotion of Exercise Factors	Exercise Stage of Change					$\chi^2(4)$	<i>p</i>
	Precontemp	Contemp	Prep	Act	Mainten		
Reduce risks						4.22	.377
No	3	17	19	8	19		
Yes	5	22	43	10	19		
Lose weight						5.44	.245
No	4	10	11	3	11		
Yes	4	29	51	15	27		
More energy						7.14	.129
No	6	15	21	7	10		
Yes	2	24	41	11	28		
Better mood						15.71	.003
No	8	21	25	9	11		
Yes	0	18	37	9	27		
Nice neighborhood						6.17	.187
No	7	26	46	14	21		
Yes	1	13	16	4	17		
Decreases stress						3.26	.515
No	4	11	20	8	16		
Yes	4	28	42	10	22		
Better sleep						10.35	.035
No	8	16	30	10	16		
Yes	0	23	32	8	22		

Note. Precontemp = Precontemplation, Contemp = Contemplation, Prep = Preparation, Act = Action, Mainten = Maintenance.

Summary

This descriptive, cross-sectional study design analyzed TTM-related variables to determine associations of regular exercise behavior in African-American adults in seven church-based settings. Through the completed surveys, statistical analyses: (a) described

the stages of change for exercise and TTM-related constructs in African Americans; (b) examined decisional balance and self-efficacy across the stages of change with modified tools to include cultural influences for African Americans; and (c) determined associations between TTM constructs (stage of change, self-efficacy, and decisional balance) with routine exercise behavior (IPAQ) in African-American adults using a summary of the study results. Study results in the form of aggregate data were shared with pastors of participating churches.

CHAPTER 6

DISCUSSION

The purpose of this chapter is to discuss the results of this study and its application to previous research related to physical activity in African Americans. Additional topics include nursing implications, study limitations, recommendations for future research, and a conclusion.

Discussion of Study Results

The theoretical framework for this study was the TTM, as described in Chapter 3. Components of the TTM were used to assess physical activity in African Americans through the stages of change, decisional balance, and self-efficacy. In addition, physical activity patterns were assessed using the IPAQ. The demographic survey provided descriptive statistical information on the population. Through the use of the TTM, several variables were examined related to physical activity in African Americans.

A total of 200 participants completed surveys in seven different church locations, with 185 of these completing a sufficient portion of the surveys. Although an eighth church had completed an authorization form to participate in the study, the pastor of the church opted out of participating due to small church membership and concerns of minimal participation. Prior to the study, three church members completed the surveys in a pilot to determine readability and approximate time for survey completion. The three pilot participants stated no problems understanding the surveys, taking between eight and 15 minutes to complete the surveys. Among the 185 completed surveys, four surveys were completed in private and one-on-one, with the survey being read to the participant by the SR. Reasons for this included poor vision (2), poor literacy (1), and “old age” (1).

While assessment of African Americans in this study provided information to develop effective interventions to improve physical activity, the population demographics were limited to a greater proportion of female respondents (69%) and a mean age of 53 years. Previous studies demonstrated similar results, with female participants ranging from 24.3% to 85.3% with mean age ranges from 46 to 55 years (Dodani & Fields, 2010; McDowell et al., 2011; Resnicow et al., 2004; Wilcox et al., 2013). This study response did not meet the goal of more male and younger generation respondents.

Additional information obtained from the demographic survey and information sheet focused on smoking behavior. While only 9% of study participants stated they currently smoked, 67% denied smoking, and 17% had quit smoking. According to the CDC (2011), cigarette smoking state to state prevalence ranges were from 9.3% to 26.5% (national median = 18.4%), while smoking rates in Ohio were 20.1%. Further, African Americans in Ohio demonstrate a smoking prevalence of 25.1%, compared to 20.7% in Caucasians (CDC, 2011). Study participants demonstrated a significantly lower rate of smoking than both Caucasians and African Americans in Ohio, as well as the national median.

Exercise Stage of Change

As discussed in Chapter 1, study participants were asked to choose the statement best describing their own individual exercise pattern known as the stages of change. The most frequent stage of change chosen was the preparation stage (34%), indicating that these respondents are considering making a change in their physical activity habits in the near future. Individuals in this stage have begun to make changes, have a plan of action to change their exercise behaviors, and are often ready to participate in an action-oriented

program (Velicer et al., 1998). These results were similar to Blaney et al. (2012). The second most frequent answer choices in this study were the contemplation stage and maintenance stage (both = 21%). Similar studies by Lee et al. (2006) and Kim et al. (2010) found 20% and 21 % in the preparation stage and 29% and 17.6% in the contemplation stage respectively.

ANOVA results showed statistical significance with exercise decisional balance across exercise stage of change. The preparation stage rated highest, although all stages were rated significantly higher than the precontemplation stage. Additional ANOVAs performed showed statistical significance in the differences in the pro scale and exercise stage of change, while no differences were found in the con scale. Defining stage of change in conjunction with other TTM constructs may assist in determining the best exercise interventions for African-American adults in order to maximize intervention success. In this way, it is important to encourage physical activity through individually adjusted exercise interventions focused on their specific stage of change (Lee et al., 2006).

The theoretical framework provides the structure for designing the health message to match each individual's characteristics and tailor the interventions (Pender et al., 2011). Research shows that those who may be ready to change (contemplation and preparation stages) respond better to stage-based interventions than those who are not ready (precontemplation stage) (Aveyard, Massey, Parsons, Maneski, & Griffin, 2009). In addition, it is important to encourage those in the more active stages of change to remain active, while encouraging those who are inactive to become more active (Jones et al., 2013). It is key to consider these factors when planning programs, as different stages

of change may require different interventions tailored to accommodate the individual, family, or community and improve physical activity outcomes (Pender et al., 2011).

Routine Exercise

To examine current routine physical activity practices, the IPAQ was used, providing information on the average amounts of vigorous exercise, moderate exercise, walking, and sitting in the past seven days. Physical activity weekly minute averages with self-reported zeroes included were as follows: (a) vigorous physical activity mean of 39.6 minutes; (b) moderate physical activity mean of 25.8 minutes; (c) walking physical activity mean 64.2 minutes; and (d) a total physical activity mean of 87 minutes.

Individual activity and total physical activity amounts were then calculated removing participants that self-reported zeroes for all three levels of activity, as well as those that answered zero daily hours of sitting. Physical activity weekly minute averages with self-reported zero values removed were: (a) vigorous physical activity mean of 52.2 minutes; (b) moderate physical activity mean of 35.4 minutes; (c) walking physical activity mean of 81 minutes; and (d) a total physical activity mean of 102.6 minutes, showing an increase in weekly exercise minutes in each activity level. The mean daily hours of sitting with the self-reported zeroes removed was 5.70, which was not significantly higher than with the self-reported zeroes included ($M = 5.62$).

Total physical activity performed by study respondents was determined by the sum of the physical activity performed (vigorous and moderate activity, and walking), demonstrating an estimated 87 to 102 minutes per week of total physical activity (with and without zero scores respectively). These amounts were both well below the recommended weekly amount of 150 minutes of moderate intensity exercise or 60 to 75

minutes of vigorous intensity exercise (ACS, 2012; Haskell et al., 2007). While results of this study demonstrated 59% of participants' self-reported inconsistent or no physical activity according to self-reported stage of change, other study inactivity results were similar with ranges from 48% to 73.9% (Kim et al., 2010; Lee et al., 2006). Interventions need to be developed to improve physical activity time per week.

Research Hypotheses

The hypothesis (H_{a3}) for research question three was: There are statistically significant differences in IPAQ total and TTM-related constructs (decisional balance and self-efficacy) across the stages of change for exercise behavior in African-American adults in a church based setting. Statistical significance in total IPAQ scores showed a difference in weekly exercise hours by stage of change. Post hoc pairwise comparisons showed these differences were in participants in the action and maintenance stages, as they demonstrated significantly higher IPAQ scores than participants in the precontemplation, contemplation, and preparation stages with self-reported zeroes included. When removing the self-reported zero scores, the group sizes decreased, making the groups too small to determine where the differences were.

Study participants were asked to weigh the pros and cons of participating in physical activity as part of their decision-making process in whether or not to exercise. One of the strongest predictors for progressing from the precontemplation and contemplation stages toward the preparation, action, and maintenance stages included increasing the pros of exercise decisional balance while decreasing the cons associated with making a behavior change (Prochaska & Velicer, 1997). In this study, a statistically significant difference in decisional balance by stage of exercise was found, with

preparation stage scoring highest followed by maintenance stage. In addition, the decisional balance pro scale demonstrated statistical significance by exercise stage of change, with the contemplation stage mean score significantly lower than the other four stages. A similar trend was found by Lee et al. (2006).

According to Prochaska and Velicer (1997), a more positive decisional balance score is associated with greater motivation to perform physical activity. The decisional balance con scale showed no statistical significance, suggesting no differences in the cons by exercise stage of change. Although this result was inconsistent with TTM predictions, similar results were found by Blaney et al. (2012). While the literature showed the mean score of the cons scale highest at the precontemplation stage with a downward trend toward the maintenance stage, no statistical significance was determined (Kim et al., 2010; Lee et al., 2006).

The original exercise decisional balance scale does not specifically address “I don’t have time” and “I am too tired,” but does address “Exercising puts me in a better mood for the rest of the day.” Researchers need to consider the addition of these items to the surveys to more comprehensively assess African Americans’ attitudes about physical activity, especially in association with exercise stage of change.

The hypothesis (H_{a4}) for research question four was: Statistically significant associations exist among the demographic characteristics and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults in a church-based setting. Correlations conducted between the physical activity surveys (decisional balance, self-efficacy, and IPAQ) and specific demographic data (age, gender, education, income, employment, and self-rated health status) showed the following: (a)

both age and income were positively related to self-efficacy, suggesting that as either age or income increased, self-efficacy also increased; and (b) full time employment was negatively related to hours of physical activity per week, suggesting that participants working full time spent less time exercising. No other correlations were significant.

Chi square results showed the following associations between demographics and exercise stage of change: (a) more males were in the precontemplation, preparation, and maintenance stages of change; (b) more young participants (age 51 years and below) were in the action and maintenance stages of change; (c) participants with higher education levels (some college or above) were in the maintenance and preparation stages of change. Practitioners need to consider the demographic results and modify their interventions to the individuals' stages of change for more effective outcomes (Hoke & Timmerman, 2011).

The hypothesis (H_{a5}) for research question five was: There are statistically significant associations between routine exercise behavior and the TTM in African-Americans in a church-based setting. Correlations showed a statistically significant inverse association existed between IPAQ scores and exercise self-efficacy, for as the IPAQ increased, self-efficacy decreased ($r = -.18$ with zero scores and $-.20$ without zero scores).

Although the literature showed that self-efficacy may positively influence participation in physical activity, the same results were not found in this study (Ashford et al., 2013; Bandura, 1986; Komar-Samardzija et al., 2012; Pekmezi et al., 2010). Because higher levels of self-efficacy are often associated with health behavior change in diverse samples, health promotion intervention approaches need to be specifically

designed to improve self-efficacy (Mansyur et al., 2013). Individuals with low self-efficacy often feel capable of performing only very simple activities (Pender, 2011). In this study, exercise self-efficacy decreased even as physical activity increased. Several study participants did state the self-efficacy survey was confusing to complete and some chose to not complete this survey at all. These factors may have affected the results.

When determining any association between the IPAQ and exercise stage of change in this study, more participants in the action and maintenance stages of change were found to display some activity as shown in their higher mean IPAQ scores, while more participants in the precontemplation, contemplation, and preparation stages were less active.

The hypothesis (H_{a6}) for research question six was: There are statistically significant associations between health conditions and the physical activity behavior (IPAQ) in African-Americans in a church-based setting. While the majority of study participants rated their health as “good,” most of the participants also noted they had health problems, specifically heart problems (39%), overweight or obese (28%), problems with bones (25%), and diabetes (19%), consistent with the literature (Cowan et al., 2010; Fardid et al., 2010; Williams et al., 2013). Correlational studies showed no significant associations between specific health problems and IPAQ total scores (with and without zero scores).

The hypothesis (H_{a7}) for research question seven was: There are statistically significant associations between factors that prevent participants from exercising and the stage of change survey results in African-Americans in a church-based setting. Statistical significance was shown for both “don’t have time to exercise” and “too tired to exercise.”

In both cases, more participants in the precontemplation, contemplation, and preparation stages signified that these factors prevented them from exercising. For those currently not participating in routine physical activity, including information on time management and methods to decrease fatigue may be beneficial. These elements need to be taken in to consideration when planning physical activity programs in African Americans. Likewise, the literature showed barriers to physical activity included lack of time, role strain, lack of energy, safety concerns, health problems, social obligations, and lack of social support (Ainsworth, Wilcox, Thompson, Richter, & Henderson, 2003; Dutton, Johnson, Whitehead, Bodenlos, & Brantley, 2005).

The hypothesis (H_{a8}) for research question eight was: There are statistically significant associations between factors that promote exercise in study participants and the stage of change survey results in African-Americans in a church-based setting. Statistical significance was shown for both “better mood” and “better sleep” as exercise promoters: (a) more participants said exercise promoted a better mood that were in the preparation and maintenance exercise stages of change while fewer were in the precontemplation, contemplation, and action exercise stages of change; and (b) more participants who said that exercise promoted better sleep that were in the contemplation and maintenance stages of change while fewer were found in the precontemplation, preparation, and action stages of change. These factors need to be emphasized as positive aspects of participating in physical activity programs in African Americans, as participants identified these as exercise promoters. In addition, although “better mood” is addressed in the exercise decisional balance scale, “better sleep” should be considered as an addition to the survey.

Limitations of this Study

There were several limitations identified in this study. The study had a moderately sized convenience sample of 200 African Americans from seven churches in one small, Midwestern city, therefore providing limited generalizability to a larger African-American population. Fifteen of the 200 completed surveys were unable to be analyzed due to large portions of the decisional balance and self-efficacy surveys being incomplete, leaving a total sample size of 185 African Americans. Although researchers encourage use of the church for health promotion programs due to its support of African Americans, it may not be the best venue to obtain input from the 18 to 40 year age group or from males, as the mean age of participants in this study was 53.1 years and predominantly female.

Some of the incentives used to encourage study participation may have been a study limitation. Pedometers were used as an incentive for survey completion, but may actually have elevated activity responses through the power of suggestion and providing a means in which to calculate exercise progress through step counts. A gym membership as a drawing prize may also have influenced survey answer choices. These items may also have acted as a deterrent to those in the precontemplation stage (not interested in these items) and the action and maintenance stages (already have a pedometer or gym membership). Replacing these items with more generic incentives such as movie passes or other gift cards may have been more effective.

Although the TTM provided a framework for the study, some participants did find the decisional balance and self-efficacy surveys difficult to use, stating that it was “confusing” to rate their answers. In addition, the length of the five surveys combined

may have been a deterrent to participate in the study. In fact, 15 of the 200 study participants left large portions of the decisional balance and self-efficacy survey questions unanswered and their surveys were excluded from data analysis.

The IPAQ was a common tool that has been used with African Americans as well as internationally, but it had an element of subjectivity and questionable validity and reliability since the amounts of physical activity are self-reported. In addition, physical activity may be incorrectly estimated, physical activity may vary in consistency from week to week, and survey questions may be misunderstood (Medina et al., 2013). Further, specific exercise types (such as leisure-time and sport activity, work, transportation, or household/ yard tasks) were not included in the IPAQ short-form, excluding more detailed information regarding specific types of physical activity of study participants that may have been helpful.

In the demographic survey and information sheet, one of the health problem choices was listed as “heart problems.” This answer choice listed a variety of health problems related to the cardiovascular system with varying levels of severity, including heart attack, chest pain, high cholesterol, stroke, high blood pressure, and heart failure. More information may have been attained if this answer choice had been separated into several more specific answer choices.

There were several additional limitations in this study. The decisional balance and self-efficacy surveys were laid out in a similar fashion as the original surveys, with the Likert scale at the top of the first survey pages and not with each question. This design may have contributed to confusion in survey completers, as some participants may have

forgotten the answer choices corresponding to the scale choices as they progressed through the surveys.

The cross-sectional design of this study examined groups of subjects in various stages of development at one time point. This can present a limitation because it is not as strong as some of the other study designs (Burns & Grove, 2009). A community-based participatory research design for intervention development should be considered. Finally, there were four participants who completed their surveys one-on-one with the SR reading the questions and answer choices to them. They may have given socially desirable answers to survey questions due to the SR being present.

Nursing Implications

Studies show insufficient physical activity contributes to poor health outcomes and health disparities in African Americans (Baranowski, 2011; Lucan et al., 2010; Pascal et al., 2010; Thomson & Ravia, 2011). Regular exercise is a significant factor in the reduction of heart disease, stroke, cancers, diabetes, hypertension, and obesity (Adler & Stewart, 2009; Rowland & Chappel-Aiken, 2012). The literature shows physical activity has a strong inverse relationship with cardiovascular disease and heart failure in both African Americans and Caucasians and a strong inverse relationship with stroke incidence in African Americans (Bell et al., 2013).

It is through effective psychobehavioral strategies that interventions toward behavioral modification to improve regular exercise behavior may be developed (Kim et al., 2010). Artinian et al. (2010) suggested using one or more cognitive-behavioral strategies for promoting behavior changes including goal-setting, self-monitoring, frequent and prolonged contact and follow-up, feedback and reinforcement, incentives,

modeling, self-efficacy enhancement, problem-solving, relapse prevention, and motivational interviewing.

This study made a significant contribution to existing knowledge about associations between physical activity behavior, TTM constructs, demographics, and exercise deterrents and promoters in African Americans. In this study, participants chose a lack of time for exercise and feeling too tired to exercise as the most common deterrents of routine physical activity, both showing an association with exercise stages of change. Conversely, the exercise promoting factors found to be most highly chosen were: (a) prevention of disease risks, (b) losing weight, (c) increased energy, (d) improved mood, (e) walking in a nice neighborhood, (f) stress reduction, and (g) better sleep. Of these promoting factors, only improved mood and better sleep were found to be associated with exercise stages of change.

Nurses often play a role in health promotion and disease prevention program development, and should work to incorporate these exercise promoting and deterring factors into physical activity programs for African Americans. Traditional exercise surveys, such as the decisional balance and self-efficacy surveys in the TTM, include the assessment of some of these factors on promotion and prevention of physical activity to provide a more comprehensive assessment of physical activity promoters and deterrents.

Recommendations for Future Research

Tailoring interventions focused at increasing physical activity in African Americans by including the use of cultural norms as well as multiple aspects of the TTM (stages of change, self-efficacy, and decisional balance) may be helpful in increasing weekly physical activity participation (Greaney et al., 2008; Pekmezi & Jennings, 2009).

A community-based participatory research design may also be beneficial for intervention development in order to create a supportive environment for behavior change (Paschal et al., 2010; Pekmezi & Jennings, 2009). Sole use of the stages of change without consideration of the other aspects of the model in population assessment and intervention development is cautioned, as the stages of change combined with the other TTM dimensions give more explanatory power (Bridle et al., 2005). In addition, although behavior change is most successful when all concepts of the TTM are integrated to help direct specific interventions, this study did not include the processes of change and future studies may want to consider the addition of this construct to obtain more detailed data for intervention development (Pender et al., 2011). Due to their significant health risks, African Americans are at even greater need of successful, theory-based interventions with validated measures such as the TTM (Blaney et al., 2012).

Traditional exercise surveys, such as the decisional balance and self-efficacy surveys in the TTM, should include the assessment of factors that both promote and deter routine physical activity. From the results of this study, examples of additional factors that could be included in these surveys are: feeling tired as a deterrent to exercise; and health risk prevention, neighborhood as a nice place to walk, and exercise effects on improving sleep as promoters of exercise. The addition of these factors to the decisional balance survey may provide a more comprehensive assessment of exercise promoters and deterrents in African Americans. Interventions focused on overcoming the cons and promoting the pros of exercise are suggested (Hoke & Timmerman, 2011). These aspects should be considered when planning programs for African Americans aimed at improving routine physical activity participation.

Continued assessments through the use of TTM constructs to develop interventions for physical activity improvement are essential. Tailoring interventions to individuals' stage of change, the pros of exercise, and improving their exercise self-efficacy may produce more effective results (Pender et al., 2011; Sutton et al., 2003). The high percentage of participants in the contemplation and preparation stages of change in this study show a large number are currently either considering or actively planning a change in their exercise behavior. Intervening at these stages may improve strategy success (Blaney et al., 2012; Sutton et al., 2003). Researchers support the construct of self-efficacy as a significant mediator for more consistent exercise (Blaney et al., 2012; Olander et al., 2013). In addition, interventions focused at improving self-efficacy levels may improve their confidence to engage in routine exercise. In this study, self-efficacy scores remained low throughout the stages of change suggesting the need for improvement to impact exercise participation.

Although the short form of the IPAQ provided data on the frequency of physical activity as well as the duration of time spent on walking, vigorous/moderate intensity, and sedentary activity (sitting), it did not include specific domains of the physical activity such as household or yard work, occupational activity, self-powered transport, or leisure-time choices related to physical activity. The long form of the IPAQ and the Global Physical Activity Questionnaires (GPAQ) include the above information but also contain domain-specific estimates of physical activity which may provide more detailed data overall (Bauman, Phongsavan, Schoeppe, & Owen, 2006).

In addition, several other changes may be incorporated into future research. To fully capture the responses of a greater number of males and also younger male and

females, other venues for data collection should be considered. Although the church has been found to play a pivotal role in promoting healthy lifestyles in African Americans, this is especially true among the African-American elderly population (Carter-Edwards, Johnson, Whitt-Glover, Bruce, & Goldman, 2011). Other venues to consider are locations such as community college campuses, barber shops, and community centers, improving the representation of younger age groups as well as increasing the number of male respondents. Also, use of other types of incentives to encourage study participation may decrease possible response bias in study data: pedometers and gym memberships as incentives may have appealed to those in the contemplation and preparation stages, and may have influenced some of their survey responses. Last, inclusion of cultural factors such as hair-related issues in surveys as a possible deterrent of routine physical activity for African-American women was suggested in the literature (Hall et al., 2013).

Conclusion

Researchers recommended routine physical activity to reduce the risk of chronic health problems. Sedentary behavior rates are higher among African-American men and women than in other American races and ethnicities, placing them at greater risk for chronic illness. Because the church often provides a source of support for the African-American community, this study was conducted both with the assistance of and on-site at local churches.

The TTM constructs (exercise stages of change, self-efficacy, and decisional balance) can be used as assessment tools to gain data regarding attitudes toward physical activity that can then be used to develop exercise interventions. Identification of individuals' stages of change, as well as identification of factors that influence these

stages may aid in the development of behavioral change strategies in African Americans. The demographic and information sheet identified lack of time and feeling too tired as exercise deterrents while improved mood and better sleep were identified as exercise promoters having statistical significant associations with participants' exercise stages of change. Current participation in routine physical activity as self-reported by study participants using the IPAQ showed weekly levels well below the recommended amounts.

From all of these results, it can be concluded that identifying stage of change, self-efficacy, decisional balance (including pros and cons), and current physical activity patterns provide valuable information about exercise behavior and attitudes toward change in African Americans. Effective interventions must be developed to improve routine physical activity of African Americans to reduce their chronic disease risk by: (a) tailoring interventions focused on characteristics and attitudes of African Americans; (b) including the use of cultural norms; and (c) including aspects of the TTM to assess characteristics and attitudes prior to intervention development (Pender et al., 2011).

Nurses can be instrumental in providing a thorough assessment of the psychobehavioral and environmental aspects of exercise choices of African Americans. In addition, nurses need to include effective interventions in the development of health promotion programs to improve physical activity behavior found to have associations with stages of change including exercise deterrents (lack of time and fatigue) and promoters (better mood and improved sleep) as well as developing stage-appropriate interventions. Capitalizing on exercise promoters may also improve physical activity outcome success.

APPENDIX A: *Studies Using the TTM to Promote Exercise in Various Populations*

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Astroth et al. (2010)	To estimate the construct validity of four TTM measures including stage of change, self-efficacy, decisional balance pros and cons, and processes of change using common response formats (true/false, ladder, 5-choice Likert scale, and interview).	A one-group, cross-sectional research design with convenience sampling of adults (N = 95) was used.	Surveyed participants using three instruments and an interview to measure exercise stages of change.	A majority of participants were classified in the maintenance stage on each of the four TTM measures, while the fewest were classified in the precontemplation stage. Only 60 percent of participants were classified in the same stage of change on all four measures. The true/false measure is most strongly recommended for use, although all measures demonstrated some construct validity. Two	Limitations included: (a) cross-sectional design did not allow for an estimation of predictive validity; (b) physical activity was measured through self-report only; (c) conclusions on the decisional balance con scale could not be drawn; and (d) limited generalizability due to the majority of participants being women, Caucasian, and highly	Additional studies are needed with diverse samples and greater representation across the stages of change. In addition, two decisional balance cons scale items need to be re-evaluated for use or reworded.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
				<p>items on the decisional balance cons scale, “too much to learn” and “exercise putting an extra burden on significant other” did not reach criterion and were not used. Analyses: descriptive statistics, Friedman’s test, Spearman’s correlation, ANOVA, ordinal logistic regression, and standardized T-scores.</p>	<p>educated.</p>	

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Blaney et al. (2012)	To validate the use of the Transtheoretical Model for exercise in African Americans.	Cross-sectional measure development in adult African Americans (N = 521).	Surveying participants through a telephone survey with the stages of change, decisional balance, self-efficacy, and processes of change for routine exercise.	The majority of participants were in the preparation stage (38.2%) and the maintenance stage (32.4%). Results provided support of validity for decisional balance, self-efficacy, and processes of change measures for exercise in African Americans. The con scale did not demonstrate replicated results. Analyses: CFA, MANOVA, and ANOVA.	Limitations: (a) cross-sectional nature of the data collected; (b) invariance testing across different ethnic groups may give a more detailed perspective of differences; (c) original item development was conducted on Caucasian samples, potentially not reflecting cultural factors; and (d) results may not be generalizable to all African Americans.	The decisional balance con scale did not replicate results of previous studies, therefore requiring further research to examine this scale. Future research may benefit from more proportionately weighted stages.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Dishman et al. (2010)	To model longitudinal change in TTM constructs and test their hypothesized relationships with change in meeting the guidelines of <i>Healthy People 2010</i> for moderate and vigorous exercise in an ethnically diverse population.	A random, multi-ethnic sample of Hawaiian adults (N = 497) were assessed at six-month intervals for two years during this longitudinal, cohort study.	A computer assisted telephone interview system was used to elicit information on: (a) demographics, physical activity, processes of change, decisional balance, self-efficacy; and temptations.	Naturally occurring change in most of the TTM constructs were useful in predicting transitions in meeting Healthy People 2010 guidelines for sufficient physical activity, although walking was excluded. Analysis: multinomial logistic regression.	Limitations: (a) 63.6% of participants were female; (b) 31.8% were Asian, 19.3% were native Hawaiians, 39.8% were Caucasian, and 8.0% were classified as other (African, Mexican, Puerto Rican, American Indian, or mixed non-Hawaiian), therefore limiting generalizability; (c) the use of self-reported physical activity in the questionnaire.	Further research efforts are needed to determine the usefulness of the TTM for explaining longitudinal transitions between sedentary and active lower-level physical activity than was studied here.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Geller et al. (2012)	To test the efficiency and effectiveness of a single-day decisional balance sheet program to target physical activity and F/V intake.	Diverse ethnic older adult population (mean age= 72.2 years) (N = 21) recruited from housing communities randomized into either the physical activity or F/V intervention group.	Physical activity was assessed using the IPAQ survey and F/V intake using the National Health and Nutrition Examination Survey	Results were presented descriptively due to small sample size. The decisional balance sheet program demonstrated high feasibility and efficiency with minimal costs, although effectiveness was greater for the physical activity group. Analysis: descriptive statistics.	Limitations: (a) small sample size; (b) high attrition rate (29% of the physical activity group and 47% of the F/V group); (c) highly diverse sample did not allow for examination of potential factors moderating the impact of the interventions; and (d) limited analyses.	Future studies can build on the large ethnic representation of this study using the decisional balance sheet.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Greaney et al. (2008)	Examined the efficacy of an intervention tailored to individual stages of change for exercise implementation.	Community-dwelling older adults (age 60 years and older) (N = 966) randomly assigned into one of 4 groups.	Twelve month intervention followed by a 12 month non-intervention, observational period. Four groups included: increased F/V consumption, increased exercise, increased both exercise and F/V consumption, and comparison	A behavioral theory-based intervention can be modestly effective in increasing stage progression for exercise in individuals in precontemplation, contemplation, preparation, and action stages of change. The intervention did not increase physical activity behavior. Analyses: descriptive statistics, Chi square, and repeated measures ANOVA.	Limitations: (a) potential for sampling bias (those in pre-action stages may have been less apt to participate), (b) drop-out bias, and (c) self-report surveys may have decreased the sensitivity and specificity of the instruments.	Future research evaluating the intrapersonal, interpersonal, and environmental mediator and moderating variables affecting the adoption and maintenance of exercise behaviors is needed.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Hoke and Timmerman (2011)	To describe participants' stage of change, the processes of change used, and the decisional balance to losing weight.	Descriptive study conducted with a convenience sample of overweight, rural Mexican American women (N = 30).	The TTM was used to describe participants' stage of change, processes of change, and decisional balance to losing weight.	Results indicated the importance of stage of change assessment (60% in contemplation stage) in order to tailor the health intervention to the individuals' needs. Analyses: descriptive statistics, ANOVA, and general linear model procedure.	Limitations included a small study sample size and the use of only English or bilingual speaking participants.	The authors recommended further research to explore methods to incorporate emotional aspects into stage-related interventions for healthy behaviors.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Karteroliotis (2008)	To test a short version of the decisional balance scale (DBS) for exercise in Greek adults.	Exploratory study design in Greek adults (N = 258).	Application of a revised version of the short form of the decisional balance scale and a demographic survey.	The revised DBS was found to have a satisfactory factor validity and internal consistency in a Greek adult population, which is consistent with previous research and TTM theory. Analyses used: Exploratory factor analysis (EFA) and Confirmatory factor analysis (CFA).	Limitations: sample selected only from suburban Athens, Greece area; findings may not be generalizable to adults in other areas.	Replication of this study with different populations and settings and with a larger sample size could strengthen scale validity.
Kim et al. (2010)	To identify stages of change, decisional balance, and self-efficacy of exercise behavior, while determining predictors of exercise behavior.	Descriptive, cross-sectional design in Korean adults with metabolic	Application of the TTM for exercise behavior including the stages of change,	The importance of TTM-related variables is different depending on the stages of exercise	Limitation: study generalizability is limited since this was a very specific sample.	Additional prospective intervention studies are needed to investigate the effect of

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
		syndrome (N = 210).	decisional balance, self-efficacy, and processes of change.	behavior. The differences between pros, cons, and self-efficacy across the stages of change for exercise were found to be statistically significant. Study findings can be used to develop strategies to improve exercise behavior in Koreans with metabolic syndrome. Analyses: Descriptive statistics, ANOVA, and MANOVA.		exercise programs. Also, longitudinal prospective research is needed to determine prevention or reduction of cardiovascular disease risk.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Paschal et al. (2010)	To use the stages of change to assess African-Americans' attitudes and decisions regarding health behaviors and provide suggestions to address them.	Cross-sectional exploratory design with a convenience sample of participants were recruited from a 501(c)3 primary health care facility (N = 242) (47% were African American)..	Survey consisting of 26 forced-choice items pertaining to demographics, physical activity, fruit and vegetable intake (F/V), and health issues, designed to assess participants' status in stage of change.	The majority of participants across all ethnic groups were in "contemplation" stage for physical activity and "maintenance" stage for F/V intake. In addition, 77% of the African Americans reported being physically inactive. Participants reported knowledge of the benefits of physical activity and F/V intake. Analyses: ANOVA and descriptive statistics.	Limitations: (a) self-reported data; (b) participants may not necessarily have represented all low-income or medically under-insured residents in the area, (c) participants may have had difficulty interpreting the survey questions; (d) "other" category for ethnic origin was too vague; and (e) the majority of participants were female.	Future studies should focus on promoting a supportive environment for behavioral change (free, easy access to physical activity) and developing appropriate interventions.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Paxton et al. (2008)	To determine if the constructs of the TTM for physical activity are measured similarly between genders, age groups, and ethnicities.	A cross-sectional multi-ethnic sample (17 separate ethnicities) of (N = 700) participants residing in Hawaii were surveyed using a computer-assisted telephone interview system.	The TTM constructs measured were self-efficacy, temptations, decisional balance, and the processes of change between genders, age groups and ethnicities.	The self-efficacy scale and revised temptation and processes of change scale showed evidence of measurement equivalence/ in (ME/I) among subgroups. The revised decisional balance scale demonstrated evidence for ME/I between genders and ethnicities, but not for age. Overall, there was slight variation between the subgroups of gender, age, and ethnicity. Analysis: Confirmatory Factor Analysis (CFA).	Limitations include: small sample size and a lack of ideal fit.	Future studies should examine how these constructs over time affect self-initiated variation over time.

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
Pekmezi et al. (2009)	To examine the efficacy of a home-based physical activity intervention among low income African Americans with high rates of chronic illness (obesity, hypertension, diabetes, and hypercholesterolemia).	Experimental design using random assignment of low income African Americans (N = 214)	Participants were randomly assigned into either a home-based physical activity intervention (printed materials on health promotion activities, five monthly newsletters, and two phone counseling sessions) or an attention control group that promoted a healthy diet. Measured the stages of change, decisional balance, and self-efficacy at baseline and	Results indicated that the intervention did not produce a significantly greater increase in physical activity and associated variables than the attention control condition over a six month period of time. Analyses used included: MANOVA, repeated measures, and chi-square.	Limitations include: (a) difficulty in contacting participants by telephone for follow-up; (b) significant attrition (214 participants randomized; 96 remained at the end of the study); (c) study findings may not be generalizable to other groups; and (d) budget limitations did not allow for the offering of incentives to participate in the study. Barriers include: the printed	Cultural relevance should be taken into consideration in the intervention of future studies involving physical activity (neighborhood safety, burden of redoing hair, lack of time due to extensive family and church commitments. Holding focus groups prior to the start of the study may improve knowledge about what

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
			six months.		intervention may not have been appropriate for this population and this intervention was originally tested on middle income, Caucasian samples.	participants' barriers are related to physical activity. In addition, multi-level interventions addressing motivation, environmental and policy barriers to active lifestyles, and a proactive approach to retention need to be addressed.
Pekmezi & Jennings (2009)	To provide a comprehensive literature review of recent physical activity intervention research conducted with African-Americans adults.	Literature review of 30 studies focused on African-American adults, published in	Nine of the studies used interventions to increase exercise while the other 12 studies focused on	Eighteen of the studies indicated that interventions produced significant increases in physical activity in African	Limitations include: (a) small sample sizes limit statistical power, and (b) over-reliance on quasi-	The authors suggested tailoring the interventions to the cultural norms and preferences of the African-

Reference	Study Purpose	Research Design and Participants	Intervention Details	Outcomes/ Analyses	Barriers and Limitations	Authors' Suggestions for Future Research
		peer-reviewed journals between 2001 and 2007. Sample sizes ranged from 24 to 8,477.	multiple behaviors.	Americans.	experimental design.	American participants. The authors also suggested using the church as a study setting.

Appendix B
Stages of Change Survey: Exercise
(Short Form)

Regular Exercise is any *planned* physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. **Such activity should be performed 3 to 5 times per week for 30-60 minutes per session.** Exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.

Please choose the BEST statement below by **circling** ONE statement below related to the definition of exercise above:

“I currently do NOT engage in physical exercise, and I am NOT thinking about starting.”

“I currently do NOT engage in physical exercise, but I am thinking about starting in the next 6 months.”

“I currently do engage in some physical exercise, but not regularly.”

“I currently do engage in regular physical exercise, but I only started within the last 6 months.”

“I currently do engage in regular physical exercise, and I have done so for longer than 6 months.”

Thank you. Please go on to the next survey.

Scoring

Stage	Q1	Q2	Q3	Q4	Q5
Precontemplation (1)	X				
Contemplation (2)		X			
Preparation (3)			X		
Action (4)				X	
Maintenance (5)					X

Note: Kim et al. (2010).

Stages of Change Exercise Survey (2013). Used and revised with permission. Retrieved from http://www.uri.edu/research/cprc/measures/ex_stages_change_exercise.html

Appendix C

Decisional Balance Survey: Exercise

This section looks at positive and negative aspects of exercise. Read the following items and indicate how important each statement is with respect to your decision to exercise or not to exercise in your leisure time. Please answer each question below using the following 5-point scale by **circling** the best answer to **each** question:

- 1 = Not important at all**
- 2 = Slightly important**
- 3 = Moderately important**
- 4 = Very important**
- 5 = Extremely Important**

Hint: If you disagree with a statement and are unsure how to answer, the statement is probably not important to you (1).

How important are the following opinions **in your decision to exercise or not to exercise?**

1. I would have more energy for my family and friends if I exercised regularly.

1 2 3 4 5

2. I would feel embarrassed if people saw me exercising.

1 2 3 4 5

3. I would feel less stressed if I exercised regularly.

1 2 3 4 5

4. Regular exercise prevents me from spending time with my family and friends.

1 2 3 4 5

5. Exercising puts me in a better mood for the rest of the day.

1 2 3 4 5

6. I would feel uncomfortable or embarrassed in exercise clothes.

1 2 3 4 5

7. I would feel more comfortable with my body if exercised regularly.

1 2 3 4 5

8. There is too much I would have to learn to exercise.

1 2 3 4 5

9. Regular exercise would help me have a more positive outlook on life.

1 2 3 4 5

10. Exercise puts an extra burden on my significant others (husband, wife, boyfriend, girlfriend, children).

1 2 3 4 5

Thank you. Please go on to the next survey.

Exercise Decisional Balance Scoring

Pros: 1, 3, 5, 7, 9

Cons: 2, 4, 6, 8, 10

Note: Decisional Balance Exercise Survey (2013). Used and revised with permission.

Retrieved from

http://www.uri.edu/research/cprc/measures/ex_decisional_balance_exercise.html

Appendix D

Self-Efficacy Survey: Exercise (Short form)

This survey looks at **how confident you are to exercise** when other things get in the way. Read the following items and **circle** the number that best expresses how **each item relates to you** in your leisure time. Please answer using the following 5-point scale:

1 = Not at all confident

2 = Somewhat confident

3 = Moderately confident

4 = Very confident

5 = Completely confident

1. I am under a lot of stress.

1 2 3 4 5

2. I feel I don't have the time.

1 2 3 4 5

3. I have to exercise alone.

1 2 3 4 5

4. I don't have access to exercise equipment.

1 2 3 4 5

5. I am spending time with friends or family who do not exercise.

1 2 3 4 5

6. It's raining, snowing, hot, or cold.

1 2 3 4 5

Scoring:

I am under a lot of stress. [Negative Affect (.852)]**

I feel I don't have the time. [Excuse Making (.829)]**

I have to exercise alone. [Must Exercise Alone (.869)]**

I don't have access to exercise equipment. [Inconvenient to Exercise (.773)]**

I am spending time with friends or family who do not exercise. [Resistance from Others (.853)]**

It's raining, snowing, hot, or cold. [Bad Weather (.837)]**

Note: Self-Efficacy Exercise Survey (2013). Used with permission. Retrieved from http://www.uri.edu/research/cprc/measures/ex_self-efficacy_exercise.html

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (IPAQ short form)

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ **days per week**

No vigorous physical activities → **Skip to question 3**

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

No moderate physical activities → **Skip to question 5**

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

No walking → **Skip to question 7**

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

This is the end of this questionnaire. Please go to the next survey.

Appendix F

Demographic Survey and Information Sheet

Please check or provide answers to the following questions. You may decide not to answer any of the questions:

Age: _____ Gender: Male _____ Female _____

Do you have any health problems? Yes _____ No _____

If yes, select one or more of the following health problems:

- | | | |
|---|---|--|
| <input type="checkbox"/> Diabetes (“sugar”) | <input type="checkbox"/> Cancer | <input type="checkbox"/> Heart Problems
(heart attack, chest pain,
high cholesterol, stroke, high
blood pressure, heart
failure) |
| <input type="checkbox"/> Breathing problems
(COPD/ Emphysema/
Bronchitis/ Asthma) | <input type="checkbox"/> Problems with bones or
joints (Arthritis, gout) | <input type="checkbox"/> Other health problems
Please list:

_____ |
| <input type="checkbox"/> Kidney disease | <input type="checkbox"/> Overweight or obese | |
| | <input type="checkbox"/> Depression | |

Have you fallen recently or are you a “high risk for falls”? Yes _____ No _____

How would you rate your health? _____ Excellent _____ Good
_____ Fair _____ Poor

Annual Household Income: _____ \$10,000 and below _____ \$11,000-\$20,000
(gross) _____ \$21,000-\$30,000 _____ \$31,000-\$40,000
_____ \$41,000-\$50,000 _____ \$51,000 and over

Education: _____ Less than high school graduation _____ High school graduate/ GED
_____ Some college _____ College graduate _____ Master’s degree or more

Employment Status: _____ Full-time _____ Part-time _____ Unemployed
_____ Retired _____ Disabled

Marital Status: _____ Single _____ Married _____ Separated/Divorced
_____ Widowed

Number of children in household under age 18 years old: _____

Do you currently smoke? ___ Yes ___ No ___ Quit
If yes, number of packs smoked per day ___

Please answer the two questions below:

1. What are some things that might prevent you from exercising? ✓ Check ALL that apply.

- | | | |
|---|---|---|
| ___ I don't have time | ___ My family/friends do not exercise | ___ It costs too much to buy exercise clothes |
| ___ I am too tired | ___ I don't like to exercise alone | ___ It costs too much to buy exercise shoes |
| ___ I can't get away from the kids | ___ I don't feel safe exercising near my home | ___ It costs too much to exercise |
| ___ I have too many health problems to exercise | ___ I don't have sidewalks or walking trails in my area | ___ I am happy with my body and do not want exercise to change it |
| ___ I am afraid I will get hurt or fall | ___ I have too much pain | ___ I do not trust people in my neighborhood |
| ___ I am afraid of dogs in my neighborhood | ___ There is too much traffic in my neighborhood | |

2. What are some things that might make you want to exercise? ✓ Check ALL that apply.

- | | | |
|---|---|--|
| ___ Exercises decreases my risk of heart problems, cancer, and stroke | ___ Exercise helps me to lose weight | ___ I have more energy when I exercise |
| ___ Exercise decreases my stress | ___ I am in a better mood if I exercise | ___ My neighborhood is a nice place to walk |
| | ___ Exercise helps me to sleep better | ___ I can easily walk to the grocery store or church |

Thank you. Please go on to the next survey.

Appendix G

Research Questions, Planned Analyses, and Hypotheses

Research Questions	Planned Analyses	Hypotheses
<p>What are the stages of change for exercise behavior in African-American adults in a church-based setting?</p>	<p>Descriptive statistics were conducted on the sample (African-American adults in a church-based setting).</p> <p>Frequencies and percentages were calculated to describe the grouping of the five stages of change of exercise.</p>	
<p>What is the physical activity behavior (IPAQ) of African-American adults according to the IPAQ in a church-based setting?</p>	<p>Descriptive statistics, means, and standard deviations were calculated for IPAQ scores (both with and without self-reported zeroes) and indicated baseline physical activity for the given demographic. The total score as well as the sub-scores (walking, moderate and vigorous activity, and sitting) were assessed.</p>	
<p>Are there differences in IPAQ total, decisional balance, and self-efficacy across the stages of change for exercise behavior in African-American adults in a church-based setting?</p>	<p>Five ANOVAs were conducted: ANOVA 1 was used to examine differences in mean values for decisional balance scores across the five stages of change.</p> <p>ANOVA 2 was used to examine differences in mean values for decisional balance pro scores across the five stages of change.</p>	<p>H₀₃: There are no statistically significant differences in IPAQ total and TTM-related constructs (decisional balance and self-efficacy) across the stages of change for exercise behavior in African-American adults.</p> <p>H_{a3}: There are statistically significant differences in IPAQ total and TTM-related constructs (decisional balance and</p>

Research Questions	Planned Analyses	Hypotheses
	ANOVA 3 was used to examine differences in mean values for decisional balance con scores across the five stages of change.	self-efficacy) across the stages of change for exercise behavior in African-American adults.
	ANOVA 4 was used to examine differences in mean values for self-efficacy scores across the five stages of change.	
	ANOVA 5 was used to examine differences in mean values for IPAQ survey total scores across the five stages of change.	
What relationships exist among the demographic characteristics (age, gender, education, income, and employment status) and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults in a church-based setting?	Spearman rank correlations examined correlations between demographic data (gender, employment, age, education, income, and self-rated health status) with decisional balance, self-efficacy, and IPAQ total scores (both with and without self-reported zeroes).	H₀4: No statistically significant relationship exists among the demographic characteristics and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults.
	Chi square tests were used to examine relationships between gender, employment, age, education, income, and exercise stage of change.	H_a4: Statistically significant relationships exist among the demographic characteristics (age, gender, education, and income) and the surveys (stages of change, decisional balance, self-efficacy, and IPAQ) in African-American adults.
Are there statistically significant associations between physical activity behavior (IPAQ) and decisional balance, self-	Pearson correlations examined the correlation between routine exercise behavior (as measured by the IPAQ), decisional	H₀5: There are no statistically significant associations between routine exercise behavior and the TTM in African-

Research Questions	Planned Analyses	Hypotheses
efficacy, and stages of change in African Americans in a church-based setting?	balance, and self-efficacy. Chi square test was conducted between IPAQ total score (with zeroes) and stage of change.	Americans. H_a5: There are statistically significant associations between routine exercise behavior and the TTM in African-Americans.
Are there statistically significant associations between health conditions and physical activity behavior (IPAQ) in African Americans in a church-based setting?	A series of point biserial correlations were used to assess significant associations in IPAQ scores (both with and without self-reported zeroes) by health conditions.	H₀6: There are no statistically significant associations between health conditions and routine exercise behavior in African-Americans. H_a6: There are statistically significant associations between health conditions and routine exercise behavior in African-Americans.
What relationships exist between factors that prevent participants from exercising and the stage of change survey results in African-American adults in a church-based setting?	Chi square tests were used to assess relationships between exercise stage of change by factors that prevent exercise.	H₀7: No statistically significant relationships exist between factors that prevent participants from exercising and the stage of change in African-American adults. H_a7: Statistically significant relationships exist between factors that prevent participants from exercising and the stage of change in African-American adults.
What relationships exist between factors that promote exercise and the stage of change survey	Chi square tests were used to assess relationships between exercise stage of change by factors that	H₀8: No statistically significant relationships exist between factors that promote exercise and the

Research Questions	Planned Analyses	Hypotheses
results in African-American adults in a church-based setting?	promote exercise.	stage of change survey in African-American adults. H_a8: Statistically significant relationships exist between factors that promote exercise and the stage of change survey in African-American adults.

Appendix H: *Frequencies and Percentages for Participant Demographics*

Demographic	<i>n</i>	%
Gender		
Male	54	29
Female	127	69
Skipped question	4	2
Income		
10,000 or below	36	19
11,000 – 20,000	19	10
21,000 – 30,000	40	22
31,000 – 40,000	16	9
41,000 – 50,000	12	6
51,000 or above	45	24
Skipped question	17	9
Education		
Less than high school	13	7
High school	67	36
Some college	51	28
College graduate	37	20
Master's degree	14	8
Skipped question	3	2
Employment		
Full time	88	48
Part time	17	9
Unemployed	12	6
Retired	41	22
Disabled	25	14
Skipped question	2	1

Marital status		
Single	63	34
Married	74	40
Separated	33	18
Widowed	13	7
Skipped question	2	1
Children		
None	122	66
1 – 2	52	28
3 or more	9	5
Skipped question	2	1
Smoke		
Yes	17	9
No	124	67
Quit	32	17
Skipped question	12	6
Health		
Poor	6	3
Fair	43	23
Good	97	52
Excellent	33	18
Skipped question	6	3

Appendix I

Facility Authorization Forms

01/30/2014 14:18 FAX

001

IN FAITH MINISTRIES INTERNATIONAL

LOVING GOD, LOVING PEOPLE, CHANGING LIVES

1575 E. High St.
Lima, Ohio 45804
Phone: 419-225-8871

Website: www.infaithministries.org
Email: infaithministriesintl@gmail.com
Fax: 419-225-8877

Letter of Authorization to Conduct Research at Facility

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/ Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at In Faith Ministries Church

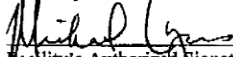
Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) researcher/research team, Robin White (Student Researcher)/Dr. Nancy Menzel (Principal Investigator) to conduct the research project entitled *Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting* at In Faith Ministries Church (1575 E. High St., Lima, Ohio 45804).

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,



Facility's Authorized Signatory

1-30-14

Date

Michael Lyons, Senior Pastor

Printed Name and Title of Authorized Signatory



**WITHOUT FAITH ITS IMPOSSIBLE TO PLEASE GOD
HEBREWS 11:6**

ELEVENTH STREET MISSIONARY BAPTIST CHURCH

**108 EAST 11TH STREET
LIMA, OHIO 45804**

Rev. Robert Toney, Pastor

419 222-2386

January 15, 2014

Office of Research Integrity- Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/ Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Eleventh Street Missionary Baptist Church.

Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) Researcher/research team, Robin White (Student Researcher)/ Dr. Nancy Menzel (Principal Investigator to conduct the research project entitled Application of the *Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting* at Eleventh Street Missionary Baptist Church (208 E. Eleventh St., Lima, Ohio 45804).

The Facility acknowledges or require at additional information, we will contract the researcher As well as the associated risks to the Facility. The Facility accepts the protocol and the Associated risks to the Facility, and authorizes the research project to proceed. The Research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board

If we have any concerns or require addition information, we will contact the researcher And or the UNLV Office of Research Integrity—Human Subjects.

Sincerely,

Pearl Lane

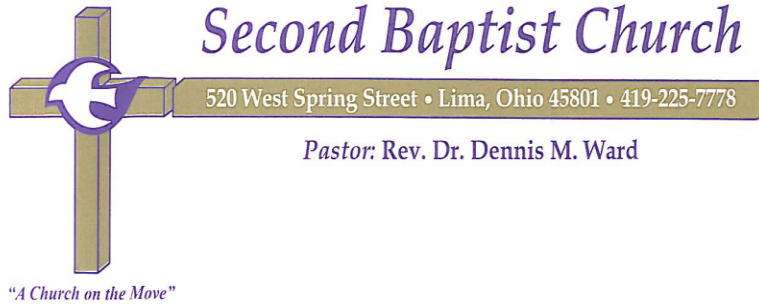
Facility's Authorized Signatory

1-14-14

Date

Pearl Lane/Trustee and Church Clerk

Printed Name and Title of Authorized Signatory



Second Baptist Church

520 West Spring Street • Lima, Ohio 45801 • 419-225-7778

Pastor: Rev. Dr. Dennis M. Ward

Letter of Authorization to Conduct Research at Facility

Office of Research Integrity—Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/Box 451047
Las Vegas, NV 89154-120947

Subject: Letter of Authorization to Conduct Research at Second Baptist Church


Dear Office of Research Integrity—Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) researcher/research team, Robin White (Student Researcher)/Dr. Nancy Menzel (Principal Investigator) to conduct the research project entitled Application of the Transtheoretical Model: Assessing Exercise Behavior in African American in a Church-Based Setting at Second Baptist Church (520 W. Spring St., Lima, OH 45801).

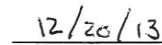
The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity—Human Subjects.

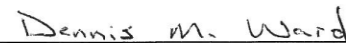
Sincerely,



Facility's Authorized Signatory



Date



Printed Name and Title of Authorized Signatory

Letter of Authorization to Conduct Research at Facility



Tabernacle Missionary Baptist Church

P. O. BOX 1182 • 138 W. NORTH STREET • LIMA, OHIO 45802-1182
419-222-0030

Dr. H. Frank Taylor III, Pastor

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/ Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Tabernacle Missionary Baptist Church


Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) researcher/research team, Robin White (Student Researcher)/Dr. Nancy Menzel (Principal Investigator) to conduct the research project entitled Application of the Trans-theoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting at Tabernacle Missionary Baptist Church
P. O. BOX 1182 • 138 W. NORTH STREET • LIMA, OHIO 45802-1182

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,


Facility's Authorized Signatory

1/18/2014
Date

Dr. H. Frank Taylor III - Pastor
Printed Name and Title of Authorized Signatory

Facility Authorization 7-2010

“The church where everybody is somebody, and Jesus Christ is Lord.”

Letter of Authorization to Conduct Research at Facility

Fellowship Missionary Baptist Church

Rev. A. Lewis

304 North Cole Street

Lima, Ohio 45805

(419) 236-3761

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/ Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Fellowship Missionary Baptist Church

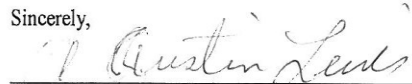
Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) researcher/research team, Robin White (Student Researcher)/Dr. Nancy Menzel (Principal Investigator) to conduct the research project entitled *Application of the Trans-theoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting* at Fellowship Missionary Baptist Church (304 North Cole Street, Lima, Ohio 45805).

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,



Facility's Authorized Signatory

Rev. Austin Lewis

Printed Name and Title of Authorized Signatory

1-21-14

Date

Letter of Authorization to Conduct Research at Facility



RONALD FAILS
Senior Pastor

CAROL A. FAILS
Pastor

2945 Wells Drive
Lima, Ohio 45804

E-MAIL:
gcm@wcoil.com
PHONE:
419-228-0618
FAX:
419-228-3999

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/ Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Grace Church Worldwide Ministries

Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) researcher/research team, Robin White (Student Researcher)/Dr. Nancy Menzel (Principal Investigator) to conduct the research project entitled *Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting* at Grace Church Worldwide Ministries (2945 Wells Drive, Lima, Ohio 45804).

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,

Ronald Fails
Facility’s Authorized Signatory

1/23/14
Date

Ronald Fails Pastor
Printed Name and Title of Authorized Signatory



PHILIPPIAN MISSIONARY BAPTIST CHURCH

Dr. B. LaMont Monford Sr.

190 E. Eighth Street • Lima, OH 45804 • Telephone 419-229-1441 • Fax 419-229-3498

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/ Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Philipian Missionary Baptist Church

Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) researcher/research team, Robin White (Student Researcher)/Dr. Nancy Menzel (Principal Investigator) to conduct the research project entitled *Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting* at Philipian Missionary Baptist Church (190 E. Eighth St., Lima, Ohio 45804).

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,

Facility's Authorized Signatory

11/13/14

Date

Teresa A. Monford Pastoral Assistant
Printed Name and Title of Authorized Signatory

“Serving God through Building One Another in the Spirit of Excellence”

Shiloh Missionary Baptist Church

Sunday School - 9:00 am • Sunday Morning Worship - 11:00 am

Bible Study - Tuesday 10:00 am & 6:30 pm

110 W. 11th Street • Lima, Ohio 45804

Pastor Cleven Jones • 419-223-7606



Letter of Authorization to Conduct Research at Facility

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway/ Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Shiloh Missionary Baptist Church

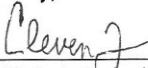
Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas (“UNLV”) researcher/research team, Robin White (Student Researcher)/Dr. Nancy Menzel (Principal Investigator) to conduct the research project entitled *Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting* at Shiloh Missionary Baptist Church (110 W. Eleventh St., Lima, Ohio 45804).

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,



Facility's Authorized Signatory

1/20/14
Date

Cleven Jones
Printed Name and Title of Authorized Signatory

Appendix J

IRB Exempt Approval Form



Biomedical IRB – Exempt Review Deemed Exempt

DATE: February 7, 2014

TO: Dr. Nancy Menzel, Nursing

FROM: Office of Research Integrity – Human Subjects

RE: Notification of IRB Action
Protocol Title: Application of the Transtheoretical Model: Assessing Exercise Behavior
in African Americans in a Church-Based Setting
Protocol # 1401-4700

This memorandum is notification that the project referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46 and deemed exempt under 45 CFR 46.101(b)2.

PLEASE NOTE:

Upon Approval, the research team is responsible for conducting the research as stated in the exempt application reviewed by the ORI – HS and/or the IRB which shall include using the most recently submitted Informed Consent/Assent Forms (Information Sheet) and recruitment materials. The official versions of these forms are indicated by footer which contains the date exempted.

Any changes to the application may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**. When the above-referenced project has been completed, please submit a **Continuing Review/Progress Completion report** to notify ORI – HS of its closure.

If you have questions or require any assistance, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 895-2794.

Office of Research Integrity – Human Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047
(702) 895-2794 • FAX: (702) 895-0805

Appendix K

Exempt Research Information Sheet



INFORMED CONSENT Department of Nursing

TITLE OF STUDY: Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting

INVESTIGATOR(S): Robin White (Student Researcher) and Dr. Nancy Menzel (Principal Investigator)

For questions or concerns about the study, you may contact Dr. Nancy Menzel at 702-895-5970 (UNLV phone number) or Robin White at 419-772-3947.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794 or via email at IRB@unlv.edu**.

Purpose of the Study

You are invited to participate in a research study. The purpose of this study is to survey regular exercise behavior in African-American adults.

Participants

You are being asked to participate in the study because you are an African-American adult 18 years or older who is a church member. Pregnant women are not eligible due to temporary changes in their exercise habits.

Procedures

If you volunteer to participate in this study, you will be asked to do the following: complete the written surveys (5) at the church sites and submit to the researcher. The surveys include a demographic survey, stage of change for exercise survey, decisional balance for exercise survey, self-efficacy for exercise survey, and International Physical Activity Questionnaire (IPAQ). The surveys take about 20 minutes to complete.

Benefits of Participation

There may be no direct benefits to you as a participant in this study. However, we do hope to learn information that may help others become more active.

Risks of Participation

There are risks involved in all research studies. This study includes only minimal risks, as you may become uncomfortable when answering some questions. There are several survey questions that may be considered personal or sensitive, such as: personal information, age, medical history, education, and income, which could possibly cause a minimal amount of stress in study participants. Participation is completely voluntary, and participants may leave blank any questions they choose not to answer.

Cost /Compensation

There will not be any financial cost to you to participate in this study. The study will take approximately 20 minutes of your time. You will be compensated for your time by receiving a pedometer on site for completing the survey packet, as well as having the chance to enter a drawing for prizes that will include water bottles, local fitness center memberships, and gift certificates to local sporting good stores and Walmart. To enter the drawing, I will give you a separate form to fill out with your name and the church you attend. These drawing prizes will be awarded at the end of the study after all churches have participated.

Confidentiality

All information gathered in this study will be kept as confidential as possible. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked office and cabinet at UNLV for three years after completion of the study. After the storage time, the information gathered will be shredded.

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Consent:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Appendix L

IRB Approved Informed Consent

Survey # _____



EXEMPT RESEARCH STUDY INFORMATION SHEET

Department of Nursing

TITLE OF STUDY: Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting

INVESTIGATOR(S) AND CONTACT PHONE NUMBER: Robin White (Student Researcher) and Dr. Nancy Menzel (Principal Investigator)

For questions or concerns about the study, you may **Dr. Nancy Menzel at 702-895-5970** (UNLV phone number) or **Robin White at 419-772-3947**

The purpose of this study is to survey regular exercised behavior in African-American adults.

You are being asked to participate in the study because you meet the following criteria: you are an African American adult 18 years or older who is a church member. Pregnant women are not eligible due to temporary changes in their exercise habits.

If you volunteer to participate in this study, you will be asked to do the following: complete the written surveys (5) at the church sites and submit to the student researcher. The surveys include a demographic survey, stage of change for exercise survey, decisional balance for exercise survey, self-efficacy for exercise survey, and International Physical Activity Questionnaire (IPAQ).

This study includes only minimal risks. The study will take 20 minutes of your time. You will be compensated for your time by receiving a pedometer on site for completing the survey packet, as well as having the chance to enter a drawing for prizes such as water bottles, local fitness center memberships, and gift certificates to local sporting good stores and Walmart. To enter the drawing, I will give you a separate form to fill out with your name and the church you attend. Drawing prizes will be delivered after all churches have completed the surveys.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794, or via email at IRB@unlv.edu.**

Your participation in this study is voluntary. You may withdraw at any time. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Consent:

I have read the above information and agree to participate in this study. I am at least 18 years of age. Turning the survey in to the researcher shows my consent to participate. A copy of this form has been given to me.

1 of 1

*Deemed exempt by the ORI-HS and/or the UNLV IRB. Protocol #1401-4700
Exempt Date: 02-07-14*

Appendix M

Individual Investigator Assurance for Collaborative Exempt Research

From: Otterbein Cridersville SK

4196457150

02/06/2014 21:42

#413 P.002/003



Individual Investigator Assurance for Collaborative Exempt Research

Name of Institution with the Federalwide Assurance (FWA): The University of Nevada, Las Vegas

Applicable FWA #: FWA00002305

Individual Investigator's Name: Brooke Ashton Elsass

Specify Research Covered by this Agreement (title): Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting

UNLV Protocol Number: 1401-4700

UNLV PI Name: Dr. Nancy Menzel

- (1) The above-named Individual Investigator has reviewed: 1) *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research* (or other internationally recognized equivalent) and 2) the relevant UNLV institutional policies and procedures for the protection of human subjects.
- (2) The Investigator understands and hereby accepts the responsibility to comply with the standards and requirements stipulated in the above documents and to protect the rights and welfare of human subjects involved in research conducted under this assurance.
- (3) The Investigator will comply with all other applicable federal, international, state, and local laws, regulations, and policies that may provide additional protection for human subjects participating in research conducted under this assurance.
- (4) The Investigator will abide by all determinations of the UNLV ORI-HS/IRB and will accept the final authority and decisions of the exempt determination, including but not limited to directives to terminate participation in designated research activities.
- (5) The Investigator will complete any educational training required by the Institution and/or the ORI-HS/IRB prior to initiating research covered under this assurance.
- (6) The Investigator will report promptly to the UNLV ORI-HS any proposed changes in the research conducted under this assurance. The investigator will not initiate changes in the research without prior UNLV ORI-HS review, except where necessary to eliminate apparent immediate hazards to subjects.
- (7) The Investigator will report immediately to the UNLV ORI-HS any unanticipated problems involving risks to subjects or others in research covered under this assurance.

- (8) The Investigator acknowledges and agrees to cooperate with the UNLV ORI-HS requirement for initial review, record keeping, reporting, and certification for the research referenced above. The Investigator will provide all information requested by the UNLV ORI-HS in a timely fashion.
- (9) The Investigator will not enroll subjects in research under this assurance prior to its review and exempt determination by the UNLV ORI-HS/IRB.
- (10) This assurance does not preclude the Investigator from taking part in research not covered by this assurance.
- (11) The Investigator acknowledges that he/she is primarily responsible for safeguarding the rights and welfare of each research subject, and that the subject's rights and welfare must take precedence over the goals and requirements of the research.
- (12) The Investigator understands that this assurance may not fulfill his/her Institution's human subjects' policies and procedures when conducting human subject research. The Investigator should check with his/her Institution for guidance.

Investigator Signature: Brooke Culshaw Date: 2-12-14
 Name: Elkass Brooke A Degree(s): RN (ADN)
(Last) (First) (Middle Initial)
 Address: 18722 Santa Fe New Knoxville Rd phone #: 419 296 5789
Wapakoneta OH 45895
(City) (State/Province) (Zip/Country)

Appendix N

CITI Forms for Research Assistant Training

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)
HUMAN RESEARCH CURRICULUM COMPLETION REPORT
Printed on 01/21/2014

LEARNER	Brooke Elsass (ID: 3956670) 18222 santa fe new knoxville Rd Wapakoneta OH 45895
DEPARTMENT	UNLV-Nursing
PHONE	4192965789
EMAIL	b-green.onu.edu
INSTITUTION	University of Nevada, Las Vegas
EXPIRATION DATE	01/20/2019

GROUP 1.BIOMEDICAL RESEARCH INVESTIGATORS AND KEY PERSONNEL

COURSE/STAGE:	Basic Course/1
PASSED ON:	01/21/2014
REFERENCE ID:	12143066

REQUIRED MODULES	DATE COMPLETED
Introduction	01/21/14
History and Ethical Principles	01/21/14
Basic Institutional Review Board (IRB) Regulations and Review Process	01/21/14
Informed Consent	01/21/14
Social and Behavioral Research (SBR) for Biomedical Researchers	01/21/14
Records-Based Research	01/21/14
Genetic Research in Human Populations	01/21/14
Research With Protected Populations - Vulnerable Subjects: An Overview	01/21/14
Vulnerable Subjects - Research Involving Prisoners	01/21/14
Vulnerable Subjects - Research Involving Children	01/21/14
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates	01/21/14
Avoiding Group Harms - U.S. Research Perspectives	01/21/14
FDA-Regulated Research	01/21/14
Research and HIPAA Privacy Protections	01/21/14
Vulnerable Subjects - Research Involving Workers/Employees	01/21/14
Conflicts of Interest in Research Involving Human Subjects	01/21/14
UNLV	01/21/14

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)
RESPONSIBLE CONDUCT OF RESEARCH CURRICULUM COMPLETION REPORT**

Printed on 01/21/2014

LEARNER	Brooke Elsass (ID: 3956670) 18222 santa fe new knoxville Rd Wapakoneta OH 45895
DEPARTMENT	UNLV-Nursing
PHONE	4192965789
EMAIL	b-green.onu.edu
INSTITUTION	University of Nevada, Las Vegas
EXPIRATION DATE	

BIOMEDICAL RESPONSIBLE CONDUCT OF RESEARCH COURSE: This course is for investigators, staff and students with an interest or focus in biomedical research. This course contains text, embedded case studies AND quizzes.

COURSE/STAGE	RCR/1
PASSED ON:	01/21/2014
REFERENCE ID:	12143067

REQUIRED MODULES	DATE COMPLETED
Responsible Conduct of Research (RCR) Course Introduction	01/21/14
Introduction to the Responsible Conduct of Research	01/21/14
Research Misconduct (RCR-Biomed)	01/21/14
Data Management (RCR-Biomed)	01/21/14
Authorship (RCR-Biomed)	01/21/14
Peer Review (RCR-Biomed)	01/21/14
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Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

Survey of Routine Exercise Behavior in African Americans in the Church Setting

Please join me on (day, date and time) at _____ Church

to assess physical activity routines and attitudes toward exercise in area African Americans through several surveys. This information will help to determine associations between theory, exercise behavior, and attitudes of African Americans using a summary of the study results. It will take approximately 20 minutes to complete the survey. You are eligible if you are African American and 18 years or older, but not if you are pregnant.

For questions concerning this UNLV Research Study, please contact Robin White, MSN, RN (student researcher) at 419-772-3947 or Nancy Menzel, PhD, RN (Principal Investigator) at 702-895-5970.



Appendix P

Instrument Permissions



Menu

- Home
- [Background](#)
- [IPAQ scoring protocol](#)
- [Cultural adaptation](#)
- [References](#)
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Dear colleague,

Welcome to the website for the **International Physical Activity Questionnaire**. Here you will find information about the use of the questionnaire and links to the [questionnaire](#) itself, in multiple languages.

This physical activity questionnaire is publically available, it is open access, and no permissions are required to use it. So we encourage any researchers to use it where it will be an appropriate measure of physical activity, particularly in large population studies or in the context of physical activity surveillance for which this measure was designed.

Regarding Scoring of the IPAQ: Over the past 10 years, we have had many requests that have asked for support with the IPAQ algorithm or [scoring protocol](#), and other methodological issues. For many years a group of four or five of us that initially developed and tested the IPAQ measure have responded to all these enquiries, but the volume of them has continued to increase in recent years. Most of the requests come from students or graduates doing pieces of research using the IPAQ, and where students are able to ask a local senior researcher for help, particularly one with physical activity experience or

a local biostatistician, they usually find that the scoring problems can be resolved.

After many hundreds of such enquiries we have decided that we have served the IPAQ measure and its development well, but that we no longer can provide the individual support to answer all these queries, and we would prefer to refer students to their local statisticians and physical activity experts. We are happy to collaborate in IPAQ projects that answer innovative and population-focused research questions, but it is difficult for us to continue to provide an un-funded advisory service.

It's not that we don't want to help, it's just that we don't have the time to answer each of these requests individually in the detail that they require. We think that the IPAQ measure protocols are reasonably straight forward and most researchers manage to use them , but if you have continuing problems, please consult your local research experts.

We hope that IPAQ is a useful measure for you, and one that meets your needs,

Yours sincerely,

The IPAQ group
www.ipaq.ki.se



Robin White <r-white.5@onu.edu>

RE: Stages of Change/ Decisional Balance surveys for dissertation study

1 message

Tracey Barton <tbaron@uri.edu>
To: Robin White <r-white.5@onu.edu>

Mon, Jul 8, 2013 at 9:33 AM

Dear Robin,

This is to grant you permission to use our measures for your dissertation and to revise as needed. Let me know what questions you have about scoring.

Best,

James Prochaska

Sent by Tracey Barton for James Prochaska, Ph.D.

Cancer Prevention Research Center

130 Flagg Road

Kingston, RI 02881

401-874-2830 / fax 401-874-5562

From: Robin White [mailto:r-white.5@onu.edu]

Sent: Tuesday, July 02, 2013 3:54 PM

To: tbaron@uri.edu

Subject: Stages of Change/ Decisional Balance surveys for dissertation study

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Curriculum Vitae

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Educational Background

Expected completion 8/2014	University of Nevada, Las Vegas	Las Vegas, Nevada	Nursing PhD Candidate Urban Sustainability: Health (in progress)
8/1998	University of Nevada, Las Vegas	Las Vegas, Nevada	Master of Science in Nursing
12/1989	University of Nevada, Las Vegas	Las Vegas, Nevada	Bachelor of Science in Nursing

Licensure/ Certifications

Registered Nurse License # 322166 (Ohio)
Basic Life Support- American Heart Association (expires 2/15)
Advanced Cardiac Life Support- American Heart Association
End-of-Life Nursing Education Consortium (ELNEC) Trainer (Certified 2/2008)
Geriatric Nursing Education Consortium Training (GNEC) (2/2008)
Peripherally Inserted Central Catheter Insertion (PICC Line) Certification (2005)

Professional Experience

Ohio Northern University, 525 S. Main Street, Ada, Ohio 45810
Assistant Professor, Course Coordinator, Course Development.....2006-Present (including Medical-Surgical Nursing I & II; foundational nursing courses: health promotion, introductory nursing courses, medical terminology, history of nursing; Service Learning; Pathophysiology; Pharmacology; Community Health Nursing; Leadership & Management; End-of-Life Care; Capstone Preceptorship (traditional & RN-BSN programs); and curriculum development). Teaching experience includes lecture, seminar, skills lab, on-line exercises/ activities, organization of preceptored clinical experiences and clinical. Tenured 2/2012

St. Rita's Home Health Care, 959 W. North St., Lima, Ohio 45805
Registered Nurse (prn status).....2011-Present

Baton Rouge Health Services, 2440 Baton Rouge, Lima, Ohio 45805
Education Consultant.....1/2007- 3/2011
(staff nurse, competency training for nurses and aides, general staff training, patient care, & NCLEX review/ prep for new graduate nurses)

Plus Health Care, 3125 Ada Rd., Lima, Ohio 45805
Per Diem Charge Nurse.....2005-2007

Wright State University, 3640 Colonel Glenn Hwy., Dayton, Ohio 45435
Clinical Instructor, Course Coordinator, BEACON Accelerated Program.2005-2006
(including Medical-Surgical Nursing, Critical Care, Community Health Nursing, Skills lab Coordination, Geriatric Nursing)

Sunrise Hospital/Medical Center/Children's Hospital Education Department
Maryland Pkwy., Las Vegas, NV
New Graduate Nurse Coordinator, Critical Care Instructor.....2001-2004

Community College of Southern Nevada, 6375 W. Charleston Blvd, Las Vegas, NV
Professor in Nursing (tenured).....1998-2005

University Medical Center, West Charleston Blvd., Las Vegas, NV
Registered Nurse.....1998-2005
(Stress Testing & Cardiac Rehabilitation)

Mountainview Hospital, 3400 N. Tenaya Way, Las Vegas, NV
Registered Nurse.....1996-2005
(Critical Care, PICC line insertion, Stress Testing, Cardiac Rehabilitation, Radiology/Special Procedure Nurse)

Sunrise Hospital/Medical, Maryland Pkwy., Las Vegas, NV
Registered Nurse.....1990-1996
(Intermediate Care, Cardiovascular Intensive Care)

Research

Ohio Northern University Sabbatical.....
Fall 2013

Application of the Transtheoretical Model: Assessing Exercise Behavior in African Americans in a Church-Based Setting (dissertation in progress) ...Fall 2013/Spring 2014

- Using Geographical Information Systems to Evaluate the Obesity Epidemic- in Spaces and Flows: An International Journal of Urban and Extraurban Studies*.....June 2013
- Self-Breast Examinations and Breast Cancer Awareness in Dominican Republic Women Research Project*.....May 2013
(manuscript in progress with RN-BSN graduate)
- Using Geographical Information Systems to Evaluate the Obesity Epidemic Virtual Presentation for the Spaces and Flows Conference (Michigan)*.....October 2012
- In-vitro Dissolution and Clinical Pharmacokinetics of an Oral Disintegration Formulation of Acetylsalicylic Acid from an Orally Disintegrating Tablet Formulation of Low-Dose Aspirin (Fasprin Drug Research Study at Ohio Northern University in collaboration with ONU Pharmacy Department (International Journal of Medical and Clinical Research, 2(2), 72-77)*
.....December 11, 2012
- Comparative Pharmokinetics of Fasprofen, a Rapidly Disintegrating Tablet of Ibuprofen, 100 mg, and Advil EC (Ibuprofen, 200 mg Enteric-coated): Clinical Significance from a Pilot Study (Journal of Clinical Research Letters, 3(2), 41-45).*
.....August 2012
- Identifying Personal Risk Factors and Promoting Healthy Behaviors in Minority Populations (Research study entitled *Minority Health: Walking for a Healthier Me-* April 2011)*September 2011
- Millennial Generation Student Nurses' Perception of the Impact of Multiple Technologies on Learning (Manuscript authored by ONU Nursing Faculty)*.....September 2013
- Dominican Republic Community Leader Needs Assessment*.....July 2011
(Research completed in Dominican Republic)
- Survey of Northern Without Borders/ Ohio Northern University (ONU) Members Attending Dominican Republic Mission Trip Summer 2010*.....September 2010
- What is Health to You? A Survey of Dominican Republic Individuals (manuscript in progress)*
.....August 2010

Nurse and Patients' Perceptions of Stress Following Coronary Artery Bypass Surgery
Master's Thesis.....August 1998

Professional Membership

Gamma Upsilon Chapter of Phi Beta Delta, Honor Society for International Scholars
(2012-2014)

Sigma Theta Tau International Member (2012-14)

Ohio Northern University Honor Society of Nursing (Honor Society for STTI) Member
2009- present/ Vice President 2010/ President 2010, 2011 & 2012-13

Ohio League of Nursing (2011)

American Academy on Communication in Healthcare (2011)

Nevada Vascular Nurses Association (2005-2006)

Professional Activities

Using Geographical Information Systems to Evaluate the Obesity Epidemic-
Manuscript accepted for publication in *Spaces and Flows: An International Journal*
of Urban and Extraurban
Studies.....June 2013

Using Geographical Information Systems to Evaluate the Obesity Epidemic Virtual
Presentation for the Spaces and Flows Conference
(Michigan).....October 2012

Using Geographical Information Systems to Evaluate the Obesity Epidemic- Western
Institute of Nursing (WIN) Research Conference Poster Presentation (Portland,
Oregon)..... April 2012

Identifying Personal Risk Factors and Promoting Healthy Behaviors in Minority
Populations (Research study entitled *Minority Health: Walking for a Healthier Me-*
April 2011):OAPN Conference (Dublin, Ohio) Poster Presentation.....October 2011

American Society for Engineering Education (ASEE)/ Institute of Electrical and
Electronic Engineers (IEEE)/ Frontiers in Education Conference Paper Presentation
(Peer Reviewed) October 2011): Interdisciplinary International Pre-professional
Service within the First-Year Engineering Curriculum (Rapid City, South Dakota)

*Ohio League of Nursing Annual Conference Poster Presentation (Peer Reviewed) April 2011: **Global Education: Engaging Nursing Students in Real-Life Experiences (Columbus, Ohio)***

*Western Institute of Nursing Annual Research Conference Poster Presentation (Peer Reviewed) April 2011: **Global Education: Engaging Nursing Students in Real-Life Experiences (Las Vegas, Nevada)***

*American Society for Engineering Education (ASEE) North Central and Illinois- Indiana Section Conference Paper Presentation (Peer Reviewed) April 2011: **The Evolution of Freshman Without Borders: Coordinating International Pre-professional Service within the First-Year Engineering Curriculum***

*Mosby's Nursing Education Development Conference Poster Presentation (Peer Reviewed) Jan. 2011: **Global Education: Engaging Students in Real-Life Experiences (Orlando, Florida)***

*National Student Nurses Association Faculty Conference Speaker (Peer Reviewed) Nov. 2010: **Global Education: Engaging Nursing Students in Real-Life Experiences (Cincinnati, Ohio)***

Nursing 2015 State Nursing Committee/ Yellow Team- Advancing the BSN Degree for Nursing Practice in the State of Ohio (leader of subcommittee on Evidenced Base Practice)- "BSN in Ten"

Graduate Preceptor/ Mentor (Wright State University) (Spring 2012)

Graduate Preceptor/ Mentor (Cleveland State University) (Fall 2010)

Allen County Minority Health Fair Planning Committee (2009-2011)

Healthy People 2010/ 2020 Member (Allen County)- 2009/2010, 2010/2011, 2011/2012, 2012/2013 (current)

Graduate Preceptor/ Mentor (Regis University-Colorado) (Spring 2010)

Ohio Board of Nursing Self-Study Report (co-authored with four additional faculty members (2008-2009)

National Student Nurses' Association Faculty Conferences (4/2007, 3/2008, 3/2009, 11/2010, 4/2012, 4/2013)- attended these faculty conferences while accompanying multiple nursing students to corresponding conferences each year)

End-of-Life Nursing Education Consortium (ELNEC) Train-the-Trainer (2/2008)

Gerontological Nursing Education Consortium (GNEC) Conference/ Training (2/2008)

CCNE Self-Study Report (co-authored with three additional faculty members (2007-2008 & 2012-2013))

National Multi-Cultural Health Professional/ Educator Conference (1/2007)

Med-Surg I and II Course Coordinator Active Status Ohio Northern University, 2007 to present

Community Health Course Coordinator Active Status Ohio Northern University, 2008 to present

Faculty Advisor for *ONU National Student Nurses Association (NSNA)*, 2006 to present

Faculty Advisor for *ONU Relay for Life/ Colleges Against Cancer*, 2006 to present

Faculty Advisor for *Northern Without Borders*, 2009/ 2010 (co-founder) and 2010-2011

Med-Surg I and II Course Coordinator (Previous)/ Wright State University Beacon Accelerated Program, July 2005 to June 2006

Med-Surg I Course Coordinator (Previous)/ Community College of Southern Nevada, August 2000 to June 2005

Faculty Advisor for *National Student Nurses Association (NSNA)*, August 2000-May 2005 Community College of Southern Nevada

Grants

June 2011

Ohio Northern University Dominican Republic Community Leader Needs Assessment Grant- \$6,500 internal ONU grant (with Dr. Chris North & Dr. Kenneth Reid): Qualitative research/ focus groups with Dominican Republic community leaders to determine health-related needs of this indigenous region.

November 2010

Ohio Commission on Minority Health- \$3,000 grant funded through the Ohio Minority Health Division for: Minority Health Kick-Off/Healthy Generations, with an emphasis on health promotion and disease prevention targeting 50 underserved, minority adults in the area surrounding the Bradford Center in south Lima. The project involves providing lipid and glucose blood test results and other baseline data to clients (Blood pressures, body mass index, waist circumference); pedometers were distributed; exercise

recorded; follow-up measurements taken and results discussed with clients. Named as Program manager for the grant.

September 2010

HRSA EETHP-NEPR Grant under Education Priority (Purpose E3) was approved for distance learning but not funded. The ONU Department of Nursing applied for the grant to provide education in new technologies, including distance learning methodologies. The university was requesting a Polycom video conferencing system (Distance Education) to develop an offsite distance education classroom that would have enabled the RN-BSN Completion program to increase student enrollment by adding an additional cohorts and educational sites.

2014 Continuing Education

Western Institute of Nursing Annual Research Conference April 2014- 22.5 CEU's (Seattle, Washington)

2013 Continuing Education

National Student Nurses' Association Faculty Conference in Charlotte, North Carolina (15 CEU's) (4/2013)

Perspectives in Nursing: Across Generations March 2013- 2 CEU's (Ada, Ohio)

Basic Life Support (BLS CPR) February 2013 (Ada, Ohio)

2012 Continuing Education

Western Institute of Nursing Annual Research Conference April 2012- 15 CEU's (Portland, Oregon)

National Student Nurses' Association Faculty Conference in Pittsburgh, Pennsylvania (15 CEU's) (4/2012)

2011 Continuing Education

Mosby's Nursing Education Development Conference Jan. 2011- 13 CEU's (Orlando, Florida)

Advanced Cardiac Life Support (ACLS) 8 CEU's February 2011 (Ada, Ohio)

Basic Life Support (BLS CPR) February 2011 (Lima, Ohio)

Understanding Infant Adoption- 4 CEU's March, 2011 (Ada, Ohio)

Ohio League of Nursing Annual Conference April 2011- 6 CEU's (Columbus, Ohio)

Western Institute of Nursing Annual Research Conference April 2011- 8 CEU's (Las Vegas, Nevada)

2010 Continuing Education

National Student Nurses Association Faculty Conference in Cincinnati, Ohio- 8 CEU's (11/2010)

2009 Continuing Education

National Student Nurses' Association Faculty Conference in Nashville, Tennessee (8 CEU's) (3/2009)

Teaching, Learning & Supporting a Complex Practice of Care by Dr. Patricia Benner at Cleveland Clinic (4 CEU's) (5/1/2009)

Diabetes Management (by Ross Laboratories) (1.0 CEU) (6/2009)

Documentation (presented by Risk Management Services) (1.2 CEU's) (8/2009)

Delegation 2008: What it Means to the Practicing RN and LPN (1 CEU) (8/2009)

2008 Continuing Education

Orthopedic Conference at Saint Rita's Medical Center (6 CEU's) (11/2008)

Wound Management by Risk Management Services (1.5 CEU) (8/2008)

FISH- Team Approach by Ross Laboratories (1 CEU) (6/2008)

Infection Control by Risk Management Services (1.5 CEU) (4/2008)

National Student Nurses' Association Faculty Conference in Grapevine, Texas (8 CEU's) (3/2008)

End-of-Life Nursing Education Consortium (ELNEC) Train-the-Trainer (8 CEU's) (2/2008)

Gerontological Nursing Education Consortium (GNEC) Conference/ Training (12 CEU's) (2/2008)

2007 Continuing Education

National Multi-Cultural Health Professional/ Educator Conference in Washington, D.C. (1/2007)

Gastrostomy Tube Management (presented by Ross Laboratories) (1.0 CEU) (3/2007)

Cardiac Symposium (presented by Saint Rita's Medical Center & Lima Memorial Hospital) (6 CEU's) (4/2007)

Legal Issues (by Risk Management Services) (1.0 CEU) (8/2007)

Community/ Public Service

Minority Health Kick-Off and Follow-up Events- *Walking for a Healthier You* targeting low income minority population in Allen County (April 2011)- funded by grant above through the *Ohio Commission on Minority Health*

Ohio Northern University Faculty Advisor

Colleges Against Cancer, Ohio Northern University, 2006 to present

Relay for Life Ohio Northern University, 2006 to present

Northern Without Borders (ONU Campus Mission Trip Student Association), 2009/2010 and 2010/2011

Ohio Northern University Faculty Collaborator with other departments/ student groups
Destination Immunization, September, 2009 (in collaboration with the colleges Of Nursing, Pharmacy & Business)- provided mini health fair, flu immunizations, blood pressure monitoring, and lipid and blood glucose monitoring to residents of Ada)

Operation Diabetes, planning for April 2010 and 2011 events (in collaboration With the colleges of Nursing & Pharmacy)- *Azucar* (providing blood glucose monitoring, blood pressure monitoring, and eye exams to a Hispanic population at a church in Columbus, Ohio)

Minority Health Fair Planning Committee Member (Allen County), 9/2009 to present (Health Fairs 4/2010 and 4/2011)

Medical Mission Trips to the Dominican Republic, August 1-8, 2009 (co-led 9 trip participants), July 31-August 8, 2010 (co-led 41 trip participants) & July 16-30, 2011 (co-led 100 trip participants), May 19-26, 2012 (co-led with 31 trip participants), November 18-25, 2012 (co-led with 8 participants), May 18-26, 2013 (co-led with 27 participants), May 18-24, 2014 (co-led with 33 participants)

Allen County Bike and Pedestrian Task Force (2012-present)

Allen County *Healthy People 2010/ 2020* (2009-present)

Creating Healthy Communities Task Force (2009-present)