ABSTRACT

Understanding Physical Activity Behaviors Among Dialysis Patients:
A Social Cognitive Approach

Megan S. Patterson, M.P.H.

Committee Chairperson: M. Renée Umstattd Meyer, Ph.D.

While engaging in physical activity is important for the general population due to its documented health benefits (Centers for Disease Control and Prevention, 2011), it is especially beneficial to patients on dialysis. Dialysis patients suffer an excessive burden of chronic conditions including hypertension, coronary artery disease, type 2 diabetes, and depression, all of which provide conditions and symptoms that can be improved with physical activity (Johansen, 2008). However, individuals with renal disease have been shown to be less physically active than individuals in a sample of sedentary healthy people (Johansen et al., 2000). The social cognitive theory (SCT) has been applied to various populations to understand physical activity behaviors in both healthy (Ince, 2008; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminski, 2004) and unhealthy populations (Basen-Enquist et al., 2010; Plotnikoff et al., 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). The purpose of this study is to use constructs of the SCT to better understand physical activity behaviors among patients on dialysis.

Understanding Physical Activity Behavior Among Dialysis Patients:
A Social Cognitive Approach

by

Megan S. Patterson, B.A.

A Thesis

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Approved by the Thesis Committee

____
M. Renee Umstattd Meyer, Ph.D., Chairperson

____
Rodney G. Bowden, Ph.D.

____
Alex Beaujean, Ph.D.

Accepted by the Graduate School
May 2012

____
J. Larry Lyon, Ph.D., Dean

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LIST OF ABBREVIATIONS

BRFSS	Behavioral Risk Factor Surveillance System
CDC	Center for Disease Control
CES-D10	Center for Epidemiologic Studies – Depression 10
CHAMPS	Community Health Adults Model Program for Seniors
CKD	Chronic Kidney Disease
CVD	Cardiovascular Disease
DRA	Dialysis-Related Amyloidosis
EPO	Hormone Erythropoietin
ESE	Bandura's Exercise Self-Efficacy Scale
ESES	Exercise Self-Efficacy Scale
ESRD	End Stage Renal Disease
GLTEQ	Godin Leisure-Time Exercise Questionnaire
GSE	Generalized Self-Efficacy Scale
HBM	Health Belief Model
IPAQ	International Physical Activity Questionnaire
IRB	Institutional Review Board
ISR	Index of Self-Regulation
MET	Metabolic Equivalent of Task
MOEES	Multidimensional Outcome Expectations for Exercise Scale
NIH	National Institute of Health
OEE	Outcome Expectations for Exercise Scale

PASE	Physical Activity Scale for Elderly
SCI ESES	Spinal Cord Injury Exercise Self Efficacy Scale
SCT	Social Cognitive Theory
SEE	Self-Efficacy for Exercise Scale
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TSRQ	Treatment Self Regulation Questionnaire
TTM	Transtheoretical Model
USRDS	United States Renal Data System

LIST OF TERMS

Behavioral Risk Factor Surveillance System (BRFSS): A survey given every year by the Center for Disease Control (CDC). The survey was created in 1984 to collect information on health risk behaviors, preventative health practices, and healthcare access primarily related to chronic disease and injury from all 50 states (CDC, 2011).

Center for Epidemiologic Studies – Depression 10 (CES-D10): A ten-item instrument created by Radloff in 1977 to measure depression in various populations. (Anderson et al., 1994; Radloff, 1977).

Community Health Adults Model Program for Seniors (CHAMPS): CHAMPS is a 41-item questionnaire developed by Stewart and colleagues that measures physical activity behavior in older adults. The measure includes light, moderate, and vigorous activities (Stewart et al., 2001).

Index of Self-Regulation (ISR): The ISR contains items that measure self-regulation, self-efficacy regulation, and motivational appraisal. The nine-item scale was created by Fleury in 1998. (Fleury, 1998; Yeom & Fleury, 2011).

Multidimensional Outcome Expectations for Exercise Scale (MOEES): A nine-item scale created to better understand a person's beliefs or expectations about the benefits of regular physical activity. (Wojcicki, White, & McAuley, 2009).

Social Cognitive Theory (SCT): The SCT was created by Albert Bandura in order to better understand principles of learning within human social context (Bandura, 1977).

This theory has since been widely used to assess behavior as well as being edited from its original form.

Spinal Cord Injury Exercise Self-Efficacy Scale (SCI ESES): Kroll, Khen, Ho, and Groah (2007) created a ten-item scale to measure exercise self efficacy within people with spinal cord injuries. It was created using the generalized self-efficacy scale (GSE) and exercise self-efficacy scale (ESES).

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DEDICATION

To my husband, Clint Patterson.

In our first year of marriage, Clint helped me choose a topic, proofread drafts, administer surveys, and cheer me on from start to finish. His love and support never went unnoticed, and I am grateful to have such an amazing man next to me.

I love you, Clint.

CHAPTER ONE

Introduction

Purpose and Significance

Twenty six million American adults have Chronic Kidney Disease (CKD) and millions of others are at risk (National Kidney Foundation, 2011). Nearly 550,000 U.S. residents were under treatment for End Stage Renal Disease (ESRD) in 2008 resulting from primary diseases including diabetes, hypertension, glomerulonephritis, cystic kidney, and urologic disease, among others (United States Department of Health and Human Services, 2011). ESRD marks almost complete loss of kidney function and results in the need for a transplant or dialysis treatment (National Kidney Foundation, 2011). Patients undergoing dialysis suffer an excessive burden of other chronic conditions including hypertension, anemia, type 2 diabetes, and depression (Kimmel et al., 2000; Kouidi, 2004; United States Renal Data System [USRDS], 2007), all of which provide conditions and symptoms that can be improved with physical activity (Johansen, 2008).

Physical activity has been repeatedly shown to improve fitness (Clyne, Ekholm, Jogestrand, Lins, & Pehrsson, 1991; DePaul, Moreland, Eager, & Clase, 2002; Headley et al., 2002), physical functioning (Boyce et al., 1997; Heiwe, Tollback, & Clyne, 2001; Koufaki, Mercer, & Naish, 2002), and some cardiovascular risk factors (DePaul et al., 2002; Kouidi, Grekas, Deligiannis, & Tourkantonis, 2004) in people on dialysis, along with ameliorating psychosocial problems associated with CKD (Johansen, 2008).

Despite the documented benefits, individuals with renal disease have been shown to be less physically active than sedentary healthy people (Johansen et al., 2000).

Application of the social cognitive theory (SCT) is useful for studying physical activity behavior among various populations including healthy (Ince, 2008; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminski, 2004); Petosa, Suminksi, & Hortz, 2003) and unhealthy populations (Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff et al., 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). Despite its applicability to other populations, the SCT has not been used to understand physical activity behavior among dialysis patients. The purpose of this study was to use SCT constructs to better understand physical activity behaviors among dialysis patients.

Research Questions

Question 1: What are the current "levels" of physical activity and select SCT variables among dialysis patients?

Question 2: Are select constructs of the SCT positively related with physical activity participation in dialysis patients?

Question 3: Which characteristics are related with physical activity engagement after controlling for demographic and health-related factors?

Study Overview

The parameters of this study consisted of dialysis patients in the Waco, Texas area. Questionnaires, including measures of SCT constructs, physical activity, depression, and socio-demographic factors, were completed by patients who were receiving dialysis treatment at clinics run by the Central Texas Nephrology Associates. Participants completed the questionnaires and were over 18 years of age. Patients with dementia were not included in this study.

Assumptions

The assumption was made that participants would answer the survey completely and honestly. Aside from that assumption, the following assumptions were made in relationship to the proposed research questions:

Assumptions of Question 1: It was assumed that the previously established scales used in the questionnaire would accurately describe physical activity levels and select SCT constructs in dialysis patients.

Assumptions of Question 2: It was assumed that various constructs within the SCT would be correlated with physical activity among dialysis patients.

Assumptions of Question 3: It was assumed that demographic and health-related factors including comorbidities, length of time on dialysis, progression of renal disease, and depression could influence physical activity behavior.

Limitations

There were multiple limitations to this study. The first limitation was that the results of the questionnaire were self-reported. Secondly, there was a lack of generalizability due to the use of a convenience sample. The convenience sample included patients from five dialysis clinics in central Texas. Third, this study used SCT constructs to understand physical activity behaviors in dialysis patients, which has not previously been done. Finally, the study used a cross-sectional study design, which limits the conclusions made from the data.

Public Health Benefits

This research has the potential to benefit physicians, nurses, health educators, patients, health researchers, and practictioners, as well as other health care providers. First, the findings will help identify social cognitive factors related with dialysis patients engaging in physical activity. These results will help identify factors related with why dialysis patients, particulary those in central Texas, do not participate in physical activity. This will help health educators design better programs to educate people with CKD on the importance of engaging in physical activity. Secondly, these results will help health care providers better understand dialysis patients and assist them in better meeting the needs of dialysis patients through addressing the barriers to exercise. Lastly, this research will provide insight into the role of comorbidities, disease status, history on dialysis, socio-demographic variables, and health related variables on physical activity behaviors and SCT constructs. Most importantly, these findings could be used to improve the quality of life for ESRD patients.

CHAPTER TWO

Literature Review

According to the National Kidney Foundation (2011), 26 million American adults have Chronic Kidney Disease (CKD) and millions of others are at increased risk. CKD includes conditions that damage the kidneys and decrease their ability to regulate body water and other chemicals in the blood such as sodium, potassium, phosphorus, and calcium. CKD also inhibits the kidneys from removing drugs and toxins introduced into the body, as well as keeping the kidneys from releasing hormones into the blood to help the body regulate blood pressure, make red blood cells, and promote strong bones. The two main causes of CKD are diabetes and high blood pressure, which are responsible for up to two-thirds of cases. End stage renal disease (ESRD) results when 85-90 percent of kidney function is lost (National Kidney Foundation, 2011). Five hundred and forty eight thousand U.S. residents were under treatment for ESRD in 2008 resulting from primary diseases including diabetes, hypertension, glomerulonephritis, cystic kidney, and urologic disease, among others (US. Dept. of Health and Human Services, 2011). In addition, the number of ESRD patients requiring chronic dialysis therapy is increasing worldwide (Schena, 2000; United States Renal Data System [USRDS], 2007).

Dialysis

Once a patient progresses from CKD to ESRD, they must replace the function of their kidneys with either a transplant or dialysis. In 2008, nearly 550,000 people had ESRD, but only 17,413 kidney transplants were performed (United States Department of

Health and Human Services [USDHHS], 2011). This leaves the vast majority of patients with ESRD undergoing dialysis treatment.

Dialysis is a treatment that helps keep the body in balance when the kidneys can no longer do so on their own. Dialysis removes waste, salt, and water from the body; keeps a safe level of chemicals in the blood; and helps to control blood pressure. There are two types of dialysis: hemodialysis and peritoneal dialysis. In hemodialysis, an artificial kidney is used to remove waste and extra chemicals and fluid from the blood. Blood flows a few ounces at a time through a filter called a dialyzer that removes substances that a kidney normally would. A dialyzer is a canister that contains thousands of small fibers through which blood is passed. Dialysis solution cleanses blood as it is pumped through the fibers. The fibers allow wastes and extra fluids to pass from the blood into the solution. The clean blood is then returned to the body (National Institutes of Health [NIH], 2006). Hemodialysis is done through a vascular access into the patient's blood vessels usually in the arm or leg. Each hemodialysis treatment lasts about four hours and is completed three times per week, on average. Peritoneal dialysis is accomplished by cleaning the blood inside the body. This process requires surgery to place a catheter into the abdomen that makes for an access point where dialysis is performed within the peritoneal cavity (National Kidney Foundation, 2011).

Kidney disease and its treatment have a number of potential complications associated with them. More common conditions include extreme tiredness, bone problems, joint problems, itching, and restless legs (NIH, 2006).

Anemia is a condition in which the volume of red blood cells is low. Oxygen is carried through the red blood cells to the rest of the body for energy. Without being delivered oxygen, the body cannot use energy from food. Anemia is common in people with CKD because the kidneys produce the hormone erythropoietin (EPO), which stimulates the bone marrow to produce red blood cells. Renal osteodystrophy is a bone disease that affects 90 percent of dialysis patients and causes bones to become thin and weak. Patients treated with hemodialysis often complain of their skin being itchy, particularly during or just after treatment. Patients with CKD are especially prone to itchiness due to wastes in the bloodstream that dialyzer membranes are unable to remove. Patients on dialysis often have insomnia or sleep apnea. Many people on dialysis have trouble sleeping at night because of aching, uncomfortable, jittery, or "restless" legs. This is caused by nerve impulses or chemical imbalances. Dialysis-related amyloidosis (DRA) is common in people who have been on dialysis for five years or longer. DRA develops when proteins in the blood deposit on joints and tendons, causing pain, stiffness, and fluid in the joints (NIH, 2006).

According to the National Kidney Foundation (2011) and the NIH (2006), engaging in physical activity is beneficial to those on dialysis because it helps to alleviate or lessen associated complications and health issues that being on dialysis and having CKD brings, as well as improving quality of life for the patient. Specifically, exercise has been shown to increase energy, improve muscle function, control blood pressure, improve muscle strength, improve bone density, lower blood fats, improve sleep, control body weight, and improve ability to get around and do necessary tasks (NIH, 2006; National Kidney Foundation, 2011).

Physical Activity

The benefits of engaging in physical activity for the general population have been well documented. Physical activity helps to control weight; reduce the risk of cardiovascular disease (CVD), type 2 diabetes, metabolic syndrome, and some cancers; strengthen bones and muscles; improve mental health, mood, and the ability to do daily activities; and increase chances of living longer (Center for Disease Control and Prevenion [CDC], 2011). Physical activity is an important component to the health and wellbeing of the population and is especially important for patients on dialysis. Patients undergoing dialysis suffer an excessive burden of other chronic conditions including hypertension, coronary artery disease, type 2 diabetes, and depression (Kimmel et al., 2000; Kouidi, 2004, Sarnak et al, 2004; United States Renal Data System [USRDS], 2007), all of which have conditions and symptoms that can be improved through physical activity (Johansen, 2008). Cardiovascular complications are of heightened concern for this population, with approximately half of all deaths of persons on dialysis in all age groups being from such complications (USRDS, 2007). Physical activity has been repeatedly shown to improve fitness (Clyne, Ekholm, Jogestrand, Lins, & Pehrsson, 1991; DePaul, Moreland, Eager, & Clase, 2002; Headley et al., 2002), physical functioning (Boyce et al., 1997; Heiwe, Tollback, & Clyne, 2001; Koufaki, Mercer, & Naish, 2002), and some cardiovascular risk factors (DePaul et al., 2002; Kouidi, Grekas, Deligiannis, & Tourkantonis, 2004) in people on dialysis, along with ameliorating psychosocial problems associated with CKD (Johansen, 2008). It has also been documented that physical activity aids in CKD-induced defects in muscle protein (Wang, Du, Klein, Bailey, & Mitch, 2009), immediately lowers blood pressure in patients with CKD (Headley, et al., 2008), and decreases the oxidative damage caused by having the disease (Coelho, et al., 2010). However, individuals with renal disease have been shown to be less physically active than sedentary healthy people (Johansen et al., 2000). Patients with ESRD receiving dialysis have considerably lower exercise tolerance, functional capacity, endurance and strength, and more muscle wasting than healthy subjects or patients with less severe CKD not yet on dialysis (McIntyre, et al., 2006; Kosmadakis, et al., 2010). Additionally, reduced exercise capacity has been associated with lower survival rates in ESRD (Sietsema, Amato, Adler, & Brass, 2004; Kosmadakis, et al., 2010), and low levels of physical activity in ESRD can lead to muscle wasting, inflammation, and further progression of CKD (Beddhu, Pappas, Ramkumar, & Samore, 2003; Kosmadakis, et al. 2010). Due to the complications associated with CKD and its treatment, excessive fatigue, poor physical functioning, and comorbidities, this population has been documented as less active than healthy sedentary populations, despite the necessity of physical activity in such a critical disease state (Johansen et al, 2000; NIH, 2006; National Kidney Foundation, 2011).

Importance of Theory

Research shows that physical activity levels can be modified by the use of theoretically based behavioral interventions (Wallace, Buckworth, Kirby, & Sherman, 2000). Complex behavior, such as physical activity, is better understood through the use of theories and models that serve to identify important determinants (Marcus, King, Clark, Pinto, & Bock, 1996). Theory has been used to understand physical activity in several demographics including healthy adults (Leenders, Silver, White, Buckworth, & Sherman, 2002; Petosa, Suminksi, & Hortz, 2003; Netz & Raviv, 2004; Petosa, Hortz, Cardina, &

Suminksi, 2004; Ince, 2008; Kwan, Bray, & Ginis, 2009; Vallance, Murray, Johnson, & Elavsky, 2010), unhealthy adults (Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008; Hunt & Gross, 2009; Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009; Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011), and CKD patients (Goodman & Ballou, 2004; Eng & Martin Ginis, 2007).

Theory and Physical Activity Studies

A review of the literature revealed consistent application of several theories to determine physical activity behavior among various populations, including high school students, college students, disabled people, cancer patients in recovery, cancer patients undergoing chemotherapy, people with spinal cord injury, cardiac rehabilitation patients, diabetics, adults, and older adults. This literature search was conducted using PubMed, psycINFO, CINAHL, MEDLINE, ERIC, ScienceDirect, and Google Scholar, and search terms included “physical activity”, “exercise”, “predictors”, “theory”, “social cognitive theory”, “dialysis”, “chronically ill”, “unhealthy”, “chronic kidney disease”, and “renal failure”.

The transtheoretical model (TTM; Prochaska & DiClemente, 1982), theory of planned behavior (TPB; Azjen, 1991), health belief model (HBM; Janz & Becker, 1984), and social cognitive theory (SCT; Bandura, 1977) have all been widely used to understand physical activity across populations. The stages of change and self-efficacy constructs of the TTM have been evidenced in the literature to predict physical activity behavior within healthy populations (Leenders, Silver, White, Buckworth, & Sherman, 2009; Tavares, Plotnikoff, & Loucaides, 2009). Studies reveal that instrumental attitude, affective attitude, descriptive norm, subjective norm, perceived behavioral control, and intention of the TPB all predict physical activity, with perceived behavioral control and intention cited as the strongest predictors within healthy and unhealthy populations, as well as within dialysis patients (Hunt & Gross, 2011; Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009; Kwan, Bray & Ginis, 2009; Lee, 2011; Vallance, Murray, Johnson, & Elavksy, 2010). Health motivation has also been documented as an HBM construct that predicts physical activity within dialysis patients (Goodman & Ballou, 2004). Social support, self regulation, outcome expectancy, outcome expectations, reciprocal determinism, reinforcement, emotional coping, and self-efficacy of the SCT have been applied to the study of physical activity behavior most often (Annesi, 2004; Doerksen, Umstattd, & McAuley, 2009; Hallam & Petosa, 2004; Keller, Fleury, Sidani, & Ainsworth, 2009; Umstattd & Hallam, 2007; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008).

Healthy Populations

Within healthy adult populations, the majority of theoretically-based research has incorporated the HBM (Becker, 1974; Rosenstock, Strecher, & Becker, 1988), TTM (Leenders, Silver, White, Buckworth, & Sherman, 2002; Prochaska & DiClemente, 1992; Tavares, Plotnikoff, & Loucaides, 2009), TPB (Azjen, 1991; Lee, 2011; Kwan, Bray, & Ginis, 2009; Vallance & Murray, 2010), or SCT (Annesi, 2004; Doerksen, Umstattd, & McAuley, 2009; Hallam & Petosa, 2004; Keller, Fleury, Sidani, & Ainsworth, 2009; Umstattd & Hallam, 2007; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008). In a review by Keller, Fleury, Sidani, and Ainsworth (2009) investigating the extent to which a study was consistent with components of theory in physical activity research, it was documented that TTM and SCT were used as the basis for physical activity interventions most often and effectively.

Health Belief Model. The HBM postulates that an individual will engage in behaviors such as physical activity if the perceived benefits of engaging in that behavior exceed the perceived barriers (Janz & Becker, 1984). Studies that use the HBM to understand physical activity (Cousins, 200; Koch, 2003; Storer, Cychosz, & Anderson, 1997) commonly find a relationship between perceived barriers and perceived benefits to exercise behavior.

*Transtheoretical Model***.** Studies looking at the TTM and physical activity in healthy populations (Leenders, Silver, White, Buckworth, & Sherman, 2002; Tavares, Plotnikoff, & Loucaides, 2009) commonly used the stages of change and self-efficacy constructs to understand physical activity, and both constructs are consistently related with physical activity (Leenders, Silver, White, Buckworth, & Sherman, 2002; Tavares, Plotnikoff, & Loucaides, 2009).

Theory of Planned Behavior. Studies using the TPB to understand physical activity in healthy populations (Lee, 2011; Kwan, Bray, & Ginis, 2009; Vallance, Murray, Johnson, & Elavsky, 2010) have often included attitude, (Kway, Bray, & Ginis, 2009), subjective norms (Kwan, Bray, & Ginis, 2009), perceived behavioral control (Kwan, Bray, & Ginis, 2009), and intentions (Kwan, Bray, & Ginis, 2009) to predict physical activity. Intentions (Kwan, Bray, & Ginis, 2009; Lee, 2011) and perceived behavioral control (Lee, 2011) have been found most often to be related to physical activity. It has also consistently been reported that theoretical constructs of the TPB predict intention rather than actual behavior (Kwan, Bray & Ginis, 2009; Lee, 2011; Vallance & Murray, 2010).

Tavares, Plotnikoff, and Loucaides (2009) used several theories to predict physical activity behavior among women in the workplace (n=1,183). This study used an experimental design with a randomly assigned control group to examine psychosocial and physical activity measures separately for women with and without young children across three time points. Constructs from the TTM, TPB, and the SCT were measured using valid and reliable instruments. A multiple regression analysis was conducted and the study revealed that self-efficacy and intention were the strongest predictors of physical activity behavior (Tavares, Plotnikoff, & Loucaides, 2009).

Social Cognitive Theory. Studies using the SCT to predict exercise and physical activity are abundant. Keller, Fleury, Gregor-Holt, and Thompson (1999) conducted a systematic review from 1990-1998 containing 27 studies that examined the relationship between the SCT and physical activity in healthy adults. All of the descriptive studies evidenced in the review found a statistically significant relationship between self-efficacy and exercise behavior, and many others found significant results using self regulation, outcome expectation, reciprocal determinism, and social support (Keller, Fleury, Gregor-Holt, & Thompson, 1999).

Based on the prolific incorporation of and evidence supporting the SCT in understanding and changing physical activity behavior, this literature review included additional studies using the SCT to predict or understand physical activity in healthy populations. While these are only a handful of physical activity studies that have a SCT premise, these are included to provide insight into the abundant use of the SCT in physical activity research across the lifespan in healthy populations. Thereby, nine additional studies were further reviewed that used the SCT to predict physical activity behaviors in healthy populations (Annesi, 2004; Doerksen, Umstattd, & McAuley, 2009; Hallam & Petosa, 2004; Ince, 2008; Petosa, Suminksi, & Hortz, 2003; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminksi, 2004; Umstattd & Hallam, 2007; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008). Within these studies, social support (Annesi, 2004; Ince, 2008; Petosa, Suminski, & Hortz, 2003), social situation (Petosa, Hortz, Cardina, & Suminski, 2004), outcome expectancy (Petosa, Suminski, & Hortz, 2003), outcome expectations (Ince, 2008; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminski, 2004), self-efficacy (Doerksen, Umstattd, & McAuley, 2004; Ince, 2008; Netz & Raviv, 2004; Petosa, Hortz, Cadina, & Suminski, 2004; Petosa, Suminski, & Hortz, 2003; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008), self regulation (Annesi, 2004; Doerksen, Umstattd, & McAuley, 2004; Hallam & Petosa, 2004; Ince, 2008; Petosa, Hortz, Cardina, & Suminksi, 2004; Petosa, Suminski, Hortz, 2003; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008), emotional coping (Ince, 2008; Petosa, Suminski, & Hortz, 2003), health knowledge (Ince, 2008), reinforcement (Petosa, Suminski, & Hortz, 2003), and reciprocal determinism (Petosa, Suminski, & Hortz, 2003) were constructs used to investigate physical activity. Of these, self regulation, outcome expectations, self-efficacy, emotional coping, outcome expectancy, reciprocal determinism, and reinforcement were related with physical activity (Doerksen, Umstattd, & McAuley, 2004; Ince, 2008; Netz & Raviv, 2004; Petosa, Suminski, & Hortz, 2003; Umstattd, Wilcox, Saunders, Watkins, & Downda, 2008).

Annesi (2004) conducted a retrospective study to investigate SCT factors to exercise maintenance in adults (n=178). Participants were recruited from business offices and YMCAs in the southeastern United States. Bivariate correlations revealed social support, self-management, and the ability to tolerate discomfort were related to physical activity behavior in healthy adults. Instruments used in the study were documented as valid and reliable.

Hallam and Petosa (2004) used the SCT to investigate the impact of a four-session work-site intervention on adult exercise. They used a quasi-experimental design with a treatment group (n=48) of employees that had enrolled into exercise classes at the workplace, and a comparison group (n=38) of employees that joined an on-site fitness center. Outcome expectancy, self-efficacy, and self-regulation were measured with valid and reliable instruments. Regression equations tested each variable and showed that self-regulation affects the number of days of regular physical activity in adults.

A study completed by Petosa, Suminksi, and Hortz (2003) examined SCT constructs in predicting vigorous physical activity among college students enrolled in a personal health class at a Midwestern university (n=350). Students were recruited during the second week of class and informed consent was secured. SCT constructs and physical activity behavior were measured over three class periods. Social support from friends and family, self-regulation, outcome expectancy, self-efficacy, exercise role identity, and positive exercise experience were all constructs from the SCT measured in this particular study. The measures used to assess SCT constructs were reported valid and reliable in this study. This study was able to differentiate physically active students from sedentary students using the SCT. Specifically, emotional coping, self-regulation, outcome expectancy, self-efficacy, reinforcement, and reciprocal determinism were related with greater physical activity (Petosa, Suminksi, & Hortz, 2003).

Another study was conducted to examine the effects of a 12-week physical activity intervention with university students enrolled in a health class (n=62), based on the SCT (Ince, 2008). In the study, an intervention was implemented with a pretest and posttest experimental design, without a control group, using core determinants from the SCT, including knowledge of health risks, perceived self-efficacy, outcome expectations, health goals (self regulation), and social support. Instruments used in the study were documented as valid and reliable. Results showed that self-efficacy, outcome expectations, and emotional coping were related with increased physical activity (Ince, 2008).

Doerske, Umstattd, and McAuley (2009) investigated the determinants of moderate and vigorous physical activity in college freshman using the SCT. Students (n=69) from a mid-western university were recruited to participate in this prospective study. Students completed surveys with demographic information and SCT measures at an initial appointment, and three months later they were given accelerometers to wear for a week. The accelerometers were returned a week later to document physical activity. Multiple regression analyses indicated self-efficacy and physical activity goals were significant predictors of vigorous activity within college freshman. The survey instruments and accelerometer had documented validity and reliability.

SCT variables have also been associated with physical activity among high school students (Petosa, Hortz, Cardina, & Suminski, 2004). The purpose of this study was to describe the relationships between SCT variables and the frequency of moderate to vigorous physical activity in a sample of 256 ninth and twelfth grade students recruited from a mid-western city school. The study used a time-series design, where students completed valid and reliable surveys measuring physical activity and SCT constructs for eight consecutive school days during their first period class. Variables examined in the study included self regulation, social situation, social outcome expectations, physical appearance outcome expectations, general health outcome expectations, negative outcome expectations, self-efficacy for ability, and self-efficacy for barriers. Results revealed that self regulation, self-efficacy, and social outcome expectations explained 31% of the total variance in physical activity among high school students (Petosa, Hortz, Cardina, & Suminski, 2004).

A few studies were reviewed that used the SCT to predict physical activity within older adult populations (Umstattd & Hallam, 2007; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008). In one of the studies, self-efficacy, self regulation, and outcome expectancy were measured to predict 98 older adults' exercise behavior. A multivariate analysis revealed that self-regulation was associated with regular physical activity. A convenience sample was recruited from senior organizations and groups based on key informant recommendations. All measures in this study were reported valid and reliable (Umstattd & Hallam, 2007). Another study reported similar results in an older adult population (n=284). This cross-sectional study used a multivariate analysis to show that using self-regulation and self-efficacy strategies were significantly related to greater physical activity among older adults. Validity and reliability were documented in the instruments used (Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008).

Netz and Raviv (2004) conducted a study investigating the application of SCT constructs to physical activity behaviors across the lifespan. Australians between the ages of 18 and 78 (n=2,298) were randomly selected to participate in the study. Participants were interviewed and completed questionnaires using valid and reliable instruments. A cross-sectional study design was used indicating each subject was only surveyed one time. A regression analysis was conducted examining the role of self-efficacy and outcome expectations for physical activity, while controlling for age, gender, and education level. Results indicated significant age differences for all variables. Older individuals reported feeling lower self-efficacy in relation to physical activity and expected fewer benefits from participating in physical activity. (Netz & Raviv, 2004).

Unhealthy Populations

Chronic kidney disease populations. Although numerous studies have been conducted to investigate activity level in dialysis patients, very few have incorporated theory (Bonner, Wellard, & Caltabiano, 2010; Deligiannis, Kouidi, Tassoulas, Gigis, Tourkantonis, & Coats, 1999; Chang, Cheng, Lin, Gau, & Chao, 2010; Coelho et al., 2010; Fitts, 1997; Hawkins, Sevick, Richardson, Fried, Arena, & Kriska, 2011; Headley, Germain, Milch, Buchholz, Coughlin, & Pescatello, 2008; Johansen, 2006; Kosmadakis, Bevington, Smith, Clapp, Viana, Bishop, & Feehally, 2010; Liberman, Boen-Edgar, Capell, 1997; Parsons, Toffelmire, King-VanVlack, 2006; Torkington, MacRae, & Isles, 2006; Wang, Du, Klein, Bailey, & Mitch, 2009). However, two studies were found that used theory to examine physical activity behavior in kidney disease patients, one using the TPB and one using the HBM (Goodman & Ballou, 2004; Eng & Martin Ginis, 2007).

Goodman and Ballou (2004) investigated the perceptions of barriers and motivators, both of which are found in the HBM, for exercise among hemodialysis patients (n=50) in their cross-sectional study. The goal of the study was to ascertain the salient motivators and barriers to exercise among hemodialysis patients. Participants who were recruited out of a large dialysis clinic in the Boston area completed valid and reliable questionnaires measuring typical exercise patterns and perceived barriers and motivators to exercise. Motivators were more salient for this sample than barriers, and both motivator frequency and intensity were associated with an increase in exercise level, whereas only the intensity of barriers endorsed were associated with a decrease in exercise level. The results of the study showed that hemodialysis patients endorse barriers and motivators of a psychosocial, medical, and environmental or contextual nature. Lack of motivation was found to be the primary factor impeding dialysis patient exercise practices (Goodman & Ballou, 2004).

Eng and Martin Ginis (2007) also conducted a study investigating physical activity behaviors in CKD patients (n=80). Patients were recruited through nephrology clinics and the kidney function program at a local hospital. In this study, the TPB was used to predict leisure time physical activity. TPB constructs were drawn from previous studies that have used TPB to examine physical activity in spinal cord injury, cancer, and cardiovascular disease. Attitude, subjective norm, perceived behavioral control, and physical activity were all assessed using a questionnaire provided to patients at regularly scheduled appointments with their nephrologist. The questionnaire consisted of valid and reliable items. Upon completion of the questionnaire, a follow-up phone interview was scheduled one week later. A regression analysis indicated that only perceived behavioral control was significantly associated with intention, but that it did not directly predict behavior (Eng & Martin Ginis, 2007).

Between the HBM and the TPB, it has been concluded that perceived behavioral control predicted intention to engage in physical activity (Eng & Martin Ginis, 2007) and that lack of motivation inhibited dialysis patients from participating in physical activity (Goodman & Ballou, 2004).

The literature is still lacking when it comes to application of theory in understanding or predicting physical activity behavior among dialysis patients. Therefore, other studies of ”unhealthy” populations were reviewed because these populations share similar barriers to exercise with dialysis patients and serve as a useful comparison (Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008).

Unhealthy populations share similar barriers to physical activity with dialysis patients, including fatigue, medical treatment, and constant disease state. Because of the similarities to dialysis patients, the remainder of this literature review focused more in-depth on unhealthy populations. For the purposes of this review, unhealthy adult populations have been grouped together as any chronically ill, rehabilitative, sick, or injured populations. Nine studies were selected to explore the use of theory to investigate physical activity behaviors in unhealthy adult populations. These populations were chosen because they share similar barriers to exercise with dialysis patients: each population requires long-term medical care and are restricted physically due to their condition (Courneya, Keats, & Turner, 2000; Jones et al., 2007; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Rogers, Shah, Prabodh, Dunningham, Greive, Dawson, & Courneya, 2005; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008; Hunt & Gross, 2009; Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009; Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011). Of the studies available that used theory to investigate unhealthy populations, studies dealing with diabetics, cancer patients after surgery or undergoing treatment, patients with spinal cord injury, cardiac rehabilitation patients, disabled persons, and bariatric surgical patients were selected for this study. Four of these representative studies incorporated TPB and five incorporated SCT.

Theory of Planned Behavior. Four studies used the TPB to understand physical activity behavior in unhealthy populations (Courneya, Keats, & Turner, 2000; Hunt & Gross, 2009; Jones et al., 2007; Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009). Attitude, perceived behavior control (Hunt & Gross, 2009; Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009), intention, and subjective norms (Hunt & Gross) were included and found to be related with physical activity in unhealthy populations.

The TPB was used in a progressive study of physical activity behaviors in 141 adults with physical disabilities (Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009). The study was a six-month, web-based prospective design. Participants were recruited by the development and distribution of a study flyer to several sites across the United States such as rehabilitation centers, disability association web sites, hospitals, disability offices, and colleges. Participants completed an online survey with documented validity and reliability at two different time periods to assess physical activity, stages of change, and TPB constructs. It was concluded that attitude had the highest effect on stage of change, followed by perceived behavioral control. Stage of change also had a direct effect on future physical activity in people with physical disabilities.

Hunt and Gross (2009) conducted a cross-sectional study to predict exercise in patients across various stages of bariatric surgery (n=226) by comparing the theory of reasoned action (TRA) and the TPB. Participants were recruited upon admittance to the surgical clinic for either preoperative evaluations or postoperative follow-up. Questionnaires were completed upon checking in to the clinic that assessed affective attitude, injunctive and descriptive norms, perceived behavioral control, intention, and physical activity behavior. All measures were reported as valid and reliable. A correlational analysis of continuous variables was conducted to determine the degree of association between the variables of interest. Findings suggest that perceived behavioral control had the highest positive association with both exercise intention and self-reported exercise behavior in bariatric surgery patients. The study also concluded that the correlational analysis supported a relationship between exercise intention, self-reported exercise behavior, and subjective norms (Hunt & Gross, 2009).

A study conducted by Jones, Guill, Keir, Carter, Friedman, Bigher, and Reardon (2007) used the TPB to understand determinants of exercise intention in patients diagnosed with primary brain cancer. A one-time survey was mailed to 100 patients measuring all of the constructs of the TPB with valid and reliable instruments. Results reported affective attitude and perceived behavioral control to be predictors of physical activity intention (Jones et al., 2007).

Courneya, Keats, and Turner (2000) also investigated cancer patients. In their prospective study, the TPB was used to determine hospital-based exercise in patients following high-dose chemotherapy and bone marrow transplantation. Each patient completed a baseline questionnaire, followed by monitoring of self-initiated ergometer cycling. A hierarchical regression analysis revealed the TPB constructs intention and perceived behavioral control explained exercise behavior in this population. Validity and reliability was reported in all instruments used.

Blanchard et al., 2011 examined the utility of the TPB and SCT in explaining physical activity during a Canadian home-based cardiac rehabilitation. Patients (n=280) completed a questionnaire at program onset and a moderate to vigorous physical activity assessment at a three-month follow-up. Results showed that perceived behavioral control of the TPB and barrier self-efficacy of the SCT were key predictors of three-month moderate to vigorous physical activity. Physical activity was measured with a pre-existing scale with documented validity and reliability. Validity and reliability of instruments were not reported for theoretical constructs (Blanchard et al., 2011)

Social Cognitive Theory. Five studies used SCT constructs to investigate physical activity behavior in unhealthy populations (Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Rogers, Shah, Prabodh, Dunnington, Greive, Dawson, & Courneya, 2005; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). Self-efficacy (Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008), outcome expectancy (Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008), self regulation (Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008), outcome expectations (Basen-Engquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011), and social support (Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008) have all been studied in relation to physical activity. Self-efficacy (Basen-Engquist et al., 2010; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008), outcome expectation (Basen-Enquist et al, 2010), outcome expectancy, social support (Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008), and self regulation (Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008) were all evidenced in the literature to predict physical activity in unhealthy populations.

Plotnikoff, Lippke, Courneya, Birkett, and Sigal (2008) conducted a study using results from the Alberta Longitudinal Exercise and Diabetes Research Advancement (ALEXANDRA) Study (Plotnikoff et al., 2006). This time-series study investigated physical activity in adults with type 1 and type 2 diabetes using the SCT. All instruments were valid and reliable. Individuals (n=1,717) completed baseline and follow up assessments on their self-efficacy, outcome expectancies, impediments, social support, goals, and physical activity. Findings provided evidence supporting self-efficacy, outcome expectancies, and social support as predictors of physical activity in people with type 1 and type 2 diabetes (Plotnikoff et al., 2008).

Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, and Hanna (2011) used the SCT to examine physical activity among people with spinal cord injury (n=160). This study was selected because of the population's barrier to physical activity due to their injury. The aim of the study was to examine self regulation, outcome expectations, social support, self regulatory self-efficacy, and task self-efficacy as predictors of physical activity in this population. Participants were recruited from two spinal cord injury research centers and completed measures to assess physical activity and predictor variables. A trained interviewer administered the SCT measures at baseline and the leisure time physical activity measures one month later. All measures were valid and reliable. Results indicated that self regulation was the only significant, direct predictor of physical activity, while self regulatory self-efficacy and outcome expectations had indirect effects mediated by self regulation (Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011).

An experimental study design was used by Basen-Enquist and colleagues (2010) to test the influence of self-efficacy and outcome expectations on adherence to exercise in endometrial cancer survivors. Endometrial cancer survivors who were at least six months post-treatment (n=200) participated in an intervention involving print materials and telephone counseling, and complete assessments of fitness, activity, self-efficacy, outcome expectations, a control group, and determinants of self-efficacy every two months for a six-month period. The authors documented instrument validity and reliability. The study concluded that both self-efficacy and outcome expectations contribute to physical activity behavior in endometrial cancer survivors (Basen-Enquist, et al., 2010).

Rogers, Shah, Prabodh, Dunnington, Greive, Dawson, and Courneya (2005) used the SCT to understand physical activity behavior during breast cancer treatment. Their cross-sectional study was conducted at a Midwestern oncology clinic with 17 women. Data for each patient was collected through a survey, seven day use of a pedometer, and medical record data that reported comorbidities, length of treatment, and basic medical information. Instruments were chosen due to previously established validity and reliability. Higher daily energy expenditure in breast cancer patients during treatment was significantly associated with self-efficacy, having a role model, and higher activity enjoyment.

Another study measuring predictors of physical exercise adherence was conducted by Schwarzer, Luszczynska, Ziegelmann, Scholz, and Lippke (2008). Three longitudinal studies were conducted on patients enrolled in cardiac rehabilitation (Study 1, n=353; Study 2, n=114) and orthopedic rehabilitation (Study 3, n=368) that used action planning and self-efficacy as predictors to bridge the gap between exercise adherence intention and behavior. The first study recruited participants enrolled in a cardiac rehabilitation program, the second study used participants that had experienced an uncomplicated myocardial infarction, and the third study recruited patients during outpatient orthopedic rehabilitation that had orthopedic ailments such as back pain, disc disorders, joint conditions, and injuries. Each study consisted of three measurement points in time, covering a period between four and twelve months. Instruments used to measure physical activity and SCT constructs were reported as valid and reliable. Structural equation modeling revealed that planning and recovery self-efficacy were specified as proximal predictors of behavior (Schwarzer, Luszcynska, Ziegelmann, Scholz, & Lippke, 2008).

With the absence of application of the SCT in dialysis patients, along with consistent evidence supporting the utility of the SCT in explaining and predicting physical activity in both healthy and unhealthy populations, application of the SCT to dialysis patients is warranted in hopes of better understanding physical activity behaviors of ESRD populations.

Social Cognitive Theory

The SCT was piloted by Albert Bandura in 1982 to better understand principles of learning within human social context and has since been widely used to assess behavior (Bandura, 1982). As previously discussed, interventions based on SCT constructs have been recommended to enhance physical activity and other health behaviors of individuals, making this theory very applicable (Ince, 2008). The SCT is based around the construct of reciprocal determinism, suggesting that humans constantly interact with their environments, which leads to individual and social change. It posits that human behavior is the interplay of personal, behavioral, and environmental influences. The theory is split into five major categories: psychological determinants of behaviors, observational learning, environmental determinants of behavior, self regulation, and moral disengagement. Within these categories are individual constructs that provide the foundations of the theory and have been documented to produce behavior change (Bandura, 1977, 1986, 1997, 1999; McAlister, Perry, & Parcel, 2008).

Of SCT constructs, the most widely used is self-efficacy, which is the individual's belief in his or her capacity to perform a given behavior (McAlister, Perry, & Parcel, 2008). Other constructs include behavior capability or skill, reinforcement, outcome expectations, outcome expectancies, self regulation, and emotional coping response. Please see Table 1 for SCT constructs and their definitions.

The SCT maintains that behavior change starts and ends with cognitions (Bandura, 1977). The SCT has been used in various populations to understand physical activity behavior including healthy populations (Ince, 2008; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminski 2004; Petosa, Suminksi, & Hortz, 2003) and unhealthy populations (Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff et al., 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). Despite its applicability to other populations, the SCT has not been used to understand physical activity behavior among dialysis patients.

Table 1

Social Cognitive Theory Constructs

Construct	Definition	Source
Reciprocal determinism	Environmental factors influence individuals and groups, but individuals and groups can also influence their environments and regulate their own behavior	Bandura, 1997; McAlister, Perry, & Parcel, 2008
Outcome expectations	A person's belief that a given behavior will result in a specific outcome.	Bandura, 1997; King, 2001; Williams, Anderson, & Winett, 2005; Wojcicki, White, & McAuley, 2009
Self-efficacy	An individual's degree of confidence that they can perform a particular behavior	Bandura, 1997; Keller, Fleury, Gregor-Holt, & Thompson, 1999; Senecal, Nouwen, & White, 2000; Williams & Bond, 2002

(continued)

Construct	Definition	Source
Self regulation	Controlling oneself through self-monitoring, goal setting, feedback, self reward, self-instruction, and enlistment of social support	Bandura, 1997; McAlister, Perry, & Parcel, 2008
Observational learning	Learning to perform new behaviors by exposure to interpersonal or media displays of them, particularly through peer modeling.	Bandura, 1977; McAlister, Perry, & Parcel, 2008
Incentive motivation/reinforcement	The use and misuse of rewards and punishments to modify behavior	Bandura, 1997
Outcome expectancy	Learned associations between specific behaviors and outcomes of engaging in that behavior	Bandura, 1997; Jones et al., 2001
Social support	Functional content of relationships that can be categorized into emotional support (empathy, love, caring), instrumental support (tangible aid and services), informational support (advice, suggestions, and information), and appraisal support (constructive feedback and affirmation)	House, 1981
Emotional coping	Strategies aimed at changing the way one thinks or feels about a stressful situation	Lazarus & Folkman, 1984

There are a number of constructs that make up the SCT and are referenced in physical activity literature. Among healthy populations, social support, self regulation, outcome expectancy, self-efficacy, emotional coping, reinforcement, reciprocal determinism, and outcome expectations have been notoriously investigated. Of these constructs, self-efficacy, outcome expectations, self-regulation, reciprocal determinism, reinforcement, outcome expectancy, and emotional coping all provide statistical significance in relation to physical activity in healthy populations (Ince, 2008; Petosa, Suminksi, & Hortz, 2003; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminksi, 2004). In unhealthy populations, similar to studies conducted with healthy populations, self-efficacy, outcome expectation, self regulation, outcome expectancy, and social support were studied and most often yielded significant results (Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). The literature provided repeated evidence that SCT constructs can predict physical activity in various populations, most notably, outcome expectations, self regulation, and self-efficacy. These three constructs have demonstrated the greatest predictive power in physical activity among healthy and unhealthy populations, and will therefore be examined among dialysis patients in the present study (Bandura, 1977, 1986, 1997, 1999; Oka et al., 1996; Goodman & Ballou, 2004; Curtin, Walters, Schatell, Pennell, Wise, & Kicko, 2008; McAlister, Perry, & Parcel, 2008; Schwarzer, Luszczynzka, Ziegelmann, Scholz, & Lippke, 2008; Basen-Engquist et al., 2010).

Measures

Given the strong evidence for the use of self-efficacy, outcome expectations, and self regulation, the literature was searched to identify appropriate measures for each theoretical construct.

Self-Efficacy

Three scales evaluating exercise self-efficacy in elderly and unhealthy populations were reviewed. The self-efficacy for exercise scale (SEE, Resnick & Jenkins, 2000) was originally created for use with elderly populations (Resnick et al, 2004) and has since been used in elderly minority populations (Resnick et al., 2004), Native American women (Fahrenwald & Shangreaux, 2006), type 2 diabetics aged 40-65 (Gleeson-Kreig, 2006), and older adults that had undergone knee replacement surgery (Harnirattisal & Johnson, 2005). The Exercise Self-Efficacy Scale (ESES) has been validated in a Korean sample with chronic disease (Shin et al., 2001) and a cardiac rehabilitation population (Everett, Salamonson, & Davidson, 2008). The Spinal Cord Injury (SCI) Exercise Self-Efficacy Scale (SCI ESES, Kroll, Kehn, Ho, & Groah, 2007) was created to test the confidence in individuals with spinal cord injury to plan and carry out physical activities and/or exercise based on their own volition. Spinal cord injury patients are a similar population to dialysis patients in that they are chronically and permanently ill. Like dialysis patients, people with spinal cord injuries undergo indefinite treatment and must make changes in their life due to their condition (Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). This scale measured exercise self-efficacy, specifically for a diseased population, and included items that could accurately describe the confidence level of any patient undergoing long-term treatment. Because of this, the SCI ESES (Kroll, Kehn, Ho, & Groah, 2007) was identified as the most appropriate to assess exercise self-efficacy in dialysis patients.

Outcome Expectations

Two scales were reviewed that studied outcome expectations and exercise in older adults. The Outcome Expectations for Exercise Scale (OEE, Resnick, Zimmerman, Orwig, Furstenberg, & Magaziner, 2001) was created to focus specifically on older adult populations (Conn, 1998; Melillo et al., 1996; Resnick & Spellbring, 2000; Schneider, 1997; Sechrist, Walker, & Pender, 1987; Sharon, Hennessy, Brandon, & Boyette, 1997; Steinhardt & Dishman, 1989). The Multidimensional Outcome for Exercise Scale (MOEES, Wojcicki, White, & Edward, 2009) was also created to study outcome expectations in older adults, as well as middle-aged adults. Due to its availability, as well as generalizability to diseased populations (Wojcicki, White, & Edward, 2009), the MOEES was identified as the most appropriate for the assessment of patients on dialysis.

Self Regulation

Three measures were reviewed that studied self regulation in elderly and unhealthy populations. The Treatment Self-Regulation Questionnaire (TSRQ, Ryan & Connell, 1989) has several forms and measures self regulation among different groups including alcoholics (Ryan, Plant, & O'Malley, 1995) smokers (Williams, Cox, Kouides, & Deci, 1999), diabetics (Williams, Freedman, & Deci, 1998), overweight and obese people (Williams, Grow, Freedman, & Deci, 1996), and adult outpatients on medication

(Williams, Rodin, Ryan, Grolnick, & Deci, 1998). The Physical Activity Self Regulation Scale (PASR-12; Umstattd et al., 2007) was created to measure physical activity self regulation in older adults. Umstattd and colleagues (2007) conducted a study to validate Petosa's (1993) 43-item physical activity self regulation scale (PASR-43). The PASR-43 did not fit the data well, which resulted in the creation of the PASR-12 through a post hoc specification search and iterative model modifications. The PASR-12 provides a concise and valid measure. The Index of Self Regulation (ISR, Fleury, 1998; Yeom & Fleury, 2009) has been used to measure individuals in an outpatient cardiac rehabilitation program (Fleury, 1998) and physical activity in older Korean Americans (Yeom & Fleury, 2011). The ISR has been tested in elderly populations, unhealthy populations, and has been used to evaluate physical activity making it the most appropriate instrument to examine self regulation of physical activity in dialysis patients.

Physical Activity

Four instruments were reviewed that measure physical activity and exercise behavior. The International Physical Activity Questionnaire (IPAQ, Craig, et al., 2003) was developed to survey large groups and populations internationally. The IPAQ has been widely used in various populations including cardiac and orthopedic rehabilitation groups (Boothe, 2000; Schwarzer, Lusczynska, Ziegelmann, Scholz, & Lippke, 2008), bariatric surgery patients (Hunt & Gross, 2011). The Godin Leisure-Time Exercise Questionnaire (GLTEQ, Godin & Shepard, 1985) was created as a simple method to assess exercise behavior in the community. It has been used to study persons with multiple sclerosis (Welkert, Moti, Suh, McAuley, & Wynn, 2010), patients that have undergone bariatric surgery (Hunt & Gross, 2011), people with CKD (Eng & Martin

Ginis, 2007), and hemodialysis patients (Goodman & Ballou, 2004). The Physical Activity Scale for the Elderly (PASE, Washburn, Smith, Jette, & Janney, 1993) as well as the Community Health Adults Model Program for Seniors (CHAMPS, Stewart et al., 2001) have been used to assess physical activity in older adult populations. CHAMPS was selected for this study given the great variety in daily activities represented in CHAMPS such as watering plants, light cleaning, or running errands (Stewart et al., 2001). Though the GLTEQ was used in dialysis patients, CHAMPS was deemed more appropriate in the study of physical activity behavior in dialysis patients. CHAMPS contains items that include everyday physical activity, versus solely light, moderate, or vigorous exercise behaviors. Due to the condition in which dialysis patients are in, there is a better likelihood that they respond positively to CHAMPS items as compared to the GLTEQ.

Conclusion

Physical activity participation is rare among dialysis patients (Gutman, Stead, & Robinson, 1981; Johansen et al., 2000). People with ESRD fight fatigue, comorbidities, and psychological factors that greatly decrease their participation in physical activity (Capodaglio, Villa, Jurisic, & Salvadeo, 1998, Johansen et al, 2000; NIH, 2006; National Kidney Foundation, 2011). There has been an abundance of literature supporting the use of theory, and the SCT in particular, to predict physical activity behavior in healthy (Ince, 2008; Kwan, Bray, & Ginis, 2009; Lee, 2011; Leenders, Silver, White, Buckworth, & Sherman, 2002; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminksi, 2004; Petosa, Suminski, & Hortz, 2003; Vallance and Murray, 2010) and unhealthy populations (Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008; Hunt & Gross, 2009; Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009; Basen-Enquist et al., 2010; Martin Ginis, Latimer, Arbour-Nicitopoulos, Bassett, Wolfe, & Hanna, 2011). However, limited theory-based research has been conducted investigating physical activity among dialysis patients, and none using the SCT (Goodman & Ballou, 2004; Eng & Martin Ginis, 2007). Given the benefits associated with physical activity there is a need to examine and better understand physical activity behaviors among dialysis patients, and theory can provide a systematic method to do so. The purpose of this study was to use the SCT to investigate physical activity behavior among dialysis patients, so that future health care providers can better serve their patients, dialysis patients can better succeed in participating in physical activity, and the population can therefore experience a higher quality of life.

CHAPTER THREE

Methodology

Introduction

While engaging in physical activity is important for the general population due to its documented health benefits (CDC, 2011), it is especially beneficial for patients on dialysis. Dialysis patients suffer an excessive burden of other chronic conditions including hypertension, coronary artery disease, type 2 diabetes, metabolic bone disease, anemia, and depression, all of which provide conditions and symptoms that can be improved through physical activity (Johansen, 2008). However, studies show that individuals with renal disease are less physically active than healthy, but sedentary individuals (Johansen et al., 2000). The SCT (Bandura, 1977, 1986) has been evidenced in the literature to explain and predict physical activity among healthy and diseased populations, where self-efficacy, outcome expectations, and self regulation have consistently been related with physical activity (Oka et al., 1996; Goodman & Ballou, 2004; Curtin, Walters, Schatell, Pennell, Wise, & Klicko, 2008; Schwarzer, Luszczynzka, Ziegelmann, Scholz, & Lippke, 2008; Basen-Engquist et al., 2010). However, these relationships have not been examined among dialysis patients. Therefore, this study was designed to examine the relationship among SCT constructs and physical activity for dialysis patients. By identifying and understanding correlates of physical activity among dialysis patients, more efficient physical activity initiatives for these patients can be planned, which should ultimately lead to improved quality of life for these individuals.

Purpose

The purpose of this study was to use SCT constructs to better understand physical activity behaviors of dialysis patients, and to subsequently examine relationships among SCT constructs and current physical activity behaviors after controlling for demographic and health-related factors.

Research Questions

In order to investigate the relationship between SCT constructs and physical activity behaviors in dialysis patients, the following research questions were examined:

Question 1: What are the current "levels" of physical activity and select SCT variables among dialysis patients?

Question 2: Are select constructs of the SCT positviely related with physical activity participation in dialysis patients?

Question 3: Which characteristics are related with physical activity engagement after controlling for demographic and health-related factors?

Participants

Sample

A convenience sample of ESRD patients over 18 years of age who use Waco, TX dialysis clinics was recruited to complete self-reported questionnaires. Adult dialysis patients treated by the Central Texas Nephrology Associates from the following dialysis clinics were recruited: the Greenway Clinic (n=24), the Brazos Clinic (n=90), the Waco West Clinic (n=110), the Temple Clinic (n=30), and the Bellmead Clinic (n=105). Questionnaire packets containing an informed consent form, an identification drawing card, and the questionnaire were distributed to patients while undergoing dialysis treatment throughout December 2011 and January 2012. All participants were given the option of having the survey read aloud to them in the event they were unable or unwilling to complete it on their own.

Sample Size

Two power analyses were conducted in order to determine the appropriate sample size needed to be able to detect statistically significant relationships. Based on Aberson (2010) and Huck (2012), coefficients and weighted betas were collected from the literature in order to calculate predictive values of self-efficacy, self regulation, and outcome expectation (Coups, et al., 2009; Dlugonski, Wojcicki, McAuley, Molt, 2011; Ferrier, Dunlop, & Blanchard, 2010; Gyurcsik, Brawley, Spink, Brittain, Fuller, & Chad, 2009; Lowe, Watanabe, Baracos, & Courneya, 2011; McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Sassen, Kok, Schaalma, Kiers, & Vanhees, 2010; Snook & Motl, 2008; Speed-Andrews et al., 2011; Strachan, Brawley, Spink, & Glazebrook, 2010). A weighted average effect (zero-order correlation) was calculated. The first analysis assumed the three predictors had independent effects and concluded that a sample size of 100 would result in a multiple R-square value different than zero. The second analyses calculated the number of people needed to detect the effect of the weakest variable, self-regulation (n=150). It was concluded based on the analyses that a sample size of 100-200 people was desired. For oversampling purposes, about 300 patients were recruited.

Measures

In order to assess physical activity behaviors in dialysis patients, a questionnaire consisting of scales and items to measure socio-demographic variables, health-related variables, SCT constructs, and physical activity behavior was used. The Center for Disease Control's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) 2011 survey questionnaire items were used to ask socio-demographic and health-related questions (CDC, 2011). The Community Healthy Adults Model Program for Seniors (CHAMPS) questionnaire was used to measure current physical activity behaviors (Stewart, Mills, King, Haskell, Gillis, & Ritter, 2001). The Index of Self Regulation (ISR) was used to measure self regulation (Fleury, 1998; Yeom & Fluery, 2011), the Multidimensional Outcome Expectations for Exercise Scale (MOEES) measured outcome expectations (Wojcicki, White, & McAuley, 2009), and the Exercise Self-Efficacy Scale measured self-efficacy (Kroll, Kehn, & Groah, 2007). The Center for Epidemiologic Studies-Depression 10 (CES-D10) was used to measure depressive symptoms in participants (Anderson, et al., 1994). Please see Table 3 for a summary of scales used in the study.

Socio-demographic and Health-Related Variables

The majority of the questions regarding demographic variables were derived from the 2011 BRFSS (CDC, 2011). The BRFSS is a state-based system of telephone surveys that was developed by the CDC in 1984. The BRFSS collects information on health risk behaviors, preventative health practices and healthcare access primarily related to chronic disease and injury. The BRFSS collects data monthly from all 50 states and publishes regional and national data analyses. The BRFSS is available for public use. This research used seven variables from the BRFSS (CDC, 2011), including age, gender, race/ethnicity, education level, employment status, alcohol use, and cigarette smoking.

Depression Variables

Given high rates of depressive symptoms among dialysis patients (Lopez et al., 2002), depression was also measured as a potential confounder and health related variable that was controlled for in the analysis. The CES-D10 is a 10-item measure of depressive symptoms (Anderson et al., 1994). It has shown to be a reliable measure for assessing the number, types, and duration of depressive symptoms across racial, gender, and age categories (Knight, Williams, McGee, & Olaman, 1997; Radloff, 1977; Roberts, Vernon, & Rhoades, 1989). High internal consistency has been reported with Cronbach's alpha coefficients ranging from .85 to .90 across studies (Radloff, 1977). Concurrent validity by clinical and self-report criteria, as well as substantial evidence of construct validity have been previously demonstrated (Radloff, 1977). This scale has also been previously used with renal failure patients to identify and examine depressive symptoms (Kutner, Brogan, Hall, Haber & Daniels, 2000; Theofikou, 2011). A summary score was created with scores ranging from zero to thirty with "rarely or none of the time" accounting for zero points per question and one point for answering "some or a little of the time", two points for answering "occasionally or a moderate amount of the time", and three points for answering "most or all of the time". Reverse scoring was used on items 4, 8, 12, and 16 (Radloff, 1977).

In addition, patient medical histories including comorbidities and time on dialysis were collected through medical chart data to allow for adjustment of these potential confounders. Information obtained from medical record data included length of disease, degree of disease, comorbidities, and months on dialysis. Greater length of disease, greater degree of disease, and more months on dialysis are correlated with increased muscle wasting, more fatigue, and less likelihood to engage in physical activity when compared to less severe kidney disease patients (Johansen, Doyle, Sakkas, & Kent-Braun, 2005; McIntyre, Selby, Sigrist, Pearce, Mercer, & Naish, 2006).

Physical Activity Behavior

CHAMPS is comprised of 41 two-part questions that assess weekly frequency and duration of various physical activities and non-physical leisure activities (light to vigorous in intensity). Each question asks if in a typical week someone has participated in an activity during the last four weeks. If the respondent has participated in that activity in a typical week, he or she also reports how many times a week and how many hours a week they participated in that particular activity. Questions represent light (e.g., leisurely walking, water exercises), moderate (e.g., walking, bicycling or stationary cycling, general conditioning), and vigorous activity levels (e.g., jog or run, swim moderately or fast) (Stewart et al., 2011). In a study using CHAMPS to measure a sample of older Australian adults, test-retest reliability was documented for all physical activity outcomes with spearman correlation coefficients ranging from .78-.93, with the exception of duration of vigorous-intensity physical activity. Test-retest repeatability of the categorical estimates of meeting the current physical activity guidelines were moderate with a kappa of .55 and 78% agreement. Construct validity of CHAMPS has been assessed against objectively measured step counts. The correlation coefficients between the weekly step counts and reported walking frequency duration recorded in the study were good (r=.40-.57; Giles & Marshall, 2009). CHAMPS has been used in studies with senior citizens (Moore, Ellis, & Allen, 2008), Spanish speaking older adults (Rosario, Vazquez, Cruz, & Ortiz, 2008), patients that have undergone a laparoscopic cholecystectomy (Feldman, Kaneva, Demyttenaere, Carli, Fried, & Mayo, 2009), elderly African-Americans (Resnicow, McCarty, Blissett, Wang, Heitzlr, & Lee, 2003), breast cancer survivors (Stewart, Mills, King, Haskell, Gillis, & Ritter, 2008), and obese older adults (King, et al., 2011). CHAMPS was selected to assess physical activity behavior in dialysis patients because of its use in similar populations previously and the various activities measured in the questionnaire other than exercises.

Two scores can be derived from the measure including frequency of activity per week and estimated caloric expenditure per week. Each specified activity was assigned a metabolic equivalent of task (MET) value based on values reported by Ainsworth and colleagues (1993). MET values are a physiological measure expressing the energy cost of physical activities (Ainsworth et al., 1993). For activities not specifically listed in Ainsworth et al. (1993), Stewart and colleagues (2001) assigned a weight by interpolating a value based on similar activities. Multiplying the estimated duration of each activity by the MET value and summing these across all relevant activities estimate duration and intensity of total physical activity reported. Because many of the MET values reported by Ainsworth and colleagues (1993) are based on assessments of younger persons, adjustments were made due to instructions provided by the authors of the CHAMPS scale to some of the activities to convert METS to those more likely to be correct for older adults (Stewart et al., 2001). See Table 2 for the MET values for each activity item.

Table 2

Summary of MET Values: CHAMPS Physical Activity Questionnaire

Item Number	Questionnaire Item	CHAMPS Metabolic Weight
7	Dance (such as square, folk, line, ballroom)	4.5
9	Play golf, carrying or pulling your equipment (count walking time only)	3.0
10	Play golf, riding a cart (count walking time only)	2.0
14	Play singles tennis (do not count doubles)	5.0
15	Play doubles tennis (do not count singles)	4.0
16	Skate (ice, roller, in-line)	4.5
19	Do heavy work around the house (such as washing windows, cleaning gutters)	3.0
20	Do light work around the house (such as sweeping or vacuuming)	2.5
21	Do heavy gardening (such as spading, raking)	4.0
22	Do light gardening (such as watering plants)	2.25
23	Work on your car, truck, lawn mower, or other machinery	3.0

(continued)

Item Number	Question Item	CHAMPS Metabolic Weight
24	Jog or run	7.0
25	Walk uphill or hike uphill (count only the uphill part)	6.0
26	Walk fast or briskly for exercise	3.5
27	Walk to do errands (such as to/from a store or to take children to school)	2.5
28	Walk leisurely for exercise or pleasure	2.5
29	Ride a bicycle or stationary cycle	4.0
30	Do other aerobic machines such as rowing or step machines	5.0
31	Do water exercises	3.0
32	Swim moderately or fast	5.0
33	Swim gently	3.0
34	Do stretching or flexibility exercises	2.0
35	Do yoga or tai chi	2.0
36	Do aerobics or aerobic dancing	3.5
37	Do moderate to heavy strength training (hand held weights of >5 lbs., weight machines, or push-ups)	4.5

(continued)

Item Number	Question Item	CHAMPS Metabolic Weight
38	Do light strength training (such as hand held weights of 5 lbs. or less or elastic bands)	3.0
39	Do general conditioning exercises, such as light, calisthenics or chair exercises (do not count strength training)	2.5
40	Play basketball, soccer, or racquetball (do not count time on sidelines)	5.0

(Stewart et al., 2001)

Social Cognitive Theory

Outcome expectations. Outcome expectations reflect a person's belief that a given behavior will result in a specific outcome (King, 2001; Williams, Anderson, & Winett, 2005; Wojcicki, White, & McAuley, 2009). The MOEES is a 15-item scale used to measure outcome expectations. Respondents answer questions using a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree (i.e., "Exercise will improve my ability to perform daily activities:"). This instrument was created using a physical outcome expectation scale with internal consistency (α=.82), self-evaluative outcome expectation scale with internal consistency (α=.84), and a social outcome expectation scale with internal consistency (α=.81). Each dimension of the MOEES is scored by summing the numerical ratings for each response. Higher scores are indicative of higher levels of outcome expectations for exercise (Wojcicki, White, & McAuley, 2009).

Self regulation. Self regulation is recognized as an important factor to fostering self controlled, goal-directed behaviors through selective processing of information, behavioral monitoring, judging individual performance, and self-evaluation (Bandura, 2005; Yeom & Fleury, 2011). The ISR contains items that measure self regulation, self-efficacy regulation, and motivational appraisal. Nine items are included, where answer responses use a 6-point Likert scale, where 1 = strongly disagree and 6 = strongly agree (i.e. "I think of the benefits of regular physical activity"). Quantification of ISR content validity was supported through the ratings of ten experts (Fleury, 1988), following criteria established by Imle and Atwood (1988). The instrument was tested in successive steps with 146 individuals, including internal consistency reliability and three forms of validity assessment (content validity, criterion-related validity, and construct validity). The total scale Cronbach's alpha was .87. Initial estimates of criterion related and construct validity were documented with moderate correlations between ISR subscales and theoretically related criterion measures including exercise self-efficacy and index of readiness (r=.20-.47; Yeom & Fleury, 2011). A sum score was created with higher scores indicating a higher level of self-regulation for physical activity.

Self-efficacy. Self-efficacy is the central concept of the SCT and consists of an individual's degree of confidence that they can perform a particular behavior (Bandura, 1977, 1986). Ten items of the ESES measure self-efficacy using a 4-point Likert scale, where 1 = not at all true and 5 = always true (i.e. "I am confident that I can overcome barriers and challenges with regard to physical activity and exercise if I try hard enough"). Internal consistency was previously confirmed (α=.93) and construct validity was previously established using principal component factor analysis and examining the correlation between the aggregated ESES and the Generalized Self-Efficacy Scale (GSE; Kroll, Kehn, Ho, & Groah, 2007). Results indicated a statistically significant correlation between the ESES and GSE (spearman rho =.361; p<.05; Kroll, Kehn, Ho, & Groah, 2007). The total score is derived by summing the scores for each individual item. Possible scores range from ten to forty.

Table 3

Summary of Instruments' Validity and Reliability used in Study

Variable	Scale	Validity and Reliability
Physical Activity	CHAMPS (Stewart et al., 2001)	Test-retest reliability (r=.78-.93) Construct validity (r=.40-.57)
Self-Efficacy	ESES (Kroll, Kehn, Ho, & Groah, 2007)	Internal consistency (α=.9269) Construct validity (rho=.361; p<.05)
Outcome Expectation	MOEES (Wojcicki, White, & McAuley, 2009)	Internal consistency (α=.82; α=.84; α=.81)
Self Regulation	ISR (Fleury, 1998 ; Yeom & Fleury, 2011)	Validity (α=.86)
Depression	CES-D10 (Anderson et al., 1994)	Internal consistency (α=.85-.90)
Demographic Variables	BRFSS (CDC, 2011)	Not reported

Procedures

Survey Development

This research study was approved by the Institutional Review Board (IRB) at Baylor University (IRB # 288775-2). Survey items were selected after conducting a literature review of existing instruments that measure the variables needed (please see chapter two).

Study Design

This study was a cross-sectional design. Approximately 300 patients were recruited to complete a one-time questionnaire to allow for the relationships among SCT constructs and physical activity to be examined.

Data Collection

Data collection occurred in December of 2011 and January of 2012. Based on power analyses, 300 questionnaires were prepared for distributed to patients through Waco area dialysis clinics. Each participant signed an IRB approved informed consent form prior to survey completion, which detailed the process of data collection, incentive prizes, and participant risk. The informed consent form also informed the participants that the survey was completely anonymous and that they could/can withdraw from the study at any point. In order to control for confounders, data on co-morbidities, history on dialysis, quality of life, and demographic information were also collected for each participant. Blinded medical record data was obtained for each patient to include accurate diagnosis of comorbidities and dialysis history. All medical record data had been previously collected by the Dialysis Clinics as part of their normal care and practice. Patient medical record data was supplied by Dialysis Clinic staff who de-identified records before providing them to the researcher. All medical records had no visible names on them, just identification numbers provided by the clinic to allow the information to be matched with the survey completed by the patients. Questionnaires were completed during dialysis sessions as to not impose on any patient's personal time. The researcher or trained research staff approached each patient and asked if he/she would like to participate in the study by completing the survey.

Due to the large number of patients that needed his/her surveys to be read to them, all researchers were trained on the appropriate methods of delivering a survey orally. Surveys needed to be read due to poor vision, inability to write while on dialysis, and personal preference. This training was used to ensure consistent methods of collecting data across researchers.

Incentives

Upon completion of a survey, each participant was entered into a drawing for one of six $100 checks. The name, phone number, and email of every participating patient was collected on drawing cards and kept completely separate from completed surveys. There was no way to match drawing card information to surveys. After all surveys were completed, and all data was collected, the researcher randomly selected six drawing cards from the collective group. The six people whose names were drawn were contacted and delivered a check worth $100. After the drawings were completed, the identification cards were shredded and disposed.

Timeline

Please see Table 4 for the timeline for this proposed thesis research project.

Statistical Analysis

Once the questionnaires were returned, data was entered, cleaned, checked, and analyzed using SPSS 19. Two undergraduate research assistants checked 100% of the submitted survey data. Twenty percent of the medical record data was randomly selected and checked for data entry error prior to the commencement of analysis. There were less than 5 errors made upon entering the data that were corrected prior to analysis.

Table 4

Thesis Timeline

Time Period	Tasks Completed
August-October 2011	Literature review Development of questionnaire
November 2011	Internal IRB proposal turned into HHPR (11.10.11) Internal IRB approval (11.20.11) University IRB application submitted (11.22.11) Study approved by Baylor IRB as exempt (11.23.11)
December 2011	Surveys printed (12.13.11) Data collection began (12.14.11) Write chapters 1, 2, & 3
January 2012	Data collection to conclude Thesis proposal (1.20.12) Data entry Data cleaning and checking
February 2012	Data analysis Write chapters 4 & 5
March 2012	Draft submitted to committee Thesis defense (3.9.12) Make corrections suggested by committee Make final revisions Submit final thesis to Graduate School (3.19.12)
May 2012	Graduate (5.12.12)

Descriptive statistics, such as means, standard deviations, and frequencies, were used to examine demographic characteristics of the sample. In order to determine the relationship between SCT constructs, demographics, healt-related variables and physical activity in dialysis patients, bivariate correlations including both Pearson's Product and Spearman's Rho correlations were calculated. Based on the evidence from the bivariate correlation anlyses, a multivariate analyses using linear regression was conducted using this sample: Self-efficacy + Outcome Expecations + Self-Regulation = Physical Activity Engagement. Bivariate analyses examining relationships between demographic and health related variables will be used to determine which variables to control for in a subsequent regression analysis.

Research Question 1

Descriptive statistics were used to address the current levels of physical activity, self-regulation, outcome expectations, and self-efficacy among dialysis patients.

Research Question 2

Analyses were conducted using a correlation (Pearson Product and Spearman's rho) matrix and linear regression to determine if select constructs were linearly related with physical activity participation in dialysis patients.

Research Question 3

To address which characteristics are related with physical activity engagement after controlling for demographic and health-related factors, potential confounding variables were added to the linear regression model. Bivariate analyses examining relationships between demographic and health related variables were used to determine which variables to control for in a subsequent regression analysis.

CHAPTER FOUR

Results

The purpose of this study was to examine physical activity behaviors of dialysis patients using the social cognitive theory (SCT). This study investigated physical activity behavior among a sample of dialysis patients from four clinics in central Texas. Of the 235 patients asked to complete surveys, 120 consented (51.06%). Five surveys had incomplete data and were therefore not retained in the final sample (n=115 out of 235; 48.94%). Data of interest was collected by surveying patients at clinics during their dialysis treatment. The survey contained questions related to physical activity behavior, SCT constructs, depression, socio-demographics, and health-related variables.

Participant Characteristics

The sample consisted of 115 dialysis patients receiving treatment for ESRD from the central Texas Nephrology Associates (See Table 5). Participants were recruited from five dialysis clinics in Central Texas. The sample was 53% (n=61) male and 47% female (n=54). The sample was predominately white (n=47; 40.9%), where 33.9% (n=39) were Black/African American and 24.3% (n=28) were Hispanic. Age ranged from 28 to 89 years, with the mean (M) age being 61.51 with a standard deviation (SD) of 14.01. More than three quarters (78.3%) of participants were either retired or unable to work, and just over a quarter of the surveyed patients (26%) had attended at least some college. Surveyed patients had been receiving dialysis treatment on average close to four years (M=47.64 months; SD=40.29) and had been hospitalized an average of 4.13 times since beginning dialysis treatment (SD=6.332). The majority reported not drinking a single alcoholic beverage in the last 30 days (n=96; 83.5%) and being non-smokers (n=108; 93.9%). Forty three (37.4%) reported having smoked at least 100 cigarettes in their lifetime. Eighty six people (74.8%) receive Medicare insurance coverage, 25.2% (n=29) receive Medicaid coverage, and 66.1% (n=76) received non-governmental insurance coverage.

When a person loses the function of their kidneys to the point that they are forced to either get a transplant or go through dialysis treatment, they are diagnosed with ESRD. Because all participants were on dialysis, all participants were diagnosed with ESRD. In addition to ESRD, the majority of patients (n=108; 97.4%) suffered a number of comorbidities including hypertension (n=100; 87%), anemia (n=77; 67%), diabetes (n=64; 55.7%), metabolic bone disease (n=29, 25.2%), depression (n=12, 10.4%) and obesity (n=10; 8.7%). Most (85.2%) suffered at least two of the five most common comorbidities in CKD patients in addition to ESRD. Please see Table 5 for demographic information regarding the sample.

Table 5

Demographics of Dialysis Patients in Central Texas

Characteristic	n	%	M	SD
Gender				
Male	61	53		
Female	54	47		
Age			61.51	14.401
Racial/Ethnic Group				
White (non-Hispanic)	47	40.9		
Black/African American (non-Hispanic)	39	33.9		
Hispanic	28	24.3		

(continued)

Characteristic	n	%	M	SD
Employment Status				
Employed for Wages	12	10.4		
Self-Employed	4	3.5		
Out of Work	4	3.5		
Homemaker	4	3.5		
Student	1	.9		
Unable to Work	39	33.9		
Retired	51	44.3		
Education				
4 years or more of college	17	14.8		
Some college/technical school	31	27		
High school graduate/GED	37	32.2		
Grades 9 through 11	25	21.7		
Grades 1 through 8	5	4.3		
Months on Dialysis			47.64	40.29
Diabetes	64	55.7		
Anemia	77	67		
Hypertension	100	87		
Metabolic Bone Disease	29	25.2		
Obesity	10	8.7		
Comorbidities in addition to ESRD				
0	3	2.6		
1	14	12.2		
2	37	32.2		
3	31	27		
4	19	16.5		
5	7	6.1		
Hospitalizations			4.13	6.332
Alcohol in the last 30 days				
Yes	19	16.5		
No	96	83.5		
Smoker				
Yes	7	6.1		
No	108	93.9		
Insurance				
Medicare	86	74.8		
Medicaid	29	25.2		
Other	76	66.1		

Research Questions

In order to examine physical activity behavior among dialysis patients, the following research questions were examined:

1. What are the current "levels" of physical activity and select SCT variables among dialysis patients?
2. Are select constructs of the SCT related with physical activity participation in dialysis patients?
3. Which characteristics are related with physical activity engagement after controlling for demographic and health-related factors?

Research Question 1

1. What are the current "levels" of physical activity and select SCT variables among dialysis patients?

Physical Activity

Three different metabolic equivalent task (MET) scores were calculated using CHAMPS data: total MET hours per week, moderate to vigorous MET hours per week, and light MET hours per week. Scores for total MET hours per week ranged from 0 to 191.06, with a mean (M) of 32.08 (SD=36.61). Scores for moderate to vigorous MET hours per week ranged from 0 to 119.63, with a mean (M) of 15.18 (SD=26.50). Scores for light MET hours ranged from 0 to 72.56, with a mean (M) of 16.90 (SD=14.53). In addition to the raw scores, the square root of each MET variable was taken in order for the data to fit a more normal distribution. The square root values were used in bivariate and multivariate analyses. *Social Cognitive Theory (SCT)*

Scores for self-efficacy ranged from 1.1 to 4, with a mean (M) of 3.07 (SD=0.68). Participants used a four point Likert scale to answer self-efficacy questions with the lowest possible score of one and highest possible score of four (1 = not at all true; 2 = rarely true; 3 = moderately true; 4 = always true), thus, on average, respondents reported that the statements were moderately true indicating above average self-efficacy. Scores for outcome expectations ranged from 1.4 to 4.6, with a mean (M) of 3.97 (SD=0.71). Outcome expectations were measured using a five point Likert scale, with the highest possible score of five and lowest possible score of one (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree). Self regulation scores ranged from 1.44 to 6 with a mean (M) of 4.45 (SD=0.97). This instrument used a six point Likert scale with the lowest possible score of a one and highest possible score of six (1 = strongly disagree; 2 = somewhat disagree; 3 = disagree; 4 = somewhat agree; 5 = agree; 6 = strongly agree). Higher scores reflected stronger exercise self-efficacy, greater outcome expectations, and greater use of self regulation strategies. See Figure 1 for sample distribution across constructs.

Depression

Scores for depression ranged from 0 to 2.89 with a mean (M) of 0.82 (SD=0.97). Each item was scored on a Likert scale ranging from zero to three (0 = rarely or none of the time/less than one day per week; 1 = some or little of the time/1-2 days per week; 2 = occasionally or moderate amount of time/3-4 times per week; 3 = most or all of the time/5-7 days per week). Lower scores depicted fewer depressive symptoms experienced by the participant.

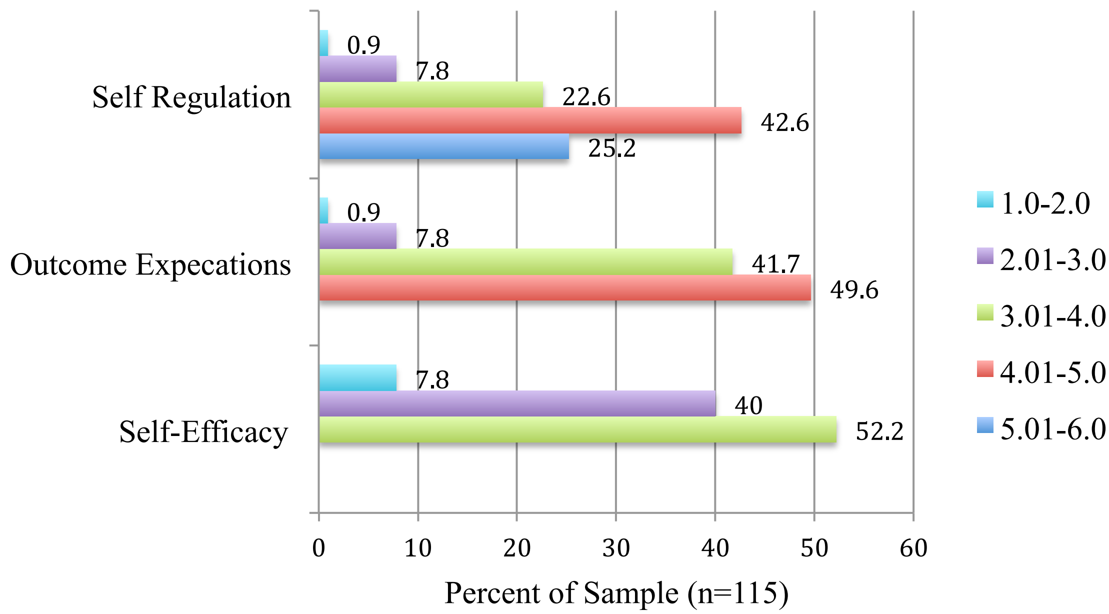

Figure 1. Frequencies of Averaged SCT Scores

Research Question 2

2. Are select constructs of the SCT related with physical activity participation in dialysis patients?

Bivariate Correlation Analyses

Pearson product correlation analyses were conducted in order to understand which variables were significantly related with physical activity behavior. Correlations were computed for SCT constructs self-efficacy, outcome expectations, self regulation; socio-demographic and health related variables; and the square root of moderate to vigorous MET hours. Please see Tables 6-11 for Pearson Product correlations.

Table 6

Pearson Correlation Coefficients of SCT Constructs and Physical Activity

	Self-Efficacy	Outcome Expectations	Self Regulation	Mod-Vig PA
Self-Efficacy	-			
Outcome Expecations	.437**	-		
Self Regulation	.374**	.551**	-	
SQ Mod-Vig PA	.336**	.265**	.280**	-

Note. n=115; SQ Mod-Vig PA= square root of moderate to vigorous physical activity; ***p* value < 0.01; **p* value < 0.05

Table 7

Pearson Correlation Coefficients of Socio-Demographic Variables and Physical Activity

	Age	Sex	Smoke	Alcohol	SQ Mod-Vig PA
Age	-				
Sex	-.058	-			
Smoke	.086	.173	-		
Alcohol	-.184*	.166	-.023	-	
SQ Mod-Vig PA	-.287**	.268**	.190*	.128	-

Note. n=115; SQ Mod-Vig PA= square root of moderate to vigorous physical activity; ***p* value < 0.01; **p* value < 0.05

According to the Pearson correlations, all SCT constructs were significantly correlated ($p < 0.001$) with each other. Self-efficacy, self regulation, and outcome expecations were signifcantly correlated ($p < 0.01$) with moderate to vigorous physical activity. As predicted by the SCT, self-efficacy had the strongest correlation with moderate to vigorous physical activity ($r = .336$).

Table 8

Pearson Correlation Coefficients of Comorbidites and Physical Activity

	Diab.	Hypert.	Met. Bone	Obesity	Depress.	SQ Mod-Vig PA
Diab.	-					
Hypert.	.204*	-				
Met. Bone	.136	.129	-			
Obesity	.079	.104	-.187*	-		
Depress.	.181	.115	.189*	.093	-	
SQ Mod-Vig PA	.052	.007	.182	-.235*	-.020	-

Note. n=115; SQ Mod-Vig PA=square root of moderate to vigorous physical activity; Diab.=diabetes; Hypert.=hypertension; Met. Bone=metabolic bone disease; Depress.=depression; ***p* value < 0.01; **p* value < 0.05

Table 9

Pearson Correlation Coefficients of Health-Related Variables and Physical Activity

	Hospitalizations	Mo. Dialysis	SQ Mod-Vig PA
Hospitalizations	-		
Mo. Dialysis	.582**	-	
SQ Mod-Vig PA	.015	.106	-

Note. n=115; SQ Mod-Vig PA=square root of moderate to vigorous physical activity; Mo. Dialysis=months on dialysis; Hospitalizations=number of hospitalizations since being on dialysis

Most of the comorbidites (diabetes, hypertension, metabolic bone disease, and depression) investigated were not significantly related with physical activity according to the Pearson correlation matrix. Obestiy was the only exception that reported a negative relationship with physical activity (r=-.235). Age and gender were both significantly correlated with moderate to vigorous physical activity ($p < 0.01$), where younger respondents and males were more likely to report greater amounts of moderate to vigorous physical activity. History of smoking (at least 100 cigarettes in one's lifetime) was also correlated with moderate to vigorous physical activity ($p < 0.05$).

Table 10

Pearson Product Correlation Coefficients of Race and Ethnicity and Physical Activity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	SQ Mod-Vig PA
Non-Hispanic White	-			
Non-Hispanic Black	-.596**	-		
Hispanic	-.472**	-.406**	-	
SQ Mod-Vig PA	-.136	.065	.069	-

Note. n=115; SQ Mod-Vig PA = square root of moderate to vigorous physical activity; ***p* value < 0.01; **p* value < 0.05

Table 11

Pearson Product Correlation Coefficients of Occupation, Education, and Physical Activity

	Employed	Out of to Work	Unable to Work	Retired	HS Grad	SQ Mod-Vig PA
Employed	-					
Out of Work	-.076	-				
Unable to Work	-.288**	-.136	-			
Retired	-.359**	-.169	-.639**	-		
HS Grad	.137	-.200*	.076	-.110	-	
SQ Mod-Vig PA	-.025	-.075	.013	.021	.062	-

Note. n=115; SQ Mod-Vig PA= square root of moderate to vigorous physical activity; HS Grad=high school graduate; ***p* value < 0.01; **p* value < 0.05

Education, occupational status, months on dialysis, number of hospitalizations, and race and ethnicity did not have a statistically significant relationships with moderate to vigorous physical activity.

The bivariate correlation analyses indicated that the three SCT constructs were related with moderate to vigorous physical activity and were then examined in mulitvariate analyses. Age, gender, history of smoking, and obesity were related with physical activity and therefore were used as control variables in the mutlivariate analysis (research question #3).

Linear Regression Analyses

A three-step linear regression analysis was performed to determine the association between SCT variables and physical activity. This analysis used the square root of moderate to vigorous MET hours as the continuous dependent variable and the average scores across each SCT variable were added to the model individually as ranked independent variables. Self-efficacy was added to the model first as the strongest predictor, followed by self regulation, and finally outcome expectations. The first model that used self-efficacy (p = .000) as the sole independent variable was significant (p = .000) with an R^2 value of .114. When self regulation (p = 0.060) was added as an independent variable with self-efficacy (p = .005), the model maintained significance (p = .000), and the R^2 value increased to 14.1. The last model tested (R^2 = .145; p = .001) used self-efficacy (p = 0.14), self regulation (p = .177), and outcome expectations (p = .488) as independent variables (See Table 13). The model using self-efficacy and self regulation as independent variables was the final model because it was significant in predicting physical activity (p = .000), self-efficacy maintained significance (p = .005) and self regulation approached significance (p = .060). The R^2 estimate in this model was .141, indicating 14.1% of the variation in physical activity was explained by the model (see Table 12). Self-efficacy (p = .005) was the only variable significantly related with physical activity in the analyses predicting moderate to vigorous physical activity, and self regulation approached significance (p = .060). Outcome expectations did not remain in the model because it was not significant (*p* = .488). See Tables 12 and 13 for each step of the linear regression analysis.

Table 12

Linear Regression Models Using Ranked SCT Constructs to Predict Moderate to Vigorous Physical Activity MET Hours among a Sample of Dialysis Patients

Model	R^2	Std. Error	*p* value
Self-Efficacy	.114	2.78	.000
Self-Efficacy and Self Regulation	.141	2.74	.000
Self-Efficacy, Self Regulation, and Outcome Expectations	.145	2.75	.001

Note. n=115; Std. Error=standard error

Table 13

Linear Regression Models Coefficients Using Ranked SCT Constructs to Predict Moderate to Vigorous Physical Activity MET Hours among a Sample of Dialysis Patients

Model	β	Std. Error	t	*p* value
1. Self-Efficacy	.336	.382	3.797	.000
2. Self-Efficacy	.269	.407	2.852	.005
Self Regulation	.180	.287	1.901	.060
3. Self Efficacy	.249	.428	2.508	.014
Self Regulation	.145	.325	1.357	.177
Outcome Expectations	.077	.455	.696	.488

Note. n=115; β= standardized beta; Std. Error=standard error

Research Question 3

3. Which characteristics are related with physical activity engagement after controlling for demographic and health-related factors?

A linear regression analysis was conducted to predict physical activity behavior in dialysis patients. This model used two sets of predictors: the SCT constructs self-efficacy and self regulation, as well as demographic and health-related variables including age, gender, obesity, and history of smoking as predictors for physical activity. This analysis (see Table 14 and 15) used the square root of moderate to vigorous physical activity MET hours as the dependent variable. The model was significant in predicting moderate to vigorous physical activity MET hours ($p = 0.000$). The R^2 estimate for the model was .272, meaning approximately 27.2% of the variance was explained by the model. However, after controlling for demographic and health-related variables, only age and self-efficacy were significantly related with moderate to vigorous physical activity MET hours ($p < .05$). Self regulation, history of smoking, and gender all approached significance, specifically having higher self regulation, being male, and not having a history of smoking.

Table 14

Multivariate Linear Regression Model Predicting Moderate to Vigorous MET Hours With and Without SCT Variables

Model	R^2	Std. Error	*p* value
Without SCT Variables	.184	2.7004	.000
With SCT Variables	.272	2.5752	.000

Note. n = 115; Std. Error = standard error

Table 15

Multivariate Linear Regression Model Coefficients to Predict Moderate to Vigorous MET Hours using Demographics and Health-Related Predictors

	β	Std. Error	t	*p* value
Age	-.250	.017	-2.958	.004
Sex	.150	.507	1.735	.086
History of Smoking	.155	.517	1.809	.073
Obesity	-.137	.879	-1.589	.115
Self-Efficacy	.197	.401	2.132	.035
Self Regulation	.165	.273	1.817	.072

Note. n=115; β=standardized beta weight; Std. Error=standard error

CHAPTER FIVE

Discussion

Introduction

The purpose of this study was to examine physical activity behaviors of dialysis patients using the social cognitive theory (SCT). This study included a sample of dialysis patients (n = 115) from various dialysis clinics across central Texas. Data was collected by surveying patients during their scheduled dialysis treatments.

The SCT suggests that a person's behavior, cognitions, and environment are constantly interacting and influencing one another (McAlister, Perry, & Parcel, 2008). The SCT is made up of several constructs that interplay with a person's likelihood to engage in a behavior (Bandura, 1977). Of these constructs, self-efficacy, outcome expectations, and self regulation are all empirically supported as correlates and/or predictors of physical activity behaviors, suggesting that the more prevalent these constructs are, the greater the likelihood that an individual will engage in physical activity (Annesi, 2004; Doerksen, Umstattd, & McAuley, 2009; Hallam & Petosa, 2004; Ince, 2008; Petosa, Suminksi, & Hortz, 2003; Netz & Raviv, 2004; Petosa, Hortz, Cardina, & Suminksi, 2004; Umstattd & Hallam, 2007; Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008), where self-efficacy has consistently demonstrated to be the strongest correlate and predictor of physical activity behavior in previous literature (Bandura, 1977, 1986, 1997, 1999; McAlister, Perry, & Parcel, 2008).

Research Questions

In order to examine physical activity behavior among dialysis patients, the following research questions were examined:

1. What are the current “levels” of physical activity and select SCT variables among dialysis patients?
2. Are select constructs of the SCT related with physical activity participation in dialysis patients?
3. Which characteristics are related with physical activity engagement after controlling for demographic and health-related factors?

Research Question 1: What are the current “levels” of physical activity and select SCT variables among dialysis patients?

Current levels of physical activity among this sample of dialysis patients were measured using the CHAMPS activity questionnaire. Patients reported how often they participated in a variety of activities that ranged from light to vigorous intensity. Each activity had an assigned MET value, which was incorporated into the measure of activity. For moderate to vigorous activity, the sample resulted in a mean of 15.18 MET hours. A large portion of the sample (39.1%) reported zero moderate to vigorous activity hours, and more than half (50.4%) reported two moderate to vigorous MET hours or less. From what was previously reported about dialysis patients’ physical activity behaviors (Johansen, 2008), the number of people reporting no moderate to vigorous activity was not surprising, but there were patients with very high activity levels offering the sample variablity. In addition, five people reported 90 or more moderate to vigorous MET hours per week, which are extreme values when compared to the mean. The four participants with the highest reported moderate to vigorous MET hours were male. Ages across all five indviduals ranged from 29 to 69. All five people have at least two additional comorbidities and have been hospitalized at least twice since beginning dialysis. Other than gender, these individuals are close to the mean in number of comorbidities in addition to ESRD (M=2.36; SD=1.18) and hospitalizations (M=4.13; SD=6.33). The large range in age and number of months on dialysis does not offer these factors as an explanation for such high moderate to vigorous reported MET hours. Skewed data has been reported when using CHAMPS in the past due to the fact that the survey contains a large number of items and allows for more self reported MET hours (Wilcox et al., 2006; Wilcox, Dowda, Dunn, Ory, Rheaume, & King, 2009).

Levels of self-efficacy, outcome expectations, and self regulation were, on average, high. Scores for self-efficacy averaged 3.07 (SD=0.68) across the sample. Ten items measured self-efficacy using a Likert scale ranging from 1 to 4 (1 = not at all true; 2 = rarely true; 3 = moderately true; 4 = always true). More than half (52.2%) of the sample averaged over a 3.0 on self-efficacy. Outcome expectation scores averaged at 3.97 (SD=0.71). Fifteen items measured outcome expectations using a likert scale ranging from 1 to 5 (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree). Almost half (49.6%) of respondents had an outcome expectation score greater than 4. The scores for self regulation were on average 4.45 (SD=0.97). Self regulation was measured with a nine-item Likert scale ranging from 1 to 6 (1 = strongly disagree; 2 = somewhat disagree; 3 = disagree; 4 = somewhat agree; 5 = agree; 6 = strongly agree). A quarter (25.2%) of participants had an average self regulation score higher than a five. For all three scales, higher scores reflected stronger individual self-efficacy, outcome expectation, and self regulation. The means for all three variables were relatively high, indicating on average, patients on dialysis had high exercise self-efficacy, outcome expectation, and self regulation, despite reported inactivity.

Research Question 2: Are select constructs of the SCT related with physical activity participation in dialysis patients?

Pearson product correlations were computed among the three SCT variables, as well as a transformed version of the physical activity variable. The square root of moderate to vigorous MET hours per week was taken in order for the dependent variable to fit a more normal distribution. The raw MET hours per week scores did not fit a normal distribution due to the large number of low scores, and therefore did not meet the assumptions to conduct bivariate or multivariate analyses. The transformed variable provided the more normal distribution needed to conduct these analyses. Self-efficacy, outcome expectations, and self regulation were all significantly correlated with one another as supported by the SCT (Bandura, 1986). All constructs were also significantly related with moderate to vigorous physical activity ($p < .01$), providing evidence that as physical activity increases, individual SCT variables increase as well.

A linear regression analysis was conducted using the square root of moderate to vigorous MET hours as the dependent variable. The SCT constructs were ranked and added to the model individually based on how strong of a predictor each construct was. Self-efficacy was added to the model first, followed by self regulation, and then outcome expectations. After adding each SCT construct as independent variables, the final model consisted of only self-efficacy and self regulation. Outcome expectations did not maintain significance once added to the model with self-efficacy and self regulation. In this analysis, the self-efficacy and self regulation explained 14.1% of the physical activity variance (p = .001). Only self-efficacy remained a significant factor in the model (p = .005), but self regulation approached significance (p = .060). This finding is not surprising, as self-efficacy has oftentimes been found to be the strongest predictor of physical activity when predicting moderate to vigorous activity (Bandura, 1986; Doerkson, Umstattd, & McAuley, 2009; Netz & Raviv, 2004; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008), and in some cases, has been shown to be the only significant predictor of moderate to vigorous physical activity when tested with other SCT constructs (Basen-Engquist, 2010; Rogers, Shah, Dunnington, Greive, Shanmugham, Dawson, & Courneya, 2005). Self regulation (p=0.60) would have likely been significant had there been a larger sample size. Outcome expectations not being related to physical activity is consistent with previous literature and the theoretical premise of the SCT. Outcome expectations as a predictor of physical activity has been found to have lessened importance when both self-efficacy and self regulation are accounted for in a multivariate model (Umsattd & Hallam, 2007; Hallam & Petosa, 2004). In addition, the bivariate analysis revealed that self regulation and outcome expectations had a strong relationship to each other (r=.551). This bivariate relationship could be responsible for outcome expectations relationship becoming insignificant in the final model. It was also recognized that in this analysis, outcome expectations lessened the relationship between self-regulation and physical activity when left in the model.

According to the literature, healthy populations tend to have a higher explained variance than what was reported in this study (Doerksen, Umstattd, & McAuley 2009; Petosa, Suminski, & Hortz, 2003; Petosa, Hortz, Cardina, & Suminski, 2004). However, explained variance in unhealthy populations including type 2 diabetics and breast cancer patients have been lower when compared to healthier populations, ranging from 9% to 14% (Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Rogers, Shah, Dunnington, Greive, Shanmugham, Dawson, & Courneya, 2005). An explained variance of 14.1% within dialysis patients is therefore consistent with findings in other unhealthy populations.

One concern presented in reviewing the data was that all three SCT variables had positive trends across the sample, and very high means, while most people surveyed did not report high levels of physical activity. One potential explanation of the outcome expectation results is the possibility of response bias. For example, an outcome expectation item states, "exercise will improve the functioning of my cardiovascular system". With 87% of this sample having hypertension, a disease related to cardiovascular health that can be alleviated with exercise, it is probable that a doctor or health care professional had previously explained the benefit of exercise to these individuals. The person knows the "correct answer" to the question, whether or not they actually engage in physical activity. It is possible that patients reported "correct" answers about exercise outcome expectations rather than personally accurate answers. An explanation for positive self regulation scores could be that the definition of "physical activity" was unclear, leading inactive people to answer positively. Or, being physically active was not required to answer positively. For example, an item states, "I have learned to make changes in my physical activity that I can live with". This statement can be answered in a positive way (strongly agree), in a number of circumstances.

Research Question 3: Which characteristics are related with physical activity engagement after controlling for demographic and health-related factors?

In order to understand how demographic and health-related factors affect the relationship between physical activity and SCT variables, bivariate correlations were conducted. According to these analyses, age, gender, history of smoking, and obesity were all significantly correlated with physical activity and were added to the linear regression model. The linear regression analyses was computed using two sets of unordered predictors: the demographic and health-related variables age, gender, history of smoking, and obesity, and the SCT variables self-efficacy and self regulation. This analysis used the square root of moderate to vigorous MET hours as the dependent variable. The model was significant in predicting moderate to vigorous physical activity ($p < .0001$) and explained 27.2% of the variance. Only age and self-efficacy remained as a significant individual predictor of physical activity ($p < .05$). However, self regulation, gender, and history of smoking approached significance ($p < 0.09$), specifically having higher self regulation score, being male, and not having smoked in the past. .

The explained variance ($R^2 = .272$) is also consistent with previous research focused on unhealthy populations (Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008; Rogers, Shah, Dunnington, Greive, Shanmugham, Dawson, & Courneya, 2005). Self-efficacy remained the strongest predictor of the SCT constructs measured, where self regulation approached significance. The roles of self-efficacy and self regulation in explaining moderate to vigorous physical activity have consistently been documented in previous research with both healthy and unhealthy adults (Bandura, 1986; Netz & Raviv, 2004; Umstattd & Hallam, 2007; Plotnikoff, Lippke, Courneya, Birkett, & Sigal, 2008;

Umstattd, Wilcox, Saunders, Watkins, & Dowda, 2008; Bandura, 1986; Doerkson, Umstattd, & McAuley, 2009) with self-efficacy and self regulation both being strong and significant predictors of physical activity. One possible explanation for why other variables were not retained in the model is the sample distribution. With nearly 40% of the sample reporting zero activity, and five MET values reaching above 90, this sample did not fit a normal distribution. Taking the square root of the raw score helped the dependent variable fit a more normal distribution, but there a large number of low values remained. A normal distribution is assumed when computing linear regression analyses in order to minimize residuals. The regression line is not the ideal predictor of physical activity in this analysis due to the array of physical activity scores and the large range in residuals. One way to handle this problem is by transforming the variable using a natural logarithm. While this normalizes extreme data points, it was not a plausible solution for this data given the fact that there is a true zero. The natural log of zero does not exist, and transforming this data using the natural logarithm would result in losing all patients that had reported zero activity. Transforming the variable using a natural log was inappropriate for this sample because it would have greatly reduced the sample size, removed variability from the data, and the data and potential analyses would have been altered.

Another limitation to this study and potential explanation for study results is sample size. Two power analyses were conducted to decide the appropriate sample size needed in this investigation (Aberson, 2010; Huck 2012). The first power analysis assumed the three predictors had independent effects and concluded a sample size of at least 100 would result in a multiple R^2 value greater than zero. This recommendation was met and was supported in the bivariate analysis. The second power analysis calculated a sample size according to the weakest variable and suggested a sample size of 150. Because the second sample size minimum was not met, the power needed to conduct a multivariate linear regression might not have been reached. In the future, a larger sample size would increase the power needed to conduct multivariate linear regression analyses. In addition, a nonparametric regression analyses should be considered to better fit the data. Even with a larger sample size, the literature still suggests a large amount of inactive people among the dialysis population (Johansen, 2008), leading the researchers to believe a normal distribution in this population is unlikely.

Limitations

The first limitation presented with this data is sample size. This sample maintains a relatively small (n = 115) sample size. A larger sample size would aid in the control of threats to validity that are common, especially within self-reported data. The larger the sample, the more representative it is and the more power it has for making accurate and reliable interpretations (Harris, 2010). Another limitation is the distribution of the sample. Without normality, assumptions are not met to run the proposed stastics, and results can be interpreted as invalid.

A third potential limitation was presented by most patients being read their surveys aloud. This is a limitation and a potential threat to validity because of the possibility of leading a respondent to a particular answer when the question is read aloud. Research assistants were trained to deliver surveys in the same way without leading a patient to an answer, but there is room for error between each person who administered a survey. Also, being around health care providers and providing answers out loud leads to the liklihood of response bias. It is possible that patients embellished their reported physical activity or SCT variables in order to please other patients, nurses, physicians, and research assistants with the “correct” answer.

Future Research

Future research should be conducted to address a few limitations of this study. First, future studies should plan to recruit a much larger sample size to ensure appropriate power to detect change. Although the sample size did meet criteria derived from a power analysis (Aberson, 2010), cross-sectional studies that have been conducted using theory and physical activity commonly use at least 200 participants (Hunt & Gross, 2009; Netz & Raviv, 2004; Umsattd, Wilcox, Saunders, Watkins, & Dowda, 2008). Also, if patients can fill out surveys on their own outside of their place of treatment, it’s possible that responses could be more valid due to increased comfort for the patient and anonymity. When patients are receiving dialysis treatment, mobility is minimal and chairs are much more conducive to laying back than sitting up. As previously mentioned, most patients needed their surveys read to them, allowing their answers to questions to be heard by other patients or health care providers, leading to a possible response bias. Both of these scenarios could have provided discomfort and loss of privacy for the patient. In addition, the data needs to better fit tests being used to analyze it. Nonparametric analyses that are more robust to non-normal distributions than linear regression, such as a bootsrap method or a nonparametric poisson analysis, should also be investigated and considered in the future.

Conclusion

Though the SCT was only able to explain minimal variance among dialysis patients, this research provided useful information and was consistent with findings from other studies of unhealthy adults. As stated by the SCT, self-efficacy, outcome expectations, and self regulation were all correlated with physical activity behavior in bivariate analyses, similar to other populations, and even among dialysis patients self-efficacy was the strongest correlate of engaging in physical activity. While a large percentage of the sample was inactive, activity behavior among dialysis patients had a large range and included variability. Dialysis patients are on average older adults who are dealing with a number of comorbidities. The fact that there are any associations with physical activity is a step in the right direction, and results showed that on average, this population had high self-efficacy, outcome expectations, and self regulation. If dialysis patients already report high levels of self-efficacy, outcome expectations, and self regulation, it is likely that a physical activity program designed for their particular needs in accordance with their disease state would be highly effective. It is already known that dialysis patients would benefit from physical activity and it has been discovered in this study that there are associations between all three SCT constructs investigated and physical activity. This warrants the implementation of an activity program that would benefit dialysis patients.

It would be beneficial to further investigate age differences and activity. According to the linear regression analysis, age and self-efficacy were the only individual predictors that significantly predicted physical activity. If programs were to be developed, this research suggests that they should be age specific and appropriate and should emphasize the development of physical activity self-efficacy. Self regulation, gender, and a patient's history of smoking should be further investigated due to their practical significance suggested by the regression analyses. More research should be conducted to better understand which activities are being participated in across the lifespan of a dialysis patient, and which cognitive variables facilitate activity among various age groups.

APPENDICES

APPENDIX A

Survey Instrument

This questionnaire is about activities that you may have done in the past 4 weeks. The questions on the following pages are similar to the example shown below.

INSTRUCTIONS

If you DID the activity in the past 4 weeks:

Step #1 **Check the YES box.**

Step #2 **Think about how many TIMES a week you usually did it, and write your response in the space provided.**

Step #3 **Circle how many TOTAL HOURS in a typical week you did the activity.**

Here is an example of how Mrs. Jones would answer question #1: Mrs. Jones usually visits her friends Maria and Olga twice a week. She usually spends one hour on Monday with Maria and two hours on Wednesday with Olga. Therefore, the total hours a week that she visits with friends is 3 hours a week.

In a typical week during the past 4 weeks, did you…							
1. Visit with friends or family (other than those you live with)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

If you DID NOT do the activity:

- **Check the NO box and move to the next question**

In a typical week during the past 4 weeks, did you …							
1. Visit with friends or family (other than those you live with)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
2. Go to the senior center? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
3. Do volunteer work? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
4. Attend church or take part in church activities? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
5. Attend other club or group meetings? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
6. Use a computer? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

7. Dance (such as square, folk, line, ballroom) (do not count aerobic dance here)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
8. Do woodworking, needlework, drawing, or other arts or crafts? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
9. Play golf, carrying or pulling your equipment (count walking time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
10. Play golf, riding a cart (count walking time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
11. Attend a concert, movie, lecture, or sport event? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

12. Play cards, bingo, or board games with other people? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
13. Shoot pool or billiards? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
14. Play singles tennis (do not count doubles)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
15. Play doubles tennis (do not count singles)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
16. Skate (ice, roller, in-line)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
17. Play a musical instrument? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

18. Read? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
19. Do heavy work around the house (such as washing windows, cleaning gutters)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
20. Do light work around the house (such as sweeping or vacuuming)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
21. Do heavy gardening (such as spading, raking)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
22. Do light gardening (such as watering plants)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
23. Work on your car, truck, lawn mower, or other machinery? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

Please note: For the following questions about running and walking, include use of a treadmill.

24. Jog or run? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
25. Walk uphill or hike uphill (count only uphill part)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
26. Walk fast or briskly for exercise (do not count walking leisurely or uphill)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
27. Walk to do errands (such as to/from a store or to take children to school (count walk time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
28. Walk leisurely for exercise or pleasure? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
29. Ride a bicycle or stationary cycle? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

30. Do other aerobic machines such as rowing, or step machines (do not count treadmill or stationary cycle)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
31. Do water exercises (do not count other swimming)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
32. Swim moderately or fast? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
33. Swim gently? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
34. Do stretching or flexibility exercises (do not count yoga or Tai-chi)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
35. Do yoga or Tai-chi? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

36. Do aerobics or aerobic dancing? **YES** How many TIMES a week?_____ → **NO**	How many TOTAL hours a week did you usually do it? →	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
37. Do moderate to heavy strength training (such as hand-held weights of more than 5 lbs., weight machines, or push-ups)? **YES** How many TIMES a week?_____ → **NO**	How many TOTAL hours a week did you usually do it? →	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
38. Do light strength training (such as hand-held weights of 5 lbs. or less or elastic bands)? **YES** How many TIMES a week?_____ → **NO**	How many TOTAL hours a week did you usually do it? →	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
39. Do general conditioning exercises, such as light calisthenics or chair exercises (do not count strength training)? **YES** How many TIMES a week?_____ → **NO**	How many TOTAL hours a week did you usually do it? →	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
40. Play basketball, soccer, or racquetball (do not count time on sidelines)? **YES** How many TIMES a week?_____ → **NO**	How many TOTAL hours a week did you usually do it? →	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

41. Do other types of physical activity not previously mentioned (please specify)? ______________________ **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

Please select the answer choice that best applies to you by darkening the appropriate bubble for each question.

I am confident...	Not at all True	Rarely True	Moderately True	Always True
1. That I can overcome barriers and challenges with regard to physical activity and exercise if I try hard enough	○	○	○	○
2. That I can find means and ways to be physically active and exercise	○	○	○	○
3. That I can accomplish my physical activity and exercise goals that I set	○	○	○	○
4. That when I am confronted with a barrier to physical activity or exercise I can find several solutions to overcome this barrier	○	○	○	○
5. That I can be physically active or exercise even when I am tired	○	○	○	○
6. That I can be physically active or exercise even when I am feeling depressed	○	○	○	○
7. That I can be physically active or exercise even without the support of my family or friends	○	○	○	○
8. That I can be physically active or exercise without the help of a therapist or trainer	○	○	○	○
9. That I can motivate myself to start being physically active or exercising again after I've stopped for a while	○	○	○	○
10. That I can be physically active or exercise even if I had no access to a gym, exercise, training, or rehabilitation facility	○	○	○	○

Please darken the bubble that best applies to you for each question.

1. Exercise will improve my ability to perform daily activities:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

2. Exercise will improve my social standing:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

3. Exercise will improve my overall body functioning:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

4. Exercise will help manage stress:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

5. Exercise will strengthen my bones:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

6. Exercise will improve my mood:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

7. Exercise will increase my muscle strength:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

8. Exercise will make me more at ease with people:

O Strongly Disagree O Disagree O Neutral O Agree O Strongly Agree

9. Exercise will aid in weight control:				
O Strongly Disagree	O Disagree	O Neutral	O Agree	O Strongly Agree
10. Exercise will improve my psychological state:				
O Strongly Disagree	O Disagree	O Neutral	O Agree	O Strongly Agree
11. Exercise will provide companionship:				
O Strongly Disagree	O Disagree	O Neutral	O Agree	O Strongly Agree
12. Exercise will improve the functioning of my cardiovascular system:				
O Strongly Disagree	O Disagree	O Neutral	O Agree	O Strongly Agree
13. Exercise will increase my mental alertness:				
O Strongly Disagree	O Disagree	O Neutral	O Agree	O Strongly Agree
14. Exercise will increase my acceptance by others:				
O Strongly Disagree	O Disagree	O Neutral	O Agree	O Strongly Agree
15. Exercise will give me a sense of personal accomplishment:				
O Strongly Disagree	O Disagree	O Neutral	O Agree	O Strongly Agree

For this section, please darken the bubble next to the answer choice that best applies to you for each question.

1. I think of the benefits of regular physical activity.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

2. I remind myself of the good that I am doing by staying physically active.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

3. I remind myself of the importance of physical activity.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

4. I keep track of the ways that I stay physically active.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

5. I watch for signs of progress as I stay physically active.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

6. I monitor myself to see if I am meeting my goals for physical activity.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

7. I have learned new habits that help me to participate in physical activity.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

8. I have learned new ways to stay physically active.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

9. I have learned to make changes in my physical activity that I can live with.
O Strongly Disagree O Disagree O Somewhat Disagree O Somewhat Agree O Agree O Strongly Agree

Please select the answer choice that best applies to you by darkening the appropriate bubble.

For each of the following statements, please choose what best describes how often you felt or behaved this way during the past week.	Rarely or None of the Time (Less than 1 day)	Some or a Little of the Time (1-2 days)	Occasionally or a Moderate Amount of Time (3-4 days)	Most or All of the Time (5-7 days)
1. I was bothered by things that don't usually bother me.	○	○	○	○
2. I had trouble keeping my mind on what I was doing.	○	○	○	○
3. I felt depressed.	○	○	○	○
4. I felt that everything I did was an effort.	○	○	○	○
5. I felt hopeful about the future.	○	○	○	○
6. That I felt fearful.	○	○	○	○
7. My sleep was restless.	○	○	○	○
8. I was happy.	○	○	○	○
9. I felt lonely.	○	○	○	○

Please answer the following questions about yourself.

1. What is your age? ______________

2. What is your gender? ○ Male ○ Female

3. Are you Hispanic or Latino? ○ Yes ○ No

4. Which one or more of the following would you say is your race? Bubble in all that apply.

○ White ○ Black/African American ○ Asian Native Hawaiian/Other Pacific Islander

○ American Indian/Alaska Native ○ Other

[specify]________________________________

5. What is the highest grade or year of school you completed? Bubble one.

○ Never attended school or only attended kindergarten ○ Grades 1 through 8

○ Grades 9 through 11 ○ Grade 12 or GED (High school graduate)

○ College 1 year to 3 years (Some college or technical school) ○ College 4 years or more (College graduate)

6. Are you currently...? Bubble one.

- ○ Employed for wages
- ○ Self-employed
- ○ Out of work for more than 1 year
- ○ Out of work for less than 1 year
- ○ A Homemaker
- ○ A Student
- ○ Retired
- ○ Unable to work

7. **During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage?**

_______ = Days per week _______ = Days in past month

○ No drinks in past 30 days

8. **One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on the average? (Note: A 40 ounce beer would count as 3 drinks, or a cocktail drink with 2 shots would count as 2 drinks.)**

_________ = Number of drinks ○ Have not had any drinks in the past 30 days.

9. **Do you smoke cigarettes every day, some days, or not at all? Bubble one.**

○ Every Day ○ Some Days ○ Not at all

10. **Have you smoked at least 100 cigarettes in your entire life? [Note: 5 packs = 100 cigarettes]? Bubble one.**

○ Yes ○ No

Thank you so much for your time!

APPENDIX B

Request for the Approval of Research Involving Human Subjects

Proposal

Title of the research project/teaching exercise: Understanding Physical Activity Behaviors among Dialysis Patients: A Social Cognitive Theory Approach

Are you using subjects in research? Yes (yes or no)
Are you using subjects in teaching exercises? NO (yes or no)

Part 1: Expedited Review Request (if applicable)
The Baylor University Committee for Protection of Human Subjects in Research (Institutional Review Board or (IRB) has agreed to perform expedited reviews of certain research proposals that involve only survey research that poses minimal risk to research subjects. Proposals handled through the expedited review process are held to the same standard as those that go through the normal review process.

☒ I have reviewed the research or teaching exercise listed above. In my opinion, this proposal meets all three of the following criteria required for expedited review by the Baylor University Committee for Protection of Human Subjects in Research:

1. The only involvement of research subjects in the proposed research/teaching activity is response to written, oral, or electronic surveys;
2. The information requested in these surveys does not include any highly personal or sensitive information (reports of criminal activity or sexual behavior); and
3. The activity poses minimal physical and psychological risk to the research participant.

Part 2: Introduction and Rationale

Describe the research background and rationale for the project:
While engaging in physical activity is important for the general population due to its documented health benefits (Centers for Disease Control and Prevention, 2011), it is especially beneficial to patients on dialysis. Dialysis patients suffer an excessive burden of other chronic conditions including hypertension, coronary artery disease, type 2 diabetes, and depression, all of which provide conditions and symptoms that can be improved with physical activity (Johansen, 2008). Cardiovascular complications are a heightened concern for this population, with approximately half of all deaths of persons on dialysis in all age groups being from such complications (United States Renal Data

System [USRDS], 2007). Physical activity has been repeatedly shown to improve fitness (Clyne, Ekholm, Jogestrand, Lins, & Pehrsson, 1991; DePaul, Moreland, Eager, & Clase, 2002; Headley et al., 2002), physical functioning (Boyce et al., 1997; Heiwe, Tollback, & Clyne, 2001; Koufaki, Mercer, & Naish, 2002), and some cardiovascular risk factors (DePaul et al., 2002; Kouidi, Grekas, Deligiannis, & Tourkantonis, 2004) in people on dialysis, along with ameliorating psychosocial problems associated with chronic kidney disease (Johansen, 2008). However, in a study of physical activity, individuals with renal disease were shown to be less physically active than individuals in a sample of sedentary healthy people (Johansen et al., 2000). Even though it can be argued that dialysis patients need physical activity to a greater degree than most, they report less physical activity than sedentary people.

Perceived barriers and facilitators to engaging in physical activity have been discovered in healthy populations and those with various chronic illnesses, including people with disabilities (Kosma, Ellis, Cardinal, Bauer, & McCubbin, 2009), endometrial cancer survivors (Basen-Engquist et al., 2010), and patients with chronic heart failure (Oka, Gortner, Stotts, & Haskell, 1996). Determinants of physical activity evidenced in the literature have included self-efficacy, outcome expectations, and self-regulation (Oka et al., 1996; Goodman & Ballou, 2004; Curtin, Walters, Schatell, Pennell, Wise, & Klicko, 2008; Schwarzer, Luszczynzka, Ziegelmann, Scholz, & Lippke, 2008; Basen-Engquist et al., 2010). These are all constructs of the Social Cognitive Theory (SCT) (Bandura, 1977, 1986), which focuses on the interaction between the person, behavior, and environment. Self-efficacy is a central construct within the SCT and deals with the degree of confidence that an individual has in his or herself to perform a particular behavior. Self-efficacy is one of the most commonly identified psychosocial determinants of adherence to physical activity among adults, and numerous studies demonstrate that high levels of self-efficacy prospectively predict physical activity (Bandura, 1977, 1986; Marcus, King, Bock, Borrelli, & Clark, 1998). Given this evidence, it is probable that these same concepts are important in understanding and increasing physical activity participation among dialysis patients as well. Thus, the purpose of this study is to use constructs of the SCT (self-efficacy, self-regulation, and outcome expectations) to better understand physical activity among dialysis patients. By identifying and understanding correlates of physical activity among dialysis patients, physicians, nurses, and other health care professionals will be better equipped to prescribe physical activity for these patients, which could ultimately lead to higher quality of life for the patient.

Clearly outline the questions being addressed

Research Question 1: What are current "levels" of physical activity and select Social Cogntivie Theory variables among dialysis patients?

Research Question 2: Are select constructs of the Social Cognitive Theory related with physical activity participation in dialysis patients?

Research Question 3: Which characteristics are related with physical activity engagement after controlling for demographic and health-related factors?

Describe any expertise you have in this area or research or teaching:

Megan Patterson will serve as the principle invesitagator of this study. She has teaching and research experience in the field of health and human behavior. Megan Patterson serves as a graduate teaching assistant and a researcher in the master of public health program at Baylor University. She holds a bachelors degree in Psychology and will graduate from Baylor's MPH in Community Health Education in May of 2012. Her teaching expertise focuses on promoting health and quality of life among college students. She teaches university students in a wellness course and has worked with adolescents to address a variety of health issues (e.g., total wellness, physical activity, nutrition, body composition and image, sexual health, infectious diseases, drugs, tobacco, and alcohol). She has also been involved in the health education of prospective Baylor students, prospective Baylor parents, current student leaders, and various faculty and staff at Baylor. She has served as a research assistant for the Interdialytic Exercise in Renal Failure patients study and the Walk at Work study under Dr. M. Renee Umstattd Meyer.

M. Renée Umstattd Meyer, PhD CHES. Dr. Umstattd is an Assistant Professor in the Department of Health, Human Performance, & Recreation. She will serve as an investigator of this study and has research expertise focusing on the promotion of health and quality of life across the lifespan through physical activity. Specific research expertise areas include examining relationships among theoretical determinants of physical activity from a social cognitive and ecological perspective; implementation and evaluation of theoretically based physical activity interventions and the translation and dissemination of efficacious physical activity interventions into community settings.

Cite relevant research (including your own) in a bibliography:

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Basen-Engquist, K., Carmack, C. L., Perkins, H., Hughes, D., Serice, S., Scruggs, S., Pinto, B., & Waters, A. (2010). Design of the steps of health study of physical activity in survivors of endometrial cancer: Testing a social cognitive theory model. Psychology of Sport and Exercise, 12, 27-25.

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Clyne, N., Ekholm, J., Jogestrand, T., Lins, L.E., & Pehrsson, S. K. (1991). Effects of exercise training to predialytic activities in hemodialysis patients. Nephron, 59, 84-89.

Curtin, R. B., Walter, B. A. J., Schatell, D., Pennell, P., Wise, M., & Klicko, K. (2008). Self-efficacy and self-management behaviors in patients with chronic kidney disease. Advances in Chronic Kidney Disease, 15, 191-205.

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Heiwe, S., Tollback, A., & Clyne, N. (2001). Twelve weeks of exercise training increase muscle function and walking capacity in elderly predialysis patients and healthy subjects. Nephron, 88, 48-56.

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Johansen, K. L. (2008). Exercise and dialysis. Hemodialysis International, 12, 290-300.

Kosma, M., Ellis, R., Cardinal, B. J., Bauer, J. J., & McCubbin, J. A. (2008). Psychosocial predictors of physical activity and health-related quality of life among adults with physical disabilities: An integrative framework. Disabillity and Health Journal, 2, 104-109.

Koufaki, P., Mercer, T. H., & Naish, P. F. (2002). Effects of exercise training on aerobic and functional capacity of end-stage renal disease patients. Clinical Physiology and Functional Imaging, 22, 115-124.

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Schwarzer, R., Luszczynska, A., Ziegelmann, J. P., Scholz, U., & Lippke, S. (2008). Social-cognitive predictors of physical exercise adherence: Three longitudinalstudies in rehabilitation. Health Psychology, 27, 554-563.

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Yeom, H. A. & Fleury, J. (2011). Validity and reliability of the index of self-regulation scale for physical activity in older korean americans. Nursing Research and Practice, 2011, 1-6.

Part 3: Methodology
Thoroughly describe the methodology to carry out the project/teaching exercise:

Participants

Eligible participants for this study will be patients in Waco Dialysis Clinics who are currently undergoing dialysis. Approximately 300-500 patients will be recruited that are 18 years or older. Dialysis patients meeting eligibility criteria will be informed of the requirements of the study and sign informed consent forms in compliance with the Human Subjects Guidelines of Baylor University.

Study Site

All supervised data collection will be conducted at Dialysis Clinics in Waco, TX.

Experimental Design

This study will be a cross-sectional design. Approximately 300-500 patients will complete a one-time survey to examine the relationships among Social Cognitive Theory (SCT) constructs and physical activity. Surveys will contain items measuring self-efficacy, outcome expectations, self-regulation, and physical activity behavior. In order to control for confounders, data on co-morbidities, history on dialysis, quality of life, and demographic information will be collected for each participant. Blinded medical record data will be obtained for each patient to include accurate diagnosis of comorbidities and dialysis history. All medical record data has previously been collected by the Dialysis Clinics as part of their normal care and practice. Patient medical record data will be supplied by Dialysis Clinic staff. All medical record data will be fully de-identified before it is supplied to members of the Baylor research team, ensuring that only de-identified and anonymous data are collected/handled by the Baylor Research Team. Patient medical record data will be de-identified by Dialysis Clinic staff who will affix an assigned an identification number to the data. The assignment of unique identification numbers will allow for patient medical record data to be matched to his/her anonymous survey data. Depending on each individual patient, the survey should take anywhere from 20-35 minutes to complete. Proctors will be available to read surveys to patients that require or desire assistance. Surveys will be completed during dialysis sessions as to not impose on any patient's personal time. The researcher will approach each patient and ask if they would like to participate in the study by completing the survey. Patients participating will be voluntary and survey information will only be collected once. No identifying information will be included on the survey or medical record data. To ensure anonymity, all signed informed consent forms will be collected and stored separately from all collected data. Study participants will also complete a drawing card with contact information to be used only to contact "winners" of the incentive drawing (described under benefits). Contact information for the drawing will be collected and stored separately from all collected data and informed consent forms. After the drawing is completed all contact information will be shredded. Given this approach, there will be no links between any collected data and any identifying information, thus ensuring that all data is anonymous.

Survey instrument/Measures

The survey instrument includes 94-items measuring physical activity using the Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire (Stewart, Mills, King, Haskell, Gillis, & Ritter, 2001), the Index of Self Regulation (ISR) (Fluery, 1998; Yeom & Fleury, 2011), the Multidimensional Outcome Expectations for Exercise Scale (Wojcicki, White, & McAuley, 2009), the Exercise Self-Efficacy Scale (Kroll, Kehn, Ho, & Groah, 2007), and sociodemographic variables.

-CHAMPS is comprised of 41 two-part items that assess the weekly frequency and duration of various physical activities. Construct validity and test-retest reliability have been documented for this instrument (Stewart et al., 2001).

-Self-Regulation will be measured with the Index of Self-Regulation (ISR). The scale used 9 items to examine a person's motivation for doing or trying to do physical activity. These items will be measured using a 6-point scale, where 1 = strongly disagree and 7 = strongly agree. Quantification of ISR content validity was supported through the ratings of 10 experts, following criteria established by Imle and Atwood (1988). The instrument was tested in successive steps with 146 individuals, including internal consistency reliability and three forms of validity assessment (content validity, criterion-related validity, and construct validity). Total scale alpha was .87. Initial estimates of criterion-related and construct validity were documented with correlations between ISR subscales and theoretically related criterion measures (.20-.47).

-Outcome Expectations will be measured by 15 items that will understand a person's beliefs or expectations about the benefits or regular physical activity. These items will be measure using a 5-point Likert Scale, where 1 = strongly disagree and 5 = strongly agree. Construct validity has been documented for this measure.

-Self-Efficacy will be measured with 10 items to assess a person's confidence in participating in physical activity. These items will be measured using a 4-point scale, where 1 = not at all true and 5 = always true. Construct validity has been previously determined through Exploratory Principal Component Factor Analysis and by correlating the aggregated ESES items with the General Self-Efficacy Scale.

-Socio-demographic information will include: age, gender, ethnicity, marital status, employment status, education level, and self-rated health data. Demographic items and self-reported behaviors regarding alcohol consumption and smoking behaviors will be modeled after Behavioral Risk Factor Surveillance Survey items. Given high rates of depressive symptoms among dialysis patients (Lopes et al., 2002), it will also be measured as a potential confounder. The Center for Epidemiologic Studies-Depression 10 (CES-D10) is a 10-item measure of depressive symptoms (Andersen et al, 1994). Validity and reliability of the CES-D10 has been previously established. This scale has also been previously used with renal failure patients to identify and examine depressive symptoms (Lopes et al., 2004).

Medical Record Data

All medical record data has previously been collected by the Dialysis Clinics as part of their normal care and practice. Medical record data will be obtained from dialysis clinic staff. For each patient surveyed, his or her medical history and chart data will be de-identified by a Dialysis Clinic staff member and the participant's identification number will be written on the data. This de-identified data will then be provided to the Baylor researcher. Information obtained from medical records used in this study will include length of disease, degree of disease, comorbidities, months on dialysis, height, weight, and other health risk indicators (e.g., blood pressure and alcohol and tobacco consumption).

Statistical Analysis

Descriptive statistics will be used to address research question #1. In order to address research question #2, bivariate and multivariate analyses will be conducted using a correlation matrix and linear regression. To address research question #3, potential confounding variables will be added to the linear regression model, including age, gender, ethnicity, employment status, education level, disease state, length of time on dialysis, and comorbidities.

Incentives

Upon completion of a survey, all participants will be entered into a drawing for one of ten $100 checks. Study participants will complete a drawing card with contact information (name, email, and phone number) to be used only to contact "winners" of the drawing. All contact information for the drawing will be collected and stored separately from all collected data and informed consent forms, and will in no way be connected to any collected data. The drawing for gift cards will occur after all completed surveys have been collected. After the drawing is completed all contact information will be shredded. Given this approach, identifying information collected for the drawing will in no way be connected to any collected data, thus ensuring that all data is anonymous.

How many subjects will be used? 200-300

How will the subjects be recruited?
Participants will be recruited by the investigator or research team member at Waco dialysis clinics. Dialysis patients will be approached during their dialysis visit and asked if they would like to participate in a study to further understand physical activity

behaviors of dialysis patients. Each participant will sign an informed consent form before completing the survey.

Possible risks to the subjects (both physical and psychological):
There are minimal risks associated with participation in this study. However, it is possible that participants could experience feelings of stress in completing surveys or in considering the questions that they are asked. Since all medical information will be blinded and de-identified before being released to Baylor researchers, there is minimal risk of privacy violation.

Method(s) to limit risks:
Since possible risks are minimal, we are not incorporating direct methods to limit risks. However, as in all research studies, all participants will be afforded the opportunity to withdraw from the study at any point in the process. To ensure protection of privacy, all data will be de-identified prior to being released to Baylor researchers.

Proposed safeguards to protect the subjects' right to privacy:
Medical record data has previously been collected by the Dialysis Clinics as part of their normal care and practice. Medical record data that will be used to investigate and control for comorbidities will be de-identified by the Dialysis Clinic staff (see details above). This will ensure that Baylor investigators will never know the identity of the person whose medical record data is being used. Staff at the dialysis clinics will remove all identifying information of patients (patient names, patient numbers, etc…) on all medical record data supplied to the Baylor researchers. Simultaneously, the Dialysis staff will write the affiliated randomly generated identification number associated with that participant on to the chart data. After ensuring that all identifying information has been removed and that the correct identification number has been added to a participant's medical record data, it will be supplied to the Baylor Research Team. Medical record data and surveys will be completely de-identified and anonymous for the Baylor Research Team. This will also be ensured by storing all signed informed consent forms separately from survey data, upon receipt.

Outline the method(s) to be used to obtain the data, to analyze the data, and to disseminate the results of the research project:
Data Collection & Dissemination Methods

Two different forms of data will be collected for the proposed study.

Survey Data

Because this study has a cross-sectional design, data will only be collected once. Surveys will be administered by the chief investigator and other Baylor students at dialysis clinics in Waco. Researchers will coordinate with staff at the various dialysis clinics regarding the best time to collect data without causing disruption or distraction for the patients or the staff. The researcher will approach the patient that is undergoing dialysis, explain the purpose of the study, discuss potential benefits and risks, and will collect signed informed consent forms before proceeding with survey administration. Surveys will be given to patients to complete themselves, or if needed, researchers will read the surveys to patients who cannot complete them without assistance. All surveys will be assigned identification numbers to ensure anonymity.

Medical Record Data

All medical record data has previously been collected by the Dialysis Clinics as part of their normal care and practice. Medical record data will be obtained from dialysis clinic staff. For each patient surveyed, his or her medical history and chart data will be de-identified by a Dialysis Clinic staff member and the participant's identification number will be written on the data. This de-identified data will then be provided to the Baylor researcher. Information obtained from medical records used in this study will include length of disease, degree of disease, comorbidities, months on dialysis, gender, height, weight, and other health risk indicators (e.g., blood pressure and alcohol and tobacco consumption).

Part 4: Informed Consent Form Checklist

When using humans as subjects in research you must obtain their informed consent. Please upload a copy of your Informed Consent Form before submitting your proposal

I verify that the following items appear on my Informed Consent Form:

☒ A statement explaining the purpose of the research.

☒ A statement of the expected duration of the subject's participation.

☒ A description of the procedures to be followed.

☒ A description of any reasonable foreseeable risks or discomforts to the subject, including invasion of privacy.

☒ A description of any benefits resulting from the research, either to the subject or to others.

☒ A statement that informs subject of his/her right not to be a subject in a research project that is also a teaching exercise.

☒ A statement informing subject about how his/her anonymity will be guarded; i.e., that their confidentiality will be protected by assigned code numbers, by limiting access to data, by locked storage of files, etc.

☒ A statement that the subject's participation is voluntary, and that his/her refusal to participate will involve no penalty or loss benefits to which the subject is otherwise entitled, and that the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled.

☒ A disclaimer, if applicable, regarding the use of the Internet to collect data.

☒ For research involving more than minimal risk, an explanation regarding the availability of any compensation or any medical treatments if injury occurs (if applicable, see OHRP Reports).

☒ If written informed consent is required, a place for the subject to sign and date the form and a statement that a copy of the signed consent form will be given to the subject for his/her records.

☒ If the subject is a minor, a statement of parental responsibility in consenting to the child's participation in the study with a place for the parent to sign and date the form in addition to the participant's signature.

☒ The name, address, and telephone number of the principal investigator of the research project, and his/her affiliation with Baylor University. If the principal investigator is a graduate student, the name and telephone number of the faculty advisor is also required.

☒ A statement informing subject that inquiries regarding his/her rights as a subject, or any other aspect of the research as it relates to his/her participation as a subject, can be directed to Baylor's University Committee for Protection of Human Subjects in Research.

Part 5: Research Instrument(s)

Please upload any non-standard, newly developed interview or questionnaire instrument (one that has not been previously published) that will be used

also

Upload as appendices any other information pertinent to the proposal, such as consent letters from participating agencies, etc.

IMPORTANT:

You must share your proposal with your Faculty Advisor and Department Chair using the "Share this Project" feature in IRBnet. If your Faculty Advisor or Department Chair is not listed as an IRBnet user, contact them and have them register with IRBnet so you can share your project with them. Your Faculty Advisor and Department Chair must sign your project within IRBnet before submitting the proposal to the IRB.

APPENDIX C

Waiver of Informed Consent

Title of Research:	**Understanding Physical Activity Behaviors among Dialysis Patients: A Social Cognitive Theory Approach.**
Principal Investigator:	Megan Patterson. Graduate Teaching Assistant in the Department of Health, Human Performance, & Recreation housed within the School of Education, at Baylor University.
Faculty Principal Investigator:	Dr. M. Renée Umstattd Meyer. Assistant Professor in the Department of Health, Human Performance, & Recreation housed within the School of Education, at Baylor University.
Sponsor:	N/A

Thank you for expressing an interest in participating in this survey. Before you decide to participate in this project, it's important that we explain the procedure clearly to you.

Explanation of Procedures:
Researchers at **Baylor University** are interested in understanding physical activity behaviors of dialysis patients. The research findings from this project will be used to help inform the development of future health promotion strategies for dialysis patients.

What will you be required to do?
The study is focused on patients undergoing dialysis. You are invited to participate in a one-time survey. The survey will be given at various dialysis clinics around Waco. The survey will take approximately 20-25 minutes to complete and you will be asked questions regarding your current physical activity behaviors and your thoughts and feelings toward engaging in physical activity. Participation is voluntary and consent is indicated by signing and turning in this informed consent form. Information from your medical record will also be gathered by the Dialysis Clinic staff including how long you have had kidney disease; the degree of your disease; how long you have been on dialysis; comorbidities, to include other disease states (e.g., cancer, heart disease, HIV, etc…), lipid levels (cholesterol), inflammation markers (e.g., C-reactive protein), albumin and uric acid levels; medication use associated with heart disease; height; weight; alcohol and tobacco use; and gender.

This information will **NOT** have any information identifying you or your name. This will make certain that we cannot link any of your information (survey or medical) with you or your name.

Risks:
One potential risk of partaking in this study is that you might not like to answer questions about your current or future health status, or talking about your opinions about your health. However, your answers to they survey questions will be completely anonymous.

Benefits:
Through being in this study, you will be entered in a drawing to win one of ten $100 Wal-Mart gift cards. You can also benefit by knowing that your participation in this study helps enhance scientific understanding and knowledge, which will help to improve quality of life for dialysis patients.

Rights as a Participant:
The information you give us will be completely anonymous. The contact information you give us for the drawing will only be used for the drawing**. This information will be gathered and stored in a completely separate location. As soon as the drawing is finished, we will shred all contact information.** Information obtained through this study will only be used by the research staff or to contact you if you win the drawing. All data will be stored using password protected computers and/or websites, and/or locked filing cabinets. Please know that partaking in this study **is voluntary.** If you choose not to take part in the study, there will not be a penalty. And, you may quit the study at any time. If you choose not to take part, the information that has been told to us will be kept anonymous.

The Baylor University Institutional Review Board (a group that looks out for the fair and just treatment of people in research studies) will review study records from time to time. This is to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Cost:
The only cost to you is the time you will spend completing the survey.

Payment for Participation in Research
If you choose to take part in this study, your name will be entered in a drawing to win one of six $100 dollar checks. There will only be one entry per adult who fills out a survey. Your name, phone number, and email are required on the "drawing entry card" so we may contact you if you win the drawing. Your name and contact information will be kept confidential and not shared with anyone and shredded as soon as the drawing is complete.

Questions or Problems:
For more information concerning this research you should contact Dr. M. Renée Umstattd at (254)710-4029; One Bear Place #97313, Waco, Texas 76798;

Renee_Umstattd@baylor.edu. Dr. Umstattd is an Assistant Professor in the Department of Health, Human Performance, & Recreation at Baylor University. If you have any questions about your rights as a research participant, you may contact Baylor's University Committee for Protection of Human Subjects in Research. The chair for Baylor IRB is Dr. Michael E. Sherr, PhD., School of Social Work, Baylor University, One Bear Place # 97320 Waco, TX 76798-7320. Dr. Sherr may also be reached at (254) 710-4483.

STATEMENT OF CONSENT

I have read this consent form. I am 18 years of age, and by signing below I understand what is in this form and freely agree to participate in this study as described. I also understand that I will be given a copy of this consent form for my records if I request it.

Printed Name: ____

Signature: ________________________________ **Date:** _________________

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