

AZUSA PACIFIC UNIVERSITY

**EFFECTS OF EXERCISE ON PHYSIOLOGIC AND PSYCHOLOGIC
OUTCOMES IN PATIENTS WITH END STAGE RENAL DISEASE
ON HEMODIALYSIS: A QUASI-EXPERIMENTAL
STUDY IN LEBANON**

by

Ghada Ballout Dunbar

A dissertation submitted to the

School of Nursing

in partial fulfillment of the requirements

for the degree Doctor of Philosophy in Nursing

Azusa, California

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DEDICATION

First and foremost, I would like to dedicate my scholarly research study to God Almighty, who guided me through this journey and showed me the path every step of the way. I would like to thank my mom and dad for their presence in my life and their unwavering love and support. I would also like to dedicate my dissertation to my dear husband, Jeffrey Dunbar, and our children, Chadi, Daniel, and Jonathan. This dissertation and research study would not have been possible without their support, love, commitment, and encouragement to always stay focused and follow my passion. This journey has been filled with many life changing experiences, and we experienced them all as a family. My husband has been my rock, and it is with his unconditional love and support that I was able to follow my dreams and complete my dissertation. Thank you for standing by my side, supporting me with my love of education and learning, allowing me to pursue my academic degree, encouraging me to travel to Lebanon after 20 years of being away from my homeland, and face my fears and challenges. You are my inspiration, and I am grateful and thankful for all that you have done and sacrificed for me during this journey so I can accomplish my dream.

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ABSTRACT

End stage renal disease (ESRD) is a public health problem that is expected to continue to rise and has overwhelming effects on individuals' psychological, physical, and emotional wellbeing. Treatment options include hemodialysis (HD), which is a lifesaving procedure for patients suffering from ESRD where a dialysis machine and a dialyzer are used to clean and purify the blood as their kidneys are not functioning normally. This patient population will suffer from muscle atrophy and weakness due to inactive lifestyle and lack of physical activity. They also question their existence, are extremely stressed, and are afraid of death. The review of literature shows that HD patients are physically inactive, and less than 50% exercise once a week, leading to an increased mortality compared to HD patients who exercise regularly (Graham-Brown et al., 2019). Guided by Pender's Health Promotion Model, this longitudinal, quasi-experimental, quantitative pre-post research design was used to study the effects of exercise on physiologic and psychologic outcomes in HD patients with ESRD in an HD unit in Lebanon utilizing a convenience sampling method. The participants received clear instructions about the exercise program, and two survey instruments were utilized: The Kidney Disease and Quality of Life Survey and the Daily Spiritual Experience Scale. Institutional Review Board approval was obtained from the academic institution as well as the practice setting. Descriptive statistics were summarized by presenting the number and percentage for categorical variables, mean, and standard deviation for continuous variables. The associations between pre- and post-and other continuous variables were carried out by using the paired *t*-tests. Multivariate regression was used to adjust for potentially confounding variables. Multiple regression analysis assessed the association between the

score of quality of life and the different predictors. The correlation between two continuous variables was assessed by using Pearson correlation coefficient. p -value < 0.05 to indicate statistical significance. All statistical analysis was performed using SPSS. Results showed that there is a significant increase in physiologic measures post exercise intervention, and a highly significant decrease was observed for the average of quality of life. In addition, there was no correlation between spirituality and quality of life among this patient population, and age was the only significantly positive characteristic associated with quality of life. Future studies are recommended with a bigger sample size to clarify whether exercise could improve and affect patients' quality of life. Based on the results, the findings of this study, and the impact of using exercise bicycles during HD to improve physiologic measures and dialysis efficacy, this author suggests incorporating bicycle exercise routinely during HD in hemodialysis centers for eligible patients.

Keywords: hemodialysis, end stage renal disease, spirituality, exercise and physical activity, quality of life, dialysis adequacy, health promotion, physiologic outcomes, psychologic outcomes

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CHAPTER 1

INTRODUCTION

End stage renal disease (ESRD) is considered an advanced stage of chronic kidney disease (CKD). End stage renal disease is a public health problem that is expected to continue to rise in the United States (US; Darrell, 2016) and has overwhelming effects on individuals' psychological, physical, and emotional wellbeing. The major psychological issues are directly related to the loss of health, inability to perform physical activity, hopelessness, depression, and mortality. Treatment options for people suffering from CKD that has progressed to ESRD include kidney transplantation and hemodialysis. Hemodialysis is a lifesaving procedure for this patient population where a dialysis machine and a special filter called an artificial kidney or a dialyzer are used to clean and purify the blood, as this population's kidneys are not functioning normally (Mayo Clinic, 2016). Dialysis adequacy is measured by Kt/V and urea reduction ratio (URR). Kt/V is a measure of dialysis adequacy. K is the clearance—the amount of urea the dialyzer can remove (liters/minute); t is the time—the duration of treatment (minutes); and V is the volume—the amount of body fluid (liters; Mayo Clinic, 2016). Urea reduction ratio (URR) means the reduction in urea as a result of dialysis. The URR is one measure of how effectively a dialysis treatment removed waste products from the body and is commonly expressed in percentage (Mayo Clinic, 2016). Related research may benefit the overall care and treatment of patients with ESRD on hemodialysis (Darrell, 2016). Patients receiving hemodialysis also experience aching, restless legs and anemia, as patients on hemodialysis suffer from low red blood cells, which is a common complication of ESRD. This patient population suffers from muscle atrophy, weakness,

and low exercise capacity due to uremic changes, which lead to fatigue and exhaustion and possibly to an inactive lifestyle with low physical activity (Wang & Johansen, 2019). These experiences of fatigue and exhaustion due to lack of exercise and decreased functional activity are very common among patients on hemodialysis (Wang & Johansen, 2019).

ESRD results from the failure of normal kidney function, which is precipitated by several factors and illnesses. The loss of kidney function is gradual, and many patients with kidney failure do not have any symptoms until the end stage of the disease (Mayo Clinic, 2016). Patients with ESRD must follow a strict dietary regime as well as comply with multiple restrictions and take many medications, which directly impact their physiological, psychological, physical, and emotional wellbeing (Gerogianni, 2012). Patients who receive hemodialysis treatments spend a lot of time thinking of their mental, emotional, and spiritual wellbeing as being dependent on hemodialysis; it has completely changed their lives (Taylor et al., 2016). They question their existence, they are extremely stressed, and they are afraid of death. Encouraging and promoting spirituality can enhance their quality of life (Taghipour et al., 2017).

The word “spirituality” has gained a wide range of acceptance recently as the recommended and preferred way to describe many different aspects of religion and religious beliefs as opposed to the older terms of “spiritual theology” or “mystical theology” (McGrath, 2010). Spirituality refers to the authentic, dependable, trustworthy, reliable, and special personal relationship with God. Spirituality is defined as the manner, customs, and ways individuals practice their faith and adhere to their beliefs and religious experiences (Doornbos et al., 2005).

Spirituality is well described as the experiencing of God, feeling God's presence in changing and transforming lives as a result and a product of that experience. It is considered the lived experiences of God, the constant prayers, and the faithful relationship with God. It is the fundamental belief that God's presence is in each and every single person (Cappellen et al., 2014). Integrating spirituality into patient care has shown to improve health and patient care outcomes (Puchalski, 2013). There is a positive relationship between spiritual beliefs and health care outcomes. It is also noteworthy to mention that there is a strong desire and need from patients to have their spirituality discussed and addressed as they are being cared for by their health care team (Puchalski, 2013).

End stage renal disease is recognized as a major threat to our nation's health, as these patients suffer from despair, depression, desolation, anguish, and hopelessness (Tanyi & Werner, 2007). Significant technological advances have assisted health care providers to deal with these effects through hemodialysis and transplantation. Despite these medical and technological advances, the number of patients who are on hemodialysis continues to grow each year (Tanyi & Werner, 2007); it is considered the most popular renal replacement therapy for this population. Hemodialysis is an extremely time-consuming procedure that requires around 4 hours a day, three times a week, which in turn will increase fatigue among this patient population and will further decrease their quality of life and active lifestyle (Mayo Clinic, 2016).

Purpose of the Study

This author has been a critical care and a hemodialysis registered nurse for over two decades. Patients come to the clinical setting feeling depressed, overwhelmed,

unhappy, concerned about their health, and worried about their loved ones as they consider themselves a burden to their families and loved ones, as this patient population values social support (Chang et al., 2017). This author chose this patient population as this researcher developed a deep empathy, utmost caring and love, and a drive to support and provide for this patient population. Based on this clinical experience, the author is passionate to learn more about patients with ESRD on hemodialysis and understand the relationship between spirituality and quality of life among this patient population to support them through their difficult times and improve their health and patient care outcomes.

According to the National Kidney Foundation Disease Outcomes Quality Initiative (KDOQI) clinical guidelines, sedentary lifestyle and lack of physical activities are major concerns among this patient population and must be treated with significance (Daugirdas, 2015). Furthermore, KDOQI encourages all health care professionals such as clinical nurse practitioners, providers, and hemodialysis teams to work with ESRD patients on hemodialysis to focus on improving their lifestyle behaviors and increasing physical activity, as this population lacks motivation and the drive due to musculoskeletal restrictions, muscle atrophy, and weakness (Daugirdas, 2015).

The review of literature shows that hemodialysis patients are physically inactive, and less than 50% of this patient population exercise once a week, leading to an increased mortality compared to hemodialysis patients who exercise regularly (Graham-Brown et al., 2019). In addition, healthy lifestyle behaviors such as exercise and physical activity improve overall health and wellbeing, reduce falls and injuries, decrease conditions of cardiovascular diseases, and elevate psychological security and comfort (Daugirdas,

2015). Furthermore, data show that hemodialysis patients who self-report physical functioning and engage in daily physical activity have better outcomes and fewer hospitalizations (Daugirdas, 2015).

Patients suffering from ESRD and undergoing hemodialysis tend to be less active and have lower physical activity, muscle performance, and quality of life compared to a healthy population (Young et al., 2018). There is an increase in musculoskeletal catabolism, malnutrition, anemia, uremia, chronic inflammation, comorbidities, physical inactivity, sedentary lifestyle, mortality, and morbidity among this population (Young et al., 2018). Literature has shown the benefits of exercise and that individuals with ESRD on hemodialysis who are dynamic, participate in activities, and perform regular exercise tend to have better quality of life, thus leading to improved health outcomes and decreased mortality rates related to cardiac origin (Jayaseelan et al., 2018). Exercise programs could be aerobic, resistance, or a combination of both exercise modalities. Aerobic exercises, also known as cardio, are considered physical exercises of low to high intensity that depend primarily on the energy process (Ouzouni et al., 2009). Some examples of these exercises include cardio machines, cycling, spinning, running, walking, and ergometer, which is a piece of equipment that provides a cardiovascular workout that benefits the entire body (Mortazavi et al., 2013).

Physical exercises reduce the risk of many conditions, including obesity, heart disease, high blood pressure, risk of osteoporosis, etc. (Mortazavi et al., 2013). Physical activity and exercise programs are performed using cycle ergometer or bicycle and consist of a 30-minute program, two to three times per week, for 8 to 12 weeks with various intensities (Mortazavi et al., 2013). Resistance exercise can benefit patients on

hemodialysis, as it improves their functional activities as well as their activities of daily living (Barcellos et al., 2015). Physical activities can be performed during hemodialysis similar to aerobic exercises two to three times per week and consist of repetitive supervised training activities that focus on strengthening lower extremities using an exercise bicycle. These exercises benefit patients on hemodialysis (Barcellos et al., 2015). It is recommended to initiate the exercise regimen utilizing resistance exercises first before aerobic exercises. This way, patients will be able to continue with their exercise program and still feel energy and strength to continue with additional exercises (Ouzouni et al., 2009). The literature shows that it is absolutely safe to perform intra-dialytic exercise during the first 2 hours of the hemodialysis treatment without causing any cardiac decompensation, as intra-dialytic exercises are far more effective than inter-dialytic programs (Jung & Park, 2011).

Theoretical Framework: Pender's Health Promotion Model

A theoretical framework is essential, as it supports the investigator in determining research questions and provides direction, guidance, and discussion for the researcher to focus on the research study. Pender's Health Promotion Model (HPM) is the theoretical framework used to guide this study. Pender developed the integrative nursing theory, Pender Health Promotion Model (PHPM), in 1982, with revisions in 1996, 2011, and 2015 (Alligood, 2014; Murdaugh et al., 2019). Pender presented the Health Promotion Model as a framework to integrate nursing and science with healthy behaviors as a guide to stimulate individuals to be engaged in positive health-behavior activities (Alaviani et al., 2015). Pender's Health Promotion Model suggests a well-rounded, complete, and holistic understanding of patients and their families. Assessing the patient's background

and self-perceptions will allow the researcher to intervene and develop a meaningful plan in partnership with the patient. Moreover, Pender's nursing model is used as a framework for planning interventions in order to anticipate, improve, and modify related behaviors in lack of balanced nutrition and physical activity (Meleis, 2018). The Health Promotion Model is the guiding framework for this study, as exercise training in hemodialysis patients is recommended and supported by the literature to promote healthy lifestyle behaviors (Wilund et al., 2019).

According to Peterson and Bredow (2013), Pender's Health Promotion Model is focused on the fact that, if people are anxious or afraid of the danger of the disease, this will lead to positive healthy behaviors. Pender suggests that health and wellbeing are not merely the absence of disease, but also the measures that are taken to improve overall health and the patient's positive perception of self, including the patient's own lifestyle (Peterson & Bredow, 2013).

Health promotion is considered art and science, as behaviors are transformed and lifestyles are changed in order to achieve a healthy behavior through balanced nutrition, physical activity, and stress-reduction techniques (Borzou et al., 2016). This will lead to patients' empowerment to take control over their lives and seek positive and effective behaviors that contribute to healthy lifestyles (Borzou et al., 2016).

Concepts in the Pender Health Promotion Model – Theory Analysis and Illustration

Pender's Health Promotion Model (HPM) is used around the world for research, education, and practice. It is considered the conceptual framework that is supported by the literature. It offers a viewpoint that is reliable and dependable to motivate and drive individuals to pursue healthy and active lifestyle behaviors (Glanz et al., 2015). The

Health Promotion Model inspires health care professionals to provide positive resources to help and support patients to achieve behavior-specific changes.

The Health Promotion Model recommends a framework for incorporating nursing and behavioral science viewpoints and outlooks with factors that predict health behavior (Murdaugh et al., 2019). The model provides a method to discover multiple processes, such as biological, psychological, and social, that motivate and inspire individuals to engage in behaviors that enhance health and wellbeing. The author chose this model, as Pender's theory fits this research study due to its humanistic and holistic approach to improve and motivate people to achieve healthy lifestyle behaviors and positive outcomes as related to ESRD patients on hemodialysis. This theory is also consistent with many nurses' philosophy of health and nursing (Murdaugh et al., 2019).

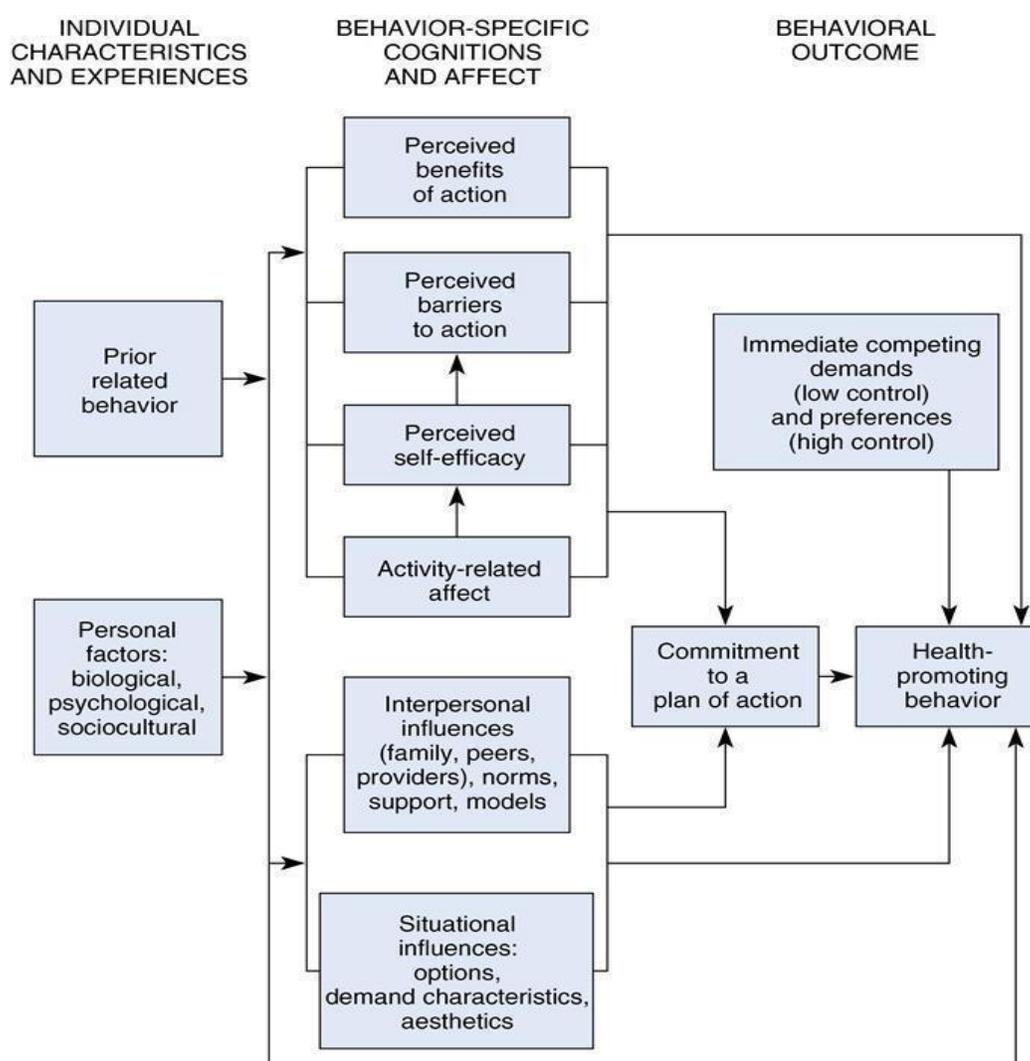
The health promotion model is considered a nursing tool. It is based on the conceptual framework that, when people believe that they are predisposed or inclined to develop a health problem with severe consequences, they are more likely to be persuaded that the benefits outweigh the barriers related to changing their behavior to prevent the problem. Moreover, the model proposes that health care is more than a treatment and prevention of disease; it encourages and allows patients to express their beliefs and create an environment where behaviors can be changed and modified. This model is straightforward and easy to understand; nurses relate to it, can apply it, and are very familiar with the concepts of this model (Peterson & Bredow, 2013).

In addition, the Health Promotion Model is designed to guide nurses and health care professionals in helping patients to improve their health status, enhance their functional ability, and promote better quality of life (DiClemente et al., 2009). It involves

behavioral, psychological, social, and environmental changes to effect improvements in society, where certain behaviors and lifestyle factors account for a great deal of health problems. Finally, the Health Promotion Model is effective in promoting health, preventing disease, and increasing the likelihood the individual will adopt the health behavior change (Murdaugh et al., 2019).

Figure 1

Predictors of Health Behavioral Outcomes



Note. From Murdaugh, C. L., Parsons, M. A., & Pender, N. J. (2019). *Health promotion in nursing practice* (8th ed.). Prentice Hall.

Pender's HPM consists of two predictors of health behavioral outcomes (Murdaugh et al., 2019). The first predictor is individual characteristics and experiences, and the second predictor is a person's knowledge and motivation. These two predictors are explained below and are depicted in Figure 1.

Application of Pender's Health Promotion Model to this Study

Pender described three different ways to assess health and health behaviors: (a) assessment of the individual client, where she incorporated the six subscales of physical fitness, nutrition, life stress, spiritual health, and social support systems the phenomenon of interest is based upon; (b) assessment of the family; and (c) assessment of the community (Murdaugh et al., 2019). As described earlier, Pender's Health Promotion Model fits into this study as it applies to individuals who are suffering from chronic kidney disease and undergoing hemodialysis. This patient population lacks motivation to perform physical activity due to muscle atrophy and weakness as well as their imposed sitting time during hemodialysis treatment (Graham-Brown et al., 2019).

The literature shows that self-care, healthy lifestyle behaviors, and motivation will improve and enhance quality of life in ESRD patients on hemodialysis (Salhab et al., 2019). It was evidenced that self-care behavior, individual characteristics and experiences, and cognitions and specific affections are important to motivate individuals' behaviors and lead them to acquire healthy lifestyles behaviors in order to meet their needs, because they value their lives (Xavier et al., 2017).

Nursing Theory and Its Use to Frame the Research Question

Chronic kidney disease is recognized as a major threat to our nation's health, as these patients suffer from despair, depression, desolation, anguish, and hopelessness

(Tanyi & Werner, 2007). Significant technological advances have assisted health care providers to deal with these effects through hemodialysis and transplantation. Despite these medical and technological advances, the number of patients with chronic kidney disease who are on hemodialysis continues to grow each year (Tanyi & Werner, 2007). As life expectancy is increasing, chronic kidney diseases have emerged as a major health care condition (Borzou et al., 2016). Educating this patient population about health promotion and disease prevention as well as providing care to this patient population presents with multiple challenges to patients, families, and health care providers, as the conditions they are faced with are complex and multifaceted in nature (Bonner & Lloyd, 2011).

The Health Promotion Model has major implications to nursing practice. Nurses' primary role is to educate, instruct, and guide patients and their families on healthy behaviors, nutrition, and regular exercise, as changes in lifestyle and eating habits will enhance health and improve overall sense of wellbeing (Khodaveisi et al., 2017).

Pender's Health Promotion Model is considered a conceptual nursing framework, as it can easily be incorporated and integrated into wellness and health promotion among patients with chronic kidney disease. The author noted that the perceived barriers to behavior directly influence health-promoting behaviors and are modifiable through education interventions to promote wellness and healthy behaviors, including balanced nutrition and physical activity (Reed & Shrearer, 2012).

Pender's Health Promotion Model helps to predict health behaviors and identifies effective practices to improving health and promoting healthy behaviors (Heydari & Khorashadizadeh, 2014). As health care professionals, it is through nursing knowledge

and development that one can relate to the disease process and assist patients and their families to deal with their physiological, psychological, physical, and emotional wellbeing (Chinn & Kramer, 2018).

Theoretical Framework

Pender's Health Promotion Model first appeared in nursing literature in 1982 and was revised in 1996 due to theoretical and empirical findings (Pender, 2011). The framework consists of five major philosophies: (a) basis for integrating nursing practice, (b) foundation for motivating individuals to engage in positive behaviors, (c) promoting healthy behaviors, (d) enhancing health and wellbeing, and (e) tools used to predict positive health behavior (Walker & Avanti, 2011).

Pender's Health Promotion Model argues that unhealthy behavior and poor lifestyle are estimated to be the cause of more than one half of the deaths that occur in the US (Murdaugh et al., 2019). Moreover, there are multiple benefits of healthy behavior such as increased life span, improved quality of life, and reduced health care costs (Murdaugh et al., 2019).

Roots of the Health Promotion Model

The Health Promotion Model identifies background that influences health behavior and is focused on achievements of higher levels of wellbeing and self-actualization (Pender, 2011). There are two major origins of the health promotion model. These are philosophical roots, where humans are viewed holistically, and theoretical roots that are based on (a) the expectancy value theory, where individuals engage in actions to achieve goals that are perceived as possible and that result in valued outcomes,

and (b) the social cognitive theory, where thoughts, behavior, and environment interact. For people to alter how they behave, they must alter how they think.

Individual Characteristics and Experiences

In her Health Promotion Model, Pender believes that prior related behavior, which is how similar behavior has been done in the past, includes (a) personal factors: biological, psychological, sociocultural, and (b) demographics: age, gender, ethnicity, socio-economic status, etc. (Murdaugh et al., 2019). These two components are not very modifiable (Meleis, 2018).

Behavior-specific Cognitions and Affect

Behavior-specific cognitions and affect are the most modifiable and studied in research (Meleis, 2018). They include the following: (a) perceived benefits of action: understanding the benefits of the health behavior; (b) perceived barriers to action: the perceived obstacles or hurdles to achieving the health behavior; (c) perceived self-efficacy: individuals' perceived ability to achieve or execute the health behavior—self confidence in performing the health behavior successfully; (d) activity-related affects, which are considered subjective feelings or emotions prior to, during, and following the health behavior; (e) interpersonal influences (family, peers), such as norms, social support, attitudes or perceptions concerning the behavior, beliefs of others who influence the patient toward the health behavior; and (f) situational influences (options, aesthetics) related to how the health behavior is perceived to fit into a person's life or environment (Murdaugh et al., 2019).

Behavioral Outcome

In the behavioral outcome, Pender described in her model that there are immediate competing demands (low control) and preferences (high control) such as other wants, needs, or alternative behaviors that might interfere with and interrupt the behavior just prior to starting. Moreover, she identified commitment to a plan of action, which is the intent to carry out the specific health behavior and identify ways and specific strategies to do so successfully leading to health-promoting behavior (Murdaugh et al., 2019).

The criteria for selecting the Health Promotion Model as the theoretical framework reside directly in the three main concepts in the revised Health Promotion Model and are directly related to the phenomenon of interest: (a) individual characteristics and experiences, (b) behavior-specific cognitions and affect, and (c) behavioral outcome (Murdaugh et al., 2019).

Figure 2

Conceptual-Theoretical-Empirical (CTE) Structure

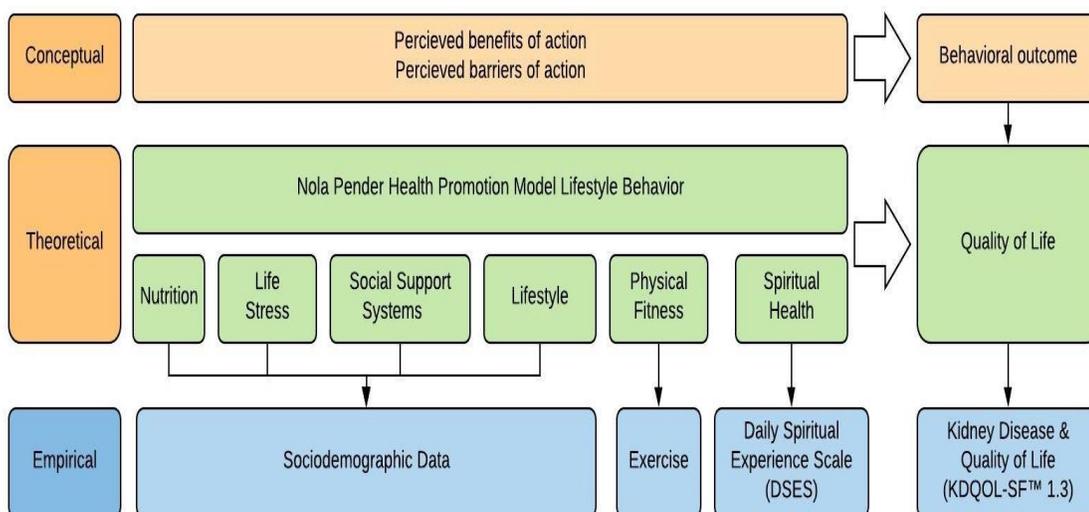
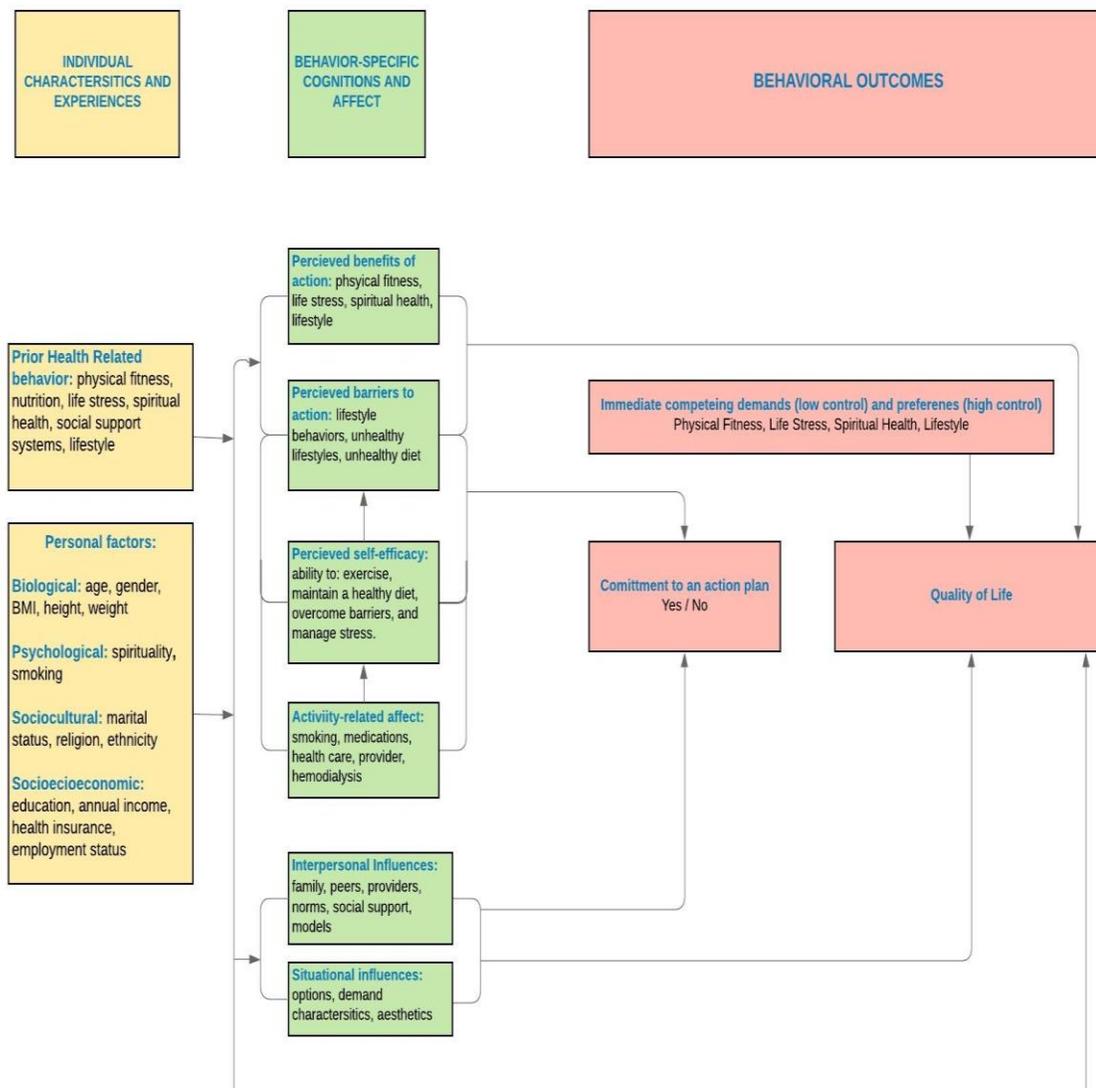


Figure 3*Concept Diagram of the Study*

Note. Adapted from Pender's Health Promotion Model.

Health Promotion Model Assumptions

According to Murdaugh et al. (2019), the HPM is based on the following assumptions, which reflect both nursing and behavioral science perspectives: people seek conditions of living where they can express their health potential; people have the ability to reflect and assess their competencies through self-reflection; people value positive

growth and achieve balance between change and stability; people are active in regulating their own behavior; people affect and are affected by the environment; people are influenced by health professionals; and people need self-motivation to change behavior.

Selection of Variables

This study looked at the effects of exercise and spirituality on hemodialysis patients with ESRD in Lebanon focusing on dialysis adequacy as measured by Kt/V, URR, and blood pressure as physiologic measures and quality of life as outcome measures. The independent variables consisted of exercise and spirituality; the dependent variables are the physiologic measures Kt/V, URR, blood pressure, and quality of life.

Significance of the Study to Nursing

Many studies have been done on the effects of exercise on dialysis adequacy as measured in Kt/V, URR, and blood pressure as physiologic measures as well as quality of life among patients with ESRD on hemodialysis (Ouzouni et al., 2009). All these studies were nationally driven, and no data have been found on the extent exercise is accepted in Lebanon among the Lebanese population with ESRD. The prevalence of ESRD in Lebanon is on the rise: patients who are receiving hemodialysis treatments increased from 2,400 to 3,200 during the time span between 2007-2012, with 3,191 active hemodialysis patients in Lebanon on November 30, 2012 (Lebanese Kidney Registry, 2012). This spurt in numbers of patients receiving hemodialysis was a 33% increase compared to the increase in the population of Lebanon of about 5% in the same period (Lebanese Kidney Registry, 2012). Cultural and societal differences impose many restrictions, and the perceptions of the benefits of exercise during hemodialysis among this population will impact the outcomes of this study.

In addition, health care professionals and providers focus on medical treatment rather than a holistic approach to health, such as physical, spiritual, and psychological support (Murphy et al., 2016). This patient population suffers from lack of activity and sedentary lifestyle, resulting in decreased quality of life (Wang & Johansen, 2019). This study's exercise program can improve patient care and increase satisfaction, leading to improving their quality of life (Ouzouni et al., 2009). This study is significant, as it generates new knowledge on the importance of spirituality and the inclusion of exercise programs during hemodialysis treatments for ESRD patients in the Lebanese community. This study will also add to the growing evidence on the effectiveness and usefulness of exercise in a culture where exercise is not very well received or adopted.

CHAPTER 2

LITERATURE REVIEW

In completing this literature review, the author developed a search strategy and discussed the methods used for this literature search. Using the research question and the phenomenon of interest, the search terms identified were hemodialysis, hemodialysis patients, spirituality, quality of life, hemodialysis patients or dialysis patients or end stage renal disease, exercise, exercise during hemodialysis. Hemodialysis or haemodialysis or dialysis search terms were excluded from the search, as they did not yield relevant articles.

Literature Search

Procedures of Literature Search

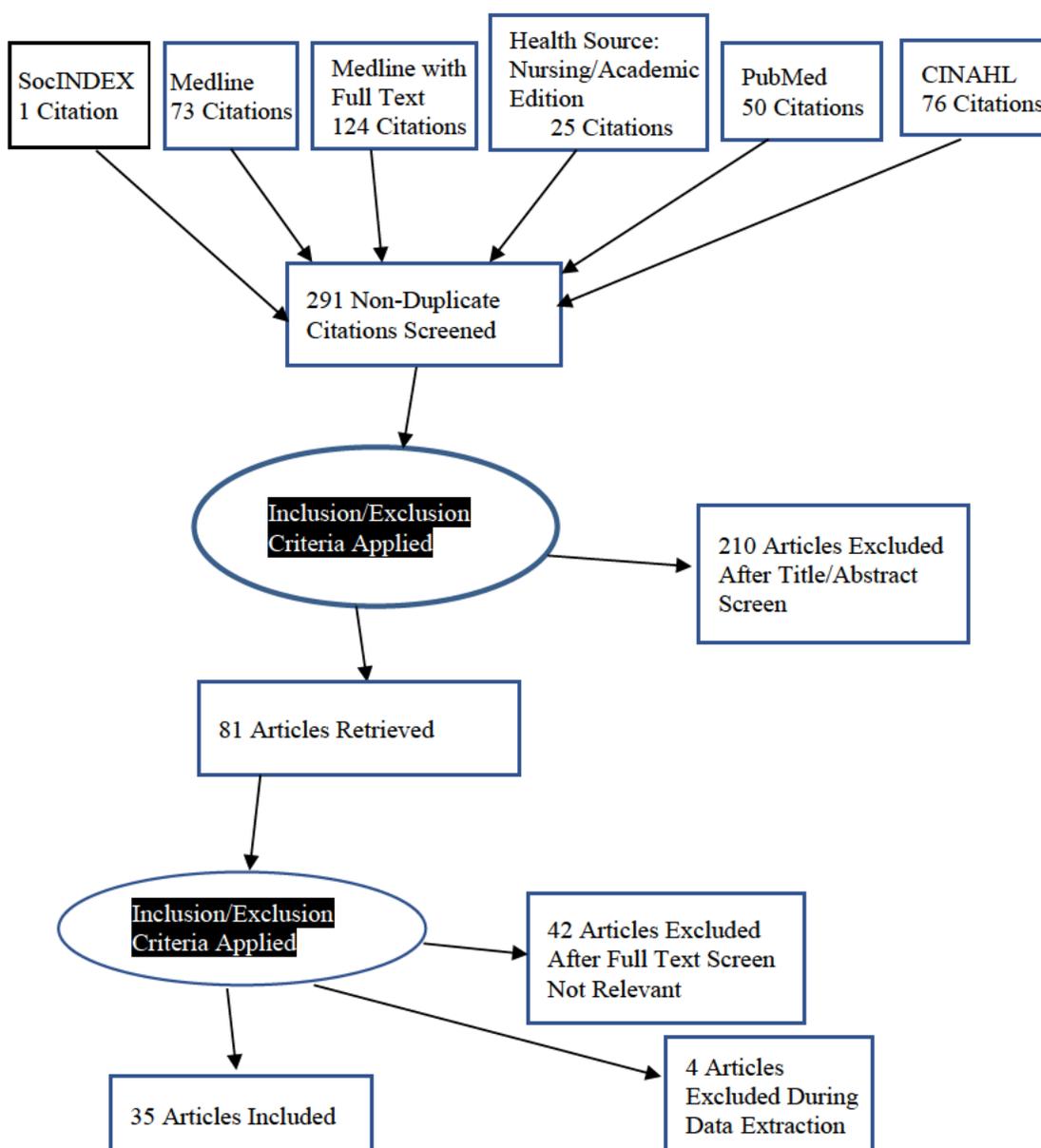
The search terms were terms available in the Cumulative Index of Nursing and Allied Health (CINAHL) database. Every possible combination of the concepts identified was searched. The search was limited to research articles published in English in peer-reviewed journals and not limited to full-text articles only. The databases that were searched included CINAHL, MEDLINE, MEDLINE with full text, PubMed, and Health Source: Nursing/Academic Edition. In addition, one of the search terms is a sociological concept, so the author included SocINDEX with Full Text.

The search yielded 349 peer-reviewed articles, of which 76 citations were from CINAHL, 25 citations were from Health Source: Nursing/Academic Edition, 124 citations were from Medline with Full Text, 73 citations were from Medline, 50 citations were from PubMed, and one citation was from SocINDEX. Two hundred ninety-one non-duplicate citations were screened where inclusion and exclusion criteria were applied.

That led to 210 articles being excluded after the title and abstract screening. Eighty-one articles were retrieved and again inclusion and exclusion criteria were applied, leading to 42 articles being excluded after full-text screens due to not being relevant, and four articles were excluded during data extraction. The final search resulted in 35 articles to analyze and synthesize based on their relevance.

Figure 4

PRISMA Flow Diagram



General End Stage Renal Disease (ESRD) Patients on Hemodialysis Literature

According to the National Kidney Foundation (2019), 37 million American adults have chronic kidney disease, and millions of others are at increased risk. It is estimated that 10% of the worldwide population is affected by chronic kidney disease, and over two million have received treatment with dialysis or transplantation. Moreover, according to the Lebanese Kidney Registry (2012), there has been an increase in the hemodialysis population in Lebanon from 2,400 to 3,200 from 2007 to 2012, with a growth in prevalence from 570 to over 700 patients per million people (Lebanese Kidney Registry, 2012). Chronic kidney disease is prevalent in Lebanon, and a study conducted by Barbari et al. (2003) showed that more than half of the hemodialysis patients have an unknown etiology of their kidney disease, and patients are diagnosed and initiated on hemodialysis before the age of 30 (Barbari et al., 2003).

Although hemodialysis can extend the life span for ESRD patients, it can result in many difficulties and complications, such as weakness, muscle atrophy, inability to perform physical activities, immobility, sedentary lifestyle, social isolation, and reduced self-confidence (Dashtidehkordi et al., 2019).

Studies have shown that there are positive effects of exercise on the health of patients with chronic kidney disease (Qiu et al., 2017). The relationship and correlation of physical activity and the health condition of this patient population have been examined (Qiu et al., 2017). A meta-analysis study demonstrated that exercise is helpful in improving and bettering the blood pressure of patients suffering from chronic kidney disease (Qiu et al., 2017). In addition, the numbers of hemodialysis patients are growing, with negative and debilitating impact on the musculoskeletal system leading to muscle

wasting and atrophy considered major concerns in patients with ESRD (Rhee et al., 2019). Intradialytic exercise utilizing a simple bicycle demonstrated a significant improvement in muscle power, trunk flexibility, sit to stand test, and six-minute walk test with p -value < 0.05 (Rhee et al., 2019).

Another systematic review of 59 articles, conducted by Barcellos et al. (2015), showed that there is a positive relationship between aerobic exercises during hemodialysis on different outcome measures such as quality of life, physical fitness, lipid profile, heart rate, blood pressure, etc. (Barcellos et al., 2015). There is strong evidence that aerobic exercises will have a positive effect on physical fitness, muscle strength, walking capacity, and quality of life in CKD patients (Barcellos et al., 2015). An exercise and strength training intervention that is a comprehensive program of progressive resistance to strengthen the body and abdominal muscles utilizing elastic resistance bands is considered an effective intervention to alleviate problems with decreased physical activity, reduced muscle mass, and fatigue while the patients are in the hospital setting (Hacker et al., 2011).

Other meta-analysis reviews were completed to study different exercise programs and their effects on the ESRD population (Johansen, 2007). These studies highlighted the importance and the benefits of performing exercise programs in reducing risk of cardiovascular diseases, which are considered the leading causes of death among patients suffering from ESRD, and mortality rates among this patient population (Johansen, 2007). It is also noteworthy to mention that exercise regimens may improve blood pressure and diabetes control, thus enhancing physiological, psychological, and physical functioning and leading to improved overall health-related quality of life (Johansen,

2007). Despite all the benefits of exercise regimens on patients undergoing hemodialysis treatments, nephrologists and health care professionals rarely evaluate, assess, educate, or counsel their patients on exercise and physical activity. As for exercise regimens, aerobic, resistance, or combined programs all seem to be beneficial for patients, but more comparative studies are needed. Furthermore, no studies have been conducted to study risks associated with exercise in the ESRD population (Johansen, 2007).

Focused Literature – Study Variables Exercise and ESRD Patients on Hemodialysis

Hemodialysis is considered one of the most commonly used treatment alternatives for end stage renal disease (Dashtidehkordi et al., 2019). Adverse events are considered the main risks for patients undergoing hemodialysis. Musculoskeletal manifestations tend to be higher in CKD patients due to muscle atrophy and inactivity (Wang & Johansen, 2019). Physical inactivity is common in patients with CKD, and CKD is associated with impaired exercise capacity. As the disease course progresses, CKD patients' exercise capacity decreases. Various CKD patient groups have demonstrated their physical function limitations and muscle weakness. This musculoskeletal risk can be decreased by introducing warm-up exercises at the beginning of hemodialysis intervention, starting with lower intensities and gradually progressing to higher levels. The role and importance of exercise in improving outcomes for patients with ESRD on hemodialysis have been studied (Bohm et al., 2019). There are multiple scholarly peer-reviewed articles that demonstrate the safety and efficacy of exercise training for hemodialysis patients (Wilund et al., 2019). In addition, evidence supports that exercising in the first hour of hemodialysis treatment, as well as intradialytic or interdialytic exercise, can benefit this sedentary population and give them strength to be able to move more (Wilund et al.,

2019). Another cross-sectional study of 431 hemodialysis patients conducted by Warsame et al. (2018) showed that patients with more intradialytic activities report better mental and kidney-disease-specific health-related quality of life (Warsame et al., 2018).

Another study conducted by Ouzouni et al. (2009) showed the positive effect of intradialytic exercise on health-related quality of life indices. Results confirmed that intradialytic exercise improved both physical functioning and psychological status, leading to better quality of life (Ouzouni et al., 2009). In summary, following the National Kidney Foundation Disease Outcomes Quality Initiative (KDOQI) clinical guidelines, health care professionals must encourage hemodialysis patients to increase their physical activity daily (KDOQI, 2015).

Focused Literature – Spirituality and Quality of Life Among

ESRD Patients on Hemodialysis

Fear of death is commonly experienced by individuals suffering from chronic diseases (Taghipour et al., 2017). Chronic kidney disease patients undergoing hemodialysis, like any other chronic disease patients, suffer from a great deal of stress, depression, and fear of their own mortality (Taghipour et al., 2017). Major complications of ESRD that are associated with increased mortality and decreased quality of life are directly related to depression, anxiety, and stress among this patient population (Semaan et al., 2018). A quantitative study that was conducted in Lebanon shows that hemodialysis, being the main treatment modality for ESRD patients, represents a huge burden and a problem not only on the Lebanese society, but also on the patients and their families, causing additional stress, anxiety, depression, and emotional distress (Rizk et al., 2016). Using certain coping strategies and mechanisms and promoting spirituality and

spiritual wellbeing will help support this patient population and alleviate their anxiety as well as support them to accept their conditions and promote their quality of life (Ebrahimi et al., 2014). Moreover, spirituality is a growing need in health care across the nation. In addition, multiple studies have examined spirituality during hemodialysis (Mulder & Sikken-Kersten, 2016). The thoughts and feelings of ESRD patients undergoing hemodialysis in the light of spirituality have shown to be an important determinant of quality of life (Mulder & Sikken-Kersten, 2016). Moreover, studies have shown that psychological wellbeing is more significant and weighs more than physical wellbeing for this patient population (Mulder & Sikken-Kersten, 2016). Studies have demonstrated that there is a strong and positive relationship between spiritual views, beliefs, and values and patient care outcomes (Al-Ghabeesh et al., 2018). Studies also show that there is a close relationship between spiritual health and quality of life in hemodialysis patients (Taghipour et al., 2017). It is evident from the literature that, through enhancing spirituality; adopting, accepting, and implementing personal values, beliefs, principles, views, opinions, and experiences; and promoting health and spirituality, anxiety, fear of death, and stress can be minimized, lessened, and eased in hemodialysis patients (Taghipour et al., 2017).

Moreover, the literature demonstrated that patients and families are now more interested and voice a desire to address their spirituality and their spiritual needs with their health care team (Cervantes et al., 2016). It is important to mention that studies also show that, when spirituality is addressed during hospitalization or during procedures and treatments, patients are able to make informed decisions and improve their patient decision-making skills, particularly as it relates to end-of-life care (Al-Ghabeesh et al.,

2018). Treating the entire person as a whole—mind, body, and spirit—is supported by health care organizations (Al-Ghabeesh et al., 2018). A few studies have been conducted in Lebanon around spirituality among ESRD patients on hemodialysis. These studies revealed that the Lebanese population relies heavily on God and the love of God (Doumit et al., 2019).

Furthermore, multiple studies have been conducted with the African-American population, who have a strong sense of spirituality, religiosity, and belonging (Murphy et al., 2016). Their perceptions of God’s concern for them, God’s help with loneliness, fulfilling relationship with God, satisfaction with life, and sense of life’s purpose are all areas of spiritual strengths among African Americans with chronic kidney disease (Fradelos et al., 2015).

During the analysis and synthesis of the review of literature, the author noted that the literature search yielded quantitative and qualitative research designs. Tanyi and Werner (2007) used a cultural competence framework by Purnell and Paulanka (2003). Multiple peer-reviewed studies addressed spirituality among African-American (AA) patients with ESRD on HD; however, Tanyi and Werner (2007) compared AA and Caucasian women, and Thomas and Washington (2012) studied religiosity and social support. Patients with chronic kidney disease are extremely vulnerable by virtue of their health condition and illness (Tanyi & Werner, 2007). Their vulnerability is multi-faceted, whether physical, psychosocial, spiritual, or their ability to function socially (Delgado, 2016). Some of this patient population may be wondering, “Why me?” and may be feeling the absence of God in their lives, leaving this patient population spiritually vulnerable (Tanyi & Werner, 2007). For nurses caring for this patient population,

procedures of patients' advocacy and discussing spirituality, the meaning of life, and living with this chronic kidney disease may have an impact on their quality of life that goes beyond existence and physical presence (Doornbos et al., 2005).

In synthesizing the dependent variables, the author distinguished that the quantitative studies addressed the concept of spiritual wellbeing (Tanyi & Werner, 2007) and health-related quality of life (Thomas & Washington, 2012). Hemodialysis measurement included two subscales—religious well-being (RWB) subscale (one's relationship with God) and the existential well-being (EWB) subscale (satisfaction with life and sense of purpose and meaning) on a Likert scale one (low) to six (high). Regarding the synthesis of independent variables, out of the four articles, one measured spiritual wellbeing (SWB) with a 20-item Likert scale (Paloutzian & Ellison, 1982), another measured religiosity—Measure of Religious Involvement for AA with a 12-item Likert scale (Chatters et al., 1992), and another measured social support—Medical Outcomes Study Social Support Survey with a 21-item Likert scale (Sherbourne & Stewart, 1991; Thomas & Washington, 2012). The qualitative articles used probing questions to describe the lived experiences of AA patients with ESRD. The focuses of the qualitative studies were (a) the concept of spirituality with four probing questions (Nix, 2017) and (b) guided interviewing of participants about experiences related to coping, spirituality, and support systems (Nix, 2017).

Of the total 269 sample size, 242 (90%) were AA and 27 (10% of the sample) were Caucasian. Across all four studies, the age range varied from 18 years old (Nix, 2017) to 85 years old (Thomas & Washington, 2012). The divorced/widowed population accounted for 40.4% (Thomas & Washington, 2012) to 45.2% (Nix, 2017), which

accounts for most of the population. Tanyi and Werner (2007) addressed household income, which ranged from <\$10,000 to \$50,000. The educational level varied between eighth grade (Tanyi & Werner, 2007) to some college (Tanyi & Werner, 2007). The setting was conducted at different outpatient dialysis centers with free-standing dialysis units (Darrell, 2016; Nix, 2017; Tanyi & Werner, 2007; Thomas & Washington, 2012).

The findings of the qualitative articles revealed multiple overarching themes and subthemes in relation to spirituality among AA on hemodialysis with ESRD. The overarching themes were (a) faith that God cares; (b) finding meaning in ailment/pain; (c) support of family and others (Darrell, 2016); (d) nursing is a trusted profession, and family is not just biological; (e) prayer is a constant companion; and (f) health beliefs prior to and after start of HD (Nix, 2017). The findings of the quantitative articles showed that AA and Caucasian women with ESRD did not differ significantly on either overall SWB, RWB, or EWB (Tanyi & Werner, 2007). Comparisons of SWB item scores indicated areas of spiritual strengths for AA women that included (a) perceptions of God's concern for them; (b) God's help with loneliness and a sense of fulfillment in relationship to God; (c) feeling satisfied with life; and (d) sensing a purpose for their life (Tanyi & Werner, 2007). Additionally, social support contributed to the emotional and physical health of AA hemodialysis patients, whereas religiosity was inversely related to the physical health of these patients.

In all studies, the researchers investigated a homogeneous population. Appropriate data collection procedures were used. Quantitative articles cannot generalize beyond the sample and the study (Polit & Beck, 2016). Sample size for both race/ethnicities is small, and there is no power analysis for quantitative studies. In

synthesizing the quantitative threats to validity, both studies (Tanyi & Werner, 2007; Thomas & Washington, 2012) utilized a purposive and a volunteer subject selection. There was a selection maturation interaction as well as a Hawthorne effect. The research design in the Thomas and Washington study was a constraining factor in that it only addressed population characteristics at a certain point in time (Thomas & Washington, 2012).

For the synthesis of qualitative trustworthiness across studies (Darrell, 2016; Nix, 2017), the rigor and quality of the studies varied, as Darrell's study addresses all the four criteria for developing the trustworthiness of a qualitative inquiry: credibility, dependability, confirmability, and transferability; however, the study by Nix (2017) was weak, as findings may not be applicable in other settings. The fifth criterion of authenticity was also addressed in both studies.

Across all research studies, some studies were qualitative/phenomenological research design method and descriptive correlational and comparative research studies published from 2000 to 2019 and conducted nationally and globally. The aim was to study spirituality among AA with ESRD.

According to Cervantes et al. (2016), patients with ESRD experience high symptom burden and poor quality of life related to advanced illness, and Latinos experience a higher prevalence of ESRD compared to non-Latinos. Latinos are under-represented in existing ESRD literature (Cervantes et al., 2016). In addition, Egan et al. (2014) argued that people with chronic kidney disease have a shortened life expectancy and carry a high symptom burden.

Gaps in Research

Despite the high-risk factors of muscle atrophy, fatigue, and weakness in this hemodialysis population, there are gaps in the literature in relation to exercise during hemodialysis and the effects of exercise on the dialysis adequacy Kt/V, URR, blood pressure, quality of life, and spirituality of hemodialysis patients in Lebanon. In addition, generally speaking, the Lebanese population does not exercise or see value in physical activity (Salhab et al., 2019). Moreover, even with sufficient evidence on the effectiveness of physical activity and exercise on hemodialysis patients' quality of life, there is not enough literature documented on how other cultures and backgrounds may benefit from these programs or what modality, type of exercise, frequency, intensity, or duration would be best. Limited randomized controlled studies have been conducted, and even fewer have assessed relevant variables such as social support or spirituality (Buffart et al., 2013).

Study Aims

The following are the specific aims of this study: (a) to discover the relationship between physical activity and quality of life among patients on hemodialysis, (b) to discover the relationship between exercise and dialysis adequacy Kt/V, URR, and blood pressure with patients on hemodialysis as physiologic measure, (c) to discover the effects of spirituality on quality of life among patients undergoing hemodialysis, and (d) to discover the predictors of quality of life on hemodialysis.

Research Questions

The research questions for this phenomenon of interest include the following: (a) what are the effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V,

URR, and blood pressure as a physiologic outcome?, (b) what are the effects of exercise on hemodialysis patients on their quality of life as an outcome measure?, (c) what is the relationship between spirituality and quality of life among ESRD patients on hemodialysis?, and (d) what are the best predictors of quality of life?

CHAPTER 3

METHODOLOGY

Study Design

A longitudinal, quasi-experimental, quantitative pre-post study design was used and followed in this study. The method consisted of two phases: (a) data collection phase pre intervention, and (b) post intervention and after the exercise program was completed.

Setting

Most hemodialysis patients travel to a treatment center to undergo dialysis treatment three times per week, although ESRD patients on hemodialysis can also undergo this treatment at home. For the purpose of this research study, the setting was at American University of Beirut Medical Center (AUBMC) in the outpatient hemodialysis center. AUBMC, a 420-bed tertiary referral medical center, is located in central Beirut in Lebanon, which is a small, middle-income country in the Eastern Mediterranean, with an estimated population of four million people (Reslan et al., 2018). It provides inpatient and outpatient services to the people of Lebanon and the region and is Joint Commission International (JCI) accredited and Magnet designated. (Magnet status is an award given by the American Nurses Credentialing Center (2011) to hospitals that meet certain standards that measure the strength and quality of nursing care.) The hospital provides all kinds of medical, surgical, and specialized services and admits around 30,000 patients a year (Reslan et al., 2018).

The outpatient hemodialysis center at AUBMC is dedicated to the treatment of all patients with ESRD undergoing hemodialysis treatments regardless of race, sex, ethnicity, or religion affiliations. The exact number of patients affected with ESRD

undergoing hemodialysis in Lebanon is unknown, but the prevalence of hemodialysis grew from 570 to 700 patients per million people during the time span between 2007 and 2012, with the majority residing in Mount Lebanon and northern and southern regions of the country (Lebanese Kidney Registry, 2012). The comprehensive outpatient hemodialysis center at AUBMC provides state-of-the-art care to patients with ESRD undergoing hemodialysis treatments. Patients are seen at regular intervals three times a week; in addition, patients and families are educated about the disease formally and informally during the treatment.

Sample Size and Power Evaluation

The sample was selected using a convenience sample targeting primarily patients on hemodialysis at AUBMC coming to the hemodialysis unit. Two research assistants who are registered nurses working in the hemodialysis unit who received all appropriate human subjects' education, training, completed their conflict of interest, and are cleared by the institutional review board at both institutions were also screeners in addition to the primary investigator, and had access to and reviewed the electronic medical record. Potential participants were screened to determine whether or not they met the inclusion criteria. All participants received the details and aims of the project, and participants consented before the administration of the instruments. A convenience sample of patients who met all the aforementioned inclusion criteria who are admitted to the hemodialysis center at AUBMC was obtained.

The sample size for the study was determined by power analysis to be a minimum of 32 subjects. It is important to have enough power to reduce the risk of a type II error (Wood & Brink, 1998). It is suggested for investigators to determine the desired power

(Ellis, 2010). A sample of 32 patients was needed to reach a power of 0.8 at $\alpha = 0.05$.

This sample size is based on previous studies (Cohen, 1988) that reached significant difference between mean and standard deviation for quality of life and blood pressure control. The following rule was used (Polit & Beck, 2016):

$$N = (\sigma_1^2 + \sigma_2^2) (Z\alpha + Z\beta)^2$$

$$(\mu_2 - \mu_1)^2$$

The estimate of the Standard Deviation (SD) by convention will be “1” for both groups (group 1 and group 2). The $Z\alpha$ is actually the probability of type 1 error. The probability of type 1 error is .05. The Z score = 1.96, which is almost 2 SD from the mean (Borzou et al., 2016). In looking at health care, the difference between the mean is typically from 1 to .7; counter the difference of .7 or > to be biologically important.

$$N = (1^2 + 1^2) (1.96 + .84)^2 \text{ or } (2) (2.8)^2 \text{ or } (2) (7.84) = 15.68$$

$$(\mu_2 - \mu_1)^2$$

$$N = (\sigma_1^2 + \sigma_2^2) (Z\alpha + Z\beta)^2 = 15.68$$

$$(1.0 - .3)^2 = (.7)^2 = (.49)$$

$$N = 15.68 / .49 = 32 \text{ is the sample size}$$

The sample size was rounded up to 35 subjects to reach power.

Based on the number of patients seen in AUBMC dialysis center, it was estimated to recruit 40 patients within 3 months. This recruitment was based on inclusion/exclusion criteria and medical clearance from patients' nephrologists being secured prior to start of the program.

Sample Selection and Inclusion Criteria

This study population targeted all patients who are on chronic hemodialysis treatments and are receiving their interventions at AUBMC in the hemodialysis unit (HDU). The following inclusion criteria were utilized for this research study. Patients must be (a) 18 years of age or older and admitted to the outpatient hemodialysis clinic, (b) hemodialysis dependent with at least 3 months on hemodialysis, (c) able to ambulate independently—canes or walkers are permitted, (d) able to provide consent, (e) receive hemodialysis treatment three times per week, (f) be medically cleared by their physicians, and (g) able to read or write Arabic, as all the consents were in Arabic. It is noteworthy to specify that the medical clearance was communicated to the participants by their physicians and documented in their electronic medical records.

Exclusion Criteria

The following are the exclusion criteria for this research study: patients with (a) a planned move to another county or hemodialysis treatment modality change within the next 3 months, (b) scheduled hospitalization for more than 1 week, (c) severe cardiovascular disease which include symptoms of fluttering in the chest, racing or slow heartbeat, chest pain or discomfort, shortness of breath, lightheadedness, dizziness, and fainting, and (d) any current medical illnesses (e.g. advanced stage of cancer, chronic obstructive lung disease, etc.) based on the review of the electronic medical record that could hinder compliance with the study protocol.

Data Collection

The subjects for this study were chronic patients on hemodialysis who were admitted to the HDU at AUBMC, fit the inclusion criteria, and were medically cleared

from their physician to be eligible to participate in this research study. Participants recruitment and screening were determined by the inclusion/exclusion criteria. The primary investigator collaborated with the two research assistants and recruitment began after obtaining institutional review board approval. The two research assistants' roles were restricted to participant recruitment and pre intervention data collection. The two research assistants started the pre intervention data collection and the primary investigator ensured throughout the entire process that the research assistants were consistently following all study protocols. Frequent huddles, check ins, and continuous communication were ongoing between the primary investigator and the research assistants. The scheduled contacts with the research assistants were two times daily as well as the primary investigator ongoing availability to provide consultation electronically via WhatsApp, internet, and in person as the need arose. The same procedures were followed for post intervention data collection with the primary investigator on site. The primary investigator followed all protocols established for and implemented and continued to provide consultation to the two research assistants on an ongoing basis. In addition, the primary investigator and dissertation chair were in continuous communication and the primary investigator consulted with the dissertation chair regarding all aspects of the interventions as indicated. These patients were approached directly by the researcher and the two research assistants and were given detailed information by the investigator about the research study. The investigator further explained the study to the patients and answered all their questions and concerns. Initially, all patients were asked, and those who agreed to be part of the study were included. The investigator and the research assistants discussed in detail the purpose and

the objectives of the study, the benefits associated with the study, as well as all potential risks. The investigator and the research assistants also shared with the subjects that participating in the study would not affect their treatment in any way and that it was completely voluntary. The participants had the right to refuse or withdraw if they chose to at any time during the study. The subjects who voluntarily chose to participate in the study were asked to review and sign the consent before taking the questionnaire pre- and post-exercise program, and the investigator ensured that these patients who signed consent were medically cleared from their physician. Data collection began in August 2020 after obtaining institutional review board approval and the two research assistants at AUBMC assisted in the data collection for the pre-intervention for several participants while the primary investigator completed all remaining data collection for post intervention and all data collection was completed in October 2020 for all thirty-five participants.

Protocol

All patients who were recruited to participate in the study received clear instructions about the exercise program and regimen. The exercise program consisted of participants riding stationary exercise bicycles during dialysis and that they were secured to the floor so there was no risk of patient injury due to rider error or equipment malfunction. These bicycles are portable, floor-pedal exercise bikes that provide gentle, low impact that allows the legs to exercise and for blood circulation during hemodialysis treatment. The intervention is totally safe and no potential harm or injury to the participants. This portable floor stationary exercise bicycle has an adjustable tension knob that also allows control of the level of resistance and workout intensity. The program

started by patients riding the stationary bicycle for 20 to 30 minutes based on patient tolerance. Participants were closely monitored throughout the intervention and any symptoms of fatigue, lack of tolerance, pain, shortness of breath were assessed and evaluated. If symptoms occurred, the exercise intervention was stopped and participants were comforted and supported. All participants were able to tolerate the intervention with no apparent symptoms noted for all thirty-five participants. Moreover, the intensity of the exercise was evaluated constantly and was primarily based on the patients' medical conditions as well as their tolerance to the exercise program. It is noteworthy to mention that, throughout the study period, which took place over 2 months and three times per week, the nursing team and support staff were available to supervise and coach the participants.

Protocol for Patients Using the Bicycle

Before the patient begins the bicycle exercise, the regular practices of the hemodialysis department were kept the same, as blood pressure and heart rate were monitored every 15 to 30 minutes. One of the nurses on the study who is one of the two research assistants performed the following functions: (a) obtained baseline blood pressure (BP) and heart rate (HR) prior to exercise as well as measured the Kt/V and URR to measure and quantify the hemodialysis treatment adequacy; (b) during the exercise, monitored blood pressure and heart rate every 15 to 30 minutes, assessed for any signs and symptoms of shortness of breath, dizziness or lightheadedness, chest discomfort or pain, feeling of exercise fatigue; (c) post exercise Kt/V, URR, BP, and HR and minutes the patient exercised (Dias et al., 2020); (d) reason for exercise to stop and

any complications noted; and (e) patient should stop cycling if he/she experienced any of the above signs and symptoms.

Exercise Mode and Protocol Selection

According to the American Heart Association literature, assessment of functional capacity is typically performed on a stationary bicycle for ESRD patients undergoing hemodialysis. Portable pedal floor exercise is generally the preferred modality for this patient population. Thus, untrained subjects will usually terminate cycle exercise because of fatigue (Fleg et al., 2000). Several studies, however, have demonstrated a consistent relationship between exercise program and quality of life among this patient population (Chao et al., 2016). In addition, bicycle exercise requires subject cooperation in maintaining pedal speed at the desired level, usually about 60 rpm (Fleg et al., 2000). Nevertheless, cycle ergometry may be preferred in subjects with gait or balance instability (Fleg et al., 2000).

Survey Instruments

The Kidney Disease and Quality of Life Survey

The Kidney Disease Quality of Life 36-item short form survey (KDQOL-36) is a widely, nationally and internationally used instrument for patient-reported outcome measure for patients on hemodialysis (Peipert et al., 2019). The Kidney Disease and Quality of Life Survey Short Form 1.3 questionnaire (KDQOL-SF™ 1.3) was used to assess quality of life. Permission from RAND Health Care was obtained to use the instrument in this research study. The Kidney Disease Quality of Life 36-item short form survey is also considered an appropriate instrument to make applicable and practical comparisons of health-related quality of life among different ethnicities and backgrounds

(Peipert et al., 2018). This questionnaire is composed of short-item questions targeted for patients with kidney disease and on dialysis. Moreover, and it is noteworthy to mention, the Centers for Medicare and Medicaid Services require that dialysis patients' health-related quality of life be assessed annually. The Kidney Disease Quality of Life 36-Item short-form survey (KDQOL-36) is the primary instrument that is used for this purpose as well. The tool includes generic core questionnaire and three kidney disease targeted scales: Burden of Kidney Disease, Symptoms and Problems of Kidney Disease, and Effects of Kidney Disease (Peipert et al., 2017). The KDQOL survey includes questions about symptoms (12 items), effects of kidney disease on daily life (eight items), burden of kidney disease (four items), work status (two items), cognitive function (three items), quality of social interaction (three items), sexual activity (two items), and sleep (four items). It also includes an additional three scales about quality of life, which are social support (two items), dialysis staff encouragement (two items), and patient satisfaction (one item), and additional questions about emotional status, pain, role limitations caused by physical health problems, fatigue, and general health perception are also present. It takes about 16 minutes to be filled out; Arabic and English versions are available, and both versions are validated and reliable using group comparison (Peipert et al., 2017). The original KDQOL scales were supported by a factor analysis for construct validity. Internal consistency reliability estimates for this instrument exceeded 0.80, with two exceptions (0.68 for cognitive function, 0.61 for quality of social interaction). Mean values for the kidney disease targeted scales ranged from 25.26 to 79.11. Reliability estimates for the eight scales of the 36-item health survey were also acceptable and ranged from 0.78 to 0.92 (Hays et al., 1997), with excellent internal consistency

reliability. The internal consistency reliability estimates for this instrument kidney disease targeted scales exceeded with $r = 0.80$, with two exceptions (0.68 for cognitive function, and 0.61 for quality of social interaction). All scales showed good internal consistency reliability, with Cronbach's alphas ≥ 0.80 but < 0.90 (Peipert et al., 2017). Construct validity was assessed in two ways: (a) correlations between measures utilizing Pearson product moment correlations and (b) known-groups analyses were conducted by comparing scores. Results showed higher correlations between measures expected to be correlated and indicated greater validity; known-groups analyses results supported a priori hypotheses (Peipert et al., 2018).

The KDQOL includes multi-item scales targeted at particular health-related concerns of individuals with chronic kidney disease and undergoing hemodialysis (Hays et al., 1997). The symptom/problem list is 34 items, and it assesses the extent of being bothered during the last 30 days related to issues with pain, soreness, cramps, itchy skin, shortness of breath, lack of appetite, nausea, vomiting, trouble with memory, etc., or any other problems with the access site, and it ranges from not at all, somewhat, moderately, very much, to extremely (Hays et al., 1997). Effects of kidney disease on daily life is 20 items and was assessed using the same scale and included restrictions on fluid and dietary intake, impact on work, carrying out family responsibilities, and time available to get things done (Hays et al., 1997). The burden of kidney disease scale is a four-item scale that assesses perceptions of frustration and interference of kidney disease in one's life. Work status, which is a four-item scale, is measured in terms individuals' ability to work full time or part time. Cognitive function, which is a six-item scale, is an indicator of thinking impairment (Hays et al., 1997). In relation to the scoring rules for this

instrument, pre-coded numeric values for some of the responses are in the directions, such as a higher number reflects a more favorable health state (Hays et al., 1997).

The scale has been used in several cultures. For example, a descriptive, cross-sectional, stratified sampling was applied to determine the psychometric properties such as reliability and validity of the five subscales of the KDQOL-36 among patients with chronic kidney disease undergoing hemodialysis in Taiwan (Chao et al., 2016). The Cronbach's alpha for the 35-item scale was 0.92 ($p < 0.001$), and the alphas for the five subscales ranged from 0.76 to 0.92 ($p < 0.001$). The correlation between item to item and item to subscale ranged from 0.21 to 0.67 ($p < 0.001$) and 0.43 to 0.92 ($p < 0.001$), respectively (Chao et al., 2016). Construct validity was assessed by correlating the KDQOL-36 to the question, "How satisfied are you with your health?" The correlations were in the range of 0.28 to 0.40 ($p < 0.001$) and 0.25 to .43 ($p < 0.001$; Chao et al., 2016).

A study employed by Abd El Hafeez et al. (2012) was done to present an Arabic translation, adaptation, and the subsequent validation of the kidney disease quality of life-short form (KDQOL-SFTM) version 1.3 questionnaire in a representative series of Egyptian CKD patients. All items of SF-36 met the criterion for internal consistency and were reproducible (Abd El Hafeez et al., 2012). Of the 10-kidney disease targeted scales, only three had Cronbach's $\alpha < 0.7$: quality of social interaction (0.23), work status (0.28), and cognitive function (0.60). As for concept validity, the correlation between all domains of the questionnaire with overall health rate was significant for all domains except for work status, sexual function, emotional wellbeing, and role emotional (Abd El Hafeez et al., 2012). Furthermore, the correlation between the disease-specific domains

and the two composite summaries of SF-36 (physical and mental composite summaries) was significant for all domains except for sexual function with mental composite summary. Construct validity was indicated by the observation that the majority of the domains of the kidney disease targeted scale of KDQOL-SFTM 1.3 were significantly inter-correlated. The results suggest that this Arabic version of the KDQOL-SFTM 1.3 questionnaire is a valid and reliable tool for use in Egyptian patients with CKD (Abd El Hafeez et al., 2012).

In this study, the reliability for this instrument showed that the Cronbach's alpha was high at $r = 0.88$. This demonstrated that the scale is very reliable with this population. For construct validity using factor analysis varimax rotation, this author ended up with five factors that explained 60% of the variance. The loadings on the five factors were not very high, some lower than the expected .4.

The Daily Spiritual Experience Scale

The Daily Spiritual Experience Scale (DSES) is a 16-item self-reported measure designed to assess and evaluate experiences and relationship to God in daily life. It includes many constructs, hypotheses, and concepts such as awe, gratitude, mercy, sense of belonging and connection, and compassionate love (Underwood, 2011). The measure includes 16 items that are written in positive terms; the first 15 are scored using a modified Likert scale, in which response categories are many times a day, every day, most days, some days, once in a while, and never or almost never. Lower scores reflect more frequent daily spiritual experience; for example, many times a day = 1, never or almost never = 6 (Underwood & Teresi, 2002).

It is important to keep the wording of the scale the same, as the wording is critical to the effectiveness and ability to find the concept of interest (Underwood, 2011). Any changes to the wording of the scale can affect performance. During the development of the scale, the focus was to answer the questions easily and directly without any analysis of the belief system, religious affiliations, or complex wording (Table 1). The questions were created to show that connection was an important concept. The focus was on the personal connection with God. Two elements were developed to address the relationship with God, one on a personal intimacy level with God (“I feel God’s presence”) and the second as a general sense of unity and connection to life (“I experience a connection to all of life”). A sense of completeness, harmony, and core integration are reflected frequently throughout the entire instrument. Moreover, many individuals consider gratefulness (“I feel thankful for my blessings”) as a fundamental and essential constituent or element of spirituality (Underwood, 2011).

The DSES is very well developed and is widely used in a variety of settings, cultures, and backgrounds. It is important to understand the depth of the constructs in order to capture the intent of the items. It is designed to measure practices and experiences of connection with the beauty of daily life. It includes constructs such as admiration, respect, appreciation, amazement, gratitude, compassion, forgiveness, kindness, and a sense of connection with love and compassion (Underwood, 2011). It is developed to link the experiences that people practice with the connection to other aspects of life. Religious connections become deeper and stronger for many individuals as this instrument can address the religiousness and spirituality for a variety of people. This author used this instrument in the phenomenon of interest and research study as the

relationship and connection with life is a reality and will lead to close engagement and involvement with a divine and heavenly life (Underwood & Teresi, 2002). Moreover, compassionate love is described when people extend their care to people around them. The DSES scale touches many lives and may affect our decisions, attitudes, and actions. This instrument used in this research study measured certain spiritual outcomes. There is a linkage that, if one can enhance spiritual experience, this in turn will enhance their lives and the lives of people around them; thus, spirituality is linked to a variety of positive outcomes (Underwood & Teresi, 2002).

The DSES instrument has confirmed good reliability across several studies, with internal consistency in the .90s (Underwood & Teresi, 2002). The DSES demonstrated good internal consistency reliability. The high internal consistency suggests that the items function together to consistently measure the spiritual experience construct. Test-retest results have been reliable, with test-retest Pearson correlation of 0.85 over 2 days (Underwood & Teresi, 2002). Cronbach's alpha is considered the expected correlation of two tests measuring the same construct. The average correlation of the DSES 16-item scale is an accurate estimate of the average correlation of all items pertaining to the construct. Moreover, the Cronbach's alpha index result shows an internal consistency of the DSE instrument and 16-item scale. Scale, item means, standard deviations, and estimates of internal consistency (Cronbach's α) are presented within each sample for different sex, racial-ethnic, and religion subgroups. According to Underwood (2011), the study contributed estimates of interrater reliability for a subset of DSES items. Estimates of test-retest reliability were also provided for the six items contained in the DSES. In multivariate statistics, the results of exploratory factor analysis (EFAs) are presented in

order to identify the underlying relationships between these variables. Preliminary evidence for construct validity is discussed in terms of differences in DSES scores for different demographic and religion subgroups and correlations of DSE with psychological and other health-related variables. Different populations can show different factor loadings. The Chronbach's Alpha for the scale is consistently above 0.9 (Underwood & Teresi, 2002). The scale examines change over time, as it is performed in both a state-like as well as a trait-like manner.

The validity of the DSES was measured utilizing a process that was established by Underwood and Teresi (2002). In general, the findings reported support the use of the DSES to measure daily spiritual experience. Construct validity was recognized through the examination of the mean scale scores across many different socio-demographic groups. The DSES appears to be consistent with the finding between religion, sex, and racial subgroups as predicted in the literature (Underwood & Teresi, 2002). Evidence of construct validity was also found by examination of correlations of the DSES with health and quality-of-life variables. It is noteworthy to mention that significant correlations and relationships were found as expected for most variables (Underwood & Teresi, 2002).

The spirituality of all the individuals in this study was measured utilizing the Arabic version of the Daily Spiritual Experience Scale (DSES) in a study that was conducted in Egypt (Amr et al., 2013). As mentioned above, this scale is intended to measure patients' perception of their relationship, interaction, interface, and involvement with God and their human experiences in daily life. The reliability of this Arabic version was found to be high in this study, and the Cronbach's alpha index of the DSES was 0.84-0.93 (Amr et al., 2013). Test-retest reliability, measured utilizing Pearson

correlation coefficient, was found to be 0.92, $p < 0.01$ (Amr et al., 2013). This study also measured predictive validity utilizing logistic regression analysis and showed that DSES scores were positive predictors of adherence. Amr et al. (2013) reported predictive validity and further studies in the future for psychometric properties of DSES will be relevant and needed to be studied properly.

In this study, the reliability for this instrument showed that the Cronbach's alpha was high at $r = 0.80$. This demonstrated that the scale is very reliable with this ESRD population on hemodialysis. For construct validity using factor analysis varimax rotation, the author ended up with six factors that explained 70% of the variance, though some loadings were less than the .40 expected.

Socio-demographic Data

The following socio-demographic data were collected: age, gender, employment status, marital status, living arrangement, support persons, living arrangement, level of education, employment status, income, internet access, health insurance status, and geographical location. Clinical variables such as smoking, alcohol consumption, and obesity were also obtained.

Data Reliability

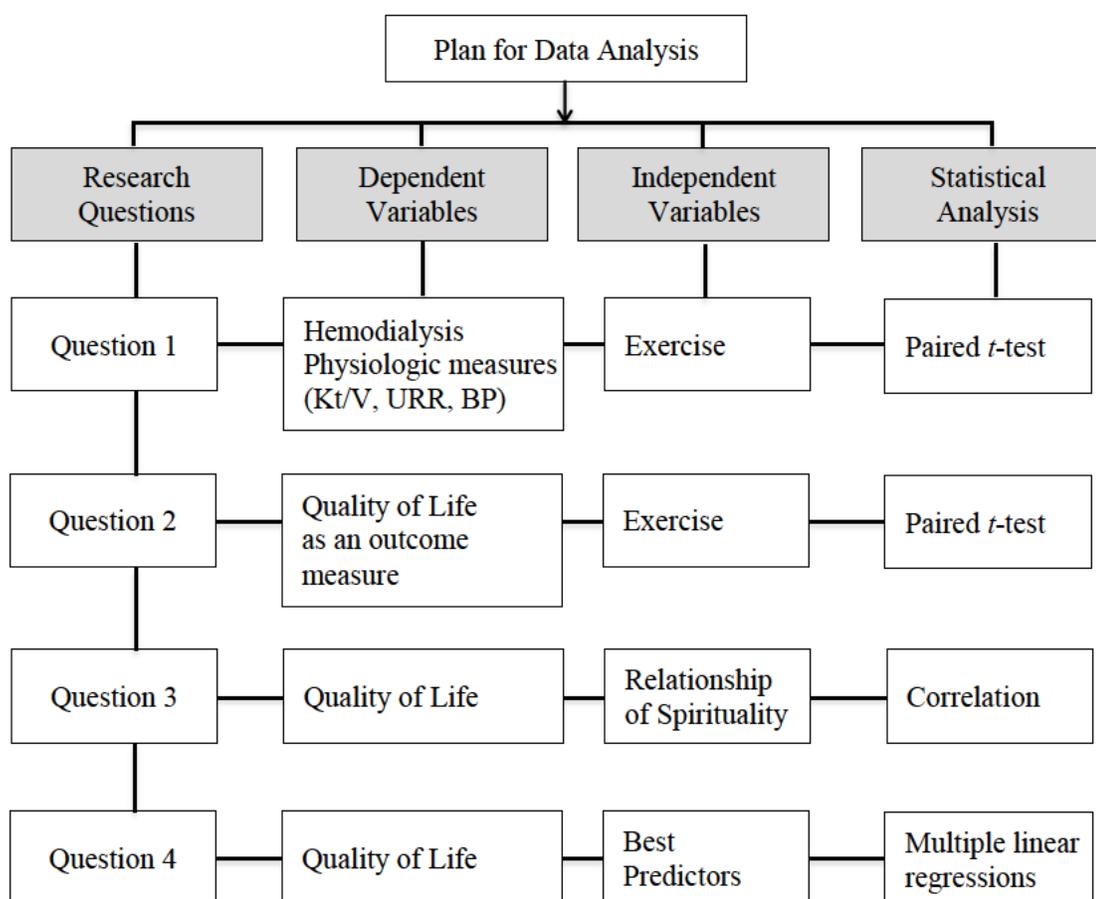
Data Analysis

Statistical analyses of the data were performed utilizing the Statistical Package for Social Sciences (SPSS). Using SPSS version xxvi, data that were obtained during the study were entered on a regular basis. Categorical variables were presented as frequencies or proportions, while continuous variables were presented as mean values

and corresponding standard deviations. A level of significance of 0.05 was used for all statistical tests.

Figure 5

Plan for Data Analysis



For research question one—what are the effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V, URR, and blood pressure as a physiologic outcome?—paired *t*-test was used. For research question two—what are the effects of exercise on hemodialysis patients on their quality of life as an outcome measure?—paired *t*-test was used. For research question three—what is the relationship between spirituality and quality of life among ESRD patients on hemodialysis?—correlation was used. For

research question four—what are the best predictors of quality of life?—multiple regression was used.

Statistical Analysis

Descriptive statistics were summarized by presenting the number and percentage for categorical variables and mean and standard deviation for continuous variables. The association between pre- and post-and other continuous variables was carried out by using the paired *t*-test. Multivariate regression analysis was used to adjust for potentially confounding variables. The linear regression analysis assessed the association between the score of quality of life and the different predictors. The correlation between two continuous variables was assessed by using Pearson correlation coefficient, and *p*-value < 0.05 was used to indicate statistical significance. All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS, version xxvi).

Protection of Human Rights

Finally, in order to protect human rights, before starting the study, the author submitted the research plans to the institutional review board (IRB) and received approval. Training in the protection of human subjects was attained through the Collaborative Institute Training Initiative (CITI) program and is valid through December 2021. The two research assistants also completed their CITI training and the validity dates of their certifications January 2021 and August 2023 respectively. The author obtained an online formal training on ethical conduct and received a certification. This author received IRB approval to conduct this study from both the academic institution Azusa Pacific University (APU) and the health care organization American University of Beirut Medical Center (AUBMC) which is a part of the university IRB. The IRB is

responsible for ensuring that the proposed plans meet federal requirements for ethical research. The IRB confirms the following: (a) risks to participants are minimized and reasonable in relation to anticipated benefits; (b) selection of participants is fair, equitable, and non-coercive; (c) informed consent is sought and appropriately documented; (d) adequate measures are taken to ensure participants' safety; (e) proper provisions to optimize participants' privacy and confidentiality; and (f) appropriate safeguards are taken to protect the rights and welfare of the vulnerable population and minimize coercion (Polit & Beck, 2016). The author used multiple strategies to ensure the rights of the participants were protected by being transparent and, taking into consideration the purpose of the research and the setting in which the research was conducted, that informed consent was obtained from the participants/subjects and their privacy was respected and protected every step of the way. The two research assistants were contacted and were invited to participate in the study and to support with the data collection in August and they were both added as collaborators to the APU IRB approval. They were both trained and received their CITI certification and conflict of interest documents and followed through with the study protocol as well as they went through the IRB process at AUBMC.

Summary

Coping with a chronic disease is a complex matter involving the patient's family and a multi-disciplinary team. Recently, observational studies suggested that spirituality and religiosity are two important determinants in coping with a chronic/terminal disease. Both concepts were studied in various settings, involving ESRD and quality of life. In summary, integrating and incorporating spirituality in the delivery of patient care is

considered patient centered and will lead to better outcomes (Puchalski, 2013). This way, patients are contributing to their care, and their values, beliefs, and experiences are incorporated into their individualized plan of care (Puchalski, 2013).

This author described in this paper the importance of physical activity and spirituality as they relate to patients suffering from chronic kidney disease and receiving hemodialysis treatment and the impact on their quality of life and physiological conditions. As demonstrated in this paper, considering, evaluating, addressing, and examining chronic kidney disease patients' receiving hemodialysis and the importance of exercise regimen and spirituality and spiritual needs are necessary to their overall quality of life and wellbeing and can have a positive outcome in health-related behaviors (Delgado, 2016). In summary, despite the medical and technological advancements in the care of hemodialysis patients, the quality of life for this patient population is still insufficient, unacceptable, and disappointing. Literature review and previous scholarly reports show the positive effects of physical activity and exercise programs and also show that spirituality during hemodialysis can improve quality of life for the hemodialysis patient population (Shahgholian et al., 2014).

CHAPTER 4

RESULTS

The purpose of this research was to study the effects of exercise on patients undergoing hemodialysis in order to answer four research questions: (a) the effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V, Urea Reduction Ratio (URR), and blood pressure (BP) as physiologic outcomes; (b) the effects of exercise on hemodialysis patients on their quality of life as an outcome measures; (c) the relationship between spirituality and quality of life among ESRD patients on hemodialysis; and (d) the best predictors of quality of life.

Sample Characteristics

Subject data were collected at the hemodialysis site at AUBMC in Beirut, Lebanon. The researcher was able to recruit total of 52 participants, of which 16 decided to withdraw, and one patient passed away during the study. That left the study with exactly what was needed to complete this research study based on the power analysis calculations of 35 participants. The characteristics of the sample are described in Table 1.

Demographics

A total of 35 participants were included in the analysis; the mean age was 62.29 ± 17.38 years, with higher male representation (77.1%). A high number of the participants were unemployed (51.5%); 17 participants had normal BMI (48.6%), and below-normal BMI and normal BMI accounted for 54.3%. Most were married (65.7%), living with family (88.6%), and, according to the participants' perceptions, 94.3% of the participants stated they have adequate support systems at home. Looking at respondents' lifestyles, 22.9% were current smokers, 14.3% consumed alcohol, and the majority (85.3%) had

internet access. Regarding health care coverage, 76.5% were covered by the National Social Security Fund (NSSF) and 23.5% by the ministry of health.

Table 1

Baseline Individual Characteristics of the 35 Participants

Characteristic	Total (N = 35)
Age	
Mean (\pm SD)	62.29 \pm 17.38
Gender	
Male	27 (77.1%)
Female	8 (22.9%)
Employment Status	
Unemployed	18 (51.5%)
Employed	16 (45.7%)
Did Not Answer	1 (2.8%)
BMI	
Low BMI less than 18.5	2 (5.7%)
Normal BMI 18.5-25	17 (48.6%)
High BMI more than 25-30	16 (45.7%)
Family Status	
Single	8 (22.9%)
Married	23 (65.7%)
Widowed	3 (8.6%)
Divorced	1 (2.9%)
With whom do you live?	
Family	31 (88.6%)
Alone	4 (11.4%)
Good support system at home	
Yes	31 (88.6%)
No	4 (11.4%)
Smoking Status	
Never smoked	16 (45.7%)
Current smoker	8 (22.9%)
Ex-smoker	11 (31.4%)
Alcohol Consumption	
Yes	5 (14.3%)
Number of years of education	
Mean (\pm SD)	10.19 \pm 4.98
Internet access	
Yes	29 (85.3%)
Geographical location	
Beirut	33 (94.3%)
South	2 (5.7%)
Health insurance status	
Ministry of health	8 (23.5%)
National security social fund	26 (76.5%)
Other	1 (2.9%)

Results Based on the Research Questions

Research Question One

What are the effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V, URR, and blood pressure as physiologic outcomes? A paired *t*-test was used to answer this research question. As seen in Table 2, there were significant differences pre- and post-exercise.

Table 2

The Effects of Exercise on Hemodialysis Patients on Their Blood Pressure, Kt/V, and URR as a Physiologic Outcome

	Pre N=35	Post N=35	<i>t</i> -value	<i>p</i> -value
SBP	130.86 ± 18.22	123.23 ± 17.16	3.51	0.001
DBP	73.86 ± 12.60	66.97 ± 15.74	3.05	0.004
Kt/V	2.10 ± 0.42	2.38 ± 0.31	-5.53	<0.0001
URR	76.72 ± 6.32	81.71 ± 3.81	-6.81	<0.0001

The results indicate that there was a significant decrease in SBP from 130.86 ± 18.22 pre to 123.23 ± 17.16 post (*p* = 0.001), with a *t*-value of 3.51, as well as in DBP from 73.86 ± 12.60 pre to 66.97 ± 15.74 post and a *p*-value = 0.004 with a *t*-value of 3.05. Moreover, there was a significant increase average of Kt/V and URR between pre- and post-groups (2.10 ± 0.42 vs 2.38 ± 0.31, *p* < 0.0001, with a *t*-value of -5.53; 76.72 ± 6.32 versus 81.71 ± 3.81, *p* < 0.0001), with a *t*-value of -6.8, respectively.

Research Question Two

What are the effects of exercise on hemodialysis patients on their quality of life as an outcome measure?

Table 3

The Effects of Exercise on Hemodialysis Patients on Their Quality of Life as a Physiologic Outcome

	Pre N=35	Post N=35	<i>t</i> -value	<i>p</i> -value
QOL – total	13.25 ± 11.23	4.51 ± 4.39	4.59	<0.0001
PCS	19.84 ± 17.89	7.62 ± 10.79	4.26	<0.0001
MCS	12.86 ± 20.45	4.52 ± 5.47	2.50	0.02
Burden of Kidney Disease	18.67 ± 16.47	8.0 ± 8.68	2.83	0.001
Symptoms of Kidney Disease	6.75 ± 1.14	1.31 ± 0.22	3.12	0.01
Effects of Kidney Disease	11.40 ± 16.79	2.09 ± 3.86	3.52	0.004

A significant decrease was observed for the average of quality of life (13.25 ± 11.23 pre versus 4.51 ± 4.39 post, $p < 0.0001$), with a *t*-value of 4.59. In terms of Physical Component Summary (PCS), the average for PCS during the pre-period was significantly higher when compared to post period (19.84 ± 17.89 versus 7.62 ± 10.79 , p -value < 0.0001), with a *t*-value of 4.26. Regarding the Mental Component Summary (MCS), results show that the average of MCS significantly decreased during the post period to 4.52 ± 5.47 from 12.86 ± 20.45 during the pre-period (p -value = 0.02), with a *t*-value of 2.50. For the burden of kidney disease, it was found that the average in pre was higher compared to post period (18.67 ± 16.47 versus 8.0 ± 8.68 respectively, p -value = 0.001), with a *t*-value of 2.83; and the average symptoms of kidney disease was 6.75 ± 1.14 in pre compared to an average of 1.31 ± 0.22 in post period (p -value = 0.01), with a *t*-value of 3.12. Finally, the average of effects of kidney disease group has significantly reduced during the post period (2.09 ± 3.86 versus 11.40 ± 16.79 , p -value = 0.004). with a *t*-value of 3.52 (Table 3).

Research Question Three

What is the relationship between spirituality and quality of life among ESRD patients on hemodialysis? Using a Pearson correlation analysis, no correlation was demonstrated between spirituality and quality of life among ESRD patients on hemodialysis ($r = 0.05$ with $p = 0.76$).

Table 4

The Relationship Between Spirituality and Quality of Life Among ESRD Patients on Hemodialysis

		Quality of life
Spirituality	Pearson Correlation	0.054
	p -value	0.76

Research Question Four

What are the best predictors of quality of life? Before a multiple regression was performed, a correlation matrix was conducted to assess the relationship between the study variables and the outcome variable (QoL). The only significant relationship was between age and quality of life, while the other factors were not associated with QOL.

The results of the linear regression analysis for the predictors of quality of life are presented in Table 5. It was found that age was only the statistically significant predictor of quality of life, with p -value = 0.05.

Table 5*Multivariate Linear Regression of the Predictors of Quality of Life*

	β	Quality of Life		<i>p</i> -value
		Lower Bound	Upper Bound	
Age	0.115	-0.004	0.235	0.050
Gender (reference: male)	0.769	-3.257	4.795	0.694
BMI (reference: below normal and normal BMI)	-0.183	-3.802	3.437	0.917
Employment status (reference: unemployed)	-2.403	-6.991	2.185	0.287
Family status (reference: single)	0.929	-3.820	5.677	0.687
Smoking status (reference: never)	-0.537	-2.794	1.720	0.624
Alcohol consumption	-1.449	-6.438	3.540	0.550
Number of years of education	-0.323	-0.744	0.099	0.125
Internet access	0.489	-5.146	6.125	0.858
Health insurance status (reference: Ministry of health)	0.182	-4.568	4.931	0.937

CHAPTER 5

DISCUSSION

This chapter discusses and interprets the study results. First, the sample demographics of the study are discussed. Then each research question is interpreted from the author's perspective as well as supported by previous research studies.

Findings Overview and Implications for Nursing

The total number of participants in the study was 52, of which 16 decided to withdraw, and one participant passed away during the study. A total of 35 participants were included in the analysis. The mean age was 62.29 ± 17.38 years, with the youngest participant age of 21 years and the oldest participant age of 88 years old, with higher male representation (77.1%). A high number of the participants was unemployed (51.5%), which reflects greater than 50% of the participants. In addition, the Body Mass Index (BMI) measurements showed 17 participants with normal BMI (48.6%), and 45.7% of participants with above-normal BMI. The majority of participants were married (65.7%), compared to single (22.9%), widowed (8.6%), or divorced (2.9%). The findings also showed that a very significant number of the participants were living with family (88.6%) and, according to the participants' perceptions, 94.3% of the participants stated they have adequate support systems at home. In looking at the respondents' lifestyle behaviors, findings showed that 22.9% of the participants were currently smokers, 14.3% consume alcohol, and the majority 85.3% had internet access. Regarding health care coverage, 74.3% were covered by the National Social Security Fund (NSSF) and 22.9% by the ministry of health.

In looking at implications for nursing, intradialytic exercise is considered a novel intervention for patients with ESRD on hemodialysis. Many outpatient hemodialysis centers do not routinely perform physical activity or exercise during the hemodialysis treatment (Salhab et al., 2019). This study examined the effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V, URR, and blood pressure as a physiologic outcome. Data revealed the exercise during hemodialysis treatment can significantly improve physiologic measures and improve participants' dialysis adequacy, as demonstrated in the significant increase in average of Kt/V and URR between pre and post groups (Anding et al., 2015). Physical activity, strength training, and exercise are considered effective interventions to alleviate problems related to reduced muscle mass, decreased physical activity, and fatigue in ESRD patients on hemodialysis, as demonstrated in this study with a significant increase in physiologic measures (Hacker et al., 2011).

It is interesting to note that the findings for research question three related to the relationship between spirituality and quality of life among ESRD patients on hemodialysis in the Lebanese population were not significant. Using a Pearson correlation analysis, no correlation was demonstrated between spirituality and quality of life among ESRD patients on hemodialysis ($r = 0.05$ with $p = 0.76$). On the other hand, there was no significant correlation between spirituality and quality of life score ($p = 0.76$) as demonstrated and depicted in Table 4.

According to the literature, spiritual wellbeing plays an important part in health care. Spirituality and nursing are linked to many aspects of human functioning, such as high self-esteem, high self-confidence, self-respect, and positive relationships with God

and others (Puchalski, 2013). Spirituality in health care is that part of nursing that gives meaning and purpose to the person's life. Spiritual nurses are optimistic, value diversity, and believe in a higher power that may inspire hope, find resolution, ethical decision-making, and exceed physical and conscious limitations (Delgado, 2016). In this study, findings showed that there is no relationship between spirituality and quality of life, yet, according to this author, spiritual care in nursing and engaging patients and families in activities that give spiritual renewal are considered important aspects of the overall health care experience (Delgado, 2016).

Demographics

The impact of individual characteristics and demographics on this study vary according to the data analysis. A total of 35 participants were included in the study after removing 16 subjects who decided to withdraw as well as removal of one additional participant who passed away during the study. Information on individual characteristics of the participants have been shown in Table 1. The mean age was 62.29—the youngest participant was 21 years old and oldest participant was 88 years old, with higher male representation of 77.1%. It is noteworthy to mention that men access health services and seek health care more than women in Arab countries (Kronfol, 2012). These barriers and obstacles to access health care could be related to social, cultural, and financial factors and may influence gender and ethnic groups in Lebanon and the Arab countries (Kronfol, 2012). It is evident from this study that men utilize health care services far more than women do and this is in alignment with the literature. As demonstrated in this study and as shown in Table 1, the percentage between men and women is skewed. Men represent 77.1% of the participants, whereas women represent 22.9%. These data are supported by

the literature: according to Hecking et al. (2014), overall, 59% of men are on hemodialysis treatment compared to 41% of women in all age groups. These data vary and differ between countries (Hecking et al., 2014). According to this author's interpretation, the reasons could also be related to women in this age group being required to care for their families, stay at home, and not seek medical advice. Socially, Lebanese women don't get taken care of—they focus on taking care of others first before caring for themselves, as supported by the literature (Kronfol, 2012).

A high number of the participants were unemployed (51.5%), 17 participants had normal BMI (48.6%), below-normal BMI and normal BMI accounted for 54.3%, 65.7% were married, 88.6% were living with family, and, according to the participants' perceptions, 94.3% of the participants stated they have adequate support systems at home. Based on the author's data analysis, there is no correlation or a direct link between working or not working, as they are almost equally distributed between the participants who were employed or not employed. It is important to mention that, based on the data, almost 77% of the participants were either married or had been married at one point in time. In addition, family support plays an integral part and has huge benefits. According to the participants, 94.3% rated their support system at home as adequate. Having a good support system will force patients to seek medical care and health services, and family support will encourage patients to seek help and go to hemodialysis; if single, there is often no desire and no motivation to access care. Moreover, the presence of family is a major source of support and contributes to emotional, psychological, and physical stability (Puchalski, 2013). In looking at respondents' lifestyles, 22.9% were current smokers, 14.3% consumed alcohol, and the majority (85.3%) had internet access. Studies

show that some of the risk factors, such as age, gender, smoking, obesity, family history of CKD, and hypertension, are considered traditional risk factors for the development and progress of chronic kidney disease (Milane et al., 2015).

According to the data, 94.3% of the participants reside in Beirut, according to their geographical location. Geographical barriers can also be a deterrent and an obstacle for individuals residing away from Beirut to seek health care. Distance is considered a major obstacle for people to access health care services. According to Kronfol (2012), three barriers exist that are related to geographical barriers. These barriers include transportation, regional variations, and rural-urban inequalities (Kronfol, 2012).

Transportation is a major concern in the Arab countries, as people are dependent on public transportation in order to access health care. Older people are at a disadvantage, particularly due to safety, cost of transportation, and boarding public buses (Kronfol, 2012). In relation to regional variations and rural-urban inequalities, it is shown that people who live in rural areas often experience economic difficulties and are at higher poverty and social segregation, limiting their access to health care services in Lebanon (Kronfol, 2012).

In addition to the issues and concerns identified above that are related to access, multiple studies conducted in Lebanon have demonstrated that women experience different symptoms and care patterns than men. A study that was conducted by Nouredine et al. (2008) established that there is a difference between the signs and symptoms of acute coronary syndromes that men and women experience (Nouredine et al., 2008). This study conducted at the American University of Beirut discovered differences between Lebanese men and women in many aspects, whether cognitive,

behavioral, or emotional responses to signs and symptoms of acute coronary syndromes (Noureddine et al., 2008). Furthermore, in this study, Noureddine et al. (2008) also discovered that there is a difference related to promptness in seeking care between Lebanese men and women. Another study conducted by Kawar (2013) revealed that culture plays an important role in seeking health care. According to Kawar (2013), women in the Arab countries reported embarrassment in seeking health care or even discussing their health concerns. These are perceived barriers to access health care in the Arab countries (Kawar, 2013). This also explains that women do not get dialysis as they do not have time to spend three times a week for 6 hours a day at a hemodialysis center, as this will take them away from their homes and caring for their families and loved ones.

Regarding health care coverage, 74.3% were covered by the National Social Security Fund (NSSF) and 22.9 % by the Ministry of Health. Financial health care costs and out-of-pocket expenses play an important role in accessing and seeking health care benefits. All participants in this study were covered by the government, whether the National Social Security Fund or the Ministry of Health. Due to the economic crisis in Lebanon, health care is expensive and inadequate, and individuals did not seek health care early on and on time; therefore, they were not able to afford the associated health care costs of CKD and hemodialysis treatments. Lebanese people are affected by the financial burden of health care costs (Kronfol, 2012). The findings of this study are consistent with similar patient circumstances in the United States, where the government pays for this service. Hemodialysis is the sole medical service the Centers for Medicaid and Medicare Services pay for regardless of age. Individuals with ESRD on hemodialysis

who are unable to work because of the disease will qualify under Social Security disability benefits (Kirchhoff, 2018).

Physiologic Outcome – Research Question One

What are the effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V, URR, and blood pressure as a physiologic outcome? There were significant effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V—where K is the dialyzer clearance of urea, t is the dialysis time, and V is the volume of distribution of urea, approximately equal to patient’s total body water, urea reduction ration (URR)—where URR is basically the fractional reduction of urea during dialysis (Salhab et al., 2019), and blood pressure as a physiologic outcome. The data present the comparison of blood pressure between pre and post, where there is a significant decrease in SBP from 130.86 ± 18.22 pre to 123.23 ± 17.16 post ($p = 0.001$), with a *t*-value of 3.51; as well as in DBP from 73.86 ± 12.60 pre to 66.97 ± 15.74 post, a *p*-value = 0.004, with a *t*-value of 3.05. Moreover, there was a significant increase average of Kt/V and URR between pre- and post-groups (2.10 ± 0.42 versus 2.38 ± 0.31 , $p < 0.0001$, with a *t*-value of -5.53; 76.72 ± 6.32 versus 81.71 ± 3.81 , $p < 0.0001$), with a *t*-value of -6.81 respectively, as shown in Table 2.

According to the United States Renal Data System (2013), cardiovascular disease is the leading cause of mortality among patients suffering from ESRD on hemodialysis, accounting for 42.3% of all deaths. This is also in alignment with the Lebanese population. In another related study, Milane et al. (2015) concluded that there is more evidence on the association of coronary artery disease (CAD) and chronic kidney disease (CKD) in the Lebanese population. In their study, 1,268 Lebanese patients were enrolled,

and logistic regression analysis revealed a strong relationship between CAD and CKD (Milane et al., 2015). In general, patients on hemodialysis are not active physically, and studies show that less than 50% of patients on hemodialysis exercise once a week and have increased mortality compared to patients who perform regular exercises (Graham-Brown et al., 2019). The results of this study are supported by the literature: one study conducted on dialysis efficacy and dialysis adequacy Kt/V as outcome measures revealed a significant increase of Kt/V by 11% at the end of the first month of the exercise program ($p < .05$) and remained elevated for the duration of the program by 18%-19% (Parsons et al., 2006).

Another study conducted by Dias et al. (2019) revealed significant improvement with Kt/V and URR after an exercise program during hemodialysis. As demonstrated from the literature, a simple bicycle exercise program increased the efficacy of dialysis at the end of the first month of the intervention and remained elevated for the duration of the program in the exercise group ($p < 0.05$); in addition, exercise is considered to be safe and an effective intervention for hemodialysis patients (Mohseni et al., 2013).

This study examined the effects of exercise on hemodialysis patients on their dialysis adequacy Kt/V, URR, and blood pressure as physiologic outcomes. A study conducted by Johansen (2007) demonstrated that cycling exercise during hemodialysis decreased systolic and diastolic blood pressure and confirmed the benefits of exercise training (Johansen, 2007). According to the literature, hemodialysis adequacy can be assessed by the Kt/V and urea reduction ratio (URR). As data revealed, exercise during hemodialysis treatment can significantly improve physiologic measures and improve participants' dialysis adequacy, as demonstrated in the significant increase average of

Kt/V and URR between pre- and post-bicycle exercise intervention (Salhab et al., 2019). The findings of this study are consistent with the literature. A study performed by Warsame et al. (2018) demonstrated that participants who perform intradialytic activity have better mental as well as kidney-disease-specific health-related quality of life (Warsame et al., 2018).

The National Kidney Foundation's Kidney Disease Outcomes Quality Initiative has set the minimum goal Kt/V at greater than 1.2 per treatment and the URR at greater than 65% (National Kidney Foundation, 2019). This study examined intradialytic exercise as an outcome physiologic measure that, with increased blood flow and greater amount of open capillary surface area in muscles that are moving and working, will result in a larger fluctuation and change of urea and associated toxins from the tissue to the vascular compartment for subsequent removal at the dialyzer (Mohseni et al., 2013). Finally, the adequacy of dialysis is considered extremely important for patients' outcomes, and inadequacy of dialysis may result in complications and is one of the causes and factors of disability and mortality for dialysis patients; therefore, increasing the adequacy of dialysis is proven to be very effective for improving the prognosis and diagnosis of hemodialysis patients (Mohseni et al., 2013).

Exercise and Quality of Life – Research Question Two

What are the effects of exercise on hemodialysis patients on their quality of life as an outcome measure? In analyzing and discussing the findings of research question two, the following results show that, for the effects of exercise on hemodialysis patients on their quality of life as an outcome measures, a highly significant decrease was observed for the average of quality of life (13.25 ± 11.23 pre versus 4.51 ± 4.39 post, $p < 0.0001$).

In terms of PCS, the average for PCS during the pre-period was significantly higher when compared to post period (19.84 ± 17.89 versus 7.62 ± 10.79 , p -value < 0.0001).

Regarding the MCS, results show that the average of MCS significantly decreased during the post period to 4.52 ± 5.47 from 12.86 ± 20.45 during the pre-period (p -value = 0.02).

For burden of kidney disease, it was found that the average in pre was higher compared to the post period (18.67 ± 16.47 versus 8.0 ± 8.68 respectively, p -value = 0.001), and the average symptoms of kidney disease was 6.75 ± 1.14 in pre compared to an average of

1.31 ± 0.22 in the post period (p -value = 0.01). As shown in Table 3, a highly significant

decrease was observed for the average of quality-of-life post exercise intervention. In

terms of Physical Component Summary (PCS), the average for PCS during the pre-period

was significantly higher when compared to the post period (19.84 ± 17.89 versus $7.62 \pm$

10.79 , p -value < 0.0001). Regarding the Mental Component Summary (MCS), results

found that the average of MCS significantly decreased during the post period to $4.52 \pm$

5.47 from 12.86 ± 20.45) during the pre-period (p -value = 0.02). For the burden of kidney

disease, it was found that the average in pre was higher compared to post (18.67 ± 16.47

versus 8.0 ± 8.68 respectively, p -value = 0.001), and the average symptoms of kidney

disease was 6.75 ± 1.14 in pre compared to an average of 1.31 ± 0.22 in post (p -value =

0.01). Finally, the average of effects of kidney disease group significantly reduced during

the post period (2.09 ± 3.86 versus 11.40 ± 16.79 , p -value = 0.004).

This researcher was surprised with the findings, as the quality of life of the participants significantly decreased post intervention. It is noteworthy to mention that the data post intervention were collected after the massive explosion that happened in Beirut on August 4, 2020, that resulted in severe economic crisis, which probably had much

more effect on the participants' quality of life than did the exercise using the bicycles. This is an internal validity threat called "history," which occurs when an event happens during the study and affects the outcome variable, which is the quality of life in this study (Polit & Beck, 2016). The massive explosion, the COVID-19 pandemic, and the economic meltdown that occurred in Lebanon in the past few months have taken their toll on all citizens, including the participants of this study. This author also argues that, after 3 months, hemodialysis patients' health became worse as the disease progressed and they sustained worsening of their symptoms and experienced fatigue and muscle weaknesses that contributed to their significant decrease in their quality-of-life post intervention.

According to the findings, the physiologic factors, such as the dialysis adequacy Kt/V and the urea reduction ratio (URR), improved significantly. This leads the author to interpret the results as what was perceived by the subjects, not what was actually happening in their lives. While the participants may have perceived that their quality of life declined, their physiologic outcomes improved. Likewise, a study by Parsons et al. (2013) demonstrated that there were no changes noted in kidney disease quality of life (KDQOL) scores post intervention, yet there were significant improvements in their physiologic measures (Parsons et al., 2013).

Other studies have demonstrated that physical activity and exercise improve and enhance kidney disease quality of life, both the physical and mental components (Chang et al., 2017), and are not congruent with the findings of this study. It is also worth mentioning that the Lebanese population generally does not believe in exercise and does not value physical activity. The mean age in this study is 62.29, with the oldest participant being 88 years old; older people may not focus on exercise or physical activity

and are not able to relate exercise to improvement in quality of life and wellbeing. Older generations never performed any activities, and physical education is not taught in the Lebanese communities or at school. This author has elderly parents and also reached out to elderly friends and families and was able to narratively back up this discussion. They described to the author that there was no time to exercise or perform any physical activity growing up. It is a survival mode, and the focus is to survive day to day; they have many children and are worried about how they can provide for them and support their kids, especially in this economic crisis, which leaves no time to exercise. It is very common that Lebanese parents care for their children to the point they ignore their own health, and family life is much more important than their personal life or health.

A study conducted by Mortazavi et al. (2013) supported the findings of this study. The authors in Mortazavi et al. (2013) study found that the independent *t*-test did not show any statistical difference between exercise groups (p -value = 0.61). The final assessment of quality of life at the end of study showed mean number of 116 ± 8.32 in the control group and 142 ± 6.1 in the exercise group, indicating no statistical difference. Mortazavi et al. (2013) recommended more studies be conducted for evaluating physical activity on quality of life.

Spirituality and Quality of Life – Research Question Three

What is the relationship between spirituality and quality of life among ESRD patients on hemodialysis? According to Table 4, using a Pearson correlation analysis, no correlation was demonstrated between spirituality and quality of life among ESRD patients on hemodialysis ($r = 0.05$ with $p = 0.76$). On the other hand, there was no significant correlation between spirituality and quality of life score ($p = 0.76$). The lack

of a significant relationship between spirituality and quality of life with ESRD patients on hemodialysis in Lebanon is surprising. While Lebanese people seem to be religious or spiritual, this may not affect their quality of life.

The expression “insha’ Allah” is heard and said many times throughout the day in Lebanon, which means “God willing.” While many of the Lebanese population mean this phrase when they say it, several others say it regularly, naturally, and instinctively without paying a second thought. The second phrase that comes to mind is “Ya Allah” or “Ya Rab,” which is used unconsciously when asking for God’s help, support, presence, and guidance in many daily activities. Another word that this author practices continuously as well as is heard many times in daily life is “Hamdellah.” This expression means “Praise be to God” to show gratitude, love, affection, thankfulness, etc., in any and all situations. This author grew up hearing this word in every sentence or in every conversation. It is natural to say, “I am fine, Hamdellah,” when asked, “How are you doing today?” or “How is work?” or “How is the family?” It is a commonly used word, and this expression is used in many different situations. Another frequently used expression is “Allah Ma’ak,” “Allah Ma’ik,” or “Allah Ma’kun,” which means “God is with you” and changes whether speaking to a male, female, or multiple people at the same time. It is a commonly used expression in Lebanon to wish for divine blessing and peace when meeting someone, when someone is leaving, or even when done with a conversation on the phone ready to hang up. Many other expressions are commonly used: (a) “Allah Ya’tik el afye” means “God gives you health and strength,” and this is said to individuals working hard; (b) “Allah A’lam,” which means “God knows more” when someone is not sure or uncertain about a particular ask or a question; (c) “Eza Allah Rad”

means “If and when God wills” and is commonly used when responding to something you plan to do in the future like visiting someone or buying something; (d) “Wallah,” which means “By God” and means you are promising that what you are saying is the truth; (e) “Allah Ykhalik,” which means “May God protect you and keep you safe” and is very commonly used when people have a new baby in the family or when people introduce their children; and (f) “Ism Allah,” which means “the name of God” and is used frequently when asking God for protection.

The beauty of these expressions is that they are used frequently by everyone no matter what their religion, denomination, spirituality, customs, beliefs, backgrounds, and experiences. Everyone in Lebanon practice these terms as part of the language, as the word of God is imbedded in all practices, daily life, interactions, communications, relationships, and connections of the Lebanese population. In addition, according to the findings, there is no correlation between spirituality and quality of life; this leads the author to interpret that, linguistically, Lebanese people use the name of “God” as frequently used expressions and not related to their practices or to augment or increase their spirituality. A study involving a vulnerable population in Brazil was conducted by Gonçalves et al. (2018) and supported the findings of this study: it showed that quality of life was not associated with any religious/spiritual measures (Gonçalves et al., 2018). These expressions may reflect more religiosity and may not reflect spirituality.

The results of this study are contrary to most published studies that found a relationship between spirituality, spiritual wellbeing, and quality of life (Al-Ghabeesh et al., 2018; Brown et al., 2011; Cervantes et al., 2016; Darrell, 2016; Delgado, 2016; Ebrahimi et al., 2014; Egan et al., 2014; Fradelos et al., 2015; Gonçalves et al., 2018;

Suarez, 2020; Taghipour et al., 2017; Thomas & Washington, 2012). Other studies investigated the association of spiritual health and quality of life and found that the use of coping mechanisms among patients with CKD on hemodialysis and promoting spirituality can enhance their quality of life. Results showed a close relationship between spiritual health and quality of life in hemodialysis patients (Taghipour et al., 2017). Another study conducted by Fradelos et al. (2015) demonstrated that considering, speaking, addressing, evaluating, and assessing spirituality and spiritual needs in chronic kidney disease patients are needed and essential to have a positive outcome related to their quality of life (Fradelos et al., 2015). However, in the present study, the findings could not be replicated, as the results showed no correlation or relationship between spirituality and quality of life among patients suffering from ESRD on hemodialysis in Lebanon. The possible explanation to support the results of this study is that the sample size is small; in addition, the primary investigator is not sure that the participants understood the questions related to spirituality. Eight out of 35 participants did not answer the question asking, "In general, how close do you feel to God?"

The results of this study demonstrated that there is no correlation between the overall score of spirituality and quality of life in hemodialysis patients in Lebanon. These findings are supported by Ebrahimi et al. (2014), where the study showed that there is no significant relationship between spiritual wellbeing and quality of life (Ebrahimi et al., 2014).

It is also noteworthy to mention that the total reliability for the quality of life and the spirituality instruments was high, and results demonstrated that the two scales are very reliable for this patient population with Cronbach's alpha of 0.88 and 0.80,

respectively. In regard to the construct validity, the quality of life instrument, the author did not get the two-factor analysis like the original author, probably due to the sample size. This also applies to the spirituality DSES instrument; the author did not get the two-factor analysis like the original author, as the sample for this study was small.

Multivariate Linear Regression of the Predictors of Quality of Life

In looking closely at the fourth research question, the best predictors of quality of life, Table 4 presents the comparison of quality of life and demographic characteristics. Results show the only significantly positive predictor associated with quality of life score was age ($r = 0.49$; p -value = 0.003), while the other factors were not associated with quality of life.

A study conducted by Brown et al. (2011) demonstrated that age was also associated with quality of life in two domains: physical and environmental domains. Age negatively affected the physical domain and positively affected the environmental domain. Brown et al. (2011) further explained that environmental quality of life increased with age, while physical quality of life decreased with age (Brown et al., 2011). Another study by Ebrahimi et al. (2014) supported the findings of this study. According to Ebrahimi et al. (2014), a statistically significant correlation was observed between the age of the patients on hemodialysis (mean = 47.51) and their quality of life ($p < 0.02$). Furthermore, the same study conducted by Ebrahimi et al. (2014) also demonstrated that there was a significant difference between the patients' level and years of education and their quality of life ($p < 0.02$). Findings of this study did not show that level or years of education is a predictor of quality of life. Another study conducted by Suarez (2020) demonstrated that number of years of education continued to predict quality of life score

as achievements, self-accomplishments, and self-attainments significantly improved quality of life (Suarez, 2020).

Limitations

This study has a few limitations. First, the sample size was too small, even though the power analysis indicated 35 subjects would be sufficient. Sample size plays an important role in the validity of the statistical conclusion (Polit & Beck, 2016). The issue of the sample size is considered a limitation for this study. Second, another threat to internal validity is the selection bias, as the participants were not randomly allocated to the intervention. All patients coming to the hemodialysis outpatient unit were initially asked to participate, and those who agreed were selected to join the study. Thus, the sample consisted for those patients who volunteered for the study. Third, in looking back at the demographics and individual characteristics, the question on smoking could have been modified to reflect what type of smoking the participants engaged in besides cigarette smoking. Smoking is a major contributing factor and needs to be investigated further and could include the number of years the participants smoked in the past and when they stopped smoking. We may find a large number of the participants have been heavy smokers for many years before they stopped. Fourth, the extent of the Hawthorne effect as a result of the subjects' awareness and knowledge that they were under study may have had an impact on the study results. Fifth, in using the Arabic version of the Daily Spiritual Experience Scale, the participants may have not understood the questions as intended by the instrument, as eight out of 35 participants did not answer the question related to how close they feel to God.

Future Research and Recommendations

Additional investigations and research studies on the effects of exercise in hemodialysis patients at different stages of chronic kidney disease are warranted. In addition, future and more studies are recommended with more patients that could clarify whether exercise can improve and affect patients' quality of life. Furthermore, future studies could benefit from a longitudinal design in which this population could be studied for a longer period of time. Since this study applied convenience sampling and the population only included patients undergoing hemodialysis at the hemodialysis outpatient unit at the American University of Beirut Medical Center, conducting similar studies in the future using other hospitals, outpatient hemodialysis clinics, or kidney disease centers is recommended. Additionally, even though the Daily Spiritual Experience Scale was administered in Arabic multiple times, this researcher did not see the psychometric measures for the Arabic version for this tool. The researcher reached out to the original author of the instrument, Dr. Underwood, and identified that this is an opportunity for future studies. Finally, future studies would be beneficial to understand and learn more about why Lebanese people use the God expressions very commonly and frequently in their conversations. Is it truly spirituality, or is it a pattern of communication?

Conclusion

Although hemodialysis is a treatment option that increases the life span of patients suffering from end stage renal disease, it can cause serious changes such as weakness, fatigue, inability to perform routine activities, sedentary lifestyle, lack of mobility, and many physiological changes (Dashtidehkordi et al., 2019). Based on the results, the findings of this study, and the impact of using exercise bicycles during hemodialysis on

improving physiologic measures and dialysis efficacy, this author suggests incorporating bicycle exercise routinely during hemodialysis in hemodialysis centers for eligible patients.

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APPENDIX A: TABLE OF EVIDENCE

Table 6

Table of Evidence

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
1	Al-Ghabeesh et al. (2018)	Systematic review	Review of 33 studies that were published in English between 1999 and 2017 focusing on spirituality and patients with chronic kidney disease (CKD).	1-The meaning of spirituality. 2-The association of spirituality to the health outcomes of patients with ESRD.	A positive relationship exists between spirituality and the health outcomes of patients with ESRD as spirituality empowers patients to feel stronger facing the disease.	Methodological limitations in terms of a shortage in literature.
2	Barcellos et al. (2015)	Systematic review conducted of randomized clinical trials (RCTs). RCTs were independently evaluated by two reviewers. 59 out of 5489 studies were included in the review.	Most were small samples that lasted from 8 to 24 weeks and applied aerobic exercises. Studies included kidney transplant, pre-dialysis, and hemodialysis patients.	1-Evaluate the effectiveness of exercise intervention on the health outcome in CKD patients.	Strong evidence exists for the effects of aerobic exercise on improving physical fitness, muscular strength and quality of life in dialysis patients.	Methodological limitations in terms of inadequate allocation and blinding processes, drop-out rates and calculations of sample size.
3	Bohm et al. (2019)	Scoping review. 25 out of 1,374 studies were included in the review. Study interventions included aerobic resistance and combined exercise.	Effect of exercise on PROs as compared to a non-exercise control group in adults (≥ 18 years old) on dialysis.	1-Evaluate the effect of exercise (aerobic, resistance, or both) on PROs as compared to a non-exercise control group in adults (≥ 18 years old) on dialysis.	HRQOL and restless legs improve with exercise. No benefit to mental health.	The inadequate use of validated and consistent patient-reported outcome (PRO) measures.
4	Borzou et al. (2016)	Quasi- experimental study. Data analysis using Kolmogorov–Smirnov. The pair t-test and independent t-test were used with SPSS version 16.	70 patients undergoing hemodialysis in two training centers - medical Hamadan, age range between 18 to 60.	1-Evaluate the effect of health promoting behaviors on the lifestyle of hemodialysis patients.	The lifestyle of hemodialysis patients is improved with teaching emphasizing on health-promoting behaviors.	Limitations: 1-Not mentioning the effects of other sources such as doctors, personnel, and media. 2-The tool used is of self -report type with different factors such as fatigue, impatience.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
5	Cervantes et al. (2016)	Systematic Review of Qualitative Studies	Latino patients w/ ESRD and their caregivers in the Unites States.	Pts w/ ESRD experience high symptom burden & poor QoL R/T to advanced illness. Latinos experience a higher prevalence of ESRD compared to non-Latinos. Latinos are under-represented in existing ESRD literature.	Four major themes emerged: 1-Losses, 2-heightened awareness of death, 3-barriers to quality communication & care, 4-mediating Latino traditions and values.	Of 694 citations published through August 2014, six met inclusion criteria.
6	Chang et al. (2017)	Pre-post experimental study. 46 patients were assigned based on their own preference, to either a control or intervention group.	46 patients, age 20 or older, on hemodialysis recruited from the medical center in central Taiwan.	Evaluate the effects of a Tai Chi exercise on the QoL and physical functioning in ESRD patients on hemodialysis.	The kidney disease QoL and physical functioning is improved in Taiwanese patients on hemodialysis with a 12-week Tai Chi exercise intervention.	Limitations: 1-Patiens were not randomly allocated. 2-Hawthorn effect – i.e. the reactivity in response to the awareness of being studied - on the observed improvement in the Tai Chi group could not be quantified.
7	Darrell (2016)	Descriptive phenomenological method by Giorgi (1970) A qualitative phenomenological study was conducted w/ a purposive sample. The study was conducted at outpatient free standing dialysis units.	African Americans with ESRD on Hemodialysis	How AA ESRD pts who are on HD experience spirituality in the management of their illness? What is the role & meaning of spirituality when AA ESRD pts face the multiplicity of challenges as part of this chronic illness? How to gain information which may help guide future clinical interventions that incorporate a patient’s use of spirituality in their treatment process?	The 4 probing questions were: 1) Discuss what the term spirituality means to you; 2) In what circumstances is spirituality most important to you? 3) How do you use spirituality in your daily life? & 4) What meaning does spirituality have for you in relationship to ESRD? African Americans are four times more likely to require hemodialysis as a long-term treatment approach for ESRD than are whites.	Spiritual assessments may help identify the strengths of spirituality in the development of positive coping skills in patients diagnosed with chronic or end stage illness within populations for whom spirituality may be a significant factor.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
8	Dashtidehkordi et al. (2019)	Clinical Trial (Before and after). 60 hemodialysis patients from 2 hospitals in Isfahan were randomly selected and divided into 2 control and intervention groups. Demographic and the Health Promoting Lifestyle Profile II (HPLP-II) questionnaires before and after the intervention were used. SPSS21 was used.	60 hemodialysis patients.	Evaluate the effects of exercise during hemodialysis on health promoting behaviors.	1-Exercise with stationary bicycle during hemodialysis can promote health promoting behaviors. 2-Exercise is recommended to be considered as part of the therapeutic protocol in hemodialysis departments.	Limitations: 1-Small sample size thus reducing the generalizability of the findings. 2-Lack of mini-bike device in the research.
9	Delgado (2016)	Qualitative / descriptive case study	N/A	Effect of spirituality on patients and their families.	Attending to spiritual needs results in higher patient and family satisfaction.	N/A
10	Ebrahimi et al. (2014)	Descriptive analytical study. 72 hemodialysis patients were selected using convenience sampling method. Paloutzian spiritual health and quality of life questionnaires were used. Pearson correlation coefficient, t-test, ANOVA were used.	72 hemodialysis patients.	Evaluate the effect of spiritual health on the Q of L in hemodialysis patients.	1-There is no significant relationship between spiritual well-being and QOL 2-There is a significant positive relation between spiritual existential aspect of well-being and fatigue, emotional health, social functioning and general health, and social performance. 3-There is a significant positive correlation between spiritual well-being and social performance.	Limitations: 1-Non-random sampling thus reducing the generalizability of the results.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
11	Egan et al. (2014)	The study followed a generic qualitative approach and included semi-structured interviews with specialists recruited from New Zealand's 10 renal centers.	Five specialist doctors and nine specialist nurses were recruited for interviews	People with chronic kidney disease have a shortened life expectancy and carry a high symptom burden. The aim of this qualitative study was to investigate the provision of spiritual care in New Zealand renal units from the perspective of specialists	Research suggests that attending to renal patients' spiritual needs may contribute to an improvement in their quality of life.	Understandings of spirituality were broad, with most participants having an inclusive understanding. Patients' spiritual needs were generally acknowledged and respected though formal spiritual assessments were not done. Consideration of death was discussed as an often-unexamined need.
12	Frados et al. (2015)	Qualitative / descriptive case study.	N/A	Evaluate the relation of spirituality and health outcomes, mostly in patients with chronic and life-threatening disease such as CKD.	Attending to spiritual needs of patients with CKD can have a positive outcome in their health related QoL, mental health and life expectancy.	N/A
13	Gerogianni (2012)	Case study. Medical history was reviewed.	35 y.o. married Greek woman with ESRD, requiring initiation of hemodialysis.	Describe the care plan of a patient requiring initiation of hemodialysis.	Education and psychological support helped in reducing the patient's anxiety and assisted in coping with the condition.	N/A

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
14	Graham-Brown et al. (2019)	Qualitative / descriptive case study.	N/A	Review the effects of exercise on traditional and nontraditional cardiovascular risk factors, as well as its effects on cardiovascular structure and function in patients on hemodialysis.	Exercise interventions improve QoL, functional capacity, aerobic fitness, and muscular strength. However, the effects of such programs on cardiovascular outcome measures are not clear.	N/A
15	Hacker et al. (2011)	One-group prospective. Repeated measures design. Convenience sample of 10 patients receiving HSCT from the Academic medical center in the mid-western United States.	10 patients receiving HSCT.	Evaluate the feasibility and acceptability of a strength-training intervention in patients receiving hematopoietic stem cell transplantation (HSCT).	The strength-training interventions were feasible and acceptable.	Limitations: 1-Pilot study, thus it is limited and not extensive enough to provide conclusive or adequate results to develop proper guidelines.
16	Jayaseelan et al. (2018)	quantitative explorative study. Cross-sectional survey was used. Five-point Likert scale and one open-ended questionnaire was used.	274 out of 500 patients from 10 hemodialysis clinics in an Australian city participated in the study.	Evaluate the relationship between exposure to exercise and the perceptions of patients on hemodialysis.	Exercise was beneficial towards preventing muscular wasting, bone disease, keeping steady body weight, improving mood and QoL, and enhancing patients' self-care activities	Lack of exposure of exercise professionals to working with hemodialysis patients did not allow the proper evaluation of the full benefit of the exercise to those patients.
17	Johansen (2007)	Qualitative / descriptive case study.	N/A	Revise the effects of exercise among patients with ESRD.	Exercise can improve fitness, muscle mass, physical performance, and self-reported physical functioning, as well as cardiovascular-related functions, such as hypertension.	N/A

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
18	Jung and Park (2011)	Qualitative / descriptive case study.	N/A	1-Assess the beneficial effects of exercise during hemodialysis. 2-Introduce various intradialytic exercise programs as a first step in combining exercise programs into clinical practice.	Exercise is beneficial in improving physical functioning, including maximal oxygen uptake and muscle strength, as well as anthropometrics, nutritional status, hematological indexes, inflammatory cytokines, depression, and health-related QoL.	N/A
19	Mortazavi et al. (2013)	Randomized control trial. Patients were divided into two groups of control and exercise. The exercise group used aerobic exercise during their hemodialysis for 16 weeks. The quality of life and severity of restless leg syndrome were assessed at the first week of study and final week.	26 pts were included in the study. Out of all patients, 18 patients (69%) were males and 8 patients (31%) were females. Mean age of patients was 41.5 ± 12.1 as a whole, 32.3 ± 6.7 in exercise group and 47.1 ± 13.1 in control group.	In this randomized clinical trial, the aim was to find a nonpharmacological way to improve signs of restless leg syndrome (RLS) and patients' quality of life.	The difference of means of RLS signs at the first week of study and final week was -5.5 ± 4.96 in exercise group and -0.53 ± 2.3 in control group. There was not any statistical difference between control group and exercise group in quality of life at the first week of study and final week	The authors suggest using aerobic exercise for improving signs of restless leg syndrome, but no evidence was found for its efficacy on patients' quality of life.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
20	Mulder and Sikken-Kersten (2016)	This research combined various methods, including analysis of patient diaries and of interviews, and found that social interaction and competence are the most important themes of spirituality	Data were collected in a small population (n = 7) in the form of diary entries, and then conducted a semi-structured interview with each person who provided the entries. In-depth interviews conducted with six respondents yielded the following results.	This study explored the thoughts and feelings of individuals being treated with hemodialysis in the light of spirituality as an important determinant of quality of life.	Ten themes were identified: • Transcendence (relationship to God, or connectedness to higher goals). • Psychological well-being (feeling balanced, feeling at ease; anxiety). • Appreciation for the other (nurses, co-patients). • Competence (feeling of being able to influence the situation, to perform). • Physical well-being (experiencing fatigue or pain). • Connectedness (experiencing relationships with partner, children, grandchildren). • Recognition (being seen or heard by doctors, nurses, co-patients). • Self-esteem and self-worth (feeling proud or valuable). • Giving your life direction (feeling of mastery within the limits of dependency). • Social interaction (being able to meet friends and family, to go out with others). In terms of perceived spirituality, the authors observed the following ranking: 1. Social interaction (17.8%). 2. Competence (15.6%). 3. Psychological well-being (15.6%). 4. Giving your life direction (14.7%) Recognition (11.8%). 6. Physical well-being (7.4%). 7. Connectedness (7.1%). 8. Appreciation for the other (4.9%). 9. Self-esteem and self-worth (3.2%). 10. Transcendence (1.3%).	A quantitative analysis revealed that psychological well-being is more significant than physical well-being during hemodialysis, at least in retrospect.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
21	Murphy et al. (2016)	Repeated cross-sectional study with available serum creatinine measurements	Adults aged 20 years or older. For the current analysis, the authors included only participants seen in the mobile examination centers where comparable laboratory measurements were taken.	There was no appreciable increase in the prevalence of stage 3 and 4 CKD in the U.S. population overall during the most recent decade.	The unadjusted prevalence of stage 3 and 4 CKD increased from the late 1990s to the early 2000s. Lack of increase in CKD prevalence since the early 2000s was observed in most subgroups and with an expanded definition of CKD that included persons with higher eGFRs and albuminuria.	Serum creatinine and albuminuria were measured only once in each person.
22	Nix (2017)	Qualitative research study. An empirical phenomenological research design. Interview questions were scripted for consistency. The study was conducted at outpatient freestanding dialysis units	Population selected from adult hemodialysis patients in the AA community, with total of 16 participants. Three freestanding hemodialysis units were selected. Inclusion criteria for participants: (a) older than 18 years; (b) having a diagnosis of diabetes mellitus; (c) African American, residing in the Mississippi delta region of Arkansas; (d) the ability to communicate in English without the aid of a translator; and having undergone hemodialysis for at least 1 year. Participants were emotionally and physically able and willing to participate. Face-to-face interviews were conducted on 3 consecutive days in 2013.	How do formal and informal support systems impact coping mechanisms among AA w/ ESRD? What role does spirituality play in the lives of AA receiving HD, if any?	Guided interviewing of participants about experiences related to coping, spirituality, and support systems	Qualitative study that explored the role spirituality plays in the lives of pts undergoing hemodialysis for management of end-stage renal disease (ESRD). Interview questions centered on the roles of spirituality, health beliefs, and different social support systems used in coping.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
23	Qiu et al. (2017)	Random-effect model was used to compare the physical function and capacity in exercise and control groups	Sampling size ranged from 15 to 56. The mean age was between 22.12 and 60.8. Cases in all selected studies were confirmed based on medical records or pathological findings. The data about matching were extracted from all of the included studies	The aim of this research was to update and evaluate the effects of exercise on the health of patients with chronic renal failure. The association between physical exercise and health state of patients with chronic renal failure has been investigated.	Exercise is helpful in ameliorating the situation of blood pressure in patients with renal failure and significantly reduces VO ₂ in patients with renal failure. The results of subgroup analyses show that, in the age >50, physical activity can significantly reduce blood pressure in patients with renal failure	The activity program containing warm-up, strength, and aerobic exercises has benefits in blood pressure among sick people and improves their maximal oxygen consumption level. These can help patients in physical function and aerobic capacity and may give them further benefits.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
24	Rizk et al. (2016)	This was a quantitative, cross-sectional cost-of-illness study conducted alongside the Nutrition Education for Management of Osteodystrophy (NEMO) trial. Twelve hospital-based HD units were randomly recruited to the NEMO trial from the official list of hospital-based HD units in Lebanon. Data were collected retrospectively for the period between June and December 2011, at one time-point (January 2012: end of intervention phase). Recall data were used for the base-case analysis	Eligible patients: treated in HD units & recruited to the study. Lebanese, adults (18 years), stable (free of the following diseases: cancer, infection with the Human Immunodeficiency Virus, and hepatitis), and on HD for 6 months. capable of communicating either verbally or through writing. willing to participate and sign the consent form. Eligible subjects were approached for participating in the study. Those who did not meet the inclusion criteria listed above were excluded. Data collection was through face-to-face interviews with HD patients, during HD sessions.	The aim: Renal failure is a growing public health problem and is mainly treated by hemodialysis. This study aimed to estimate the societal costs of hemodialysis in Lebanon	The mean 6-month societal costs were estimated at \$9,258.39. The larger part was attributable to healthcare costs (91.7%), while costs to patient and family and costs in other sectors poorly contributed to the total costs (4.2% and 4.1%, respectively). In general, results were robust to sensitivity analyses. Using the maximum value for hospitalization resulted in the biggest difference (p15.5% of the base-case result). Female gender, being widowed/divorced, having hypertension comorbidity, and higher weekly time on dialysis were significantly associated with greater societal costs.	Limitations of this study: Information regarding resource consumption and cost were not readily available. Rather, they were obtained from a variety of sources, with each having its own strengths and limitations.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
25	Semaan et al. (2018)	A cross-sectional, descriptive design was used. The patients were interviewed while undergoing their dialysis session using the Hospital Anxiety and Depression Scale and asked demographic and clinical questions.	Ninety patients receiving hemodialysis were targeted using convenience sampling, with a final sample size of 83 patients. The majority of participants were married men over 60 years of age; 48% achieved high school education.	The aim of this study is to examine the prevalence of anxiety and depression and associated factors among patients receiving hemodialysis at a major tertiary referral medical center in Lebanon that receives patients from all over the country.	Depression was prevalent in 40.8% and anxiety in 39.6%, with 20 patients (24.1%) having both conditions. Although 24.1% self-reported anxiety symptoms, only 2.4% were taking anxiolytics. Illiterate patients had significantly higher depression scores than those with higher levels of education ($p = 0.021$). Patients who were living with their family had higher anxiety scores than those living alone ($p = 0.014$). Anxiety and depression are underdiagnosed and undertreated in Lebanese dialysis patients. Screening and appropriate referral to mental health specialists are needed.	Around 40% of hemodialysis patients at AUBMC have probable anxiety or depression symptoms and 24% have both. The study is limited in terms of: 1) generalizability of findings by the small sample recruited from one center. 2) when discussing the findings with the nursing staff, many patients denied feeling frightened as if something bad was about to happen because they relied on God. 3) nurses were stating that some of these patients seemed to be depressed and came often crying to the dialysis session, which is not in line with their answers during the interviews
26	Shahgholian et al. (2014)	Quasi-experimental study conducted in a single group and in two steps.	25 hemodialysis patients, admitted to hospitals in Isfahan, Iran, were selected, and their QOL was compared before and after intervention in two domains of satisfaction and importance. Convenience sampling was used.	This study aimed to determine the effect of tai chi exercise on the QOL of hemodialysis patients	Data analysis showed that there was a statistically significant difference in health and functioning ($P < 0.001$), socioeconomic ($P < 0.001$), and psychospiritual ($P < 0.001$) dimensions, and the family dimension had $P = 0.002$ in the satisfaction domain and $P = 0.008$ in the importance domain; the total score of quality of life in both domains was $P < 0.001$.	Tai chi exercise improves the QOL score significantly in all dimensions, and adding tai chi classes to the rehabilitation program of hemodialysis patients can have a positive effect including an improved QOL for them

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
27	Taghipour et al. (2017)	Cross-sectional study	Studied death anxiety, spiritual intelligence, spiritual health, and quality of life in 123 Iranian hemodialysis patients	To explore the relationship of spiritual health and intelligence with quality of life and death anxiety	This study showed a close relationship between spiritual intelligence and death anxiety and between spiritual health and quality of life in hemodialysis patients. It seems that by enhancing spirituality, internalizing spiritual values and beliefs, and promoting health and spiritual intelligence, death anxiety can be assuaged in hemodialysis patients. Also noted significant relationship between educational level and quality of life. Studies show educational level of patients was among the variables affecting quality of life of the patients, that is, low educational level of patients was associated with low quality of life.	This study also showed that most patients had moderate levels of spiritual well-being
28	Taylor et al. (2016)	Qualitative study with semi structured interviews	Semi-structured interviews were conducted with five consultants and 36 ESRD patients from two UK renal units. Interviews were transcribed verbatim and analyzed using the constant comparative method	Qualitative study aimed to evaluate whether two different low-cost interventions could individually enable consultants to talk with patients about their emotional concerns during routine outpatient consultations.	Findings suggest that both interventions are feasible and acceptable and have the potential to help consultants improve emotional and psychological patient care, providing cognitive and behavioral tools to enable discussion of emotional issues during routine outpatient consultations.	A major strength of this study is that the qualitative design enabled exploration of the feasibility, acceptability and appropriateness of the two different interventions and an understanding of consultant and patient responses to the interventions. Limitations: As sample included only patients on dialysis for ≤ 12 months, the findings may not be generalizable to all ESRD patients; the authors not directly observe consultant-patient interactions and therefore cannot verify the reported responses.

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
29	Thomas and Washington (2012)	Research design was a constraining factor in that it only addressed population characteristics at a certain point in time. Purposive sample selection. The study was conducted at outpatient free standing dialysis units.	176 sample size. 20-85 w/ a mean age of 55.69	What is the relationship between religiosity and social support contributing to the health-related quality of life among AA HD patients?	The results from model 3 (regression) indicate that gender, greater levels of social support, less time on dialysis, and not having heart disease, provide unique contributions to mental health aspects of quality of life. The results from model 3 indicate that age, greater social support, less religiosity, and less chronicity related to other conditions contribute to greater physical quality of life among African American hemodialysis patients.	The sample size for both genders was almost equivalent. It is homogeneous sample. Appropriate measures were used for data collection.
30	Ouzouni et al. (2009)	Randomized clinical trial	Thirty-five patients on hemodialysis, with a mean (SD) age of 48.8 (13.9) years, volunteered to participate in the study	To assess the effects of intradialytic exercise training on health-related quality of life indices in hemodialysis patients	The results demonstrated that intradialytic exercise training improves both physical functioning and psychological status in hemodialysis patients, leading to an improvement of patients' quality of life. Results also indicated that exercise training can help hemodialysis patients to improve the perception of health-related quality of life.	the statistical analysis has shown that the quality of life level of the exercised patients depended on their participation in a training program, on the level of their cardiorespiratory efficiency and on the level of their depression

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
31	Tanyi and Werner (2007)	Purposive sample selection. The study was conducted at outpatient freestanding dialysis units.	65 sample size. 24-79 w/a mean of 57.5 (SD=14.8)	What is the difference in SWB between AA and Caucasian women with ESRD receiving HD?	The groups did not differ significantly on either overall SWB or EWB. The difference in RWB mean scores approached significance ($p = .056$), indicating a strong trend for African American women to have higher well-being in their relationship to God. In sum, the African American women represented in this reanalysis indicated a strong trend in scoring higher on RWB than did Caucasian women. Spiritual strengths for African American women included their perceptions of God's concern for them, God's help with loneliness, a sense of fulfillment in relationship to God, feeling satisfied with life, and sensing a purpose for their life.	The two-sample sizes for both race/ethnicities is small. It is homogeneous sample. Appropriate measures were used for data collection.
32	Wang and Johansen (2019)	Randomized control trials	A total of 17 volunteered to enroll and 14 completed baseline testing	While many dialysis patients may appear too frail to participate in moderate-to-vigorous aerobic exercise training, those who can complete such programs appear to derive substantial benefit.	Most patients on dialysis are not too frail to perform resistance exercise of adequate intensity to achieve increases in muscle size and strength, therefore, frailty should not be considered a contraindication to exercise.	Although study quality has not always been high, the preponderance of evidence suggests that exercise improves exercise capacity, physical performance, HRQOL, and possibly some cardiovascular risk factors. A significant concern with interpreting data in the exercise literature in dialysis is that there may be a selection bias against frail patients

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
33	Warsame et al. (2018)	Cross-sectional study	431 hemodialysis patients	Kidney disease, quality of life, measured frailty, and surveyed participants about their usual active intradialytic activities (reading, playing games, doing puzzles, chatting or other) and passive intradialytic activities (watching TV or sleeping).	The two most common intradialytic activities were passive [watching TV=87.9%; sleeping=72.4%] Higher intradialytic activity index was associated with better mental and kidney disease specific HRQOL but not physical HRQOL.	These results should be confirmed in a prospective study with a broader cohort of hemodialysis patients. Dialysis providers may consider offering patients with low levels of activity additional support and opportunities to engage in beneficial intradialytic activities.
34	Wilund et al. (2019)	Review – studies	N/A	The purpose of this review was to describe the evidence that supports or refutes the beliefs.	Myths include exercising in the first hour of dialysis; not exercising if hypertensive, cramping, or volume overloaded; avoiding heavy weights on vascular access limb; clinicians managing an exercise program; intradialytic exercise or interdialytic exercise is better; and strength training during dialysis is impractical	Beliefs or myths have generally led to an overly conservative approach to exercise that serves as a barrier to increasing physical activity levels in an overly sedentary population that could benefit from moving more. It is clear that questions remain regarding the optimal frequency, intensity, type, and timing, and intensity of exercise in HD patients. While larger and longer clinical trials may help address some of these issues, it is not prudent to provide overly conservative exercise recommendations while we wait for clear answers to every question

Table 6, continued

No.	Source	Method and Design	Sample	Purpose/Aims	Findings and Conclusions	Strengths and Limitations
35	Young et al. (2018)	This systematic review and meta-analysis. Twenty-four databases were searched alongside Internet and hand searching, and consultation with experts. Eligibility criteria were cluster randomized, randomized and quasi-randomized controlled trials (RCTs) of IDC versus usual care in prevalent adult HD patients. Descriptive statistics were used to study characteristics of included studies	N/A	To examine the evidence on the effects of IDC on exercise capacity, quality of life (QoL), physical function and cardiovascular health	Thirteen RCTs were eligible. Eight provided data for use in meta-analyses, which indicated no significant change in VO2 peak, physical, or mental component. summary scores of the Medical Outcomes Short Form 36, pulse wave velocity, systolic, or diastolic blood pressure following IDC. IDC, however, leads to an improvement in performance on the 6-min walk test	There is insufficient evidence demonstrating whether cycling exercise during HD improves patient outcomes. High-quality, adequately powered RCTs of IDC are required. All included studies were considered to have high risk of bias.

APPENDIX B: AZUSA PACIFIC UNIVERSITY INSTITUTIONAL

REVIEW BOARD APPROVAL



Azusa Pacific University

***Institutional Review
Board***

Office of Research and Grants
PO Box 7000
Azusa, CA 91702

Tel: 626.815.2036

Fax: 626.815.2087

DATE: August 26, 2020

TO: Ghada Dunbar

FROM: Institutional Review Board

IRB ID NUMBER: 20-366

PROJECT TITLE: Effects of Exercise and Spirituality on Hemodialysis Patients with End Stage Renal Disease Focusing on Blood Pressure and Quality of Life as Outcome Measures in Lebanon.

Azusa Pacific University's Institutional Review Board (IRB) has approved your research proposal by Expedited Review for the period of August 26, 2020 through August 25, 2021

Researcher's Responsibilities:

1. For those whose research involves surveying any portion of the APU population, contact should be made with the Office of Institutional Research and Assessment (OIRA) for scheduling.
2. If you intend to alter your research protocol or personnel in any way submit a Request for Revisions or Additions in IRBManager <https://apu.my.irbmanager.com>
3. All protocol deviations, unanticipated or serious adverse events, must be reported to the IRB within one week from when they are discovered. Please log in to IRBManager <https://apu.my.irbmanager.com> to report these incidents.
4. Submit a yearly Request for Renewal of Continuing Research or a Closure of Research Report form prior to the anniversary of the date of most recent IRB approval by logging into IRBManager <https://apu.my.irbmanager.com>

Disclaimer The Institutional Review Board at Azusa Pacific University is charged with oversight of protection of human subjects in experimental research. Receiving IRB approval does not constitute **institutional approval** of the project by Azusa Pacific University. If the responsible investigator believes that the project might be inconsistent with the mission and values of Azusa Pacific University or potentially not represent Azusa Pacific University in a favorable light, it is recommended that the responsible investigator contact the dean in their School or College at APU.

For assistance please contact the Institutional Review Board Coordinator at 626.815.2036.

APPENDIX C: THE DAILY SPIRITUAL EXPERIENCE SCALE

Daily Spiritual Experience Scale (with item numbers added). Introduction: “The list that follows includes items you may or may not experience. Please consider how often you directly have this experience, and try to disregard whether you feel you should or should not have these experiences. A number of items use the word ‘God.’ If this word is not a comfortable one for you, please substitute another word that calls to mind the divine or holy for you.”

		Many times a day	Every day	Most days	Some days	Once in a while	Never or almost never
1*	I feel God’s presence.						
2	I experience a connection to all of life.						
3	During worship, or at other times when connecting with God, I feel joy which lifts me out of my daily concerns						
4*	I find strength in my religion or spirituality.						
5*	I find comfort in my religion or spirituality.						
6*	I feel deep inner peace or harmony.						
7	I ask for God’s help in the midst of daily activities.						
8	I feel guided by God in the midst of daily activities.						
9*	I feel God’s love for me directly.						
10*	I feel God’s love for me through others.						
11*	I am spiritually touched by the beauty of creation.						
12	I feel thankful for my blessings.						
13	I feel a selfless caring for others.						
14	I accept others even when they do things, I think are wrong.						
15*	I desire to be closer to God or in union with the divine						
		Not close		Some-what close	Very close		As close as possible
16	In general, how close do you feel to God?						

© Lynn Underwood – contact author to register to use scale <http://www.dsescal.org/> or lynnunderwood@researchintegration.org

APPENDIX D: DEMOGRAPHIC SURVEY

The following socio-demographic data will be collected: date of birth, marital status, parental status, living arrangement, support persons, education, employment, income, internet access, health insurance status, and geographical location. Clinical variables such as smoking, alcohol consumption, and obesity will also be obtained.

- 1) Age: _____ Years
- 2) Gender: _____ Male _____ Female
- 3) Marital Status: _____ (married, single, separated, divorced)
- 4) Parental Status: _____
- 5) Living Arrangement: _____ Lives at home _____ Lives with friends _____ other (specify)
- 6) Support persons:
 _____ Spouse _____ Parent _____ Sibling _____
 Other (Specify) _____
- 7) Education: _____ Elementary _____ Middle School
 _____ High School _____ College _____ Other
 (specify)
- 8) Employment: _____ employed
 _____ unemployed _____ other
 (specify) _____
- 9) Income: _____
- 10) Internet Access: _____ yes _____ no _____ other
 (specify)

11) Health Insurance Status:

_____yes_____no_____Other

(specify)_____

12) Geographical Location: _____specify

13) Smoking: _____yes_____no_____other

(specify)

14) Alcohol Consumption:

_____yes_____no_____other (specify)

15) Obesity: _____yes_____no_____other

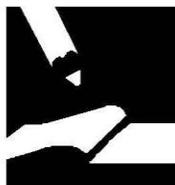
(specify)

APPENDIX E: KIDNEY DISEASE AND QUALITY OF LIFE INSTRUMENT

Your Health – *and* – Well-Being

Kidney Disease and Quality of Life (KDQOL-SF™ 1.3)

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.



Thank you for completing these questions!

Study of Quality of Life For Patients on Dialysis

What is the purpose of the study?

This study is being carried out in cooperation with physicians and their patients. The purpose is to assess the quality of life of patients with kidney disease.

What will I be asked to do?

For this study, we want you to complete a survey today about your health, how you feel and your background.

Confidentiality of information?

We do not ask for your name. Your answers will be combined with those of other participants in reporting the findings of the study. Any information that would permit identification of you will be regarded as strictly confidential. In addition, all information collected will be used only for purposes of the study, and will not be disclosed or released for any other purpose without your prior consent.

How will participation benefit me?

The information you provide will tell us how you feel about your care and further understanding about the effects of medical care on the health of patients. This information will help to evaluate the care delivered.

Do I have to take part?

You do not have to fill out the survey and you can refuse to answer any question. Your decision to participate will not affect your opportunity to receive care.

Your Health

This survey includes a wide variety of questions about your health and your life. We are interested in how you feel about each of these issues.

1. In general, would you say your health is: [Mark an in the one box that best describes your answer.]

Excellent	Very good	Good	Fair	Poor
▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

2. Compared to one year ago, how would you rate your health in general now?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? [Mark an in a box on each line.]

	Yes, limited a lot ▼	Yes, limited a little ▼	No, not limited at all ▼
a <u>Vigorous activities</u> , such as running, lifting heavy objects, participating in strenuous sports	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
b <u>Moderate activities</u> , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
c Lifting or carrying groceries	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
d Climbing <u>several</u> flights of stairs	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
e Climbing <u>one</u> flight of stairs.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
f Bending, kneeling, or stooping	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
g Walking <u>more than a mile</u>	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
h Walking <u>several blocks</u>	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
i Walking <u>one block</u>	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3
j Bathing or dressing yourself	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

		Yes	No
		▼	▼
a	Cut down the <u>amount of time</u> you spent on work or other activities	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2
b	<u>Accomplished less</u> than you would like.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2
c	Were limited in the <u>kind</u> of work or other activities	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2
d	Had <u>difficulty</u> performing the work or other activities (for example, it took extra effort).....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

		Yes	No
		▼	▼
a	Cut down the <u>amount of time</u> you spent on work or other activities	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2
b	<u>Accomplished less</u> than you would like.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2
c	Didn't do work or other activities as <u>carefully</u> as usual.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely
▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

7. How much bodily pain have you had during the past 4 weeks?

None	Very mild	Mild	Moderate	Severe	Very severe
▼	▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

	All of the time ▼	Most of the time ▼	A good bit of the time ▼	Some of the time ▼	A little of the time ▼	None of the time ▼
a Did you feel full of pep?.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
b Have you been a very nervous person?	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
c Have you felt so down in the dumps that nothing could cheer you up?.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
d Have you felt calm and peaceful?.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
e Did you have a lot of energy?	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
f Have you felt downhearted and blue? .	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
g Did you feel worn out?..	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
h Have you been a happy person?.....	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6
i Did you feel tired?	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5.....	<input type="checkbox"/> 6

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

11. Please choose the answer that best describes how true or false each of the following statements is for you.

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
	▼	▼	▼	▼	▼
a	I seem to get sick a little easier than other people				
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b	I am as healthy as anybody I know				
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
c	I expect my health to get worse				
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
d	My health is excellent.....				
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Your Kidney Disease

12. How true or false is each of the following statements for you?

	Definitely true ▼	Mostly true ▼	Don't know ▼	Mostly false ▼	Definitely false ▼
a My kidney disease interferes too much with my life	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5
b Too much of my time is spent dealing with my kidney disease	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5
c I feel frustrated dealing with my kidney disease	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5
d I feel like a burden on my family	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5

13. These questions are about how you feel and how things have been going during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

	None of the time	A little of the time	Some of the time	A good bit of the time	Most of the time	All of the time
a Did you isolate your- self from people around you?	▼	▼	▼	▼	▼	▼
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
b Did you react slowly to things that were said or done?.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
c Did you act irritable toward those around you?.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
d Did you have difficulty concentrating or thinking?.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
e Did you get along well with other people?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
f Did you become confused?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

14. During the past 4 weeks, to what extent were you bothered by each of the following?

	Not at all bothered	Somewhat bothered	Moderately bothered	Very much bothered	Extremely bothered
	▼	▼	▼	▼	▼
a Soreness in your muscles?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b Chest pain?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
c Cramps?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
d Itchy skin?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
e Dry skin?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
f Shortness of breath?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
g Faintness or dizziness?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
h Lack of appetite?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
i Washed out or drained?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
j Numbness in hands or feet?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
k Nausea or upset stomach?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
l (Hemodialysis patient only) Problems with your access site? ...	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
m (Peritoneal dialysis patient only) Problems with your catheter site? ..	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Effects of Kidney Disease on Your Daily Life

- 15. Some people are bothered by the effects of kidney disease on their daily life, while others are not. How much does kidney disease bother you in each of the following areas?**

	Not at all bothered	Somewhat bothered	Moderately bothered	Very much bothered	Extremely bothered
	▼	▼	▼	▼	▼
a Fluid restriction?....	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
b Dietary restriction?.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
c Your ability to work around the house?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
d Your ability to travel?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
e Being dependent on doctors and other medical staff?.....	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
f Stress or worries caused by kidney disease?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
g Your sex life?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
h Your personal appearance?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5

The next three questions are personal and relate to your sexual activity, but your answers are important in understanding how kidney disease impacts on people's lives.

16. Have you had any sexual activity in the past 4 weeks?

(Circle One Number)

No1

→

If no, please skip to Question 17

Yes2

How much of a problem was each of the following in the past 4 weeks?

	Not a problem	A little problem	Somewhat of a problem	Very much a problem	Severe problem
a. Enjoying sex?	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5
b. Becoming sexually aroused?	<input type="checkbox"/> 1.....	<input type="checkbox"/> 2.....	<input type="checkbox"/> 3.....	<input type="checkbox"/> 4.....	<input type="checkbox"/> 5

17. For the following question, please rate your sleep using a scale ranging from 0 representing “very bad” to 10 representing “very good.”

If you think your sleep is half-way between “very bad” and “very good,” please mark the box under the number 5. If you think your sleep is one level better than 5, mark the box under 6. If you think your sleep is one level worse than 5, mark the box under 4 (and so on).

On a scale from 0 to 10, how would you rate your sleep overall?
[Mark an in one box.]

Very bad											Very good
▼											▼
0	1	2	3	4	5	6	7	8	9	10	
<input type="checkbox"/>											

18. How often during the past 4 weeks did you...

	None of the time	A little of the time	Some of the time	A good bit of the time	Most of the time	All of the time
a. Awaken during the night and have trouble falling asleep again?.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
b. Get the amount of sleep you need?.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
c. Have trouble staying awake during the day?...	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

19. Concerning your family and friends, how satisfied are you with...

	Very dissatisfied	Somewhat dissatisfied	Somewhat satisfied	Very satisfied
a. The amount of time you are able to spend with your family and friends?.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
b. The support you receive from your family and friends?.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

20. During the past 4 weeks, did you work at a paying job?

Yes	No
▼	▼
<input type="checkbox"/> ₁	<input type="checkbox"/> ₂

21. Does your health keep you from working at a paying job?

Yes	No
▼	▼
<input type="checkbox"/> ₁	<input type="checkbox"/> ₂

22. Overall, how would you rate your health?

Worst possible (as bad or worse than being dead)	Half-way between worst and best	Best possible								
▼	▼	▼								
0	1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Satisfaction With Care

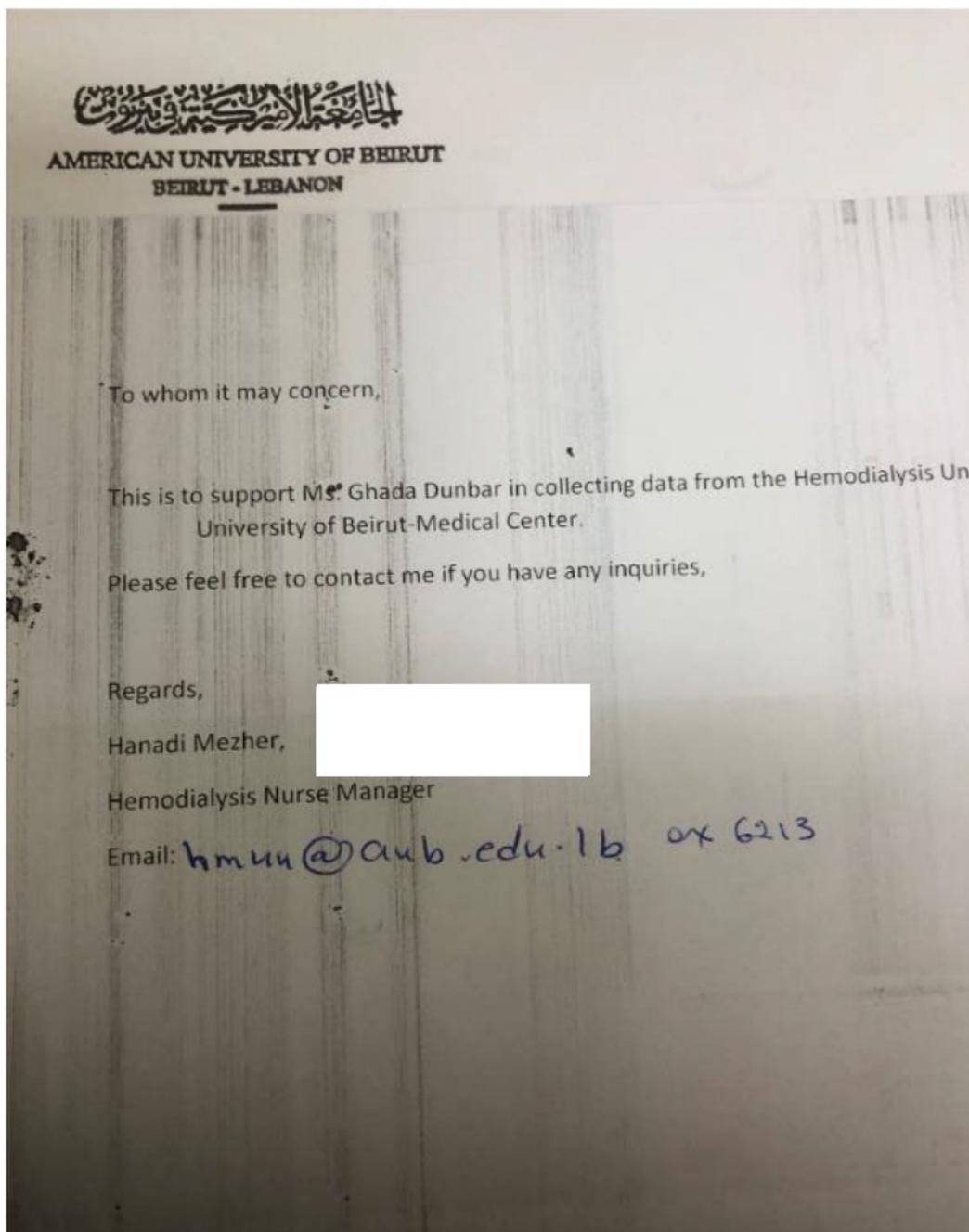
23. Think about the care you receive for kidney dialysis. In terms of your satisfaction, how would you rate the friendliness and interest shown in you as a person?

Very poor	Poor	Fair	Good	Very good	Excellent	The Best
▼	▼	▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

24. How true or false is each of the following statements?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
	▼	▼	▼	▼	▼
a. Dialysis staff encourage me to be as independent as possible	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
b. Dialysis staff support me in coping with my kidney disease	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5

Thank you for completing these questions!

APPENDIX F: LETTER OF SUPPORT AUBMC HEMODIALYSIS UNIT

APPENDIX G: AUB INSTITUTIONAL REVIEW BOARD

From: Karine Ismail <ki09@aub.edu.lb>
Sent: Friday, July 10, 2020 12:01 AM
To: Lina Kordahi <lb24@aub.edu.lb>
Cc: Abeer Dakik <ad17@aub.edu.lb>; Dana Fakhreddine <df17@aub.edu.lb>
Subject: Re: exercise study

Dear Dr. Badr,

This is to acknowledge that Ghada Dunbar has completed her CITI certificate, and will be joining the research team of the below study:

- NUR.LB.05: “The effect of a physical exercise program on quality of life on oncology and hemodialysis patients”.

Kind Regards,
 Karine

Karine Ismail, MSc
Biomedical Regulatory Analyst
Institutional Review Board
American University of Beirut
Halim and Aida Daniel Academic and Clinical Center (ACC), 3rd Floor
Tel:+961-1-738024 or +961-1-350000 ext: 5591

The information contained in this message may be privileged and confidential.
 If you are NOT the intended recipient, please destroy this message and notify the sender. Thank you.

PPlease consider the carbon footprint of printing this e-mail!
*In view of the evolving situation worldwide and in Lebanon in regards to COVID-19 pandemic, the IRB at AUB switched its operations to electronic communications starting March 16, 2020. Until further notice, please submit your IRB applications, research materials, continuing review forms, study closure forms, and **serious adverse events reports (SAEs)** as email attachments to ki09@aub.edu.lb. Please stay safe.*

APPENDIX H: INVITATION TO PARTICIPATE – FLYER

Dear Hemodialysis Patient,

My name is Ghada Dunbar. I am a registered nurse and currently working on a research study in nursing in partial fulfillment of the requirements for the degree Doctor of Philosophy in Nursing at Azusa Pacific University. I am interested to study the Effects of Exercise and Spirituality on Hemodialysis Patients with End Stage Renal Disease Focusing on Blood Pressure and Quality of Life as Outcome Measures in Lebanon.

If you are currently 18 years of age or older and are admitted to the outpatient hemodialysis clinic and are hemodialysis dependent with at least three months on hemodialysis, able to ambulate independently, able to provide consent, receive hemodialysis treatment three times per week, cleared medically by your health care provider, and able to read and write Arabic, I would like to invite you to participate in this study. Anyone who chooses to take part will be requested to sign an informed consent form. Be advised that participation is completely voluntary and that you have the right to withdraw from the study at any time and any data obtained will be removed from the database. Any information gathered from this study will remain strictly confidential.

Thank you for taking the time to read this letter. Should you wish to take part of this study, or have any further questions prior to making a decision, please feel free to contact me at or gdunbar18@apu.edu

If you do decide to participate, please contact me either via phone or email.

Thank you for your consideration,

Sincerely,

Ghada Dunbar, RN

APPENDIX I: INFORMED CONSENT FORM



Effects of Exercise and Spirituality on Hemodialysis Patients with End Stage Renal Disease Focusing on Blood Pressure and Quality of Life as Outcome Measures.

Ghada Dunbar

[List IRB # 20-366]

INFORMED CONSENT FORM

Key Information:

If you agree to participate in this study, it will involve:

- Males/Females between age 18 or older
 - Procedures will include:

All patients who are recruited to participate in the study will receive clear instructions of the exercise program and regimen. The exercise program will consist of bicycles during dialysis. The program will start by using stationary bicycle for twenty to thirty minutes for both exercises based on patient tolerance. Moreover, the intensity of the exercises will be evaluated constantly and will be primarily based on the patients' medical conditions as well as their tolerance to the exercise program. Throughout the study period, which will be three months duration and three times per week, and the nursing team and support staff will be available to supervise and coach the participants.

- The study period, which will be three months duration and three times per week number of visits are required
 - There risks associated with this study:

There is minimal risk associated with this study, this includes, the physical tiredness and potential physical harm while performing the physical exercise, this means accidental falling or injury.

Protection Against Potential Risks: To protect patients from any adverse effects and throughout the entire hemodialysis treatment, the nursing team and support staff will be available to supervise and coach the participants and ensure all participants are protected from any risk or harm.

- You will be paid \$10 cash for your participation as a token of appreciation for your time
 - You will be provided a copy of this consent form

Invitation:

You are being invited to participate in a research study conducted by the researchers listed above. You are being asked to volunteer since you meet the requirements for enrollment into this study. Before you can make your decision, you will need to know:

- What the study is about;
- What you will have to do in this study, and
- The possible risks and benefits of being in this study

The researcher will talk to you about the study, and he/she will give you this consent form to read. You may also decide to discuss it with your family or friends. If you find some of the language difficult to understand, please ask the researcher about this form. If you decide to participate, you will be asked to sign this form.

Purpose: The overall objective of this study for which you are being asked to participate is to determine the effects of exercise and spirituality on the quality of life of hemodialysis patients with end stage renal disease (ESRD) in Lebanon.

Procedure: All participants who voluntarily participate in this study, are recruited and will be asked to participate in the study. As a participant, you will receive clear instructions of the exercise program and regimen. The exercise program will consist of bicycles during dialysis. The program will start by using stationary bicycle for twenty to thirty minutes for both exercises based on patient tolerance. The intensity of the exercises will be evaluated constantly and will be primarily based on the patients' medical conditions as well as their tolerance to the exercise program.

Before the patient begins the bicycle exercise one of the nurses on the study will be performing the following functions: (a) obtain baseline Blood Pressure (BP) and Heart Rate (HR) prior to exercise; (b) during the exercise monitor: HR every five minutes, assess for any signs and symptoms of shortness of breath, dizziness or lightheadedness, chest discomfort or pain, feeling of exercise fatigue; and (c) post exercise BP and HR; minutes the patient exercised; (d) reason for exercise to stop and any complications noted; and (e) patient should stop cycling if he/she experiences any of the above signs and symptoms.

Your total participation in the study will take approximately 20 to 30 minutes during your dialysis procedure over three months period.

The researcher will store all the participants information or research records in a locked cabinet and secured computer files. The study is strictly anonymous and the participant's name will not be placed on any research data. Instead, the researcher will label participant's information with a study number. The master list that links a person's name to their study number is stored in a locked cabinet or on a secure computer file. The participant's information is strictly confidential. The researcher, the academic institution, and the hemodialysis center will protect your privacy, unless they are required by law to report information to city, state, or federal authorities, or to give information to a court of law. Otherwise, none of the information will identify the participant by name. Any electronic mail notification to the participant will be sent as an encrypted and secure message. If the results of this research study are published, the researcher will not use any information that identifies the participant.

Possible Risks: There is minimal risk associated with this study, this includes, the physical tiredness and potential physical harm while performing the physical exercise, this means accidental falling or injury.

Protection Against Potential Risks: To protect patients from any adverse effects and throughout the entire hemodialysis treatment, the nursing team and support staff will be available to supervise and coach the participants and ensure all participants are protected from any risk or harm

However, there is always the chance that there are some unexpected risks. These may include, for example, an accidental disclosure of your private information, or discomfort by answering questions that are embarrassing. If you feel uncomfortable or distressed, please tell the researcher and he/she will ask you if you want to continue. Below is a list of resources available to you should you experience any distress. Because this is research and does not have anything to do with the current services you are receiving, you can withdraw from the study at any time without penalty.

Community resources
AUBMC

In the event of any physical injury resulting from research procedures, you will not be provided medical treatment through Azusa Pacific University, however, you may seek treatment with your primary care physician or make sure and coordinate this aspect of the consent with AUBMC.

Each participant will receive \$10 cash as a financial compensation as a token of appreciation for participating in the study.

APU will not provide you with financial compensation if you are injured in this study.

Benefits: You may or may not benefit from participation in this study. Benefits include

The researcher hopes that this study will benefit ESRD patients in the future who are undergoing hemodialysis three times a week and demonstrate that exercise during hemodialysis treatment can improve this patient population quality of life while dealing with this chronic disease and show positive physiologic outcomes. The information we get from this study may help others to gain Knowledge of the perceived benefits, barriers, of exercise and spirituality with patients suffering from ESRD on hemodialysis on quality of life. You may talk to the researcher at any time and choose to withdraw at any time for any reason.

You will not receive any direct [non-monetary] benefits from participating in this study; however, your participation in this study will help improve the knowledge about exercise and spirituality and the effects on quality of life. Your participation may also benefit other people with similar concerns.

Confidentiality:

The investigator and staff involved with the study will keep your personal information

collected for the study strictly confidential. Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Your identity will be kept strictly confidential.

The researcher will store all the participants information or research records in a locked cabinet and secured computer files. The study is strictly anonymous and the participant's name will not be placed on any research data. Instead, the researcher will label participant's information with a study number. The master list that links a person's name to their study number is stored in a locked cabinet or on a secure computer file. The participant's information is strictly confidential. The researcher, the academic institution, and the hemodialysis center will protect your privacy, unless they are required by law to report information to city, state, or federal authorities, or to give information to a court of law. Otherwise, none of the information will identify the participant by name. Any electronic mail notification to the participant will be sent as an encrypted and secure message. If the results are of this research study are published, the researcher will not use any information that identifies the participant.

Nothing that you will tell us today will be shared with anybody outside the research team, and nothing will be attributed to you by name. The knowledge that we get from this research will be shared with you and the group from the outpatient hemodialysis center before it is made widely available to the public. Each participant will receive a summary of the results. There will also be small meetings in the hemodialysis center and results will be announced. Following the meetings, we will disseminate and publish the results so that other interested people may learn from the research.

This document explains your rights as a research subject. If you have questions regarding your participation in this research study or have any questions about your rights as a research subject, please contact the Principal Investigator using the information at the bottom of this form. Concerning your rights or treatment as a research subject, you may contact the Research Integrity Officer at Azusa Pacific University (APU) at (626) 815-2034 or at vbowden@apu.edu.

Contact Information and Institutional Affiliation

If you have any questions, you can ask at any time, now or later. If you prefer to ask later, you may contact the researcher: Ghada Dunbar by phone at 818-633-9288 or by email at gdunbar18@apu.edu

The proposal has been reviewed and approved by the Azusa Pacific University Institutional Review Board (IRB), which is a committee whose task is to make sure that research participants are protected from harm. If you wish to find out about the IRB, contact Dr. Lina Badr by phone at 626-815-6000 or by email at lbadr@apu.edu

Conflict of Interest: The Principal Investigator has complied with the Azusa Pacific University Conflict of Interest in Research policy.

Compensation: Each participant will receive \$10 cash financial compensation for participation in the study.

Voluntary Status: Your participation is voluntary which means you can choose whether or not you want to participate. You may withdraw any time without penalty. If you decline to

continue, any data gathered to that point may be used in data analysis. If you choose not to participate, there will be no loss of benefits to which you are entitled.

Consent: I understand that my participation in this study is entirely voluntary and that I may refuse to participate or may withdraw from the study at any time without penalty. I understand the procedures described above, and I understand fully the rights of a potential subject in a research study involving people as subjects. My questions have been answered to my satisfaction. I agree to participate in this study. I have received a copy of this consent form.

I am 18 years of age or older

I am younger than 18 years of age

I agree to be recorded

I do not agree to be recorded

Participant Name Printed

Participant Name Signed

Date

I have explained the research to the subject or his/her legal representative and answered all of his/her questions. I believe he/she understands the information described in this document and freely consents to participate.

Signature of Principal Investigator

Date

Time

[Signed by researcher or certified assistant after participant has demonstrated understanding of research procedures through questions and answers]

PI Name, Printed
Address
Phone
Email address

APPENDIX J: THE DAILY SPIRITUAL EXPERIENCE SCALE IN ARABIC

مقياس الخبرة الروحانية اليومية

أبدا أو تقريبا أبدا	نادرا جدا	بعض الأيام	معظم الأيام	كل يوم	عدة مرات في اليوم		
						أشعر بوجود الخالق	١
						اختبر ارتباط بكل الحياة	٢
						أثناء العبادة ، أو في الأوقات الأخرى عند القرب من الله أشعر بالسرور الذي يبعدني عن الهموم اليومية	٣
						أجد القوة في ديني أو روحانيتي	٤
						أجد الراحة في ديني أو روحانيتي	٥
						أشعر في داخلي بسلام عميق أو وئام	٦
						أطلب عون الله خلال عملي اليومي	٧
						أشعر بإرشاد الله من خلال عملي اليومي	٨
						أشعر بمحبة الله لي مباشرة	٩
						أشعر بمحبة الله لي من خلال الآخرين	١٠
						جمال الخلق يؤثر فيا روحي	١١
						أشكر الله على نعمه	١٢
						أشعر بإهتمام غير أناني بالآخرين	١٣
						أتقبل الآخرين حتى عندما يفعلون الأشياء التي أعتقد أنها خاطئة	١٤
						أرغب أن أكون أقرب أو متواصل مع الله	١٥
						بشكل عام كيف تقيم قربكم من الله ؟	١٦

تتضمن القائمة التالية البنود التي من الممكن أو من غير الممكن أن تكون قد جربتها و الرجاء الأخذ بعين الاعتبار عادة كيف تكون هذه الخبرة بطريقة مباشرة ، ومحاولة تجاهل ما إذا كنت تشعر بأنك ينبغي أو لا ينبغي أن تحوز

APPENDIX K: KIDNEY DISEASE AND QUALITY OF LIFE

INSTRUMENT IN ARABIC

Arabic عربي

Health Related Quality of Life Instrument

. نحن معنيون ببعض المعلومات عنك و عن صحتك لذا الرجاء الإجابة بنفسك
 عن كل من الأسئلة التالية و ذلك بوضع دائرة حول الإجابة الأكثر ملائمة لك
 علما بأنه لا يوجد جواب "صحيح" أو "خطأ" كما أن جميع المعلومات و
 البيانات التي سيتم جمعها هي لأغراض البحث العلمي فقط و ستعامل بسرية
 تامة.

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الرجاء إملأ الحروف الأولى من اسمك

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تاريخ ميلادك (اليوم، الشهر، السنة)

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تاريخ اليوم (اليوم، الشهر، السنة)

الرقم	الفقرة	إطلاقاً	قليلاً	بما فيه الكفاية	كثيراً جداً
1.	هل لديك صعوبة في بذل جهد جسماني شاق مثل حمل كيس مشتريات ثقيل أو حقيبة؟	1	2	3	4
2.	هل لديك مشكلة بالسير لمسافة قصيرة خارج البيت؟	1	2	3	4
3.	هل لديك مشكلة بالسير لمسافة طويلة؟	1	2	3	4
4.	هل تحتاج للبقاء في السرير أو المقعد خلال اليوم؟	1	2	3	4

- 4 3 2 1 .5 هل تحتاج للمساعدة في الأكل أو ارتداء الملابس،
الاجتسال، المرحاض؟
خلال الأسبوع الماضي تحديداً: -
- 4 3 2 1 .6 هل كنت محدودة/ مقيدة بالقيام بعملك أو فعاليات
يومية أخرى؟
- 4 3 2 1 .7 هل كنت محدودة/ مقيدة في ممارسة هواياتك او
فعاليات في اوقات الفراغ؟
- 4 3 2 1 .8 هل ضاقت أنفاسك؟
- 4 3 2 1 .9 هل كان لديك ألم؟
- 4 3 2 1 .10 هل كنت بحاجة لان تستريحي؟
- 4 3 2 1 .11 هل عانيت من مشاكل بالنوم (الأرق/ صعوبة
بالنوم/تقطع النوم)؟
- 4 3 2 1 .12 هل شعرت بالوهن؟
- 4 3 2 1 .13 هل فقدت شهيتك؟
- 4 3 2 1 .14 هل شعرت بالغثيان؟
- 4 3 2 1 .15 هل تقيأت؟
- 4 3 2 1 .16 هل عانيت من إمساك؟
- 4 3 2 1 .17 هل كان لديك إسهال؟
- 4 3 2 1 .18 هل كنت متعبة؟
- 4 3 2 1 .19 هل الوجدع شوش فعالياتك اليومية؟
- 4 3 2 1 .20 هل كان لديك صعوبة بالتركيز في الأمور مثل قراءة
الجريدة أو مشاهدة التلفزيون؟
- 4 3 2 1 .21 هل شعرت بالتوتر؟
- 4 3 2 1 .22 هل شعرت بالقلق؟
- 4 3 2 1 .23 هل شعرت بالهيجان (عصبية/ منز عجة)؟
- 4 3 2 1 .24 هل شعرت بالاكتئاب؟

25. هل كانت لديك صعوبة بتذكر الأشياء؟
4 3 2 1
26. هل حالتك الجسمانية أو علاجك الطبي تدخلت بحياتك
4 3 2 1
- العائلية؟
27. هل حالتك الجسمانية أو علاجك الطبي تدخلت بحياتك
4 3 2 1
- الاجتماعية؟
28. هل حالتك الجسمانية أو علاجك الطبي أديا إلى مشاكل
4 3 2 1
- اقتصادية؟

في الأسئلة التالية الرجاء الإشارة بدائرة حول الأرقام بين 1 - 7 الاكثر ملائمة لك؟

29. كيف تدرج / تدرجي صحتك عموماً خلال الأسبوع الماضي؟

1 2 3 4 5 6

7

ممتاز

سيء جداً

30. كيف تدرج / تدرجي جودة حياتك عموماً/ مستوى حياتك عموماً خلال الأسبوع الماضي؟

1 2 3 4 5 6

7

ممتاز

سيء جداً

النشاط البدني في الحياة اليومية			
<p>الأسئلة التالية تتعلق بنشاطك البدني في العمل، المنزل ووقت فراغك. لذلك هي تتضمن أكثر من الأسئلة المتعلقة بالرياضة والتمارين. هي تشمل كل أنواع التمارين الفيزيائية والخمول الجسدي في حياتك اليومية.</p>			
دقائق _____	ساعات _____	كم من الوقت بالساعة والدقيقة تنام عادة خلال أيام الأسبوع (من الإثنين للجمعة)؟ (مع وقت الراحة أو القيلولة خلال النهار).	يومية 
دقائق _____ دقائق _____	ساعات _____ ساعات _____	خلال عملك أو دراستك لكم من الوقت يوميا: تكثر الجلوس؟ تقف أو تمشي؟	
دقائق _____	ساعات _____	تقوم بأعمال تتطلب مجهود جسدي كبير (مثلا: حمل أشياء ثقيلة أو صعود السلالم	يومية 
دقائق _____	ساعات _____	تقوم بأي عمل	
دقائق _____	ساعات _____	لكم من الوقت بالساعة والدقيقة تقوم بقيادة دراجة أو تمشي للاستقلال وسيلة نقل من وإلى العمل؟	يومية _____ 
دقائق _____	ساعات _____	في وقت فراغك، لكم من الوقت بالساعة والدقيقة تشاهد التلفاز، تجلس بهدوء، تقرأ أو تستمع إلى الموسيقى أو ما شابه ذلك	يومية 

دقائق _____	ساعات _____	لكم من الوقت بالساعة والدقيقة تقوم أسبوعيا بنشاط جسدي خفيف كالمشي، أعمال التنظيف الخفيفة، تنظيف الحديدية، أو الأعمال المجهددة قليلا كاليوغا، البولنغ (تعبة كرة خشبية) أو أعمال ؟مشابهة لا تشمل التنقل (من وإلى العمل)	 <p>أسبوعيا</p>
دقائق _____	ساعات _____	في وقت فراغك، لكم من الوقت بالساعة والدقيقة أسبوعيا تلتزم بأعمال كالعمل في الحديدية، نقل أشياء كثيرة باستعمال السلاالم، أو بنشاطات مجهددة قليلا كالجمباز، السباحة، قيادة الدراجة، تمارين القوة، أو أعمال مشابهة؟ (لا تشمل التنقل من وإلى العمل)	 <p>أسبوعيا</p>
دقائق _____	ساعات _____	في وقت فراغك، لكم من الوقت بالساعة والدقيقة أسبوعيا تلتزم بتمارين رياضية مجهددة ومقوية كالركض، المشي السريع، كرة القدم، كرة المضرب، أو أعمال مشابهة؟ (لا تشمل التنقل من وإلى العمل)	 <p>أسبوعيا</p>

APPENDIX L: INFORMED CONSENT FORM IN ARABIC

موافقة للإشتراك في بحث علمي

تأثير التمرين الفيزيائي على نوعية حياة مرضى السرطان :عنوان البحث

د. لينا بدر:الباحث الرئيسي

إننا نقوم ببحث علمي تجريبي لمقارنة العناية التقليدية بالعناية المرتكزة على التمرين الفيزيائي. المرضى الذين يقبلون بالمشاركة في هذا البحث سيتم توزيعهم عشوائيا إلى واحد من هذين الفريقين. هذه الموافقة تهدف إلى أمرين: الأول، تزويدك بالمعلومات اللازمة عن الإجراءات في هذا البحث والمخاطر المتلازمة مع الأبحاث التجريبية، وذلك لتمكينك من اتخاذ القرار بالمشاركة في هذا البحث. ثانيا: التأكد من أنك تسمح (ين) باستعمال ونشر المعلومات الطبية التي سنحصل عليها منك خلال هذا البحث. الرجاء أخذ الوقت الكافي لاتخاذ قرارك بالمشاركة في هذا البحث. بإمكانك مناقشة الأمر مع أصدقائك أو عائلتك. إذا كان لديك أية أسئلة، يمكنك طرحها على الباحث الرئيسي وتلقي الشرح اللازم.

نعرض عليك المشاركة في هذا البحث لأنه تم استشفائك لتلقي علاج كيميائي أو زرع النخاع الشوكي.

لماذا نقوم بهذا البحث؟

الهدف من هذا البحث هو اكتشاف تأثير برنامج التمرين الفيزيائي على نوعية حياة المرضى مع الأخذ بعين الاعتبار تأثير عوامل أخرى مؤثرة كالروحانيات والدعم الاجتماعي المتوقع للمريض وعوامل أخرى ديموغرافية متعلقة بالمريض.

ما هو الذي نهدف لاكتشافه في هذا البحث؟

يمكن لهذا البحث أن يزيد من البراهين الداعمة لفعالية التمرين الفيزيائي وخاصة أنه سيجري في بيئة حيث التمرين الفيزيائي ليس بالأمر الشائع.

كم من المرضى سيشارك في هذا البحث؟

سيتم اختيار 70 مريض من المركز الطبي للجامعة الأميركية في بيروت من الذين يخضعون لعلاج كيميائي أو زرع النخاع الشوكي. خاصة المرضى الذين أدخلوا إلى الوحدات التالية: باسيل الداخلي، باسيل الخارجي، ووحدة زرع النخاع الشوكي خلال 6 أشهر.

ماذا سيحدث في هذا البحث؟

هذا البحث، سيقدم لك أحد القائمين بهذا البحث شرحا وافيا عن إذا وافق طبيبك على مشاركتك في التفاصيل. وإذا قررت المشاركة، سيطلب منك التوقيع على الموافقة. بعد الحصول على موافقتك

بالمشاركة في هذا البحث، سيتم إلحاقك بأحد فريقَي هذا البحث وذلك عبر رمي عملة نقدية لاتخاذ القرار. سيتم الطلب من كل المشتركين في الفريقين بملء جدول التمرين الفيزيائي الذي يصنف 9 أنشطة يومية بحسب درجة المجهود الذي تطلبه وذلك على مقياس من 10 نقاط حيث أدنى درجة تعني: لا مجهود على الإطلاق وأعلى درجة تعبر عن أقصى مجهود. المرضى الذين لا يتبعون للفريق الإختباري سوف يتلقون العناية العادية التي نقدمها في مركزنا الطبي. وسيتم الإتصال بهم خلال 3 أسابيع للحصول على إجاباتهم على بعض الأسئلة

مرضى الفريق التجريبي سيتلقون معلومات من الباحثين على كيفية القيام بالتمرين الفيزيائي. سوف يطلب من الفريق التجريبي القيام بالتمارين الفيزيائية لمدة 10 دقائق أقله مرتين في الأسبوع (ستكون هذه الفترة أطول عند الذين كانوا ناشطين بدنيا أساسا) وسوف تزداد المدة ل 30 دقيقة على فترة 5 أيام في الأسبوع خلال فترة البحث التي ستدوم 3 أشهر. سيتلقى كل مريض في الفريق التجريبي تدريب خاص من أحد الباحثين على كيفية القيام بالتمارين الفيزيائية في غرفته. في حال كان الإستشفاء عن طريق العيادات الخارجية، سيتم ذلك في غرفة خاصة لضمان الخصوصية وضمان جو ملائم. سيقوم الباحثون بأداء تمارين التنفس والتمدد الفيزيائية أمامك و من ثم يطلب منك إعادتها. التمارين هي كناية عن تمارين تنفس تتبعها تمارين تمدد لليدين والرجلين. التمارين مأخوذة من "تمارين لإحياء ذكرى الناجين من مرض السرطان – مركز سلون كيتيرينغ". بإمكانك مشاهدة الفيديو على

<http://www.youtube.com/watch?v=pNBAIGdelO0>.

سيتلقى كل مشترك في الفريق التجريبي فيديو باللغة العربية يظهر كيفية القيام بالتمارين المطلوبة. كما أنه سيتم الإتصال بكل مريض في الفريق التجريبي 8 مرّات خلال 12 أسبوع (أسبوعيا لمدة 4 أسابيع، ومرّتين في الأسبوع لمدة 8 أسابيع) لتقييم الإلتزام ببرنامج التمارين الفيزيائية. سنقوم بالحصول على بعض المعلومات المتعلقة بالبحث من كل المشتركين قبل توزيعهم على أي من فرق البحث وبعد 3 أشهر من نهاية برنامج التمارين الفيزيائية (زيارة ال 3 أشهر) عندما تقوم بزيارة طبيبك أو وحدة الإستشفاء. المعلومات التي سنجمعها تتعلّق بنوعية الحياة وذلك عبر طرح 30 سؤال عن هذا الموضوع، الروحانيّة عبر طرح 16 سؤال، وأسئلة ديموغرافية. المعلومات المتعلّقة بدرجة تفشي السرطان سيتم الحصول عليها من ملفك الطبي. يمكن أن نتصل بك في المستقبل للحصول على أي معلومات نحن بحاجة إليها

؟كم ستدوم مدّة البحث

3 مدة البحث هي

أشهر يمكنك خلالها التوقف عن المشاركة في أي وقت. في حال قرّرت التوقّف عن المشاركة، الرجاء إعلام

أحد الباحثين. كما أنه يمكن للباحثين منعك من الإستمرار في هذا البحث في حال عدم إلتزامك بقوانين البحث.

؟ما هي الأخطار الناتجة عن هذا البحث

الأخطار الناتجة عن هذا البحث طفيفة وتتضمن التعب الجسدي واحتمال السقوط والتأذي الجسدي إذا كنت في الفريق التجريبي. هناك أيضا خطر إستعمال ملفك الطبي، ولكن سيتم الحفاظ على سرية المعلومات.

؟هل هناك من منافع من المشاركة في هذا البحث

يمكن لهذا البحث أن يعود عليك ببعض المنافع كتخفيف درجة شعورك بالتعب بعد العلاج وتحسين حالتك النفسية. كما أنه سيتم إعلامك بنتائج هذا البحث.

؟ما هي الخيارات الأخرى

يمكنك أن تختار عدم المشاركة في هذا البحث. خيارك هذا لن يؤثر على حقوقك بالعناية التي يجب أن تتلقاها. وفي حال قررت المشاركة، ستبقى المعلومات المتعلقة بك سرية. الباحث الرئيسي ومعاونيه هم فقط من يحق لهم الإطلاع على المعلومات الخاصة بك. كما أنك ستحصل على نسخة من هذه الموافقة. يمكن أن يوضع حد لمشاركتك في هذا البحث إذا كنت غير ملتزم بالتمارين أو إذا قرر طبيبك عدم استمرارك بالمشاركة.

؟ما هي التكاليف المترتبة علي من المشاركة في هذا البحث

.لا تكاليف مترتبة عليك نتيجة مشاركتك في هذا البحث ولا على شركة التأمين

؟ماذا لو حصلت أية أذية بسبب المشاركة في هذا البحث

في حال حصول أية أذية ناتجة عن المشاركة في هذا البحث، سوف يتم تقديم العلاج الفوري بالكلفة المعتادة. لا تعويض عن الأذى الغير ناتج عن المشاركة في هذا البحث.

؟هل سأحصل على مقابل للمشاركة في هذا البحث

.ليس هناك من مقابل للمشاركة في هذا البحث سواء كان مبلغ من المال أو غيره

؟ما هي المعلومات المتعلقة بي التي سيتم الحصول عليها خلال هذا البحث

:إذا قررت المشاركة في هذا البحث، سنحصل على المعلومات الطبية التي تتضمن

- معلومات تثبت صلاحية مشاركتك في هذا البحث وهي تتضمن الأدوية التي تتعاطاها، والعمليات الجراحية التي خضعت لها

- المعلومات المتوافرة في ملفك الطبي والتي تتعلق بتاريخك الطبي والعلاجات التي خضعت لها قبل هذا البحث.

؟ماذا عن السرية المتعلقة في هذا البحث

بمجرد توقيعك لهذه الموافقة، سيعطى الحق للقائمين على هذا البحث بالإطلاع على المعلومات المذكورة أعلاه والتي تخولهم المضي في هذا البحث. ولكن سوف يحرص على إبقاء المعلومات المتعلقة بك سرية. سوف نستعمل الأرقام بدل الأسماء للتعريف عن الوثائق التي تتضمن المعلومات الخاصة بك. كما أنه لن يظهر إسمك في حال قمنا بنشر نتائج هذا البحث في أي مجلة علمية.

هل لي الحق برفض السماح بكشف أو استعمال المعلومات الطبية المتعلقة بي

يمكنك عدم السماح بكشف أو استعمال المعلومات الطبية المتعلقة بك، ولكن في هذه الحالة لن يمكنك المشاركة في هذا البحث.

ما هي مدة صلاحية السماح بكشف أو استعمال المعلومات الطبية المتعلقة بي

تستمر مدة صلاحية هذا القرار لسنتين من بعد انتهاء البحث.

هل يمكن لي التراجع بالسماح بكشف أو استعمال المعلومات الطبية المتعلقة بي

يمكنك ذلك في أي وقت وذلك بإرسال طلب خطي إلى الباحث الرئيسي: الدكتورة لينا بدر، بناية جيفينور قسم . الطابق الرابع غرفة 109 المركز الطبي للجامعة الأميركية في بيروت، بيروت، لبنان.c

إذا قمت باتخاذ قرار مماثل، سوف تنتهي مشاركتك في هذا البحث. ولكن المعلومات الطبية المتعلقة بك والتي حصلنا عليها منك سابقا واستعملناها قبل قرارك بالسماح لنا بذلك تبقى جزءا من هذا البحث.

ما هي حقوقي كمشارك في هذا البحث

يمكنك طرح الأسئلة على الباحثين في أي وقت. المشاركة في هذا البحث هي اختيارية. يمكنك اختيار عدم المشاركة، كما أنه يمكنك الانسحاب في أي وقت أردت. الانسحاب لن يؤدي لأية خسارة لحقوقك كمريض أو لأي جزء بالمقابل.

بمن يمكنني الإتصال إذا كان عندي أي مشكلة أو أسئلة

للأسئلة المتعلقة بالبحث أو الأضرار المتعلقة بهذا البحث، يمكنك الإتصال بالباحثين: الدكتورة لينا بدر 03281504، السيد محمد بيضون 70949086، الأنسة غنى العرب 70602168، والأنسة 03301699 غنى الخطيب

إذا كان لديك أي أسئلة أو شكاوى تتعلق بحقوقك كمشارك في هذا البحث، يمكنك الإتصال بمكتب لجنة الأخلاقيات في الجامعة الأميركية:

5445 :هاتف: 9611350000 تحويلة

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موافقة المشترك تصريح

أنا بحريتي الخاصة وطوعاً أقبل بالمشاركة في هذا البحث. وقبولي مبني على المعلومات الشفهية والمكتوبة التي قدمت لي، وإني أعلم أنه بإمكانني طرح الأسئلة في أي وقت كان لي الحق بعدم القبول بالمشاركة في هذا البحث كما يمكنني الإنسحاب في أي وقت من دون تحمل أي جزء أو فقدان أي من حقوقي كمريض بما فيها الحق بالرعاية الطبية في هذا المركز الطبي. إضائي في الأسفل يعبر عن رغبتني الإختيارية بالمشاركة في هذا البحث وبالسماح بكشف واستعمال المعلومات المتعلقة بي والتي تخص هذا البحث. وأنا سأحصل على نسخة ممضية من هذه الموافقة

إسم المريض التاريخ الوقت

إسم منسق البحث \ التاريخ الوقت

الشخص المولى الحصول على موافقة المشترك

إسم الباحث الرئيسي التاريخ الوقت