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Measuring Knowledge of Chronic Kidney Disease (CKD) Among Community College Students

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2020

Abstract

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Abstract

Chronic Kidney Disease (CKD) once detected is easily treated; however, it has become a major health problem associated with increased morbidity and mortality rates, creating an economic burden worldwide. While approximately 24 million Americans over the age of 20 suffer from CKD, there is a lack of awareness among the general population. Using a pre/post assessment, this quantitative study measured the impact of a 75-minute workshop on 126 community college students' knowledge of kidney disease, perception of its severity, and perceived susceptibility. The theoretical framework for the study was the health belief model, which suggests that individuals will make positive lifestyle changes if informed about the nature and impact of a specific disease. A *t*-test was conducted for Research Question 1 and Research Question 2, and multiple regression was performed for Research Question 3. The results of the study indicated that the knowledge workshop increased participants' level of knowledge and their perception of susceptibility to kidney disease. However, their perception of CKD's severity decreased, suggesting that factors such as environment, racial/ethnic background, and/or attitudes may need to be addressed in future studies. It is recommended that health awareness workshops, especially for renal failure, be made available to all community college students. By educating individuals about CKD and creating awareness of its signs and symptoms, individuals can make better lifestyle choices that benefit not just themselves but create positive social change for the greater society.

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Dedication

This research is dedicated to my sons, Willie Jason Moore, III, and Joshua Moore along with my grandchildren (Ariel, Christopher, Willie, III, and Jacquelyn) and my daughter-in-law, Tasmine Moore. I pray that I have encouraged you to continue your education and become an asset to the society in which you live. I love you very much and wish the best for you.

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Chapter 1: Introduction to the Study

Chronic Kidney Disease (CKD) is described as a complex long-term illness that ultimately leads to End-Stage-Renal-Disease (ESRD) and occurs in every age group (Muhammad, Noble, Banks, Carson & Martin, 2012). Even though the advancement of technology has improved the treatment of individuals diagnosed with CKD/ESRD, the mortality rate of individuals receiving dialysis is approximately 20% to 25% annually with an increasing number of people dying because of withdrawal issues from dialysis (Davison, 2010). Since CKD is a disease that progresses in stages, it is important that individuals become aware of the functions of the kidneys as well as signs and symptoms related to kidney failure; otherwise the increase of CKD will continue and ultimately lead to ESRD requiring lifetime treatment (Tout et al., 2013).

Outcomes related to CKD/ESRD are a significant economic and healthcare burden globally; thus, there has been increasing interest in the development of methods for prevention to delay the onset of CKD as well as slow the process of developing ESRD and incidental death (Tout et al., 2013). According to the previous studies recorded by the United States Renal Data System (USRDS;2013), diabetes, atherosclerosis, sickle cell disease, hypertension, kidney stones, glomerulonephritis, HIV, polycystic kidney disease, and CKD are major problems worldwide. The USRDS (2013) also recognized ESRD as a complete and permanent kidney failure, that progresses into to death. The disease is irreversible and must be treated continuously until the end of life. Individuals diagnosed with ESRD experience a major life change including decreased quality of life (QoL). By increasing the awareness level of individuals who do not currently have a CKD diagnosis,

concerning the signs and symptoms of the disease, there may be a decrease in the number of individuals being diagnosed in the future. Therefore, I created a general training tool to inform individuals who may not currently have CKD but could be at risk of CKD in the future, and then analyzed the efficacy of the tool with a knowledge check prior to and following the training.

Finnegan-John and Thomas (2012) stated that ESRD also affects an individual's self-image and self-esteem due to the insertion of the access line that is required to receive treatment, especially in some instances when the catheter can be seen by others. Chow et al. (2012) found that CKD is the 9th leading cause of death and is steadily increasing in the United States. Distribution of literature concerning CKD encouraged individuals to identify and create healthy lifestyles that included regular exercise and monitoring of dietary habits (Hoseini, Maleki, Moeini, & Shareifiard, 2014).

CKD has had such a major impact on society that it has become necessary to increase awareness of the disease. Therefore, this study's population was community college students who are 17 years of age and above as well as from various racial backgrounds. Because CKD is a stage progression disease which leads to ESRD, strategies and treatment plans should include an educational component that teaches early signs and symptoms of kidney failure thereby decreasing the stages of progression. The National Center for Chronic Disease Prevention and Health Promotion estimated that more than 20 million adults in the United States may be diagnosed with CKD while another 20 million individuals are at risk for contracting kidney disease (CDC, 2014). As the increase of renal failure diagnosis becomes more prevalent worldwide, committees

are being developed in many countries to address this issue. Although literature existed concerning the challenges and treatments of CKD and ESRD for patients who are diagnosed and receiving treatment, there is a gap in the literature about public awareness or public education in regard to the onset of CKD (Couser & Riella, 2011; Tan, Hoffman & Rosas, 2010).

Tan, Hoffman and Rosas (2010) stated that CKD is noted has having a high correlation with the development of cardiovascular disease, along with a high mortality rate, compared to any other chronic illness. Not only are cardiovascular problems a concern for CKD, the development of CKD may also lead to complications causing psychological problems and life-altering situations (Santos, 2013). Individuals who are diagnosed with chronic diseases are affected socially. Davison & Jhangi, 2010 found that the changes these individuals experience included a loss of employment as well as a change of roles within the family. Individuals diagnosed with CKD, a life-long disease that ultimately progresses to ESRD, perceived the world differently, and thus created stressors for themselves about their future.

Research indicated that the Kidney Early Evaluation Program (KEEP) is the only approach in the United States that implemented a screening process to measure levels of knowledge of kidney disease and provided educational information for follow-up procedures. The method focused on individuals who were diabetic, hypertensive, or genetically susceptible to kidney disease. The process included a urinalysis screening, blood pressure checks along with an educational component. The criterion provided for chronic kidney disease awareness according to KEEP was if a doctor or healthcare

provider had diagnosed the potential participant with weak or failing kidneys is “Have you ever been told by a doctor or healthcare provider you have weak or failing kidneys?” (Tuot, Plantinga, Hsu & Powe, 2012, p. 191; Whaley-Connell et al., 2012).

Moore (2013) stated that once an individual has been properly diagnosed with kidney failure, there are two techniques available for treatment: hemodialysis(HD) and peritoneal dialysis (PD). HD is accomplished in a clinical setting for approximately 3 to 4 hours, and occurs at least 4 days of the week while peritoneal dialysis allows patients to treat themselves at home every day for approximately 4 hours a day or according to the physician’s order. Each of these procedures creates severe changes in an individual’s lifestyle and may lead to depression or anxiety.

Interestingly, evidence has shown that CKD has such a profound effect on the nation because it is linked with several other chronic illnesses that may cause a rise in mortality. However, there is limited research on public awareness of kidney disease (Wright, Wallston, Elasy, Ikizler & Cavanaugh, 2011). There is not an awareness program provided for individuals who are not diagnosed with kidney failure. These individuals may not be aware of the signs and symptoms of kidney failure in order to detect a change in their bodies (Chow et al., 2012). Nevertheless, there are several strategies that have been proposed to avoid ESRD that included monitoring high-risk patients with diabetes or blood pressure. However, there has been no mention of sharing this information through workshops for awareness as a key component of prevention. Knowledge about these workshops is a gap in the literature (Fink, Ishani, Taylor, Greer, MacDonald, Rossini…Witt, 2012).

In this study I found that the use of awareness workshops is beneficial in introducing the topic to community college students, which I assessed with a pre- and post-assessment to measure the knowledge gained from attending the workshop. However, the results indicated that the participants did not show a significant change in their perception of the severity of the disease. In order to address this problem with a lack of severity, it becomes necessary to review the cultural and ethnicity of individuals when developing workshops. According to Walton (2011), previous research indicated that different cultures view illness based on their religious and political beliefs. Therefore, it is a necessary component to develop community partnerships to ignite a public awareness of this disease. Relationship building and cultural education become important for success to take place.

With CKD cited as a major cause of morbidity and mortality in America, the implementation of the health belief model served as a framework to develop an educational intervention for community college students to address the severity of the disease (Hoseini et al., 2014). With this in mind, community college students who were not diagnosed with the disease, gained information when they attended an awareness workshop that discussed the signs, symptoms, and how to make informed decisions about being screened for the disease. In the workshop, the facilitator taught general kidney knowledge that included anatomy, physiology, etiology, and progression of the disease. Moreover, community college students who understand CKD and its progression into ESRD may be more likely to make lifestyle modifications and incorporate healthier behaviors compared to individuals who lack knowledge of the disease.

Background of the Study

Approximately 133 million Americans are diagnosed with at least one chronic illness, creating 75% of the health costs, and 7 out of 10 people have died from chronic illnesses (CDC, 2014). According to the Centers for Disease Control (2014), an illness that is classified as chronic is prolonged and incurable. Individuals diagnosed with a chronic illness may also suffer from psychological and psychiatric challenges from the changes in daily activities and the pain that may accompany the illness (Shahar & Lerman, 2012). Earlier research has classified CKD as a chronic illness that alters the life of individuals and is an increasing problem in the United States (De Sousa, 2008). This disease is predicted to affect at least half of the American population ranging in treatment plans from Stage 1 through Stage 5, consequently becoming a major epidemic, costing a significant increase in health care dollars (Charnow, 2013). Bakris Ritz (2009) stated that the United States Renal Data System (2004) estimated that approximately 500,000 individuals during 2004 within the United States were treated for ESRD; however, by 2010 there was a significant increase to 40% of the population. As time passes, the percentage is expected to increase due to the expansion of the life span. The worldwide population is increasing in age; thereby, more people are experiencing problems such as hypertension and diabetes, which directly affects the kidneys. According to *Healthy People 2020*, diabetes has been cited as having a strong correlation to kidney failure. Since diabetes has been associated with genetic determinants, it is crucial that community college students become aware of kidney failure (U.S. Department of Health and Human Services, 2014). Additionally, it is important to understand how an individual's behavior

and environment influence the progression of CKD. Furthermore, *Healthy People 2020* suggested that all people be treated equally and fairly by using a health model that is non-biased and include information for all ethnic groups.

Research suggested that many people who experience CKD may not be aware that they have the disease during its early stages. Even though there have been recent efforts to increase awareness through dissemination of materials, which provided the definition of CKD as well as explained its severity, there is still a lack of proof that the level of awareness has improved over time (De Sousa, 2008). Not only is there a lack of awareness, but also limited access to healthcare facilities and skilled health care workers in the area of CKD create major problems for individuals suffering from hypertension and diabetes (Charnow, 2013).

CKD leads to end-stage renal disease, requiring individuals to use artificial resources to survive. Having to use artificial resources to sustain life creates a major lifestyle change, which affects an individual physically, financially, socially, and psychologically. Individuals who require treatments to live may develop clinical depression, anxiety issues, suicidal ideations, as well as delirium (De Sousa, 2008). Furthermore, individuals diagnosed with CKD may develop uncertainty, become vulnerable, fearful, and hopeless, as well as depressed, resulting in losing major roles in life due to the treatment plan. Since CKD leads to ESRD, which ultimately leads to death, the individual may develop a fear of dying (Davison & Jhangri, 2010). Finnegan-John and Thomas (2013) reported that individuals who are experiencing end-stage renal disease have a tendency to undergo severe changes in their daily living, including major

diet changes and restrictions of fluid in order to manage their illness. Collins, Gilbertson, Snyder, Chen and Foley (2010), in the last decade, suggested that there has been a significant increase in diagnoses of CKD and ESRD causing severe increase in healthcare budgets nationwide.

According to the 2014 Annual Report of the United States Renal Data System, Medicare expenditures for all stages of kidney disease exceeded $99 billion in 2013 in the United States, and $68 billion of these expenditures were spent on CKD patients (USRDS, 2014). In 2011, the annual cost of renal failure among the population was estimated at $49.3 billion dollars, which is a disproportionate share of the healthcare budget. The cost per patient with ESRD receiving Medicare averaged $32,922 for transplants to $87,945 for HD per year (Obrador, & Pereira, 2013). This illustrates the growing economic burden of CKD. By 2020, the cost will have increased to $55.6 billion, with the average dialysis treatment costing $72,000 per year for each person receiving treatment (Narva, Briggs, Jordan, Pavkov, Burrows & Williams, 2010). Section 152(b) of the Medicare Improvements for Patients and Providers Act, established January 2010, sets forth guidelines for reimbursing healthcare personnel who offered predialysis education to individuals that focused on topics such as nutrition/diet, the benefit of exercising, and the importance of managing comorbid diseases. The education process included a discussion of treatment options listing the advantages and disadvantages of each option (Tuot et al., 2013; Kutner, Johansen, Zhang, Huang, & Amaral, 2011). To offset the economic burden of CKD/ESRD individuals should be made aware of the pros and cons of receiving a kidney transplant (KT). However, research indicated that KTs are

most likely to be discussed with individuals who are younger, employed, enrolled in a private health insurance as well as reported as having good physical health (Kutner, et al., 2012).

Problem Statement

Whaley-Connell (2012) has suggested that there is a low degree of awareness of kidney disease among individuals in society. With the significant increase in the population requiring treatment for CKD and ESRD, the research addressing strategies for prevention of this disease is lacking for the general population. Because evidence-based therapies are designed to improve the mortality and morbidity rate caused by CKD it becomes important to make as many citizens of society as early as possible aware about the disease (Tuot et al., 2011).

Thus, implementation of educational material at the community college level will reach a wide age range as well as diverse population of students. This study assessed the knowledge level of community college students concerning CKD/ESRD and the risk factors that are associated with the disease. The dissertation provided a conceptual and operational definition of CKD/ESRD. CKD awareness was the outcome variable for this study. The pre-assessment and post-assessment measures were designed to assess the level of knowledge of the functions of the kidney, perceived susceptibility and perceived severity. Basic demographic information, such as age, race and educational level, was also included (see Avery, Leggett & Juncos, 2015).

Purpose of the Study

The purpose of this quantitative study was to establish whether presenting a workshop on CKD /ESRD to students in a community college would increase knowledge level of kidney physiology and anatomy, measure perception of severity, as well as perception of susceptibility. The workshop was facilitated by a registered nurse who has been employed by the Kidney Foundation of America for over 12 years. The facilitator taught basic kidney knowledge that included: anatomy, physiology, etiology, signs and symptoms, progression of the disease, resources available, and treatment plans. Information was offered using power-points, models and diagrams on a 9th grade reading level. The facilitator allowed time for questions or feedback from the participants. There was also a measurement of perceived susceptibility and perceived severity, before and after the workshop. I found the workshop to be effective, and will make it available for use by other community colleges around the United States, increasing the level of knowledge of community college students throughout the country.

The population of the community college offered a pool of individuals from diverse backgrounds, ethnicities, socioeconomic statuses, and ages. Furthermore, this population should be mature enough to recognize the seriousness of this disease and its implications both for them and their family members. Some community college students may choose majors in the healthcare field, while others may choose majors in areas related to working with the general population such as teaching or business. Regardless of the area in which students choose to be employed, information about CKD presented in a workshop can be useful to them now as well as in the future. Since there is an

indication of the lack of individual awareness of the beginning stages of CKD, this study is directed toward closing the gap in awareness of CKD among community college students, those who are in the earliest stage for potentially understanding conceptions of CKD. Increased awareness may produce individuals who are able to combat or slow down the progression of CKD/ESRD, thereby decreasing the economic burden on society. This awareness fulfills the mission of Walden University to create a positive social change through health psychology.

Research Questions and Hypotheses

Research Question 1 (RQ1): Does presentation of a workshop on CKD/ESRD to students in a community college increase students' level of knowledge?

$H1_0$: There is no significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H1_1$: There is a significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

Research Question 2 (RQ2): Does presentation of a workshop on CKD/ESRD to students in a community college increase students' perceptions of the severity of the disease?

$H2_0$: There is no significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H2_1$: There is a significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

Research Question 3 (RQ3): Does level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD predict perceived susceptibility of the disease?

$H3_0$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are not predictors of perceived susceptibility of the disease.

$H3_1$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are predictors of perceived susceptibility of the disease.

This study investigated the level of knowledge that individuals attain by attending awareness workshops for chronic diseases. Chronic diseases are a major problem nationally and internationally. Those diseases include, but are not limited, to high blood pressure, diabetes (Type 1 and Type 2), cardiovascular disease, stroke, and cancer. With this in mind, assessing the level of knowledge of individuals concerning facts, signs, and symptoms becomes imperative in order to control the growing effect of chronic diseases and thereby decreases the economic healthcare burdens of many countries. Since there is not an identified cure for CKD, this research offered insight on the level of knowledge that may be attained by attending public awareness workshops (Sullivan, 2009).

Theoretical Framework

The theoretical framework of the study was the health belief model (HBM). This model was created by Hochbaum, Rosenstock and Kegels during the 1950s and is still used today (Bosky, 2019). The perception of threat is a major component of the HBM, therefore individual perceptions was measured through the use of Likert-scale assessment of the proposed threat of the health problem; in so doing, I measured individual cognition of susceptibility or severity. There are six major constructs to the model; however, only two variables, plus level of knowledge, will be used in this study: (a) perception of severity and (b) perception of susceptibility.

The HBM is also noted as an excellent tool for developing a framework for short-term and long-term strategies to promote behavioral (Boskey, 2019). In this particular study, this model was used to express how individuals are affected by this disease, thus changing the student's perception of susceptibility, in addition to increasing their knowledge of the severity of CKD and the importance of being educated about this disease. Furthermore, awareness is affected by age, race, sex, whether the individual is insured, whether or not the individual has a regular healthcare provider, and the lifestyle of the individual (i.e. eating habits, alcohol consumption, drug and tobacco usage, lack of physical activities). Therefore, the workshop was designed to increase the level of knowledge of CKD, consequently allowing individuals the opportunity to make life-changing choices that may ultimately lead to better health.

Nature of the Study

The design for this study was a quantitative, one-group pre/posttest research design testing whether an intervention workshop is effective. The participants in the study were students in the community college setting. Students who had been diagnosed with a kidney disease were included in such a manner that they are not identified as having kidney disease; however, their data was analyzed separately. The participants were selected from English classes, because all students must take English, and the students were not duplicated. Participants were asked to attend a 75- minute workshop providing basic knowledge of kidney functioning and related potentially fatal diseases.

The workshop presenter was a registered nurse who is employed as a nurse educator and works with the American Kidney Foundation (AKF). The workshop agenda included basic knowledge of anatomy and physiology, national statistical trends, as well as the importance of diet. The participants completed a pretest and posttest assessment. The data gathered was to determine the effectiveness of the workshop (Appendix A). The information regarding sociodemographic included age, gender, race/ethnicity, social support, income and level of education.

Definition of Terms

Chronic Kidney Disease (conceptual definition): A condition in which the kidneys are damaged and cannot filter blood as well as healthy kidneys, causing wastes from the blood to remain in the body leading to other health problems (CDC, 2014).

Chronic Kidney Disease (operational definition): Estimated GFR (eGFR) and proteinuria:

- eGFR >60 mL/min/1.73 with proteinuria determined by an albumin/creatinine ratio (ACR) ≥ 30 mg/g or eGFR <60mL/min/1.73 m^2.
- Stage 1: eGFR > 90 mL/min/1.73 m^2, ACR ≥ 30 mg/g
- Stage 2: eGFR 60-89 mL/min/1.73 m^2, ACR ≥ 30 mg/g
- Stage 3: eGFR 30-59 mL/min/1.73 m^2
- Stage 4: eGFR 15-29 mL/min/1.73 m^2
- Stage 5: eGFR < 15 mL/min/1.73 m^2

End Stage Renal Failure: The last stage of chronic kidney disease where the kidneys have stopped working well enough for the patient to survive without dialysis or a kidney transplant.

Nephrologist: Medical doctor who has specialized in renal failure.

Primary Care Physician: Doctor with a general medical degree

Assumptions

The following assumptions in this study included: (a) every participant was taught the basic knowledge of kidney anatomy and function, along with perceived severity and perception; (b) the presenter was actively engaged with the participants during the presentation of the workshop, as well as assessed the students pre/post-assessment accurately; and (c) in order for the *t*-test to be valid, the differences between the paired values was normally distributed.

Scope and Delimitations

The study focused on community college students, 18-55 years of age, which was a delimitation to this study. This population was chosen because previous research has

shown a lack of awareness in the need for understanding the knowledge level, perceived severity and perceived susceptibility of this age group. Children, young teenagers, and adults over the age of 55 were not used in this study. The community college population included individuals from six surrounding counties.

Limitations

The limitations of this study were a small sample size of community college students from one geographical area of the United States. The community college has an average enrollment of 2800 students; however, there are several campuses and only one campus with approximately 400 students was included in this study. The fact that awareness of knowledge of CKD was self-reported and based totally upon recall offered a limitation as well. The study is also limited to community college students enrolled in the general courses and have not been exposed to health science courses. Thus, the findings cannot be generalized to the entire population of community college students because the study was a single-center experience. The questionnaire only identified demographics and levels of awareness of CKD pertaining strictly to this workshop. A further limitation was a lack of in-depth interviewing of the sample participant. The study was conducted to assess the knowledge level of students concerning only CKD/ESRD after attending a 75-minute workshop with a pre- and post-assessment. There was not a follow-up session to this workshop. Another limitation of this study was the use of quantitative research because it does not account for human individuality, thereby offering information only on a group of people in a particular setting. A final limitation to this study is not having a control group. A control group is a major component in

conducting research using the quantitative methodology for comparison purposes as well as for strengthening internal validity (Marsden & Torgerson, 2012). Although random assignment to treatment and control conditions strengthens internal validity, for purposes of this quasi experimental study, participants functioned as their own controls by completing a knowledge questionnaire before and after exposure to the knowledge workshop. The use of a pretest and posttest as a design of study was influenced by time-lapse between presentation of material and the administration of the questionnaire; further information of this limitation is provided in Chapter 3.

Significance of the Study

Over the last 2 decades there has been a significant increase in the diagnosis of CKD and ESRD in the United States, thereby causing a major health concern for the population. CKD has been identified as being common in America and is costing the country billions of dollars for life sustaining treatment plans. Furthermore, individuals diagnosed with CKD/ESRD experience major psychosocial impact on their lives that ultimately affected their quality of life (QoL) on a day-to-day basis (Santos et al., 2010). The disease can be diagnosed easily and early enough to slow progression with treatments that have proven to be effective.

The cost of CKD/ESRD in America has become an incentive to create programs designed to raise awareness of community college students about the seriousness of this disease. In 2007, approximately 24 million people were diagnosed with diabetes, which is directly related to CKD, costing $174 billion (Sorensen, et al., 2011). To help change the effect of CKD, three Federal agencies have made attempts to strategize plans to create

awareness of the disease: (a) The Centers for Disease Control and Prevention (CDC) initiated a surveillance system that requires all public health agencies to report data; (b) The Centers for Medicare and Medicaid Services (CMS) developed a plan for supporting earlier diagnosis of renal failure; and (c) The National Institute of Diabetes and Digestive and Kidney Diseases developed a program to disseminate information through education.

Healthy People 2010, developed by the U.S. government to provide specific goals and objects using a 10-year target date to lead national promotions for the prevention of health and diseases, recommended that kidney disease become a target for the future (Narva, Briggs, Jordan, Pavkov, Burrows, & Williams, 2010). As a result, CKD became a targeted goal of *Healthy People 2020* requesting to focus on a reduction in newly diagnosed cases of CKD, illuminating the complications of disability, decreasing the death rate and decreasing related health costs associated with CKD. After reviewing the objectives for *Healthy People 2020,* six objectives were designed to focus on the prevention of CKD and ESRD. *Healthy People 2010* only addressed nine areas of CKD compared to *Healthy People 2020* addressing 24 objectives of CKD (Healthy People 2010 Final Review, n.d.). Therefore, the importance of this study was to establish the benefit of awareness of CKD and ESRD among community college students.

Summary and Transition

There is a considerable amount of research on the worldwide effect of CKD/ESRD. However, the awareness of CKD as well as the risk factors associated with the disease such as diabetes and hypertension is low globally. With awareness of the disease, individuals can better manage CKD, thereby slowing the rate of progression to

ESRD and reducing the incidences of cardiovascular disease that have a direct correlation with CKD diagnosis. In order to decrease the global spread of this disease, primary care physicians need to become more aware and direct by screening their patients to assess their vulnerability to the CKD. Additionally, there is still a great need for awareness campaigns to educate individuals of how renal failure occurs to reduce the number contracting the disease (Bakris & Ritz, 2009). Information should be presented in several ways, but it is imperative that the correct definition of CKD be included along with accurately identifying the risk factors, presenting the symptoms, and discussing the diagnostic test. Individual perceived susceptibility can be evaluated by items presented on a questionnaire (Plantinga, Tuot, & Powe, 2010).

Even though there is a natural effort for mindfulness of CKD, previous research indicated that there is still a gap in the education of the public. The National Health and Nutrition Examination Surveys (NHANES) suggests that 8% of the population with CKD Stage 3 are aware that they have the disease, and 41% of the individuals suffering from CKD Stage 4 have self-reported that they have CKD (Tuot et al., 2011). Educating the public is a key step in creating the awareness of CKD/ESRD, allowing individuals to seek early strategies for therapeutic interventions, as well as to possibly delay the onset of the disease and the complications that may be associated with the disease (Atkins & Zimmet, 2010).

The understanding of CKD for individuals globally, as well as in the United States, is important. Awareness should include general knowledge of CKD, along with the risk factors involved for vulnerability of the disease. Individuals should also be

cognizant of stages and consequences of the disease in order to make necessary medical decisions that will guide their quality of life in the future (Plantinga, Tuot, & Powe, 2010).

Because college students are part of the young adult population of America, it is urgent that this age group is targeted for teaching chronic illness attentiveness. During the college years, individuals begin to formulate ideas and habits for their lives with less influence and pressure from parents. This is a time of exploration which should include not only academic learning but also attaining information that will improve their QoL. Therefore, the focus of this study was designed to teach students about CKD through the use of evidence-based practice workshops, as well as focus on their perception of illness (Walton, 2011).

Chapter 2 presents a review of existing literature concerning the lack of awareness of CKD/ESRD and the risk factors associated with the disease. Chapter 3 describes the methodology that was used to research the proposed hypothesis, including a description of the sample population, data collection and analysis procedures, as well as ethical considerations. Chapter 4 describes the process of collecting the data, the results of the study along with charts and figures for clarification. Chapter 5 presents a discussion on the study, conclusions and further recommendations.

Chapter 2: Literature Review

Concise Synopsis of Current Literature of CKD

Worldwide, CKD is a fast-growing problem with high rates of morbidity and mortality associated with the diagnosis, thereby becoming a major concern in all countries. The increase of CKD is causing havoc globally and yet very little attention has been given to disease, therefore causing the public to be vulnerable due to a lack of knowledge. With the increase of an aging population, the risk of infectious diseases decreases because of immunizations however the risk of chronic diseases increases due to longevity as well as lifestyle factors. CKD ultimately leads to ESRD but the rate of the disease progression is correlated with other pathologies that may exist (Charnow, 2013). In the United States alone, approximately 26 million people are affected by this life-threatening disease, and the number is expected to continue to grow. However, the disease is still not recognized and treated as aggressively as it should be. Furthermore, the general population of the United States is not as knowledgeable as they should be about the associated risk factors of CKD or ESRD (Tuot & Powe, 2011). In the United States, approximately 10%-13% of the adult population has been diagnosed as experiencing damage to their kidneys or a reduction in their kidney function (Plantinga, Tuot, & Powe, 2010). Furthermore, the number of individuals being diagnosed with ESRD, which is a result of CKD, is steadily increasing as the population ages.

In 1973, Medicare paid for approximately 10,000 people to receive treatment for renal failure. In 1983, the number of people receiving treatment increased to 86,354, and in 2011, the number of people diagnosed and treated for ESRD was 615,899 (Charnow,

2013). With such dramatic increases in this disease, diagnosis of CKD is now a serious public health issue, causing a major increase in the budget of the healthcare system. Furthermore, African Americans are cited as being diagnosed with CKD earlier than their white counterparts. Ng and Anpalahan, 2011, stated that approximately 10.3% of African American males are diagnosed with CKD by age 60, and 10.4% of African American females by age 60 are diagnosed with CKD, compared to white males who are diagnosed at 6.9% and white women who are diagnosed at 7.8% by age 60. Not only is cost a concern, but also the increased mortality rate associated with this disease is significant. It is also important to know that CKD may affect all age groups, but the elderly population is more at risk.

In order to slow the process of CKD/ESRD, it becomes important to develop particular strategies that are directly related to the disease. Presently, the strategies being used to prevent or slow the process of CKD include the following (a) choosing a select population to screen for CKD, such as individuals who are considered to be at-risk for developing CKD due to diabetes, high blood pressure, or by particular ethnicities (African Americans); (b) continuous monitoring of patients who are in stage 1 to 3 of CKD; and (c) monitoring for patients who may develop cardio-vascular disease (CVD) during Stages 1 to 3 (Fink et al., 2012).

Literature Search Strategy

The library databases and search engines used in this study include the following: PsycINFO, PsychEXTRA, PsychARTICLES, PsycBOOKS, Google Scholar, Ebsco Host, Academic Search Premier, and Medline. The key terms used for data searches were

awareness of chronic kidney disease (CKD), end-stage renal disease, effects of diabetes and CKD, effect of hypertension and CKD, perception of primary care physicians on CKD, Health Belief Model (HBM), Healthy People 2010, Healthy People 2020, depression, social culture theory and public awareness of the effect of chronic diseases, and *Acute Kidney Disease as it relates to CKD/ESRD.* The literature review ranged from January 2008 to March 2020. The sources included current peer-reviewed literature.

Theoretical Foundation

The Health Belief Model (HBM)

Boskey (2019) suggested that the HBM is embedded in psychological and behavioral theories. The theories suggest that health behavior is related to an individual's desire to avoid being ill or to get better if they are already ill and putting forth certain actions which help them avoid getting ill or bring about a cure to an illness. Such actions are based on perceived susceptibility. The limitations to the HBM involve not allowing for personal attitudes, habits, economic factors, and environmental factors, and the model suggests that all people have equal access to information concerning diseases or illnesses. Furthermore, the HBM is a descriptive guide that does not offer an explanation, but rather a plan for prevention for a desired outcome, such as prevention of chronic illnesses (Adams, Hall and Fulghum, 2014). How an individual perceives their physical health and the emotions that they attached to the disease process, may ultimately affect the outcome of their diagnosis (Sorensen et al., 2011).

The (HBM) is noted as being a framework that is widely used to clarify and understand health behavior. The model has been applied in many settings from the

importance of seat belt use, to change of sexual behaviors (condom use), to health screenings for various diseases, as well as measuring the perceived barriers that may affect the treatment outcome of HD in African American women (Bell, 2013). The model is designed on the principle that people will change their behavior if the change will cause a positive impact on their lives. The framework for the model based on educational interventions has been successful in designing programs to change people's beliefs and has led to an increase in creating healthy behavior patterns (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012).

The HBM has been used with dialysis patients receiving HD. Adams, Hall and Fulghum, (2014) conducted a study with HD patients on the effectiveness of immunization, specifically influenza and pneumococcal vaccines. HD patients are susceptible to many illnesses along with communicable illness and should be immunized each year for the flu and pneumonia. Even though vaccines for both of the diseases are available, and most of time offered free, there is still a major increase in the morbidity and mortality rates for diseases that are preventable. According to the United States Department of Health and Human Services, 2011 as reported by Adams, Hall and Fulghum (2014), each year nearly 42,000 adults die from diseases that are preventable by a vaccine. Individuals who are in Stage 5 of CKD are at a higher risk for developing infections such as the flu or pneumonia due to a severe decline in their immune system, thereby increasing the rate of morbidity and mortality in these patients, according to Persanti (2001) (as reported in Adams, Hall and Fulghum, 2014).

Because of the increase of morbidity and mortality rate caused by preventable diseases, *Healthy People 2020*, set a goal to vaccinate 90% of the adult population age 18 to 64 and all adults age 65 for influenza and pneumonia annually. However, data received from Medicare suggests the patients that have progressed to Stage 5 of CKD who receive HD are not reaching the targeted goals. Reported rate of influenza vaccinations are 69.6% and pneumococcal pneumonia vaccinations are 30.0%. To get patients to comply with *Healthy People 2020*, there has to be a change in knowledge according to HBM. The study listed several uses of the HBM in changing behaviors of individuals. The HBM uses a framework that has been identified as middle-range theory. The constructs of the model used variables that are limited, direct, and can be easily interpreted as well as being concentrated on the efforts of individuals to make a positive change concerning their health (Adams, Hall & Fulghum, 2014). There are several studies presented in the article by Adams, Hall and Fulghum (2014) that substantiated the validity of using HBM in quantitative studies with healthcare patients and delivery systems. Furthermore, research indicated that the use of HBM is effective in assisting individuals to create a change toward creating a healthy way of living (Ghaffari, Tavassoli, Esmaillzadeh & Hassanzadeh, 2012).

Over the last ten years, there has been a growing conception that individuals rely heavily on their environmental and social contexts to understand the world around them in all aspects of life including risk factors that are associated with their health beliefs. An individual's culture is an important factor in them understanding the values and practices as they relate to health issues (Arnowitz, Deener, Keene, Schnittker & Tach, 2015). There

is a cluster of diseases that can be associated with CKD/ESRD such as hypertension, diabetes, and cardiovascular disease; thereby targeting certain minority groups such African Americans, Native Americans and Hispanics (Sullivan, 2010).

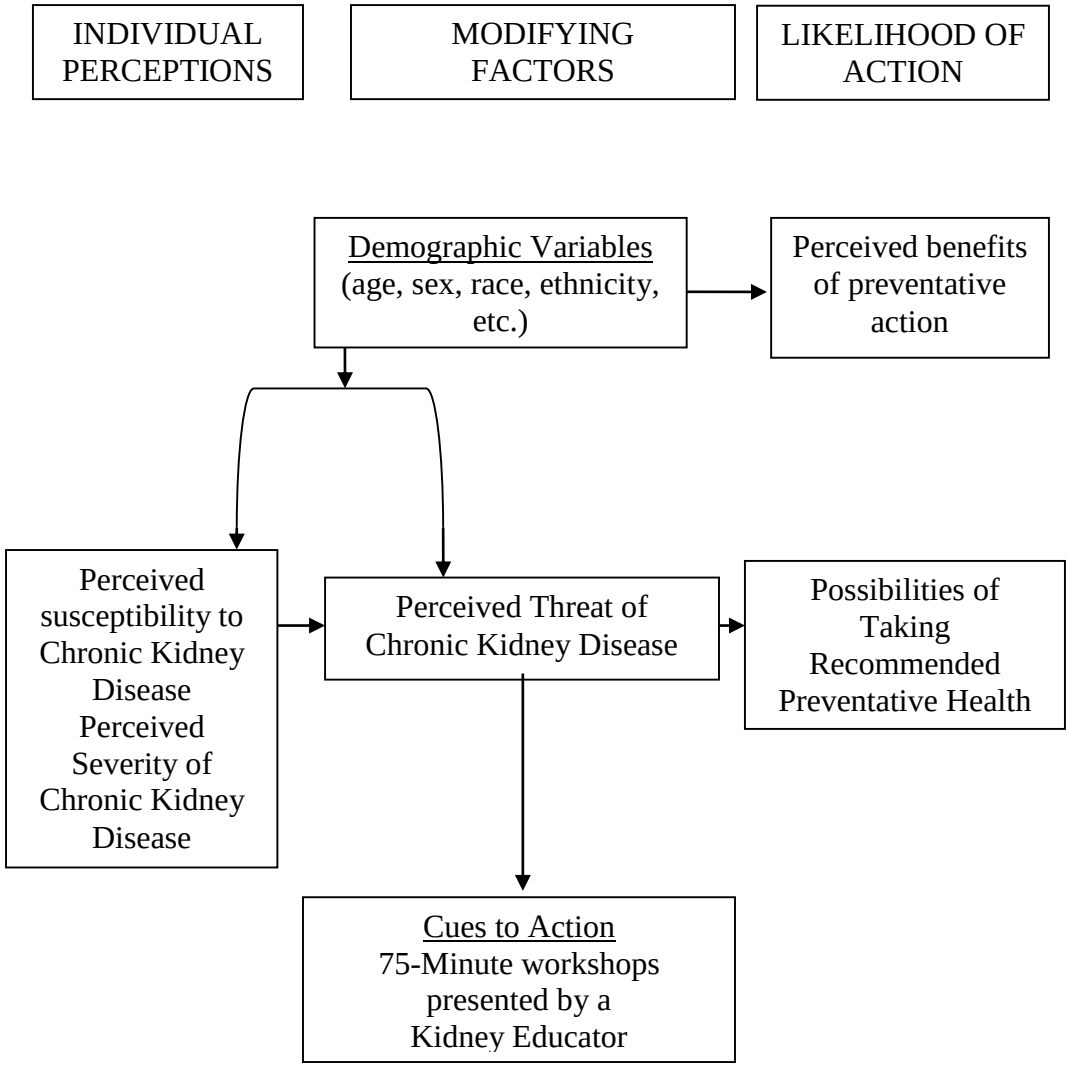

Figure 1. The Health Belief Model.

Hypertension has been cited as being the cause of many chronic illnesses including CKD as well-being the basis for high rates of mortality throughout the world, and amazingly it is treatable. Because worldwide, approximately 8.4 million people are diagnosed with hypertension, it has become a serious health challenge. With a modified change in lifestyle, most individuals can prevent or manage hypertension. People tend to form lifestyle habits based on attitudes, beliefs and experiences, which then become part of their personality. Implementation of the HBM with individuals diagnosed with hypertension to increase their physical activity was successful. The educational component offered by using the HBM consisted of 3 sessions that was held in a 4-week time frame. Information shared in the sessions was based on the constructs of the HBM, which suggested that changing a person's lifestyle to include more physical activity, non-communicable diseases could be prevented and chronic diseases could be managed for a better QoL (Hoseini, Maleki, Moeini & Sharifirad, 2014).

The way an individual perceives his or her health affects their prognosis. Minorities as well as individuals in lower socioeconomic groups tend to have a risk of developing cancer, heart disease and stroke (Sorensen et al., 2011). The HBM is a psychological-based model designed to explain as well as predict behaviors associated with health by concentrating on an individual's attitudes and beliefs. The model was created in 1974 by Rosenstock with six ideas: (a) perceived susceptibility-distinguish an individual's belief or concern about a specific disease, in essence do they feel a danger of contracting the disease; (b) perceived severity—is used to determine the individual's idea of how much harm or pain will they experience if they contract the disease; (c) perceived

benefits and perceived barriers will discuss the truth in regards to how a specific disease will affect the population as well as the cost that an individual will encounter after being diagnosed with a disease; (d) cues to action are designed to be fast paced forces that cause a person to act on his/her behalf; and (e) self-efficacy is described as being a belief that an individual has that he or she will be able to change behavior (Hoseini, Maleki, Moeini & Sharifirad, 2014).

In previous research according to Bellamy in 2004, as cited by Thalacker (2011), the HBM may be used to explain, to predict, or to influence the health behavior of individuals suffering from a chronic disease such as CKD, by offering the development of a suitable educational program specific to the disease. Hypertension, which is directly related to the development of CKD, is a treatable disease that is considered a preventable cause of death, and receiving treatment for hypertension is an important factor in prevention of cardiovascular disease. Individuals who are diagnosed with a chronic illness but are following the treatment plan recommended are usually able to manage their disease and have a better QoL using the HBM (Thalacker, 2011). Furthermore, Newell et al. as cited in Hoseini, Maleki, Moeini & Sharifirad, 2014, shared that the HBM model has been instrumental in increasing awareness of perceived severity concerning hypertension, leading to a major reduction in systolic and diastolic blood pressures.

Habits are developed over time and are influenced by an individual's beliefs, experiences and attitude; therefore, asking a person to change to a different style of living becomes a challenge. The HBM was the first theory designed to offer insight in how to

live healthy to combat diseases, exclusively. This model was further extended to include the rationale for a lack of public participation in detection and prevention of illness workshops/programs. By using this model, individuals were able to gain a better understanding of information, thereby giving them better control over health decisions and prevention of diseases (Hoseini, Maleki, Moeini, & Sharifirad, 2014). Furthermore, the model is based on individuals acting in a positive manner, especially if they feel that the action caused them to avoid being diagnosed with diseases that ultimately have a negative impact on their health (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012). When individuals view themselves as being in danger, they will more likely take actions to prevent the perceived threat. The HBM suggested that once an explanation is presented to an individual discussing the negative consequences of a specific disease, the individual established perceived susceptibility (Hoseini, Maleki, Moeini & Sharifirad, 2014).

However, there are several limitations to the HBM: (a) the model does not make provisions for personal attitudes or beliefs that may affect their judgment concerning the acceptance of an illness; (b) the model does not address behaviors that are considered to be habitual and that may have an impact on individuals making informed decisions about their health; (c) the model does not have an explanation for behaviors that individuals engage in to be socially accepted; (d) the model does not address environmental or economic factors that may interfere with therapeutic recommendations; (e) there is an assumption that all people have access to gain knowledge and information pertaining to

illnesses and diseases; and (f) there is also an assumption that individuals are encouraged to act in the decision making process (Boston University School of Public Health, 2019).

Literature Review Related to Key Variables

Economic Burden of CKD

Since the economic crisis that affected the world in 2007-2009, national budgets in all countries have taken notice of structures requiring funding in specific areas. Health care is a major expense and has been for several decades, for individuals in all income levels. A major source of concern in many countries is the increasing rates of diabetes and obesity, which have a direct relationship to kidney failure. With such a significant rise in kidney disease which progresses to ESRD requiring a transplant or dialysis, the health care budget has become stressed worldwide (Collins, Gilbertson, Snyder, Chen & Foley, 2010). The annual estimated cost of an individual receiving HD includes: $7332 in Brazil, $7500 in China, $5000.00 in India and $6240.00 in Indonesia (White, Chandban, Jan, Chapmenn, & Cass, 2014).

The economic burden of CKD/ESRD is attributed to the long-term care that is necessary for patient survival on dialysis (Nugent, Fathima, Feigl, & Chyung, 2011). Patients suffering from ESRD are hospitalized approximately 12 days for inpatient care yearly, with a high annual mortality rate (Fischer, Anya & Gordon, 2011). Furthermore, individuals with financial difficulties or from a low-economic status may experience limited resources, invest in low-cost drugs, seek low-cost health services and do not to comply with dietary restrictions (Gerogianni & Babtsikou, 2014). Thus, CKD is a major challenge to global policy in the 21st century due to the increasing rate of disabilities,

decreasing the QoL, increasing cognitive decline and creating a higher infection rate (Tuot & Powe, 2011). Developing nations are not prepared to handle the effects of chronic illnesses due to diabetes, obesity, and hypertension that are rising among the poor of their nation. There is a severe lack of attention to chronic illnesses, which results in a lack of awareness, especially about CKD, in the global health community. With the growing rate of CKD in developing nations, there is a severe need for funding to develop programs that will provide information on methods to prevent CKD. Since CKD is the 12th highest cause of death and 17th highest source of disability globally, there is a serious need for population awareness in order to help combat the escalation of a major economic burden. In developed countries, such as the United States, the public healthcare system received 10-15% of the gross domestic product GDP (Nugent, Fathima, Feigl, & Chyung, 2011). However, in the low- and middle-income countries' (LMICS) public health care systems received approximately 0.8-4% of the annual GDP, making it impossible for them to offer healthcare resources for chronic diseases.

With increased public awareness of CKD, Medicare will be able to save an estimated $250,000 per patient who will not be diagnosed with ESRD requiring dialysis. This figure is based on treating the person at $65,000 a year, with a 4-year life expectancy. Therefore, if the person lives longer, the savings will be greater (Narva et al., 2010). Individuals within the United States aged 20-39 years diagnosed with CKD have a life span projection of approximately 17 years or longer, thus requiring a longer treatment time for survival purposes or receiving a kidney transplant (White, Chadban, Jan, Chapman & Cass, 2008). Predictions are that 30% of the 1.1 trillion dollar allocated for

medical spending will be due to nephropathy as a result of diabetes (Atkins & Zimmet, 2010). Furthermore, by 2020 it is projected that the Medicare budget will have expenditures reaching as high as 53.6 billion dollars. There is also a projected 50% increase in individuals waiting for kidney transplants that will ultimately have to receive dialysis, thus increasing the death rate tremendously. Therefore, public awareness and interventions are a great concern for combating the diseases related to CKD such as obesity, hypertension, nicotine addiction (smoking), and diabetes. Today, it is necessary to offer as much education as possible for the prevention of kidney disease to the general population, since the projected increase for ESRD is approximately 50% over the next ten years (Collins et al., 2010). If patients are educated to sustain quality self-management protocol by using information from the National Kidney Foundation, there will be a decrease in hospitalizations, thus reducing the economic burden as well. However, a major component to reduce the cost of CKD on the health care system is the increase in public awareness of kidney disease and the importance of making lifestyle changes that will decrease likelihood of the disease (Tuot & Powe, 2011).

CKD and ESRD are quickly becoming an economic burden globally, and initiatives for developing a strategic framework that include international involvement, local legislation, communities, and health professionals are being established. At the international level, the plan includes strategies to prevent cardiovascular disease and diabetes, promotion of organ donation, and public awareness. The framework on the local level involves updating the national register of dialysis and patients receiving transplants; expanding programs to prevent chronic vascular disease; hiring and maintaining

personnel who are skilled in the area of nephrology; and developing guidelines for national RRT delivery. Local communities should be involved in public education in order to raise the awareness level of the general population concerning vascular disease and the associated risk factors, along with offering suggestions for lifestyle changes and screenings for hypertension, cholesterol and kidney disease. Health professionals are becoming more educated concerning chronic kidney disease its stages of progression, as well as the importance of early diagnosis and patient education, however this component is lacking in society (Li, & Kalanta-Zadeh, 2020).

Approximately 3 out of 4 deaths by 2030 will be directly related to chronic diseases. Globally, individuals suffering from cardio-vascular disease and diabetes are the major contributors to the global economic burden. Furthermore, by 2025 there will be an estimated increase of diagnoses of hypertension from 972 million people to 1.56 billion people, as well as a major increase of people with diabetes to 366 million by 2030 (Nugent, Fathima, Feigl, & Chyung, 2011). Therefore, it is imperative that the budget make optimal use of the limited resources designated to the healthcare system for educational purposes. In order to combat CKD/ESRD along with other chronic illnesses that the American population is facing, there must be an analysis of the cost for implementation of programs and preventative services. Cost analyses should be designed to measure the effectiveness of interventions through the preferences of people in determining the length of life compared to gaining knowledge of specific diseases (Virgili, Koleva, Garattini, Banzi & Gensini, 2010).

There are approximately 8.4 million individuals diagnosed worldwide with hypertension each year. People have a tendency to ignore the signs and symptoms of hypertension creating a higher vulnerability to the development of chronic illnesses. Interestingly, hypertension can be controlled by changing lifestyles which can be expressed in awareness (Hoseini, Maleki, Moeini, & Sharifirad, 2014). With the increase of high blood pressure and diabetes, the escalation of CKD will be at a much faster rate increasing the cause of death and disability globally, thereby creating a major challenge for the economy (Nugent et al., 2015). Furthermore, Section 152(b) of the Medicare Improvements for Patients and Providers Act, January 1, 2010, decided that kidney disease education (KDE) services be considered an addition to Medicare Part B for patients diagnosed with Stage 4 chronic kidney disease (42 CFR 410.48) (Tuot et al., 2013). It becomes imperative that cost-effective interventions resources for health in society be studied. Since resources are limited, healthcare systems are faced with a declining budget on a daily basis. Therefore, prevention plans become necessary to sustain the general population through educational workshops that are cost-effective and yet successful (Virgil et al., 2010).

Definition of CKD/ESRD

CKD may be defined as dysfunctions of the kidney or damage to the kidneys that lasts for approximately three months or more. CKD has five stages, with the first three stages being asymptomatic. Each stage of kidney damage is reflected in the glomerular filtration rate: Stage 1: GFR ≥90 mL/min per 1.73m^2; Stage 2: GFR of 60-89mL/min per 1.73m^2; Stage 3: GFR of 30-59 mL/min per 1.73 m^2 obliviously to kidney damage; Stage

4: GFR of 15-29 mL/min per 1.73 m^2 obliviously of kidney damage; Stage 5: GFR< mL/min per 1.73 m^2 obliviously of kidney damage or transplant or dialysis treatment (Fink et al., 2012). When an individual reaches the advanced stages of CKD (Stages 4 and 5), he/she is in ESRD, which requires life-saving dialysis or a kidney transplant (White, Chadban, Jan, Chapman & Cass, 2008). Individuals who are experiencing CKD, approximately 95% had early stages of the disease unknowingly (Fink et al., 2012).

Anatomy and Physiology of the Kidneys

The human body has two bean-shaped kidneys which are located in the middle of the body near the back on each side of the spinal cord. The kidneys are necessary to sustain life by cleaning the blood, as well as balancing other chemicals in the body through filtration. The kidneys should process approximately 200 quarts of blood, removing about 2 quarts of waste material and excess water per day. The waste and water removed by the kidneys become urine leaving the body through the bladder in a process called urination. In other words, the kidneys are complex organs which maintain homeostasis for human beings. When measuring renal function, the physician checks for efficiency of kidney function, which should be at 100% if the kidneys are healthy. To measure the functioning of the kidneys, blood work has to be completed using a formula to calculate estimated glomerular filtration rate (eGFR) (Reddenna, Basha, & Reddy, 2014).

Not only do the kidneys cleanse the body, but they also produce Vitamin D and other hormones that have direct relationship to other organs in the body, such as erythropoietin, which creates red blood cells in the body (Sullivan, 2010). Individuals

experiencing renal failure may have an increase in body fluids which leads to swelling, an increase in level of acids, potassium, and phosphate retained in the body, with a decrease in calcium and the development of anemia in later stages of the disease (Reddenna, Basha & Reddy, 2014). Therefore, patients who develop kidney disease must seek immediate help; otherwise, the body will build up toxins which affect the fluids, and the patient could die in a matter day. Symptoms of severe kidney dysfunction include vomiting, loss of appetite, nausea, seizures, agitation, changes in mental status, psychosis, and coma (Sullivan, 2010).

Diagnosis of CKD

Since the study of medicine is being divided into more specializations, the development of new diseases and treatment plans are being discovered, thereby creating more clinical practice guidelines directly related to a targeted illness. Due to the spread of CKD which leads to ESRD, there is on-going research to provide up-to-date information for preventing or slowing down the stages of progression in order to help with the economic burden. However, it should be noted that many of the guidelines being develop are based on the opinions of experts rather than clinical evidence. The guidelines offer standardization for physicians throughout the world in order to maintain consistency of treatment and help manage with the day-to-day operation of their businesses. The Kidney Disease Outcomes Quality Initiative (K/DOQI) was developed by the National Kidney Foundation for “diagnosis and management of chronic kidney disease (CKD)” (Agrawal, Garimella, Roshan, & Ghosh, 2009). When an individual experiences total renal failure, they will be diagnosed as having ESRD, which involves the person’s body filling up

water and waste creating a condition called uremia. Uremia that is left untreated may result in death (Reddenna, Basha, & Reddy, 2014).

CKD is diagnosed by specific clinical markers which have been specified as having a direct relationship to renal functioning (Tuot et al., 2011). When the kidneys do not filtrate at least 180 liters per day, allowing urine to be created at about 2 liters, they are beginning to decline. Renal functioning that shows a small decline of about 30% to 40% may not be noticed. However, individuals with less than 25% of their kidney function will encounter serious health problems. If the functioning drops below 10 to 15 percent, the individual will need to have a kidney transplant or receive dialysis treatment in order to sustain life. Physically, an individual may experience two types of renal failure: acute kidney injury or chronic kidney disease. Acute kidney injury occurs by damage to the kidney or poisoning; however, acute kidney injury may be reversed with the right treatment plan. Chronic kidney disease, on the other hand, is a result of destroying the nephrons in the kidney which filters the blood, and this problem cannot be reversed. Individuals may not be aware of kidney damage for years and therefore eventually suffer from CKD. Individuals who are developing renal failure may start retaining fluid, which will make the body swell; their levels of acids may increase, along with increases in calcium, phosphate, and potassium. They may later develop anemia. There are four classifications for renal failure: (a) acute kidney injury, (b) CKD, (c) ESRD and (d) acute-or-chronic renal failure (Reddenna, Basha, & Reddy, 2014).

Acute kidney injury (AKI) can occur due to several factors that may exist, such as (a) the increasing of serum creatinine by $\geq$ 0.3mg/dl within a 48-hour period, (b) an

increase in serum creatinine to ≥ 1.5 times base line during the last 7 days; or (c) a volume of urine less than 0.5 ml/kg/h for approximately 6 hours. AKI is responsible for roughly 3.2-9.6% of hospital admissions, as well as for 50% of intensive care unit patients and 20% of hospital mortalities.

There are several risk factors that are associated with the development of CKD: (a) Individuals with a fasting serum glucose ≥ 126 mg/dl or a serum glucose ≥ 200mg/dl non fasting and who may also be using an oral-hypoglycemic medication or insulin are diagnosed as having diabetes, which is a major cause of kidney failure; (b) individuals suffering from previous myocardial infarction according to EKG recordings; and (c) individuals suffering from an inability to control their blood pressure (Tout et al., 2012). Furthermore, CKD can also develop from infectious diseases that may include malaria, HIV, schistosomiasis, hepatitis B, and from herbal usage, and multivitamins (Nugent, Fathima, Feigl, & Chyung, 2011 & Grubbs et al., 2013).

Individuals who add supplements to their diets that are not prescribed by a physician may also increase their chances of developing CKD. It is imperative to avoid chemicals that can be harmful to the kidney in order to reduce the progression of CKD. General practitioners (e. g. primary care doctors and nurse practitioners) should ask patients “have you used or taken any vitamins, minerals or other dietary supplements in the past month?’ (Grubbs et al., 2013).

If the patient answers “yes” to the question, he or she should be asked to provide the bottles with the labels for the supplements taken. Supplements may be harmful if they contain at least one of 37 particular herbs which have been identified from research

performed by the Council on Renal Nutrition for the National Kidney Foundation (NKF). The supplements with the highest risk are:

1. Ginseng-36.5%;
2. ginger-23.06%;
3. alfalfa- 19.6%;
4. capsicum -14.19%;
5. licorice-14.8%;
6. dandelion -10.3;
7. aloe-9.3%p;
8. mahuang-7.4%;
9. nettle-7.4%;
10. horsetail-6.0%;
11. yohimbe – 2.6%;
12. rhubarb -2.3%;
13. cascara-2.0%;
14. (14) noni-1.0%;
15. senna- 1.0%;
16. wormwood, broom, buckthorn and bayberry - < 1.0% each

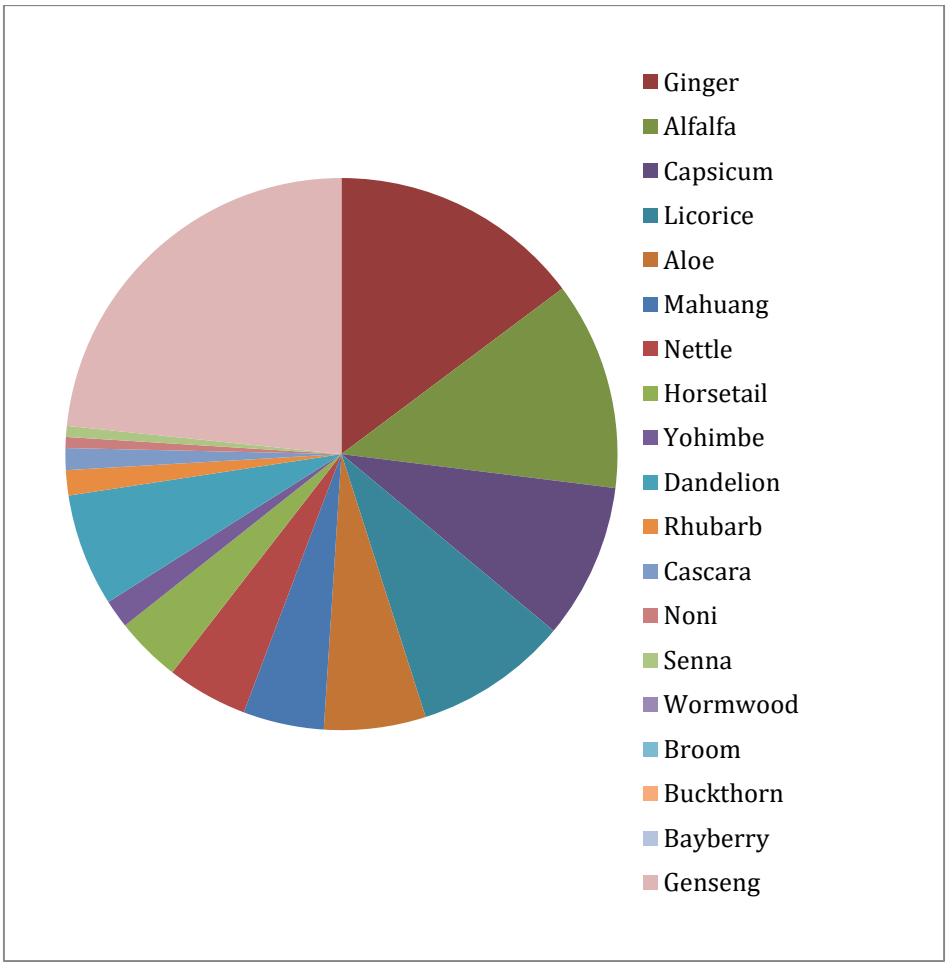

Figure 2. Natural Herbs that Affect Kidney Function.

Several over-the-counter vitamins are also considered to be a high-risk factor. The list includes:

- Centrum Advanced Formula Carb Assist Complete Multivitamin/Multimineral from A to Zinc (3.4%)
- GNC Men's Timed Release Senior Formula (1.7%)
- Centrum Performance Complete Multivitamin Specially Formulated with Ginseng, Ginko, and Higher Levels of 5 Essential B Vitamins (1.6%)
- One Source Complete Women's with Ester-C Calcium 500 mg Cranberry EGCG (Green Tea Extract) Multivitamin Mineral & Herb (1.6%)
- GNC Men's Ultra Saw Palmetto Formula (1.4%)
- One Source Complete Women's Multivitamin/Multi-mineral Herbs with EGCG Green Tea Extract 37 mg & Cranberry 50 mg (1.4%)
- Member's Mark Advanced Multi Performance Multivitamin for Adults (1.3%)
- Member's Mark Advanced with Herbs Metabolic Cleansing System 343 Advocare (1.1%)
- One Source Pure Performance the Advanced Formula Multivitamin Multi-Mineral Herbs Formulated for Active Adults Complete (1.1%) (Grubbs et al. 2013)

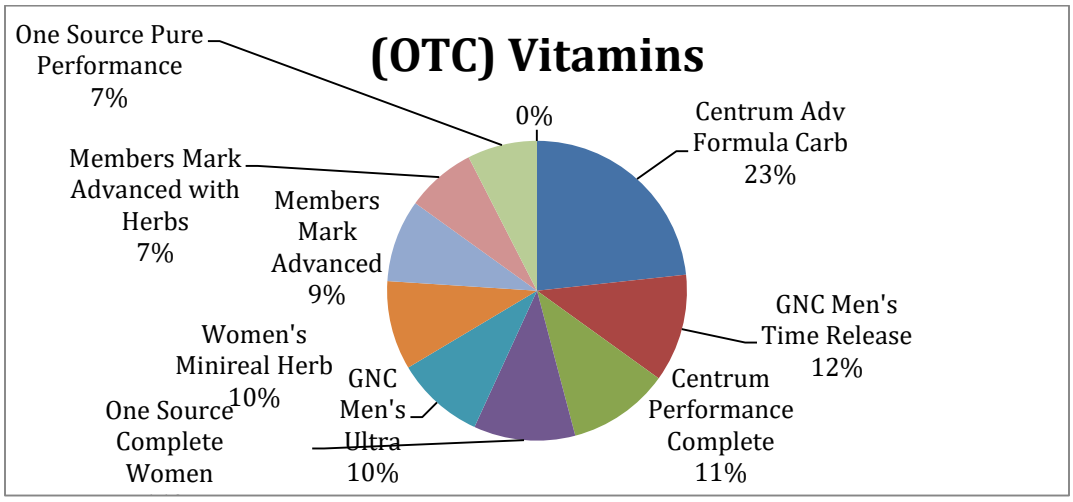

Figure 3. Over The Counter Vitamins (a).

	OTC Vitamins
Centrum Adv Formula Carb	3.4
GNC Men's Time Release	1.7
Centrum Performance Complete	1.6
One Source Complete Women	1.6
GNC Men's Ultra	1.4
Women's Minireal Herb	1.4
Members Mark Advanced	1.3
Members Mark Advanced with Herbs	1.1
One Source Pure Performance	1.1

Figure 4. Over the Counter Vitamins (b).

CKD is determined by five stages of declining renal functioning that are irreversible and progress to total renal failure resulting in ESRD. Stages 1 and 2 of renal decline are defined as covert CKD, which may be asymptomatic, and is often diagnosed in a routine screening targeting people who are diagnosed with hypertension and diabetes. The urine markers are used to determine the presence of micro- and

microalbuminuria, assessing for vascular damage and micro-inflammation for cardio-kidney damage (Nugent, Fathima, Feigl, & Chyung, 2011). There are numerous reasons for kidney failure, such as (a) diabetic kidney disorder, which is associated with the development of diabetes when the glucose metabolism is not producing normally; (b) high blood pressure, which damages the small blood vessels located in the kidney; (c) glomerular disorder, may involve autoimmune diseases, sclerotic diseases and infectious diseases; (d) genetic population, the disease is carried on the APOL1 gene. Inherited or innate kidney disease such as polycystic kidney disease (PKD) occurs when cysts replace the mass of the kidney through a slow growing process. An ingestion of poisons or trauma may also cause kidney failure (Redenna, Basha, & Reddy, 2014).

Prognosis for CKD

Worldwide, CKD is irreversible with a poor prognosis which creates a decrease in the QoL, an increase in physical and mental disabilities, a severe decline in cognition, and a major increase in developing infections (Tuot & Power, 2011). Therefore, people who receive a diagnosis of CKD may also experience psychological disorders such as depression. Furthermore, individuals with the diagnosis of CKD are at higher risk for developing diabetes, cardiovascular issues, and hypertension, thus creating co-morbidity, which is identified as causing premature death, even though aging is a significant phenomenon in this disease (Shan, Zhang, Liu, Hu, & Liu, 2010). Individuals who are part of the dialysis population may have a five to ten likelihood of having a stroke and being hospitalized as compared to individuals who are not suffering from ESRD (Bao et al., 2013). Several strategies have been proposed to prevent CKD, such as screening of

patients who are selected, as well as monitoring and treating patients who are experiencing early stages (1-3) of CKD (Fink et al., 2010). However, if an individual receives a diagnosis of CKD, it is important to monitor the stages of the disease in order to determine if and when comorbidity becomes an issue. CKD is noted to have a mortality rate that is three times higher than most diseases and the patient should be assessed on a routine basis (Ciervo, Davidson & Weir, 2013).

Kidney failure may involve several factors, but the two most prevalent factors are hypertension and diabetes. Approximately 1 billion people are diagnosed with hypertension world-wide, with a majority being African American and male, thereby making this group an at-risk population for developing CKD. Hypertension is defined as having a blood pressure reading greater than 140/90 mmHg (millimeters and mercury). Individuals should be aware that systolic blood pressure rather than diastolic blood pressure is identified as increasing the risk for the development of cardiovascular disease and CKD. Individuals diagnosed with diabetes are also considered to be at risk for developing CKD. According to Previous research it is estimated that by 2025, approximately 350 million people will be diagnosed with diabetes because of the growth of the population, longer life spans, unhealthy food choices, sedentary lifestyles, and increased body mass index (Bakris and Ritz, 2009).

A major factor in renal failure is the aging process. As an individual age, there is a noticeable decrease in renal functioning concerning the mass that declines approximately 30% between the age range of 30 and 90. The blood flow in the renal system decreases approximately 10% every decade after age 30 however, this is not a major concerned

unless individuals are suffering from conditions such as diabetic nephropathy, amyloidosis, benign prostrate hypertrophy, renovascular disease, hypertensive nephrosclerosis, tubulointerstitial diseases, contrast nephropathy, cholesterol embolism, and uroepitheilial malignancies (Ng & Anpalahan, 2011).

Individuals diagnosed with ESRD or CKD may face several manifestations as well as latent issues that include, but is not limited to lifestyle changes, dietary changes, and fluid restrictions leading to depression. As people battle this progressive illness, they may become depressed (Finnegan-John & Thomas, 2012). Since the use of more invasive treatments in dialysis does not decrease morbidity or mortality, the QoL diminishes over a period of time, causing a poor outlook on life from the patient's perspective (Davison & Jhangri, 2010). CKD/ERSD eventually leads to death; however, patients diagnosed with renal failure experience a different form of life-ending experiences. Therefore, it becomes important for health care personnel to discuss the end-of-life process with these individuals. However, this discussion often is not held with the patient and his or her kidney care team. Medical teams normally avoid this conversation with their patients because it takes away the patients hope for living (Davison, 2010). With the understanding of CKD/ESRD implications, individuals can evaluate their lifestyles and change their behavior, thereby decreasing the economic burden of this disease and prolonging their lives (Nazar, Kindratt, Ahmad, Ahmed & Anderson, 2014). With the estimated increase of individuals diagnosed with hypertension being approximately 1.56 billion people by 2025 as well as an increase of individuals being diagnosed with diabetes

to 366 million according to the World Health Organization (WHO), CKD will be become the 3rd leading cause of death by 2030 (Nugent et al. 2015).

Primary and Secondary Prevention of ESRD

Individuals, who are deemed at risk for CKD, may be able with awareness to slow down the stages of developing ESRD by researching proposed medical therapies to change the course of the disease. Primary Care Physicians play a major role in preventing the progression of CKD to ESRD by teaching the importance of controlling blood pressure through diet, exercise, and medication as well as monitoring the use of medication that may be labeled as being nephrotoxic (i.e. non-steroidal anti-inflammatory agents). Lifestyle changes may also be modified to help slow down the progression of ESRD that include decreasing the body mass index to less than 24.9 and ceasing tobacco usage (i.e. smoking). Preventable risk of CKD that includes specific modifications is management of hypertension, diabetes and associated CVD by following medical treatment protocols as prescribed (Tuot & Powe, 2011).

There are evidenced-based practices that have been identified as being successful in slowing down the progression of CKD to ESRD. By controlling blood pressure through the use of an angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB), and by controlling glycemic levels, there is a significant decrease in the progression of the stages in CKD (Tout, Plantiga, Hsu, & Powe, 2012). Physical activity is also considered an evidenced-based practice for individuals diagnosed with hypertension and diabetes (Patterson, Meyer, Beaujean, & Bowden, 2014). Changing to a healthy lifestyle that includes eating the right diet, exercising and getting

regular medical exams can help prevent chronic as well as non-communicable disease, reducing the health cost burden of America (Hoseini, Maleki, Moeini, & Sharifirad, 2014). No matter which treatment modality the individual chooses, the results will be directly related to self-care and adherence to the prescribed treatment plan (Wright et al., 2011).

Lifestyle Changes Resulting from CKD

Since CKD is a life-threatening prolonged disease that ultimately leads to ESRD, which requires a major adjustment in an individual's lifestyle in order to survive, his or her QoL is thereby affected. The maintaining of life that is of quality depends solely on the coping skills of the individual (Kaltsouda et al., 2011). The World Health Organization (WHO) defines the QoL "as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns (p. 946)" (Finkelstein, Wuerth, & Finkelstein, 2009). On the other hand, "health-related quality of life can be defined as the extent to which one's usual or expected physical, social or emotional well-being (QoL) is affected by a medical condition and/or its treatment" as defined by WHO according to Finkelstein, Wuerth, and Finkelstein, (2009). Additionally, after an individual receives a diagnosis of CKD, he/she begins a spiritual quest for meaning and hope in their lives. The onset of this spiritual need is usually based on the individual's uncertainty of the future and the development of vulnerability, fear, anger, depression and fear of dying. Spirituality gives individuals a divine meaning of life and death based on the internal and external value of their religious beliefs. There is a direct correlation between illness and

spirituality that influences the progression of an illness, the treatment plan, and the adjustment of social life skills. For a more positive outcome for CKD/ESRD patients, it is imperative that the dialysis team attend to the spiritual needs of the patients as those needs impact the HRQL as well as the physical needs (Davison & Jhangri, 2010).

A major emotion experienced by individuals suffering from renal failure is grief, which relates to the loss of being independent, a change in self-image, and changes in dietary regiments according to previous research conducted Viederman and Kimmel (as cited in Kaltsouda et al., 2011). Furthermore, there is a direct relationship between patient outcome and denial. Individuals who choose to ignore that they have been diagnosed with a chronic illness will have adverse effects psychologically, spiritually, and physically (Kaltsouda et al., 2013). QoL is important in determining the therapeutic outcome as well as the rate of morbidity and mortality. Therefore, Health Related Quality of Life (HRQOL) is characterized by domains of emotionality and physical, social, functional and spiritual dimensions. Individuals who have a diagnosis of CKD have to identify their perception of the physical nature of the disease along with psychosocial stress, thereby creating a perspective of their future (Davison & Jhangri, 2010).

A major component of chronic illnesses and how they are viewed is based in spirituality, which in many cases identifies one's view of life. Spirituality in this modality is not linked to religion based institution or faith, instead is part of an individual's psychic being which is affected emotionally by illnesses that may exist. Spirituality may affect the choice of whether to receive treatment, the type of treatment to be received, and relationships between family members as well as friends. Additionally, spirituality has a

direct effect on the HRQOL and the individual's adjustment. Since spirituality is imperative, WHO promotes early identifying and assessing problems that may be associated with spirituality such as depression, feelings of worthlessness, and hopelessness. Therefore, all hospitals that are accredited in the United States are required to complete a "spiritual assessment" to identify any needs that may be addressed (Davidson & Jhangri, 2010). Interestingly, individuals who are diagnosed with comorbidities have an excessive lower score in five of the eight identified QoL domains specified in the SF-36. Younger people diagnosed with CKD/ESRD have been reported as experiencing more problems in mental health compared to the elderly. The elderly, on the other hand, experience more difficulty in physical health compared to their younger counterparts (Santos et al., 2010). In order to reduce the morbidity and mortality rate in the future, it is essential to monitor a patient's ability to function on a day-to-day basis, and their social well-being (Han et al., 2009).

Elderly patients who suffer from CKD/ESRD do not always have an opportunity to receive a kidney transplant; therefore, their QoL becomes a major concern. This is true especially since elderly patients also have a tendency to develop comorbidity to include vision that is impaired, deafness, cognitive dysfunctions, as well as arthritis that may cause poor mobility. Furthermore, this population is normally isolated and may suffer financial problems as well as live in poor housing situations. Therefore, depression becomes major concern for the elderly patient suffering from CKD/ESRD (Brown et al., 2010).

Since CKD is a life-long disease which alters a person's life dramatically, the patient may feel vulnerable, hopeless, fearful and angry, depressed, and suffer possible role changes along with a fear of dying. Traditional or non-traditional spirituality may exist in an individual's life and is essential to individuals, especially when they are facing a disease that will ultimately end in death. The individual's knowledge of the disease has an impact on how that individual deals with the course of his or her illness, treatment choices, the relationships that he or she develops with loved ones, and overall quality of health. Therefore, healthcare professionals measure the HRQOL by using the Kidney Dialysis Quality of Life Short Form (KDQOL-SF), Version 1.3, which includes the ESRD Spiritual Belief Scale consisting of nine- specific items in survey form to assess their spiritual role (Davison & Jhangri, 2010).

Individuals who are not able to get a kidney transplant and choose HD as their mode of treatment usually experience a major effect on their QoL compared to individuals who are diagnosed with cancer, arthritis, chronic lung disease, diabetes and cardiovascular problems. There will be changes affecting their diet that will cause limitations for employability and traveling, as well as changes in sexual functioning (Santos, 2013). Theofilou (2011) suggested that individuals receiving HD may have a lower QoL in the areas of environmental and social relationships areas. However, it should be noted that QoL is subjectively based on the individual's perception of their disease and how it affects him or her on a day-to-day basis. The severity of perception will determine the individual's outlook on life and how he or she will adjust to making important medical decisions that pertain to him or her physically, emotionally and

socially. If the outlook is of a positive nature, the individual will adhere to the prescribed treatment plan, and his or her survival rate will be extended (Fructuoso, Castro, Oliveira, Prata & Morgado, 2011).

The Center for Medicare Services (CMS) issued a mandate that all dialysis units monitor HRQOL in their patients as a stipulation for coverage. The major reason for this requirement is to make the nephrologists aware of how patients perceive their QoL, so that the nephrologists do not focus just on the biological effect of the disease. Execution of this mandate has led to more emphasis on patient's HRQOL. To address this issue, units are asked to use the Kidney Disease Quality of Live-36 (KDQOL-36) questionnaire. CMS requires that the assessment be done on regular intervals within 4 months of beginning HD and to be continued annually or if a change is noticed in the patient. The instruments designed to evaluate HRQOL consists of measurements that are objective and subjective (Finkelstein, Wuerth, & Finkelstein, 2009).

Subjective measurements encompass outcomes reported by the patient concerning their physical and mental well-being and not interpreted by the healthcare provider. This subjective information has been documented as being a valuable source in identifying inconsistencies between patients receiving treatments and the perception of their health care provider assessments of problems that may exist. In essence, the patient becomes the expert in describing his/her perception of their QoL (Finkelstein, Wuerth, & Finkelstein, 2009). The use of objective measurements is just as important to the medical team for determining treatment plans to improve the patient's HRQOL. Assessing the patient's ability to function physically by asking him or her to perform a treadmill test will give the

healthcare provider a baseline to operate from in order to assess declining mobility. Areas of concern for individuals diagnosed with CKD on the KDQOL-36 are low scores in the areas of depression, sleep disturbance, slower physical functioning, lack of regular social interaction, expressions in cognitive dysfunctions, development of anxiety, excessive pain, and a lack of global perceptibility (Finkelstein, Wuerth, & Finkelstein, 2009).

Other assessments may be included when working with the patient. The health survey assessment consists of 36-items (SF-36) that measure eight categories, including physical functioning, role limitations, bodily pain, vitality, emotional well-being, emotional problems, and perception of general health. Items from each category are added together to get an overall score. The score range is 0 to 100, with 100 being designated as the best HQOL. The Rationality/Emotional Defensiveness (R/ED) scale, which consists of 12-items, may also be administered to measure the person's rational thought process. It is important to note the individual's reality is based on being diagnosed with a chronic illness and the way he or she perceives the illness. Diseases that attack the body physically will arouse emotions such as sadness, anger, fear, and anxiety (Kaltsouda et al., 2011). Finkelstein, Wuerth, and Finkelstein (2009) indicated that patients who score low on SF-36 may experience a higher rate of hospitalization as well as mortality.

Psychosocial Effects of CKD

Adapting to a chronic illness affects individuals mentally, physically, and socially. Therefore, it is important for the medical team working with the individual to be

aware of the patient's subjectivity to his/her diagnosis in order to provide the necessary care for a positive outcome (Fructuoso, Castro, Oliveira, Prata & Morgado, 2011). The spiritual well-being of individuals with chronic illness is also a major part of adjusting psychosocially to a specific illness and their overall psychological experience of the disease and its progression. However, it should be noted that even though spirituality is important, spiritual distress is ignored in most clinical settings, and there is also a struggle with physicians as to how to implement this component (Davison & Jhangri, 2010).

Physically, individuals diagnosed with kidney disease may experience the retention of fluid in the body, causing swelling, their acid levels may increase, there may be a rise in their potassium levels, but there will be a decrease in their calcium levels, with an increase in the phosphate levels as well as the development of anemia in Stages 3-5 (Reddenna, Basha, & Reddy, 2014). Williams, Quinn, Callery, Kiss and Oliver (2009) stated that individuals who suffer from ESRD requiring dialysis have an increased chance of developing infections, which have been identified as being a major cause of death in the CKD population. HD patients are identified as being vulnerable to developing septicemia/bacteremia because of the use of catheters, compared to PD patients who are at higher risk for developing peritonitis.

Individuals with CKD or ESRD altered their lifestyles to accommodate the required treatment in order to live. Therefore, cognitive dysfunction is a challenge for individuals experiencing HD. The most common disorder for individuals suffering from a somatic disease is depression. Depending on the severity of the disease, the level of depression will fluctuate along with physical symptoms. Not only are physical symptoms

a determining factor for depression, but the individual's perceived objectivity and subjectivity along with their personality will also help determine their level of depression (Makara-Studzinska & Koslak, 2011). Finkelstein Wuerth & Finkelstein (2009), along with Finnegan-John and Thomas (2012), suggested that individuals suffering from CKD may experience a major form of depression with all the lifestyle changes required, thereby affecting their treatment outcome. Also, depending on how they perceived the disease and their susceptibility to the disease, patients may experience a period of mourning which may lead to a Major Depressive Disorder. This is especially true with changes that may include giving up their careers, changes in their sexual performance, the chances of reproduction decreasing due to damage to the reproduction organs, as well as personality changes (Finnegan-John & Thomas, 2012). Approximately 30% of individuals diagnosed with ESRD have a low score on the HRQOL and suffer from clinical depression that has been associated with a high rate of morbidity and mortality. Depressive disorders increased the frequency of hospitalization, thereby having an adverse effect on the proposed treatment plan for replacement therapy. Furthermore, previous studies of individuals who suffered from severe or chronic depression showed an increase of suicide ideations, increasing the rate of mortalities (Makara-Studzinska& Koslak, 2011).

Because depression is a major issue for ESRD patients, it is important to assess the patient by using an instrument such as the Beck Depression Inventory in order to measure his or her level of depression before a treatment plan is developed. Furthermore, the patient should be assessed and diagnosed by normal psychiatric criterion, particularly

if medication for anti-depression is required. The use of non-pharmaceutical treatments such as cognitive behavioral therapy, exercise therapy, and psychotherapy may also be effective for this group of patients. Gender is a major factor to be considered in assessing for mental health issues; in a study conduct by Theofilou (2011) female patients diagnosed with CKD/ESRD exhibited a higher score of trait anxiety and depression with low scores in positive affect. Male patients diagnosed with CKD/ESRD are shown to have more social activity involvement with more interests and a higher QoL.

Individuals who are sustaining life through HD are diagnosed more often with depression compared to individuals who are utilizing PD. The depressive symptoms may be linked to the process of the HD, which requires connection for a 3 to 4-hour period, three times a week at a machine, which restricts mobility (Theofilou, 2010). The physical symptoms of depression are exhibited by fatigue, loss of appetite, insomnia, and a change in temperament. With the changes caused by depression, individuals may choose to stop treatment or not adhere to all phases of the treatment plan (Makara-Studzinska & Koslak, 2011).

Emotional Changes

Kaltsouda et al., (2011) expressed that individuals who are diagnosed with chronic illnesses may experience stress in the situation, thus having a profound effect upon their future and their adjustment to being chronically ill. Individuals who are diagnosed with physical diseases that are life-threatening or that lead to death may have a tendency to develop emotions that have a negative impact on their lives as well as adherence to treatment plans (i.e. anxiety, anger, sadness and fear; Kreitler, 2004, as cited

in Kaltsouda et al, 2011). It was furthered noted that a high rate of individuals suffering from CKD experienced depression on a systematic basis, which may ultimately affect their treatment outcome. With the diagnosis of ESRD, individuals are required to live under certain constraints which regulate their diet as well as social lives in order to survive. The illness is prolonged and stressful with several life-changing situations. The disease requires several hospital admissions and ultimately ends with death. The emotional-aspects of being diagnosed with ESRD affected the coping mechanisms that an individual employed to adjust and survive. Since CKD is asymptomatic during early stages, an individual may experience denial as a defense mechanism. ESRD patients are noted to experience several psychological adjustments before final acceptance of the disease, thereby affecting their adherence to treatment plans as well as their mental adjustments (Kaltsouda et al., 2011). In previous research conducted by Olff (1999) and Monat and Lazarus (1991; as cited in Kaltsouda et al., 2011) individuals diagnosed with ESRD who are not accepting of their diagnosis may experience a negative emotion which will affect them mentally and physically.

Public Awareness of CKD

With the increase of CKD/ESRD worldwide, it is important that the public become aware of this life-threatening disease. Prevention programs are basically non-existent in the lower and middle income counties, thus leaving the population at higher risk for developing the disease (Nugent, Fathima, Feigl & Chyung, 2011). Individuals who may be at risk of developing CKD may not have knowledge pertaining to the signs and symptoms of the disease or how the disease progresses to ESRD, which ultimately

leads to death (Greer et al., 2011). Latinos and African Americans are identified as being at a higher risk for developing CKD in comparison to the white population, thus creating a need for educating this targeted population (Ramirez, 2008). There is a distinct difference between low awareness and poor awareness. Low awareness suggests that there is lack of knowledge in understanding the disease of the kidney whereas, poor awareness is a lack of physician recognition of the disease or confusion may exist pertaining to the proper diagnosis or treatment plan during the early stages, thus resulting in not educating the patient (Whaley-Connell et al, 2012).

Prevention programs for individuals with advanced stages of CKD (4 or 5) should include information that raises the level of awareness of how the disease is genetically linked, as well as how risky lifestyles may be a significant factor in the development of the disease (Tong et al., 2008). In a study conducted in North Karelia, Finland, a theoretical based activity was used as part of a national policy framework showed success over a 25-year period of decreasing non-communicable diseases such CVD on national basis in 1972. There was a joint effort between authorities both on the local and national level along with WHO in the implementation of a comprehensive awareness program to disseminate information to organizations of the community such as schools, media campaigns, food industries, etc. informing the general public of non-communicable diseases. The key to the success of this project was the ability to work with the community and local organizations and create a program that was flexible using feedback to improve the program contents. In essence, prevention programs that are organized and

well planned can have a great impact on an individual's lifestyle and the community a whole (Avery, Legget & Juncos, 2015).

Nephrologists (kidney specialists) have worked to develop a strategy to increase CKD awareness. However, their effort has focused only on at-risk patients or patients who have already been diagnosed with the disease (Lien, 2012). This has resulted in leaving the general population unaware of a disease that is becoming a major epidemic throughout the United States and the world. When the general population experiences a low level of awareness of a disease such as CKD, they will not understand the impact of the disease on the health care system or society (Whaley-Connell et al., 2011).

Since there are very few signs and symptoms of CKD, and the disease is asymptomatic in nature, public awareness becomes important in order to establish preventive methods or to slow the pace of the disease's progress if already diagnosed. Individuals who control their blood pressure, manage their diabetes, and check their protein in their urine regularly may be able to avoid CKD or decrease the rate of the progression of kidney failure (Mathew et al., 2010). Depending on the characteristic of the individual, such as age, race, sex, or whether there is a diagnosis of diabetes or hypertension, screening may be done on a regular basis. Elderly people may have issues that are being treated, and screening will not take place because of a previous diagnosis. Insurance is also considered a barrier in whether a patient is screened by his or her primary care physician. If the individual does not have a primary care physician and keeps regular appointments, he or she will not be screened on a regular basis. Last but not

least, individuals must develop a healthy lifestyle, which includes but is not limited to not smoking, physical activity, and very little alcohol (Plantiga et al., 2009).

It is suggested that is not economically feasible to screen the entire population, but community workshops can raise the level of consciousness among the general public (Mathew et al., 2010). There are several steps that may be taken to increase public awareness as well as clarity in creating campaigns: (a) information pertaining to the prevention of developing type 2 diabetes; (b) encouragement of screenings for early detection of diabetic kidney disease; (c) information for patients of kidney disease through educational seminars; (d) encouragement in following of prescribed medications; and (e) continuation of research for strategies to reach the general population. Since CKD/ESRD is a global problem, it becomes a challenge to increase awareness that involves all facets of society from primary care physicians to individuals in all economic statuses, in all countries, so therefore awareness has to be a local action with a chain effect (Atkins & Zimmet, 2010). Furthermore, it may be necessary to present the awareness workshop by using primary, secondary and tertiary plans in order to have the ability to incorporate education to reach every participant.

Cognizance of CKD is comprised of knowledge of the disease along with causes, risk factors, treatment plans, and long-term prognosis (Plantinga, Tuot, & Powe, 2010). The National Health and Nutrition Examination (NHANES, 1999-2004) suggests that 8% of individuals diagnosed with CKD Stage 3 and 41% diagnosed with Stage 4 of CKD were aware of the disease and the risks that are associated with the disease (Tuot et al., 2011). Increasing public knowledge of awareness will allow people to effectively control

their comorbidities such as diabetes, hypertension, and cardiovascular diseases (Santos et al., 2010).

Recognition of CKD can be placed into two categories: (a) patient/public awareness and (b) provider awareness. This study was designed to focus on patient/public awareness, which involved presenting general knowledge of the disease to include: (a) anatomy and physiology of the kidneys, (b) risk factors (cardiovascular disease, hypertension, diabetes, family history, etc.) and (c) individual perception of susceptibility and perception of severity (Plantinga, Tuot, & Powe, 2010). Furthermore, it is not known at the present time the power between chronic kidney disease awareness and the associated health behaviors (Tuot et al., 2013). However, Tong et al., (2008) suggested that individuals are not willing to undergo dialysis and transplantation for renal failure but would rather be taught how to prevent the disease if possible. Therefore, in order for CKD to be prevented, it becomes necessary to conduct research on increasing the awareness of this disease among the general public through the promotion of health awareness. Community health awareness may include screening events, non-medical treatments to incorporate lifestyles factors that include diet plans and complementary medication, as well as research for cure or remission of the disease.

In March 2006, the International Society of Nephrology and the Korean Society of Nephrology developed the World Kidney Day to increase public awareness of the impact of CKD as well as increase general knowledge about the disease. The development of educational programs may lead to an initial delay of dialysis, improvement in self-care management, as well as decrease in mortality rates for

individuals diagnosed with ESRD who are receiving treatment through dialysis (Tuot et al., 2013). When clinical markers are present in a patient, awareness can be an important factor, especially if the marker identifies renal dysfunction. Awareness allows the individual to benefit from a change of lifestyle and from medical procedures that are designed to sustain life. Public awareness may stem from programs designed for the education of the general population. The process of predialysis workshops may postpone the beginning of dialysis treatment, help to improve self-care, and slow down the mortality rate for patients diagnosed with ESRD.

Since it is emphasized that self-recognition of CKD, knowledge of kidney disease as well as the complications associated with CKD are low, it becomes urgent to develop community workshops to educate the general population (Tuot et al., 2012). To help facilitate knowledge to the general population, The National Kidney Foundation designed a program for awareness entitled Kidney Early Evaluation Program (KEEP). KEEP is designed to provide screening for the detection of kidney disease among individuals who are high risks due to being diagnosed with diabetes mellitus or hypertension or having an established family history of diabetes, hypertension or kidney disease. The program provides follow-up with the participants that were screened as well as with their healthcare providers. However, it should be noted that this is the only sustainable program available now (Whaley-Connell et al, 2011).

Effectiveness of Existing Awareness Programs

Health problems that are common in the American culture such as diabetes, hypertension, cancer, and heart disease are associated with individual choices of

lifestyles. Approximately 35% of cancer diagnosis is due to diets, whereas a lack of exercise resulting in a sedentary lifestyle is associated with diabetes, obesity, hypertension and cardiovascular disease (Osaba, et al., 2012). In areas, such as breast cancer and cardiovascular disease individuals who are aware of their diagnosis and prognosis have an active role in their care, as well as be an active role in their treatment plan (Whalley-Connell et al., 2012). Public health alertness included many disciplines to prevent disease and death among the general population, in so doing provided a variety of choices for a better QoL. Furthermore, the generating of environmental changes was healthy to all people by involving institutions, community, and society (Boston University School of Public Health, 2019.

When individuals become conscious of a specific disease, they may become motivated to gain knowledge about the disease to include risk factors, treatment plans, allowing them the ability to communicate with their primary caregivers. Proof of the power of public awareness has been documented with heart awareness between 1980 and 2000. There was a 50% decline in mortality associated with heart attacks directly due to public awareness (Whaley-Connell et al., 2012). Individuals who are not aware of symptoms or delay seeking medical attention after signs and symptoms are noticed, contribute to status of late stage diagnosing (Austoker et al., 2009).

Individuals who attend awareness campaigns or workshops are encouraged to get screening for early detection of specific health problems. The National Breast Cancer awareness from 1993-1995 found that workshops were effective in early diagnosis of breast cancer patients (Jacobsen and Jacobsen, 2011).

CKD Perception

Perception of the CKD impacts how an individual views his/her treatment plan, as well as adherence to the prescribed treatment. Since CKD leads to ESRD, which requires an artificial process for excretion in order to survive, the patient's view of what is happening to him/her and how his/her life will be affected becomes important (Finnegan-John & Thomas, 2013). Every person has a personal perception of illnesses and what an illness may incur. This perception is based on past experiences that they may have had. Experiences and environment help to dictate the development of stereotypes and biases (Walton, 2011). Furthermore, the perception of illness plays a vital role in developing self-care behavior and adherence to the prescribed treatment plan for individuals requiring HD. Therefore, interventions such as education and awareness, which may improve the understanding of the disease, may create an improvement in adhering to the treatment prescribed for a better QoL (Seyyedrassoli, Parva, Rahmani, & Rahimi, 2012).

When individuals are aware of what is going on in their bodies, they are able to make better decisions on prevention or deciding what healthcare treatment will be more appropriate for them. However, at the present time there is not an instrument/assessment that has been developed that is accepted by physicians, thus, leaving the decision to the physicians as to whom they will treat; therefore, patients not chosen to be treated are still at risk for developing CKD (Tangri et.al., 2011).

Because CKD is considered asymptomatic or silent, it is important to make the general population aware of this disease which causes a severe lifestyle change in order to live. Individuals who suffer from hypertension and/or diabetes are at a higher risk for

developing CKD. However, there is a gap in the literature in determining what would be the best way to raise CKD/ERD awareness among the general population thereby improving health outcomes for people around the world (Tout et al., 2013). Knowledge allows people to manage the disease process better as well as slow down the progression of CKD. Increased awareness may also help patients prevent complications that are metabolic in nature, as well reduce the development of cardiovascular-related diseases (Tuot et al., 2011).

Previous research by Klienman and Benson (as cited in Walton, 2011) indicates that cultural consideration is major phenomena that have a direct bearing on the perception of CKD. Medical practices that are based on the tradition of an individual's educational background are limited and may not meet the needs of a specific patient because of a lack of knowledge. To combat the issue of not being culturally aware, healthcare professionals may use an "ethnography" approach, which incorporates engagement with other people to learn and understand their cultural practices. To be successful in teaching awareness of CKD, nephrology nurses must gain cultural knowledge of the community and build relationships to facilitate an environment that is productive in reducing illnesses. Every individual has a perception of the world that is based on previous social or environmental experiences to transform an individual's thinking process, the individual may have to initiate a critical self-reflective process about his/her personal perception of illness as well as of the world (Walton, 2011).

Individuals at Risk for Developing CKD

Interestingly, most individuals that are deemed at risk for developing CKD have a poor perception of the disease as well as the knowledge of the severity of the disease (Greer, Cooper, Crews, Powe, & Boulware, 2011). Individuals who suffer from diabetes, hypertension, or who have a family history of kidney disease, along with the aging process are at a higher risk for developing CKD. Individuals who are over 60 years old are also considered to be at a higher risk for developing CKD (39.4%), compared to individuals age 40-59 (12.6%) as well as age 20-39 (8.5%). Education level is a major risk factor for the development of CKD as well. Individuals who did not complete high school are stated to be at a higher risk (22.1%) than those who did complete high school (15.75) (Ciervo, Davidson & Weir, 2012; Sullivan, 2009). In view of the fact diabetic nephropathy is considered to the leading cause for developing ESRD in fluent countries such as Europe, North America, and Australasia in addition to counties that are least fluent that includes India, Turkey several Latin American countries, and Malaysia, race and ethnicity is a key component to ESRD as well (White et al., 2014).

Not only is age a major factor, ethnicity has been cited as being an important factor as also. Interestingly, individuals who are identified as being African American, Hispanic, Asian, Native American (American Indian), and Pacific Islanders have been noted as having an increased risk of developing CKD since they have high incidences of high blood pressure and diabetes (Sullivan, 2009). CKD also increases in the non-Hispanic African American population (15.6%) compared to the non-Hispanic Caucasian population (14.5%), as well as to other nationalities (13.1%; Ciervo, Davidson & Weir,

2012). Research suggests that African Americans are not really concerned about CKD, but they are more focused on seeking help for high blood pressure, diabetes and heart disease, not being aware that these are major risk factors for developing CKD. It should also be noted that African Americans are six times more likely to develop CKD if there is a family history of renal failure (Tan, Hoffman, & Rosas, 2010). Furthermore, the use of tobacco as well as the regular use of non-steroidal anti-inflammatory drugs (NSAIDs) will also have a negative effect on the kidneys (Tout et al., 2013).

In populations of individuals who are stated to be at-risk, only one out of three was undiagnosed with CKD and exhibited poor management skills of the disease, creating a growing problem world-wide (Sumaili, Cohen, Zinga, Krzsinki, Pakasa, & Nseka, 2009). A key factor in combating CKD/ESRD is to understand the knowledge base and communication skills of the target population. Cultural awareness of at-risk populations offers health care personnel insight as to how individuals view chronic diseases and progress (Walton, 2011).

Globally, diabetes is a major reason for the development of kidney failure. Approximately 20-40% of the individuals diagnosed with CKD were also diagnosed with diabetes. Reports from Australia indicated that from 1993 to 2005, there was a five-fold increase of patients with Type 2 diabetes starting dialysis. Japan reported a seven-fold increase from 1983-2005 of individuals receiving renal replacement therapy due to a diagnosis of diabetes., whereas in the United Kingdom, newly reported diabetes account for a 2-3% yearly increase in renal failure (Atkins & Zimmet, 2010).

Individuals who receive dialysis are five to 10 times more likely to be hospitalized for a stroke in comparison to individuals who are not diagnosed with ESRD. CKD affects the cerebrovascular system of the body, thereby increasing the morbidity and mortality rate. Individuals who suffer from ischemic stroke are at a high risk for developing CKD; therefore, immediate action for detection of any renal failure and intensive treatment should be applied if necessary. There is a direct relationship between hypertension and ischemic strokes. Individuals diagnosed with hypertension are at a greater risk of suffering from ischemic strokes in comparison to individuals who are not hypertensive. The vascular beds of the brain and kidney have a low-pressure tolerance causing them to be vulnerable to the fluctuation of blood pressure. Therefore, it becomes important that blood pressure be controlled to combat diseases that may affect the small blood vessels. Individuals who are suffering from CKD with a comorbidity of diabetes and hypertension may decline more rapidly (Bao et al., 2013).

Obesity is also identified as a contributing factor to the progression of kidney disease. The population of individuals diagnosed with CKD and ESRD has a higher body mass index placing them into the category of obesity compared to individuals in the general population without a diagnosis. Furthermore, there is direct link of obesity to hypertension and diabetes both of which are common causes of renal failure. Therefore, it is important to include diet management in workshops designed for prevention or interventional purposes (McClellan & Plantinga, 2013). Not only is obesity an identified at-risk issue, minorities and poor people are also considered to be at great risk for

developing ESRD due to geographical location and a lack of insurance or money for treatment (Tuot & Powe, 2011).

Targeted Goals and Objectives for Healthy People 2020

The United States Department of Health and Human Service focused on individuals with diabetes and CKD in Healthy People 2020. According to the Center of Disease Control (2014), diabetes is defined as a group of diseases with an increase level of blood glucose as of the production of insulin in the body. There are four categories for diabetes: (a) Type 1; (b) Type 2, which affects approximately 90% and above of all adults; (c) Gestational diabetes; and (d) other Types of Diabetes (i.e. juvenile). The goals cited for CKD/ESRD are as follows:

1. Decrease in the number of people in the United States diagnosed with chronic kidney disease—the baseline for this target is based on figures from 1999-2004 stating that 15.1 percent of the population in the United States was diagnosed with CKD. The target goal for 2020 is to reduce the CKD population to 13.6%.
2. Increase the awareness level of individuals of the early stages of CKD in order for early treatment phase thereby slowing the progression of the disease—only 7.3 percent of the people diagnosed with CKD were aware that they were experiencing renal failure during stages 1-3. The target is to increase awareness by 11.3 percent for early treatment purposes.
3. Increase renal evaluation for hospital patients who experience acute kidney injury.

4. Increase the number of persons with CKD receiving medical evaluation by continuously measuring their serum creatinine, lipids, and microalbuminuria during treatment. Only 25.7 percent of individuals diagnosed with CKD received appropriate medical evaluation with the necessary accompany laboratory work-up. Target goal is to increase by 28.3 percent.

Comorbidities Associated with CKD

There are several diseases such as hypertension, diabetes, dyslipidemia, and the development of cardiovascular issues that have been associated with CKD. The major cause of death in patients diagnosed with CKD is cardiovascular disease. Individuals diagnosed with CKD are at a greater risk (10-20 times) of developing cardiovascular disease compared to individuals who are not diagnosed with CKD, without regard to race, gender, age or the diagnosis of diabetes (Ciervo, Davidson, & Weir, 2013).

Hypertension has been stated to be a cause as well as a result of CKD and is a major contributor to renal failure development. Therefore, it becomes important that individuals maintain a normal blood pressure or take medication as prescribed to maintain therapeutic doses required to control the blood pressure. The majority of the patients diagnosed with CKD/ESRD also suffer from diabetes (Ciervo, Davidson, & Weir, 2013).

Primary Care Physicians and Nephrologists

Since CKD affects so many people throughout the world, it becomes vital that medical therapies are introduced to the general population to help combat the development of the disease or slow down the progression rate. Consequently, it becomes

important to recognize the signs and symptoms of the disease as early as possible and introduce, if necessary, an aggressive treatment process (Tuot & Powe, 2011). Many CKD diagnoses are made by the primary physician because there are very few nephrologists and individuals are generally under the care of a primary physician if they are not suffering from a chronic or terminal illness (Greer, Crews, & Boulware, 2012). However, it has been noted that most primary physicians do not discuss or lack the knowledge to discuss, CKD/ESRD and its progress with their patients, thus causing the physicians to be suboptimal. Furthermore, primary care physicians may not be aware of the clinical guidelines proposed by the National Kidney Foundation (NKF) and may delay the process of referring individuals to a nephrologist due to a lack of experience (Agrawal, Ghosh, Barnes, & McCullough, 2008). Several barriers to patient education have been identified: (a) healthcare providers suggest that individuals may be aware of the risk factors associated with CKD, but they are not aware of the disease itself, thus creating a lack of communication between the healthcare provider and the patient; (b) there are healthcare providers who do not perceive CKD as being a separate medical problem because there is a direct correlation between diabetes and hypertension; (c) healthcare providers in primary care areas may not have the knowledge required to educate their patients, thus they rely heavily on lab results and refer patients to nephrologists. Additionally, primary care health professionals may express a problem with providing education to individuals who exhibit low educational attainment or a low reading level; (d) healthcare providers, may also have a fear overwhelming a patient with information that they feel the patient does not need to know, since the patient is not

showing any symptoms of CKD; (e) Due to time constraints of office visits as well as a lack of monetary reimbursement, primary care providers do not spend time having general discussions with their patients; and (f) Primary care providers may also lack educational materials or resources for their patients (Greer, Crews & Boulware, 2012).

Research indicated that primary care physicians are not always consistent in identifying symptoms of CKD, especially during the early stages. Furthermore, if the diagnosis is made by the primary care physician and the patient is in stage three or four of the disease, patients are usually not co-managed by nephrologists; it is only during dialysis treatment that a nephrologist is consulted (Allen et al., 2010). The primary care providers perform an important role in the screening process and treatment plan of the patient. Therefore, it may become necessary to implement more training during the residencies of primary care providers to increase their level of awareness and knowledge of the stages of progression of CKD. The training may involve round table discussions presented by nephrologists as well as specified conferences. There may also need to be a curriculum change in medical schools to include problem-based learning or case- based learning for CKD (2008).

Two models have been developed to help primary care physicians manage individuals who are diagnosed with chronic illnesses: The Patient Centered Medical Home (PCMH) and Chronic Care Model (CCM). There are six important factors necessary for physicians to be aware of when using the CCM for chronic care patients: policies and availability of community resources, organizations that are devoted to health care, support of the patient through self-management, the design of the delivery system,

decision making process, and information provided to patients by the clinic. All of the factors in the CCM have to function together in order for success to take place with the chronically ill patient. The PCMH (Patient-Centered Medical Home) uses the same components of the CCM but places the responsibility of the functions on private practices or medical homes (Elliott, Robinson, Sanford, Herrman, & Riesenberg, 2011)

There are barriers that may hinder the implementation of the CCM and PCMH models, thereby causing the models to be ineffective. In a study conducted by Elliot et al., 2011, the majority of the primary care physicians stated that they spend a great deal of time treating individuals for acute symptoms and do not have time to practice preventive medicine for asymptomatic disease such as chronic kidney disease. Furthermore, decisions for treating individuals who report to the doctor are based on the individuals' behavior as well as the payment option or insurance reimbursement. Individuals have a tendency to seek treatment for signs and symptoms that are concerning them at the present time rather than a complete routine check-up that will require laboratory work on blood and urine, especially if it is not covered in a wellness-exam or insurance. The study also revealed that primary care physicians do not always have the capability necessary to provide proactive treatment to their patients. Yet, to prepare individuals to be self-managers which are required in CKD/ESRD there must be access to educators who can offer several hours of class, along with a nutritionist in order to provide information that is helpful. The cost of hiring educators in primary care physicians' offices is extremely expensive, and the educator will not be able to specialize in one area of disease management. Also, reported in this study was a lack of clinical

information on various illnesses in the primary care physician's office; most information has to be obtained from a specialist in the field of the illness (Elliott et al., 2011).

When emphasis is placed on controlling blood pressure in individuals who are considered to be high-risk for developing CKD, especially individuals who are diagnosed with proteinuria and diabetes, the process of the disease is slowed down (Crinson, Gallagher, Thomas & Lusignan, 2010). With the right treatment plans and goals, primary care physicians can help slow down the process of CKD through the management of diabetes, hypertension, and dyslipidemia. Therefore, the use of integrative care models performed by primary physicians would be beneficial to coordinating medical care throughout the health system (Ciervo, Davidson, & Weir, 2012). With this in mind, it should be emphasized that there is great deal of variation in how the disease may be diagnosed and what specific treatment plan may be offered by the primary care physician. Thus, it becomes necessary for primary care physicians to follow an implemented guideline that is consistent with established, evidence-based research concerning best practices for CKD/ESRD (Thomas, Gallagher & Jain, 2014).

As with any other specialists, the caseload of a nephrologist has a direct effect on patient care. Research indicates that nephrologists who have a caseload of approximately 65 patients experience a lower mortality rate compared to nephrologists who have a caseload of 100 or more patients. If there is an increase of 50 patients per nephrologist, the rate of mortality increases (Charnow, 2013). With the use of nephrologists in early stages of diagnosis (Stages 1-3) of CKD, patients may be able to survive with the use of

dialysis, or the use of dialysis may be delayed (Allen, Forman, Orav, Bates, Denker, & Sequist, 2010).

However, as the population of ESRD patients increases, the demand for services provided by nephrologists may become overwhelming, creating a shortage in this area of specialization. Therefore, it may become crucial to increase the use of nurse practitioners during mid-level care to provide for the patients diagnosed with CKD. To help slow down the likelihood of a shortage of nephrologists, it becomes necessary to emphasize a public awareness campaign for the prevention of CKD. Furthermore, reduction of diabetic nephropathy may be carried out through more aggressive therapies to control the glycemic level; increasing the control of blood pressure will lessen deterioration of glomerular filtration; and nurses in primary care facilities can provide education to patients concerning the impact of diabetes and hypertension in the development of CKD (Dixon, Borden, Kaneko & Schoolwerth, 2011).

Types of Treatment Plans

As kidney function declines, it will be necessary for individuals to become familiar with the Renal Replacement Therapy (RRT) in order to avoid death (Lewis, 2013). As part of the treatment plan for individuals diagnosed with CKD/ESRD, individuals are assessed with the National Kidney Foundation (NKF) Kidney Disease Outcomes Quality Initiative (KDOQI) as a practical guideline used for clinical purposes. This assessment is designed to present a specific definition of CKD as well as the classification of the stages of CKD. Furthermore, the assessment has several components that involve the management of diabetes, nutrition, hypertension, bone disease,

hyperlipidemia, and cardiovascular disease in individuals with CKD/ESRD (Agrawal et al., 2008). The treatment of CKD is based on severity, which is determined by the level of glomerular filtration rate (GFR) obtained from serum creatinine; however, research suggests that this technique is not adequate for making treatment decisions (Tangri et al., 2011). After the diagnosis of CKD, goals should be established to evaluate the onset of other diseases that may have a direct effect on the kidneys or that may interrupt the treatment plan such as cardiovascular functioning, hypertension, diabetes, or dyslipidemia. Since CKD is noted for being a high cause of death, monitoring of comorbidity becomes important, especially hypertension and diabetes (Ciervo, Davidson & Weir, 2012).

Renal replacement therapy involves kidney transplantation or dialysis. The use of kidney transplantation improves the individual's QoL more effectively than dialysis and therefore, is the preferred treatment option. Transplants that are successful provide the individual a better QoL as well as decrease the health-care burden by not having to receive dialysis. Transplantation involves little if any changes in day-to-day activities, thereby increasing the mental health of the individual. The cost for transplantation is approximately one-third to one-fourth the cost of an individual receiving dialysis (White et al., 2008). But, there are two major obstacles to transplantation, a shortage of donors and the expense of the process of transplantation that includes rejection medication that must be taken for the patient's entire life span (Nazar et al., 2014). Furthermore, individuals who undergo a transplant will be subjected to expensive immunosuppressive drugs to make sure that the body does not reject the organ. However, at the present time

there is a lack of organs, so transplants are not performed on a regular basis, even though they are more cost effective for the patient (Sullivan, 2009).

Dialysis is designed to remove the waste content and excess water from the bodies of individuals who are diagnosed with ESRD. This process allows an individual to live longer. Nevertheless, there is the risk that the individual will be diagnosed with another illness due to the use of dialysis. There are two ways for an individual to perform dialysis: PD or HD (Reddenna, Basha, & Reddy, 2014).

PD is effective in the treatment of RRT and is conducted at the home of the patient. This form of treatment started during the 1980s (Yeates, Zxhu, Vonesh, Trpeski, Blake & Fenton, 2012). PD uses the peritoneal cavity to dialyze patients. A catheter is implanted in the lower abdominal area, and toxins are able to flow out with a solution of dialysate. The membrane of the peritoneal cavity is used as the filter for dialysis to take place. There are two categories of PD that a patient may choose from: (a) Continuous Ambulatory Peritoneal Dialysis (CAPD), which is done by several exchanges a day of dialysis without equipment; and (b) Continuous Cycling Peritoneal Dialysis (CCPD) requiring the use of a "cycling" machine while the patient is asleep at night. Both CAPD and CCPD are performed on a daily basis. However, individuals that use PD therapy have a more flexible schedule for treatment compared to individuals who use HD therapy. The major drawback for this modality of treatment is the development of peritonitis, which is an infection of the peritoneal cavity. If the patient develops peritonitis, he/she will convert to HD, and many patients cannot convert to PD (Sullivan, 2010).

HD is the most common therapy chosen by CKD patients as well as nephrologists. However, this treatment has a severe impact on the QoL for patients, affecting them physically as well as psychologically (Gerogianni & Babatsikou, 2014). HD is conducted at an out-patient facility, where the patient is scheduled for therapy at least 3 times a week for 3 ½ to 4 ½ hours for each treatment. The process of HD involves using a machine to pump the blood from an individual through an artificial kidney where toxins are removed by dialysate. The blood is returned to the body after cleansing using Venus lines. Patients receiving dialysis will also require surgery to create a vascular line access; however, this line may cause hospitalization due to clots. Patients who are receiving HD may develop a social bond with other patients, thereby creating social networks (Sullivan, 2010). If an individual chooses to use HD, he or she will be faced with many encounters that are related to the adhering of the treatment plan. There are four major facets to be considered: such as the limitation of the consumption of liquid, changes in dietary habits, adhering to the recommended dosage of medication as well as following a fixed schedule for sessions of dialysis (Seyyedrassoli, Parvan, Rahmani, & Rahimi, 2013).

When choosing a treatment modality, it is important to keep in mind that the risk of the patients becoming infected is a major factor which contributes to the mortality rate in patients receiving treatment for CKD/ESRD. In order to choose the best options for the patient, the primary care physician should discuss the complications that may occur including the possibility of the risk for infections. For instance, individuals receiving HD treatment may be at an increased susceptibility of developing septicemia/bacteremia from

the use of HD catheters, which are the main access for conducting the treatment. PD treatment, on the other hand, increases the risk of peritonitis and has a higher rate of death because of infections (Williams, Quinn, Clallery, Kiss & Oliver, 2011). However, the focus of treatment of the elderly population should be preventing of or decreasing the progression to ESRD through the control of managing hypertension, cardiovascular, and metabolic risks. There should also be special attention to psychosocial developments that may occur in the elderly population (Ng & Anpalahan, 2011).

Furthermore, individuals should also consider stressors that are associated with HD, such as financial hardships that may occur due to loss of income, the changes in relationships with spouses due to a decrease of sexual drives, the changes in social relationships with others due to traveling a distance, hospital admissions on a regular basis, the increase of depending on the dialysis machine for living, fear of dying or being totally disabled, diet and fluid restrictions that are directly related to the patient developing pulmonary edema, and physical fatigue that accompanies treatment of CKD (Gerogianni & Babatsikou, 2014).

Evidenced-based practices for treating individuals with CKD involve controlling the blood pressure, use of first-line drugs for inhibiting renin-angiotensin, thereby controlling the proteinuria, and effective teaching for self-management skills to the patient (Thomas, Gallagher, & Jain, 2014). Education in CKD/ESRD and its risk allows the patient to have a choice in choosing the treatment modality, as well as prolonging the development stages to ESRD, thereby improving their life quality with the use of dialysis. Furthermore, it is important that healthcare providers make their patients aware

of the risk factors that are associated with kidney health and share the importance for the need to monitor for physiological signs such as blood pressure, glucose level, proteinuria, and creatinine level (Tan, Hoffman, & Rosas, 2010).

Nutritional Changes

Individuals are encouraged to modify their diets to prevent or slow down the stages of CKD. The Dietary Approaches to Stop Hypertension (DASH) is highly recommended, which is designed to lower blood pressure, thereby reducing the risk for developing CKD. Reduction of sodium intake, along with adherence to prescribed medications for hypertension, is a major goal in slowing down the progression of renal failure (Ciervo, Davidson & Weir, 2013). Individuals who are diagnosed with CKD are limited to the amount of foods and liquids that they can consume. The recommended daily amount of fluids is limited to 500 ml per day, which includes food product that may turn to water after being digested in the body.

Furthermore, because the individual is using a machine to clean the blood, there is high need for potassium and phosphorus to be replenished at excessive levels, which have a direct effect on the heart, as well as cause the patient to itch or develop renal osteodystrophy. It has been further suggested that when individuals gain adequate knowledge concerning different traits of their illness such as the importance of managing their diet, they can modify their eating habits for better results to the required treatment plan (Seyyedrassoli, Parvan, Rahmani & Rahimi, 2013).

Models of Behavior Change

Empowering patients to become involved in self-management through education allows them to better understand their diagnosis of a specific disease and gives them information for consulting purposes with their healthcare providers. Informed individuals can become proactive in staying healthy or slowing the disease progress by changing their behavior (Thomas, Gallagher, & Jain, 2014). There are various models of behavior that are designed to influence and change individuals for a healthier living.

The Chronic Care Model

For better management of CKD, the Chronic Care Model (CCM) offer a framework that is theory based for improving the awareness of CKD. This model is designed to offer an outline for creating healthy communities, solutions that are multi-dimensional for problems that may be complex in nature, the model is evidenced-based and provides a guide for quality improvement and the model is also considered to be flexible and may change as new evidence for a particular illness emerges (Turner, 2018).

The Chronic Care Model (CCM) as well as the Patient-Centered Medical Home (PCMH) Model can be beneficial as well with individuals diagnosed with CKD/ESRD. Both of these models stress the importance of managing individual lifestyles. There are six major areas of the chronic care model that are required: (a) a need for community resources and policies; (b) the development of health care organizations; (c) individual self-management; (d) a healthcare delivery system design; (e) decision support system and (f) clinical information disbursement system. The PCMH has the same six major components as the CCM but the responsibility for implementing the components is given

to primary practices or Nursing Homes. The six suggested areas of the CCM were also cited as presenting major barriers for patients in the health care system. Individuals diagnosed with chronic illness tend to be involved in treating acute symptoms and complications as opposed to being involved with prevention of a disease or managing the disease, which is primarily based on their perception of the severity of the disease, as well as the financial cost involved in preventive techniques. There is also inability for individuals to provide appropriate self-management education due to a lack of awareness of the disease, or the disease process, and inadequate finances for classes associated with a specific disease. There is a major lack of communication and clinical information available to the general population for basic education concerning chronic illnesses. Neither is there a great deal of support for public health. Individuals have limited knowledge and understanding of important health consequences of diabetes, hypertension, obesity and pre-diabetes. There is a major concern that "We don't have a very coherent comprehensive strategy that addresses the public education aspect of prevention" (Elliott et al., 2011, p. 287).

The use of CCM has been implicated through a theoretical framework in increasing the awareness of CKD. Physician awareness of specific clinical markers of CKD should alert the physician to recognize that there is renal dysfunction that may lead to CKD, thereby leading the physician to initiate a patient-provider conversation to increase the awareness of CKD. However, CKD recognition by providers has been reported as being slow or lacking (Tuot et al., 2011).

Self-Regulation Model

The Self-Regulation Model (SRM) has also been identified as being a model that has been effective in identifying the cognitive factors needed to develop consistency between behaviors and disease outcome. The model stresses the importance of developing behaviors that are related to adhering to prescribed treatment plans. The basis of SRM is that individuals have an active role in the perception of the disease, whether positive or negative. When individuals have specific perceptions of their illnesses, they will be able to evaluate other signs and symptoms that may appear concerning other diseases. There are five areas of this model related to disease perception and adhering to treatment plans: (a) the nature of the disease; (b) the duration of the disease; (c) the outcome of the disease; (d) a person's ideas about why they have the disease; and (e) if the disease is controllable. Furthermore, this model suggests that every person has an exclusive perception concerning his/her disease, which may interfere with group workshops, so it may be necessary to do individual sessions (Seyyedrassoli, Parvan, Rahmani, & Rahimi, 2013).

Individuals who are aware and informed of CKD and how it progresses to ESRD can manage their disease better, thus slowing down the rate of progression of the renal failure, along with decreasing cardiovascular issues and preventing complications that may be metabolic in nature. However, for individuals to be knowledgeable concerning specific illnesses, physicians must be aware of critical illness in order to implement evidenced-based therapies that will teach individuals how to manage their disease. The Chronic Care Model created by Ed Wagner suggests that an individual, who is informed,

along with a medical team that is well prepared, is able to produce improved outcomes (Tuot et al., 2011).

Summary

In this chapter, the applicable literature on the lack of awareness of CKD/ESRD and the risk factors associated such as cardiovascular disease, hypertension, and diabetes was reviewed. Chronic illness is a major focus for the healthcare system of America, WHO, and National Kidney Foundation. CKD is identified as being a 5-stage disease that has a major effect on an individual's life. CKD is asymptomatic during the first three stages, and therefore the general population is not aware of the devastation of the disease. Awareness campaigns are designed to target a specific group of people who may be vulnerable to a certain illness (i.e. breast cancer, heart disease, prostate cancer, etc.).

To communicate detailed information for a particular illness, the wording of the campaign is based on what is to be accomplished. The importance of campaigns to raise awareness should focus on the individual making a behavioral change (Meyer, 2008). In a study conducted by Greer, Crews and Boulware (2012), primary physicians have suggested that providing education to the general population may decrease the lack of awareness of CKD in the general population. The chapter also discussed the HBM and its effectiveness in managing individual behavior after being diagnosed with a chronic illness. The HBM has been instrumental in measuring people's belief and perception of the severity of their illnesses as it relates to adhering to the prescribed treatment plan. There was also a discussion on the CCM being used as an evidenced-based model to

involve the community, as well as the healthcare system for improving health care behavior and practices. To fight this disease, which is no longer a rarity but a world epidemic, World Kidney Day has been established. It is imperative that the general population, as well as individuals who are vulnerable to developing CKD become aware of the disease. Developing kidney disease is now a common problem globally, which is harmful, but treatable. It is more important that people protect their kidneys (Couser & Remuzzi, 2011).

Chapter 3: Research Method

Introduction

This chapter describes the methodology used to determine whether information will be gained from students attending a 75-minute workshop on CKD/ESRD. A pre- and post-assessment was used to assess the participants' change in knowledge and perceived severity. The assessment also measured perceived susceptibility after the attendance of the workshop. The workshop was conducted by a clinical nephrologist nurse with 12 years of experience in renal care.

The chapter includes a justification of the research design, description of the participants and instrumentation, and a discussion of the methodology. Information is presented in the body of this chapter pertaining to the setting of the research, the samples, workshop intervention, workshop description and the collection of data. Detailed information is also provided on the procedures that were used for data analysis as well as the ethical considerations. The chapter concludes with explanations of delimitations and limitations.

Research Questions and Hypotheses

RQ1: Does presentation of a workshop on CKD/ESRD to students in a community college increase students' level of knowledge?

$H1_0$: There is no significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H1_1$: There is a significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

RQ2: Does presentation of a workshop on CKD/ESRD to students in a community college increase students' perceptions of the severity of the disease?

$H2_0$: There is no significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H2_1$: There is a significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

RQ3: Does level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD predict perceived susceptibility of the disease?

$H3_0$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are not predictors of perceived susceptibility of the disease.

$H3_1$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are predictors of perceived susceptibility of the disease.

Research Design and Rationale

The study was a quantitative, one-group pre-posttest research design testing the effectiveness of an intervention workshop on CKD/ESRD. The use of a quantitative design allowed for the discovery of facts while the research can be replicated with a

different population achieving results that are close in proximity. The data collected can be analyzed with different statistical techniques (Shuttleworth, 2009). The independent variable for this study was the presentation of the workshop. The dependent variables included level of knowledge, perception of severity, and perception of susceptibility.

This study employed the quantitative research method to test the significance of the levels of knowledge and perceptions of severity and susceptibility concerning CKD after attending an awareness workshop. Additionally, participants completed a pretest prior to attending the workshop and a posttest following the workshop. The level of knowledge gained during the workshop was a significant factor in determining the effectiveness of the material presented.

The theoretical framework provided a rationale for conducting a quantitative investigation of CKD awareness. Based on the goals of this study deductive reasoning was appropriate for guiding the research project and generalizing the results are conducive to the population of community college students. The questions in this study was designed to measure and examine the relationships between the independent and dependent variables as well as make inferences that may be used to guide future studies. The results were gathered through inferential analysis where conclusions were drawn from a sample of a population (Creswell, 2009). Based on the outcome of the workshop as determined by the hypotheses, the results may be used to develop and implement new strategies for informing the public about the disease while using community college students to lay the foundation for awareness and advocacy.

Methodology

This study was created as an evidence-based methodology to provide assumptions about levels of knowledge, perceived severity, and susceptibility of CKD. Quantifiable data was collected and analyzed to obtain objective knowledge from participants using pre- and posttests during a workshop designed to educate participants about CKD. The action-oriented outcomes of the study were compiled and exposited. In the following sections of the chapter, details about proposed participant selection, data collection, instrumentation, and data analysis are discussed.

Population

The population for this study was students in the United States enrolled at a community college which offers Associate of Arts degrees in various programs of study. The most recent analysis of community college enrollment reported by the Integrated Postsecondary Education Data System indicated that approximately 7.3 million undergraduate students were enrolled in the 1,132 Associate degree-granting community colleges in the United States in Fall 2014 (American Association of Community Colleges, 2016). The number of enrolled students compared to the number of community colleges produced an average enrollment of nearly 6,450 students. The sampling frame was gathered from the student body at a local community college where approximately 6,500 students are enrolled. The community college consisted of a main campus and three off-campus sites.

Sampling and Sampling Procedures

The community college has three sites that are accredited, the off-campus site from which the sample for this study was drawn has existed for 16 years and offers courses on a semester format. Most of the students are residents of the seven counties that are designated to support the college. The number of students currently enrolled in this site of the community college is approximately 750 students. Nearly 72% of the population is African American students, while 22% are White and 1% other. This study was open to students enrolled in classes at a specific campus of this community college regardless of age, sex, or ethnicity, during a 75-minute class period. Further studies should be expanded to include populations of other community colleges throughout this state and this country. The sample was based on the number of students that were presently enrolled in classes at the community college during the time of the study. Those who agreed to participate in the study made up the sample.

This study utilized non-probability sampling. Thus, there was no likelihood that any of participants in the study chosen were known. Representative data was drawn from a convenience sample of those students who were available to attend the workshop instead of randomly selected participants. Convenience sampling, also known as accidental or haphazard sampling is a commonly used method for quantitative study. Participants were selected based on their availability and ease of access to volunteer (Farrokhi & Madmoudi-Hamidabad, 2012). With convenience sampling, there is the risk that the sample might not represent the population as this may undermine the external validity of the research. The inclusion criteria for the study were students enrolled at the

local community college off-campus site during a 75-minute class period. This helped to ensure that students attend the workshop and complete the two tests only once.

I used a paired *t*-test for the pre-and post-assessment (before the workshop and after the workshop) to measure level of knowledge, perceived susceptibility, and perceived severity of community college students. A power of analysis was conducted with a two-tailed $\alpha = 0.050$, with a *Type I error rate, $\beta = 0.200$,* with a probability of failing to reject the null hypothesis under the alternative hypothesis, with a *Type II error rate* and an effect size (E=0.500). The sample size required for this study was 126 participants (Kohn, Jarrett, & Senyak, 2016).

Recruitment Process

The president of the community college was contacted by letter to request permission to conduct the study at the off-site campus (Appendix C). He granted his approval, pending permission from the Institution Review Board (IRB; Appendix D). A letter was presented to the Academic Dean requesting that instructors and students be allowed to attend a 75-minute workshop on CKD/ESRD, which is a normal class period. Instructors were notified by email of the place and time of the workshop. Students were given a brief description of the workshop along with an Informed Consent Form (Appendix D), prior to attending the workshop. The attendance to the workshop was on a voluntary basis.

Procedures for Participation and Data Collection

Two subject-completed questionnaires were administered to participants to measure the learning received during the awareness workshop, a pretest, and a posttest.

The pretest was used to identify the amount of pre-existing knowledge of CKD and included demographic questions, queries about the participants' personal health, and inquiries concerning what participants know and understand about kidney disease. The posttest measured the participants' learning as a result of the workshop, along with assessing for changes in perceived perception and perceived susceptibility. Furthermore, a comparison of pretest and posttest scores was analyzed. The pretest and posttest was given to the students as one package, with a blank sheet separating the two tests. The pretest included the knowledge and perceived severity questionnaires. The posttest included these two questionnaires plus the perceived susceptibility questionnaire. Participants completed the pretest prior to the workshop and the posttest after the workshop. This allowed both tests to be collected from the same person without requiring any identifying information and allowed for the use of paired *t*-tests in analyzing the data.

Demographic questionnaire. In the demographics section of the pretest, participants selected answers from the questions provided regarding their age, gender, ethnic background, and marital status. The demographic information aided in the interpretation and understanding of participants' responses. Participants were asked, "Have you ever been told by a doctor or healthcare provider that you have weak or failing kidneys?" If participants answered yes to the question their data was not analyzed due to the fact that they had been exposed to information concerning the progression of CKD/ESRD. According to Robinson, McMichael, & Hernandez (2017), the process of collecting and reporting the demographic characteristics of participants, adds to the validity and reliability of the study in several ways. In addition to aiding in secondary

data analysis, the provision of detailed information about participant characteristics showed there were similar occurrences of phenomena among different groups. It also allowed for the recognition of who was being generalized by research findings and enables researchers to make comparisons across replications of studies.

Instrumentation

Kidney knowledge questionnaire. The kidney knowledge questions developed by Chow et al., (2012) were designed to assess knowledge of primary care patients concerning kidney disease in a cross-sectional survey. The instrument is in a multiple-choice format, with a closed-ended single response, which was used to access the knowledge of primary care physicians concerning CKD. The development of the questionnaire focused on three main components: (a) an individual's attitude toward organ donors that are living; (b) an individual's knowledge level of CKD; and (c) individual demographics. Validation occurred with the use of a pretest with a focus group. The instrument is used as part of a peer-review research and has been translated into two languages: Chinese and Malay. The 7 questions concerning kidney knowledge are based on distinctive categories: (a) Anatomy, (b) Physiology, (c) CKD Etiology, (d) Early symptoms of CKD, (e) Progression of CKD, (f) Treatment and prognosis of complete renal failure, and (g) Availability of resources for patients diagnosed with CKD (Chow et al., 2012). There is one correct answer in each of the kidney knowledge test questions. Therefore, one point was given for each correct answer pertaining to CKD, which allowed a maximum possible score of 7 points and a minimum of 0.

Perceived susceptibility. The questions, which are moderately reliable when used in a single index, are chosen for perceived susceptibility is designed to measure the participant's thoughts on risk or fear of contracting CKD. According to Champion (1984), the questions are scored on a multidimensional scale that was reliable with a Cronbach's α =.78. The scale also included an item that measured anxiety as well as prediction (Huaman, Kamimura-Nishimura, Kanamori, Siu, & Lescano, 2011). The perceived susceptibility instrument was originally developed to measure perceived susceptibility in breast cancer patients. However, the questions were modified and used in several disease-related studies (Abaudas, Petro-Nustas, Albikawi, & Nabols, 2016). The 6-item instrument was scored based on a 5-point scale, with 1 being strongly agree to 5 being strongly disagree. The maximum score was 30 and lowest score was 6. The data was scored as a continuous outcome.

Perceived severity. The questions chosen for perceived severity were developed by Champion in 1984, which is moderately reliable when used in a single index. This assessment consisted of 12 questions, which were based on a scale ranging from 1 to 5, measured by *strongly agree* to *strongly disagree*, with a Cronbach's alpha = .78. The rationale for choosing Champion's scale contributed to the fact that the scale is adaptable to any illness or situation (e.g. cancer, asthma, osteoporosis in pre-menopausal women, etc.). In an article validating evidence for Turkish adaptation of the Champion's Health Belief Model Scales, Gozum & Aydin (2004), described how the theoretical framework had been translated and tested in various studies in different countries and cultures and

found to be a valid and reliable scale for use. The minimum score for this section was 12 and the maximum score was 60.

Workshop Intervention

A 75-minute workshop was presented to community college students to increase their knowledge of CKD/ESRD. The content of the workshop was adopted from Kidney School, an online nonprofit website with a comprehensive educational program for individuals living with CKD, which started in 2002 and is used throughout the world. The program contains 16 modules on the function of the kidneys and kidney disease. Each module offers a specific topic which can be downloaded or presented in an audio version. Modules 1 and 2 are used for this particular workshop in order to increase the knowledge level of the participants. The content of each model is written at a 6th grade reading level and has a pre/post assessment. The modules thereby target the level of learning styles that include photos, graphics, and animations. The topics included how kidneys work, causes of chronic kidney disease (CKD), what happens when kidneys stop working, stages of CKD, types of kidney failure, warning signs of CKD, living with CKD, and available treatment options to include PD, HD and transplants (KidneySchool.org, 2012).

The workshop was presented by a registered nurse who has conducted workshops for the National Kidney Foundation for the past 12 years. The registered nurse is a community educator, and regularly provides workshops on subjects of basic kidney disease functions to advanced patient-centered information training. The workshop for this study will incorporate basic anatomy and physiology of the kidneys along with signs and symptoms, perceived perception and perceived severity. The HBM was the basis for

the presentation of all materials. The information was presented on a 9th-grade reading level for clarity and understanding. The presentation included models and a power point developed from Kidney School, with combined questions of the pre- and posttest as a basis for discussion. Participants was given a pre-assessment before the workshop and a post-assessment after the workshop in order to assess the information gained during the workshop. Each question on the assessment is aligned with the presentation.

Workshop Description

A 75-minute workshop was developed to address the following objectives: (a) how normal kidneys work in the human body; (b) what happens in the body when the kidneys fail; (c) awareness of kidney disease and its treatment can affect you or a loved one; and (d) the ability to speak with your health care provider in an informed and confident way. The workshop presented with a power point will include terminology and definition of words related to Chronic Kidney Disease and End-Stage-Renal Disease. The workshop will provide information on the anatomy and physiology of the human kidneys along with what happens when the kidneys begin to fail. Further discussion will include the signs and symptoms of the three types of kidney failure at each stage of kidney failure. The workshop will also inform participants of the cause of kidney disease, early detection, and treatment plans will be presented to the participants.

Data Analysis Plan

The data collected from the tests will be quantified, analyzed, and compared to draw conclusions. The data analysis will be analyzed by IBM SPSS, Inc. released in 2015, and will be used for this study (Statistical Package, v. 23, 2015). The descriptive

statistics to include the means and standard deviation, along with the demographic information will be reported. According to Maverick (2015), assumptions that are considered to be common when conducting a t-test include normality of data distribution, the scale of measurement is used, random sampling, the adequacy of sample size, and the equality of variance in standard deviation. The assumption for the paired difference in this study is the change from the first value in the pair to the second valued in the pair. The paired t-test will assume that the size of the paired difference will not be dependent on the identity of the pair. It will be assumed that when the data are plotted, there will be a normal distribution resulting in a bell-shaped distribution curve. Furthermore, if the population sample is skewed, then the paired *t*-test may mistakenly reject the null hypothesis suggesting that the mean of the paired differences is 0 even when it is true. However, unless the skewness is severe, or the sample size very small, the *t*-test may be executed sufficiently; there is an assumption that sample size will be rather large. The paired *t*-test is designed to compare the mean difference of the values to zero.

The paired *t*-test will be performed in response to the first and second research question to measure the change in level of knowledge and change in perceived severity gained from attending the workshop. The differences between the scores on the pretests and posttests will be calculated for each participant as well as the mean difference. These results will be used to compute the standard deviation and the standard error of the mean difference. The *t*-statistic will be determined, and the table of *t*-distribution will be used to find the *p*-value for the paired *t*-test (Creswell, 2009). To carry out a paired *t*-test in IBM SPSS, a one-sample *t*-test will be done by comparing the means, and the difference

variable will be chosen as the test value. Conclusions will be drawn to indicate whether the difference in scores is statistically significant based on a 95% confidence level.

To respond to the third research question, the IBM SPSS program will be used for multiple regression analysis as well (Lorexnzo-Seva, Ferrando & Chico, 2010). There will be two predictor variables: posttest knowledge and posttest perceived severity. The dependent variable will be perceived susceptibility. Regarding the level of knowledge and perception of severity of CKD/ESRD as predictors of perceived susceptibility following an awareness workshop on the disease, linear regression tests will be used. A correlation matrix will be used as input. The first variable in this matrix is considered the criterion variable, and the other variables are predictor variables. A histogram will be developed to show the difference between pre- and posttests results.

Threats to Validity

The major validity issue in this research is related to the research instrument, the Awareness of Kidney Disease Assessment, which is a combined set of questions developed by Chow et al., (2012) and Champion (1984) specifically for this study. The Awareness of Kidney Disease Assessment has a well-established construct and content validity as previously discussed. A final limitation is the lack of a control group. As this is a quasi-experimental design with no random assignment and no control group, participants will function as their own controls.

Ethical Procedures

Necessary steps are taken to ensure the protection of these participants. The Institutional Review Board (IRB) will be contacted at Walden University to seek

approval to conduct the study. The participants will be presented with an Informed Consent Form (Appendix C) discussing the participants' role, explaining confidentiality, possible risks associated with the study, and benefits that the participant may gain. The Informed Consent Form will be signed and collected before the workshop starts. For the most part, the participants will have minimal harm during the study. Moreover, in addition, the participants will be informed that they are free to leave at any time.

Participants' confidentiality will be protected in various ways. Raw data is collected and stored on a computer that will be password-protected for a period of 5 years. The password will only be known by the researcher. The raw data will not have the participants' names attached. Instead participants will be asked to place their school identification number at the top. An Excel spreadsheet will be created to record participants' demographic information along with their school identification number for confidentiality. The data obtained for the study will not have information that allows the participants to be identified.

All data collected from the pre-and posttest will be entered in IBM SPSS and a spreadsheet will be developed to record all participants' demographic information along with their scores from the pre- and post-assessment. Participants will be informed that their participation is voluntary and the study presents no risk or harm to them. As soon the Excel spreadsheets are imported into IBM SPSS, all patient information obtained for this study will be destroyed. Participants will be given the details of the study before the workshop starts. If a participant does have a diagnosis of CKD, he or she will be

guaranteed confidentiality. Identification of the participants will not be exposed at any time before or after the study.

Limitations

As in most studies, possible threats to validity will appear. There may be a compromise of external validity due to the generalizability of the study to other populations. The population of individuals enrolled in a community college represents a variety of ages, both male and female. The study is exclusively limited to the Mississippi Delta, which has an extremely high rate of dialysis patients. The community where the college is based is economically depressed with a high rate of chronic illnesses and a lack of medical professionals. The results of this study may not be considered generalizable to a population with more racial diversity. Since the community where the study is taking place suffers from economic depression and lacks medical services and employment opportunities, this study may not be simply generalized or compared to a population that has a more robust economy. A final limitation is the lack of a control group. Where possible, random assignment to the treatment and control groups strengthens internal validity, making it more likely the impact on the outcome can be attributed to the treatment. However, for purposes of this quasi experimental study, participants will function as their own controls by completing a knowledge questionnaire before and after exposure to the knowledge workshop.

Summary

Chapter 3 presents the methodological approach that was used in this study to investigate the research questions proposed. A comprehensive description of the

workshop along with the assessment instrument was discussed. The data analysis plan, threats to validity and the ethical procedure were also included in this chapter. Chapter 4 is designed to report information pertaining to the results of the pre and posttest scores using a *t*-test analysis to verify acquisition of knowledge after attending a workshop pertaining to CKD/ESRD. A detail analysis of the data collected is presented in Chapter 4 pertaining to the participants' knowledge of kidney health, perceived susceptibility and perceived severity.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to explore the knowledge of chronic kidney disease (CKD) as it relates to community college students. The study was based on evaluating the interests of community college students' awareness of chronic kidney disease as well as the students' idea of severity and susceptibility of the disease. This quantitative non-experimental study was conducted to evaluate the knowledge gained by attending a 75-minute workshop and to determine if the knowledge from the workshop impacted participants' perception of severity and susceptibility to the disease.

The instrument used for this study was a kidney knowledge questionnaire developed by Chow et al. (2012) for use in primary care by practicing physicians. The instrument was created using closed-ended multiple choice questions designed to address three main components: (a) a person's attitude toward living organ donors, (b) the level of kidney knowledge a person may possess, and (c) the individual's demographics. The instrument is comprised of seven distinct categories including: (a) anatomy, (b) physiology, (c) chronic kidney disease etiology, (d) early symptoms of chronic kidney disease, (e) progression of chronic kidney disease, (f) treatment and prognosis of complete renal failure, and (g) availability of resources for patients diagnosed with chronic kidney disease (Chow et al., 2012).

The kidney knowledge section of the instrument is scored by allowing one point for each correct answer. Therefore, the maximum possible score is 7 points, and the minimum score is 0. To test for perceived susceptibility and perceived severity, questions

were used from Champion (1984). The questions developed by Champion have been modified and included in numerous disease-related studies (e.g., Adaudas, Petro-Nustas, Albikawi & Nabolsi, 2016). There are six items related to perceived susceptibility. These items were scored using a 5-point scale, creating a maximum score of 30 and a minimum score of 6. There were 12 questions used for perceived severity with answers ranging from 1 to 5, making the maximum score 60 and the minimum score 12.

Research Questions and Hypotheses

RQ1: Does presentation of a workshop on CKD/ESRD to students in a community college increase students' level of knowledge?

$H1_0$: There is no significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H1_1$: There is a significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

RQ2: Does presentation of a workshop on CKD/ESRD to students in a community college increase students' perceptions of the severity of the disease?

$H2_0$: There is no significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H2_1$: There is a significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

RQ3: Does level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD predict perceived susceptibility of the disease?

$H3_0$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are not predictors of perceived susceptibility of the disease.

$H3_1$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are predictors of perceived susceptibility of the disease.

A convenience sample of 126 community college students participated in the study by completing a pre-assessment concerning kidney knowledge, perception of susceptibility, and severity, attending a 75-minute workshop concerning CKD/ESRD, and completing a post-assessment after the workshop (see Champion, 1984 as cited by Tan et al., 2010; Chow et al., 2012). Participants' data were analyzed using SPSS version 25. This chapter presents the research questions, a description of the data collection process, an evaluation of the statistical assumptions, and the results of the multiple linear regression analysis.

Data Collection

The participants were students enrolled in a local community college with one main campus and two off-campus sites in nearby communities. The previous chapter indicated the data were to be collected at only one of the off-campus sites; however, there

was a major decline in enrollment due to graduation and students transferring to the main campus, reducing the pool of participants from 630 to approximately 375 students. After a 2-week recruitment period and presentation of the workshop to the student body at the original chosen site, only 23 individuals participated in the study. Because of the decline in the student body, it became necessary to recruit participants from the main campus. Flyers were placed on bulletin boards and emails were sent to instructors in the Social Science Department. Two weeks after recruitment ended, the study on the main campus was conducted with 108 participants, creating a total of 131 participants (n = 23 from the off-campus site). Data collection took place for a 6-week period from February to March 2019. Data screening and cleaning removed two participants for not meeting the inclusion criteria and three were removed for missing data, leaving a total N of 126. In order to control for internal validity, the same instrument was used for both pre- and post-assessment. The participants in this study represent a small community college population; to increase external validity, it may be necessary to conduct the workshop again with a different age group or demographic area. All participants were enrolled in a local community college with an age range of 18 to 55. Each participant completed the demographic section on the pre- and post-assessment. The majority of participants were single young African American females as indicated in Table 1 and Figure 5.

Table 1

Descriptive and demographic characteristics

Variable	*n*	%
Gender		
Male	43	34.1
Female	83	65.9
Ethnicity		
African American	99	78.6
Caucasians	18	14.3
Hispanics	06	4.8
Asian Americans	03	2.4
Marital Status		
Married	07	5.6
Single	118	93.7
Divorced	01	.8
Age of Participants		
Mean		21.35
Median		19.00
Std. Deviation		6.310

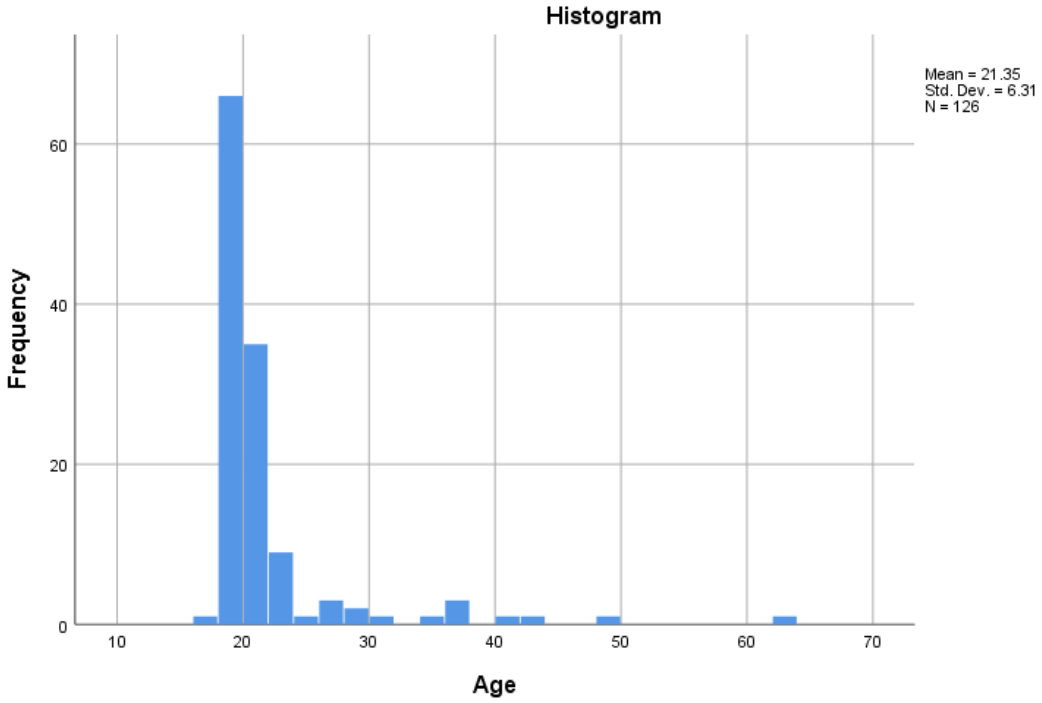

Figure 5. Histogram representing age of participants.

Results

Evaluation of Assumptions for *t* test

Before conducting the *t*-test for research question one, an evaluation of assumptions was completed. According to Field (2013), there are several assumptions to be considered when conducting the paired samples *t*-test. First, data were randomly and independently sampled, thereby meeting the assumption for collection of data for this research. Second, the assumption of scale of measurement is met by using a ratio scale. Using the ratio scale as the unit of measurement, a zero-starting point allowed for a numerical calculation of differences between pre-post assessment scores (Field, 2013).

Third, the sampling distribution of the difference scores must be normally distributed. In large samples (over 30), the sampling distribution tends to be normal.

Results for pre and post kidney knowledge test

All participants were asked to complete a pretest prior to attending a 75-minute workshop and a posttest immediately following the workshop:

RQ1: Does presentation of a workshop on CKD/ESRD to students in a community college increase students' level of knowledge?

$H1_0$: There is no significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H1_1$: There is a significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

An individual's total score on the pre/post knowledge test could range from 0 to 7. A paired *t* test was performed in SPSS v. 25 to assess whether knowledge was gained by attending a workshop for 75 minutes on CKD/ESRD for a group of 126 participants. Mean scores increased from 3.83 before the Workshop to 4.80 after the Workshop (see Table 2). This increase in mean score of 0.976 was significant (t=7.183, $p < 0.001$; see Table 3). Participants' knowledge of CKD/ESRD increased significantly from pre- to posttest; therefore, the null hypothesis was rejected for Research Question 1.

Table 2

Paired Samples Statistics t-*test for Pre and Posttest of Kidney Knowledge*

Knowledge Test	*N*	*M*	*SD*	*SE*
Pre-Kidney Knowledge	126	3.83	1.513	.135
Post-Kidney Knowledge	126	4.80	1.414	.126

Table 3

Paired Samples Test for Paired Differences	*M*	*SD*	*SE*	*CI*	*t*	*df*	Sig (2-tailed)
Pair 1 Pre-KK &Per KK	-.976	1.526	.136	L-1.245 U- .707	-7.183	125	.000

Note. *KK = Kidney Knowledge. ** = 95% Confidence Interval of the Difference

***Research Question 2*:** Does presentation of a workshop on CKD/ESRD to students in a community college increase students' perceptions of the severity of the disease?

*H*2$_0$: There is no significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

*H*2$_1$: There is a significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

An individual's total score on the post-perceived severity survey could range from 12 to 30. Mean scores decreased from 35.33 before the Workshop to 34.87 after the

Workshop (Table 4). This decrease in mean score of .460 was not significant (*t*=.638, *p*=.524, *df*=125) (Table 5). Therefore, the results failed to reject the null hypothesis for research question 2.

Table 4

Results for Pre and Post Severity

Pair 1	*M*	*N*	*SD*	*SM*
Pre-Severity	35.33	126	8.971	.799
Post=Severity	34.87	126	9.031	.805

Table 5

Results of Paired Samples Test

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	*PreSeverity - PostSeverity*	*.460*	*8.095*	*.721*	*-.967*	*1.888*	*.638*	*125*	*.524*

Research Question 3: Does level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD predict perceived susceptibility of the disease?

*H*3$_0$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are not predictors of perceived susceptibility of the disease.

*H*3$_1$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are predictors of perceived susceptibility of the disease.

Research Question 3 was analyzed using multiple linear regression with the post-knowledge kidney assessment and post-perceived severity assessment as the independent variables. The dependent variable for Research Question 3 was perceived susceptibility. However, there were several assumptions to be considered before the regression could be performed.

Evaluation of Statistical Assumptions

Prior to conducting a multiple linear regression analysis, data were entered into SPSS simultaneously (Field, 2013). Data were also assessed for multicollinearity and linear relationships. In this study, there were two predictor variables for research question 3. To check for a linear relationship between variables, scatterplots (Figure 6) between the dependent variable (perceived susceptibility) and each of the independent variables (kidney knowledge and perceived severity) all validated a good linear relationship. The assumption for a linear relationship for this model was confirmed. Normality was assessed using a Q-Q plot. As shown in Figure 7, the data appear very close to the line of best fit, suggesting a normal distribution (Field, 2013). The coefficients output-collinearity statistics obtained a value of 1.019 is between 1-10, suggesting there are no multicollinearity symptoms (Table 6) (Field, 2013).

According to the Scatter Plot of Residuals (Figure 9), the test of homoscedasticity was met since there was no obvious pattern of the dots (Field, 2013). Figure 9 (P-P Plot), is used to show the results of homoscedasticity. A simple histogram was created to display frequencies of scores for post-susceptibility (Figure 8). The histogram indicates

that there is a fairly normal distribution centered at about the mid-point of the post-susceptibility scale.

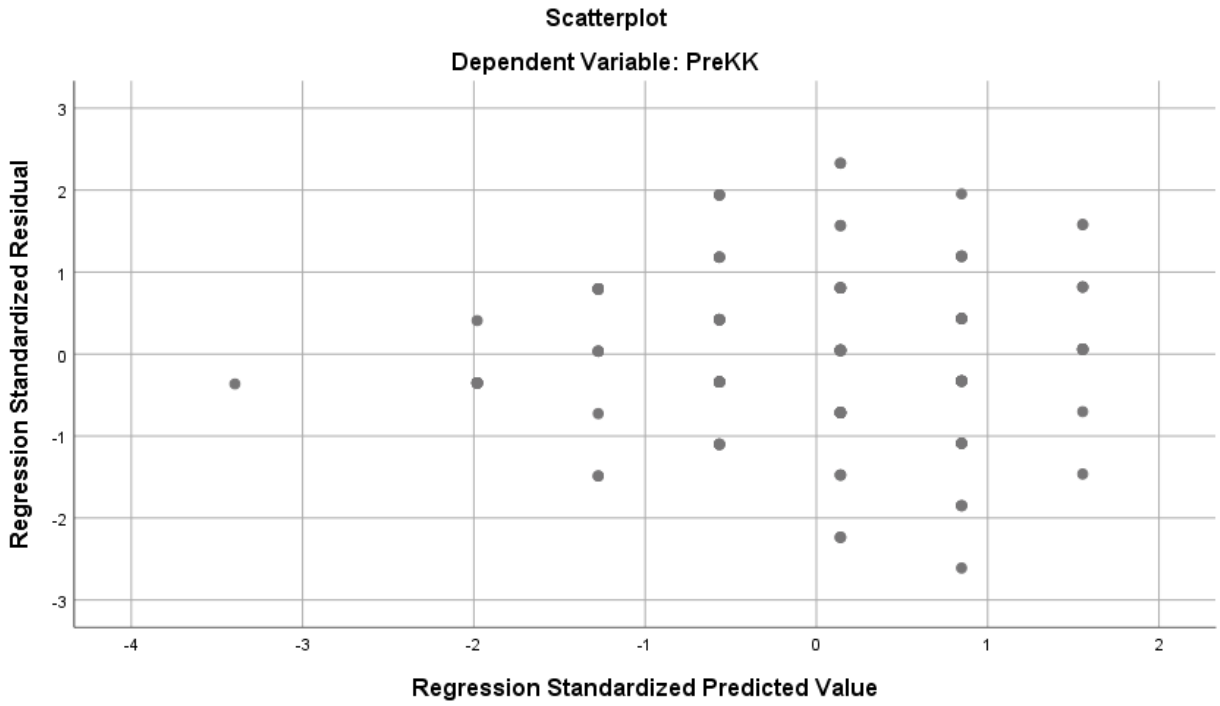

Figure 6. Residual scatter plot for pre-kidney knowledge.

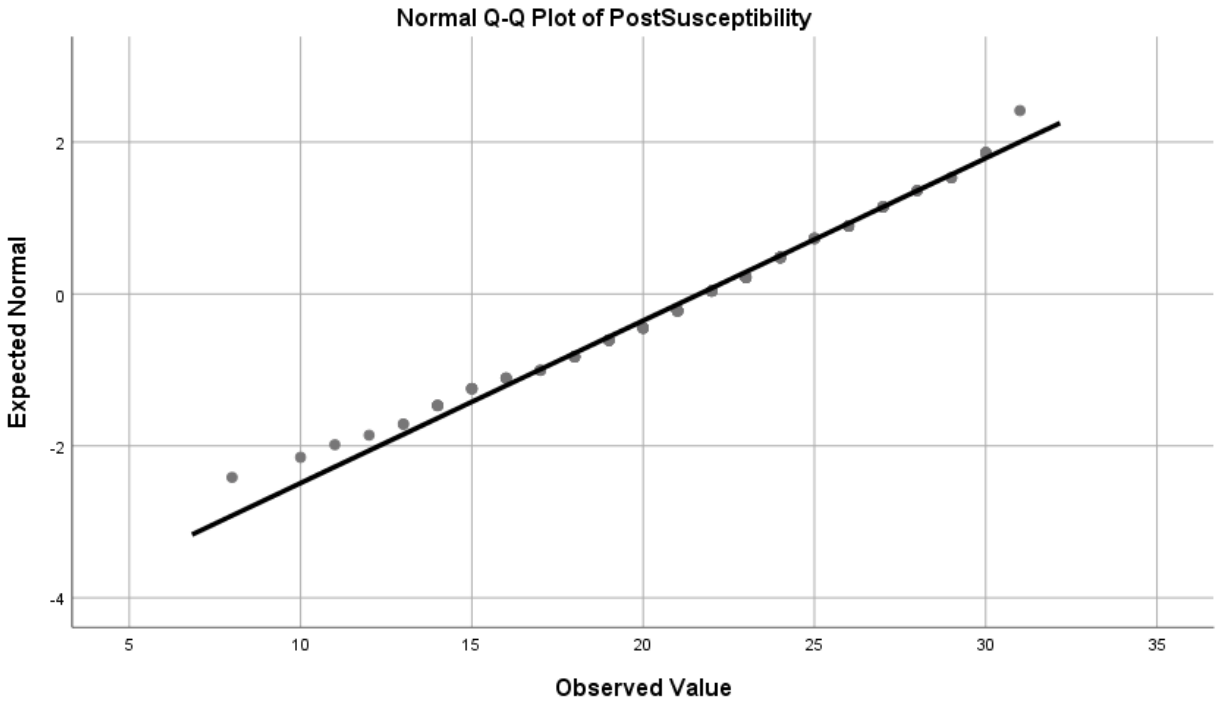

Figure 7. Q-Q plots of normality for post-susceptibility.

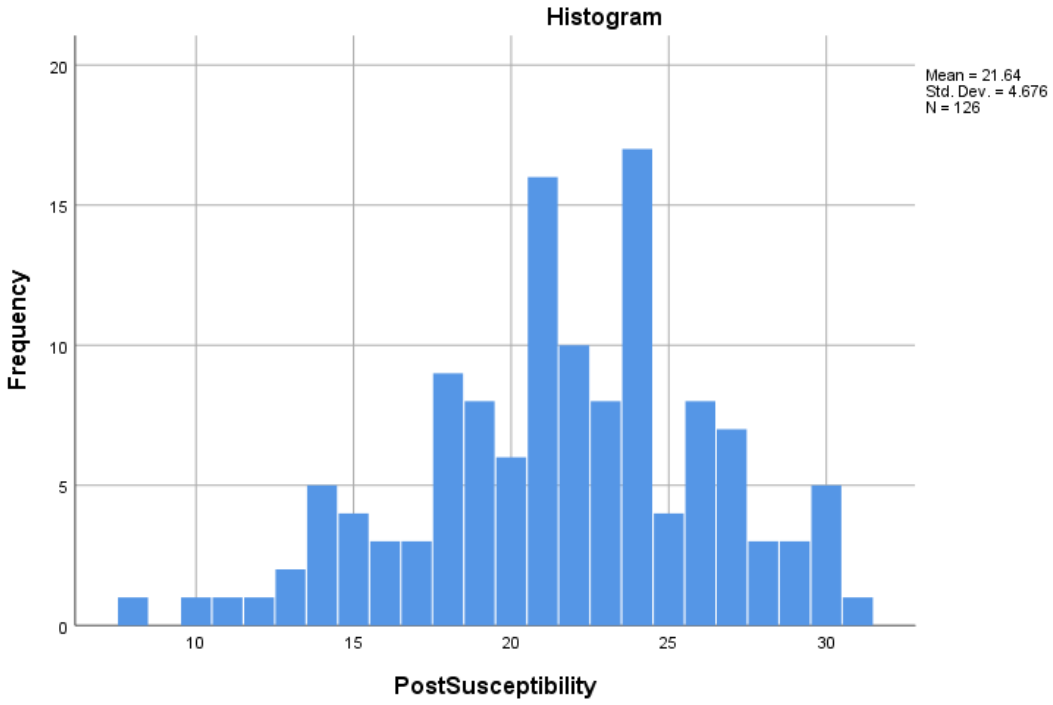

Figure 8. Frequencies of scores for post-susceptibility.

Table 6

Collinearity Diagnostics

Model	Tolerance	VIF
(Constant)		
Post Kidney Knowledge	.981	1.019
Post Severity	.981	1.019

Note. Dependent Variable: Post Susceptibility.

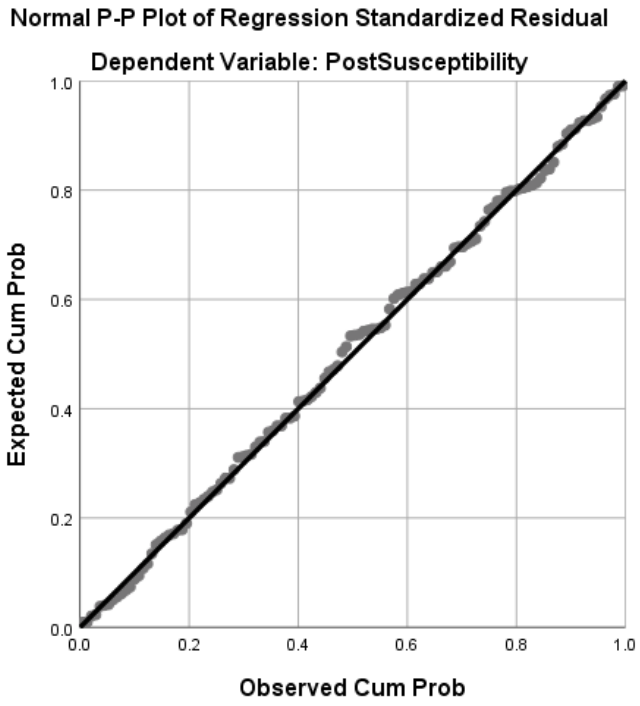

Figure 9. Residual scatterplot for post-susceptibility.

Multiple Linear Regression Analysis

A multiple linear regression analysis was conducted to determine if the level of knowledge and perception of severity of CKD/ESRD following an educational workshop predict perceived susceptibility to the disease. To complete the multiple linear regression using SPSS v. 25, I clicked analyzed, regression, and linear. I then entered post susceptibility as the dependent variable and post-perceived severity along with post-

kidney knowledge as the independent variables. I applied the default method for multiple linear regression analysis which is "Enter," therefore forcing all variables in the model. After clicking the statistics tab, I checked Model fit, *R* squared change, descriptive, part and partial correlations and collinearity diagnostics, along with Durbin-Watson and case-wise diagnostics. Under the Plots tab, I plotted ZPRED on x-axis and ZRESID on y-axis along with checking the normal probability plot box. After completing all required tests for the multiple linear regression, I clicked continue to run the data for the output information. The descriptive statistics displayed in Table 7, is a summary of the data for Research Question 3. Table 7 also presents the mean and standard deviation for each variable in the data set for Research Question 3.

Table 7

Descriptive Statistics

	N	M	SD
Post Susceptibility	126	21.64	4.676
Post Kidney Knowledge	126	4.80	1.414
Post Severity	126	34.87	9.031

I also created a correlation table designed to show three elements of the study (Table 8). First, the table presents the value of Pearson's correlation coefficient between every pair of variables Second, the one-tailed significance of each correlation is displayed. Third, the number of cases pertaining to each correlation (N=126) is displayed. There was a significant correlation between post-severity and post-susceptibility (r = .407, < .001).

Table 8

Correlations Results

		Post Susceptibility	Post KK	Post Severity
Pearson Correlation	Post Susceptibility	1.000	-.020	.407
	Post KK	-.020	1.000	-.137
	Post Severity	.407	-.137	1.000
Sig. (1-tailed)	Post Susceptibility		.410	.000
	Post KK	.410		.063
	Post Severity	.000	.063	
N	Post Susceptibility	126	126	126
	Post KK	126	126	126
	Post Severity	126	126	126

The Model Summary Table 9 was developed using the model fit option and presents the multiple linear regression model summary and overall fit statistics. The adjust *R* for the model is .154 with the R^2 =.167. This means that the linear regression model with the independent variables post-kidney knowledge and post-perceived severity explains 17% of the variance of post-perceived susceptibility. The multiple regression model (Table 10) with both predictors was significant F (2, 123) = 12.349, $p < .000$. As can be seen in Table 11, post-severity had a significant positive association with post-susceptibilit*y*. A histogram was developed to show a graphical relationship of susceptibility scores, kidney knowledge, and severity (Figure 10). A scatter plot (Figure 11) was developed to show homoscedasticity among variables (kidney knowledge and

perceived severity). There appears to be no curvature in the scatterplot, indicating a normal distribution (Field, 2013).

Table 9

Model Summary Results

Model	R	R^2	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.409[a]	.167	.154	4.302	2.110

Note. Predictor (Constant), Post Severity, Post Kidney Knowledge. Dependent Variable: Post Susceptibility

Table 10

ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	456.984	2	228.492	12.349	.000[b]
	Residual	2275.945	123	18.504		
	Total	2732.929	125			

Note. Dependent Variable: Post Susceptibility. Predictors: (Constant) Post Severity, Post Kidney Knowledge

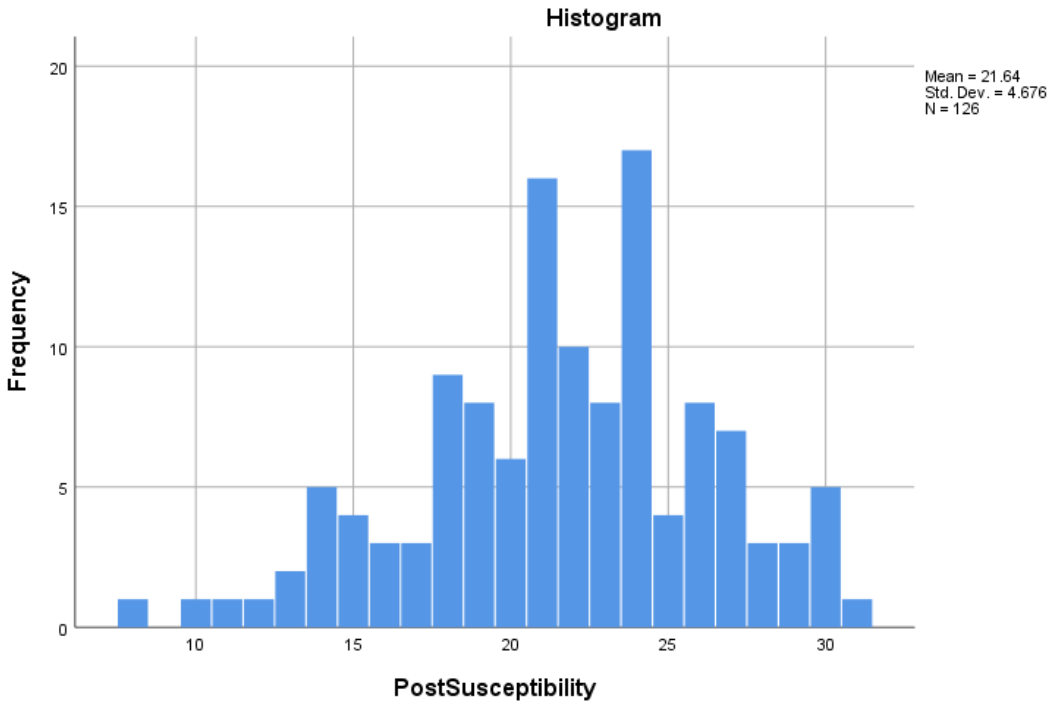

Figure 10. Relationship of scores for post-susceptibility, post kidney knowledge and post-severity.

Table 11

Coefficients Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	13.625	2.163		6.300	.000					
	PostKK	.119	.275	.036	.435	.664	-.020	.039	.036	.981	1.019
	PostSeverity	.213	.043	.412	4.963	.000	.407	.408	.408	.981	1.019

a. Dependent Variable: PostSusceptibility

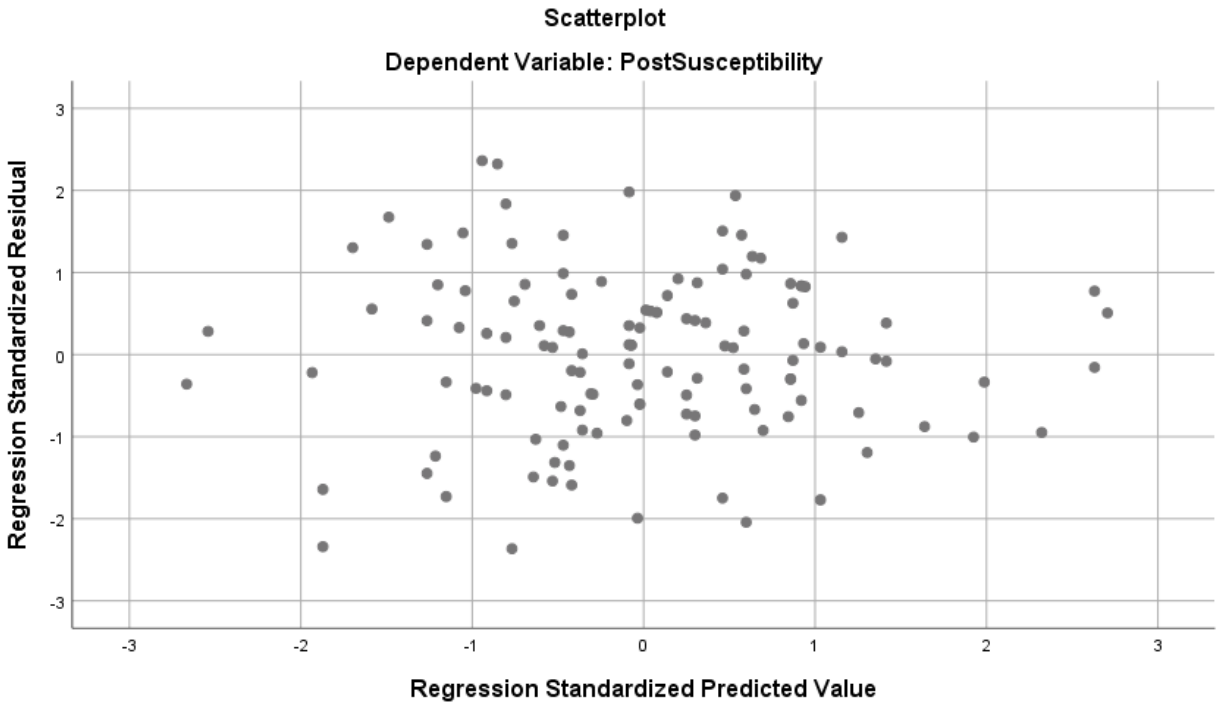

Figure 11. Standardized residual plot for post-susceptibility.

Summary

Results for the three research questions were presented in this chapter. A table was created to present the demographic characteristics of the participants. The results of the *t*-test indicated that the mean scores increased from 3.83 before the Workshop to 4.80 after the workshop. The increase was significant, and the null hypothesis for Research Question 1 was rejected. The results of the analysis for Research Question 2 did not show a significant decrease in the mean score after the workshop (Pre-35.33; Post-34.87), therefore the results failed to reject the null hypothesis. In order to analyze Research Question 3, a multiple linear regression was conducted. The independent variables were post kidney knowledge and post perceived severity, and the dependent variable was post

perceived susceptibility. Assumptions were evaluated and verified. Scatterplots, histograms, and tables were created to present findings of the study. The results of the analysis indicated that R^2=.154, F (2, 123) = 12.349, p < .000, thereby suggesting that the Workshop had a significant impact, thus rejecting the null hypothesis. Chapter 5 will present an interpretation of the findings and recommendations for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quantitative study was to determine whether presenting a workshop on CKD /ESRD to students in a community college would increase their knowledge level of kidney physiology and anatomy, measure the perception of severity, as well as the perception of susceptibility. The workshop was facilitated by a registered nurse employed by the National Kidney Foundation of America for over 12 years. The facilitator taught basic kidney knowledge, including anatomy, physiology, etiology, signs and symptoms, the progression of the disease, resources available, and treatment plans. Because I found the workshop to be effective, the workshop can be made available for use by other community colleges around the United States, increasing the level of knowledge of community college students throughout the country.

The population of the community college offers a pool of individuals from diverse backgrounds, race socioeconomic status, and ages. Furthermore, this population should be mature enough to recognize the seriousness of this disease and its implications both for them and their family members. Some community college students may choose majors in the healthcare field, while others may choose majors in areas related to working with the general population, such as teaching or business. Regardless of the area in which students choose to be employed, information about CKD presented in a workshop may prove useful to them now as well as in the future. Given the lack of individual awareness of the beginning stages of CKD, this study was directed toward closing the gap in awareness of CKD among community college students; increased awareness may produce individuals who can combat or slow down the progression of CKD/ESRD,

thereby decreasing the economic burden on society. This awareness fulfills the mission of Walden University to create a positive social change through health psychology.

The nature of this study was quantitative. Participants were students in the community college setting. Students who have been diagnosed with kidney disease were included but not identified as having kidney disease; however, their data were analyzed separately. The participants were selected from English classes required for all students. Participants attended a 75- minute workshop providing basic knowledge of kidney functioning and related potentially fatal diseases. Participants completed pre- and posttest assessments. The data gathered were used to determine the effectiveness of the workshop (Appendix A). Demographics included age, gender, race/ethnicity, social support, income, and level of education.

The results of this quantitative nonexperimental survey research design were based on showing whether a relationship existed between the independent variable (awareness workshop) and three independent variables. The data were calculated numerically and statistically analyzed. This study addressed the gap in the literature by examining the effectiveness of an awareness workshop on chronic kidney disease among community college students. To address this gap, the study focused on kidney knowledge, perceived susceptibility, and perceived severity. The independent (predictor) variable was the awareness workshop presented by a registered nurse, certified by the Kidney Foundation of America. The dependent (outcome) variables were kidney knowledge, perceived susceptibility, and perceived severity. For Research Questions 1 and 2, a standard *t*-test was conducted after all assumptions were met. The results for

Research Question 1 showed an increase in knowledge after attending the workshop. However, the results for Research Question 2 showed a slight decrease after the workshop, meaning participants' perception of severity decreased after attending the knowledge workshop. To answer Research Question 3, a multiple linear regression analysis was performed to determine if the level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD predict perceived susceptibility of the disease. The data for the research question indicated that the workshop increased participants' knowledge and perception of susceptibility; however, acknowledgment of perceived severity was not indicated. This chapter discusses the interpretation of the study's findings, the limitations of the study, recommendations for future research, implications for social change, and conclusion.

Research Questions

RQ1: Does presentation of a workshop on CKD/ESRD to students in a community college increase students' level of knowledge?

$H1_0$: There is no significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H1_1$: There is a significant change in mean level of knowledge among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

RQ2: Does presentation of a workshop on CKD/ESRD to students in a community college increase students' perceptions of the severity of the disease?

$H2_0$: There is no significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

$H2_1$: There is a significant change in mean perception of the severity of the disease among students before and after presentation of a workshop on CKD/ESRD to students in a community college.

RQ3: Does level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD predict perceived susceptibility of the disease?

$H3_0$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are not predictors of perceived susceptibility of the disease.

$H3_1$: Level of knowledge and perception of severity of CKD/ESRD following a workshop on CKD/ESRD are predictors of perceived susceptibility of the disease.

Interpretation of Findings

Kidney Knowledge

The first research question was designed to determine whether community college students would gain knowledge on CKD and its impact on society by attending an awareness workshop for 75 minutes as measured by a kidney knowledge questionnaire developed by Chow et al. (2012). Consistent with previous studies, the results showed a significant increase in knowledge from pre- to posttest among participants who attended; therefore, the null hypothesis was rejected. These findings suggest that awareness workshops can be beneficial to the community college student population. With this

awareness, this population will be better able to make life choices to protect themselves from developing CKD/ESRD.

According to the CDC (2019), there are approximately 37 million people diagnosed with CKD and counting. To slow this increase, Li et al. (2020) suggest three categories of prevention: (a) primary prevention involves intervention and awareness techniques before the onset of the disease; (b) secondary prevention includes awareness that would prompt individuals to request kidney screenings from their primary physicians to detect whether they are experiencing any renal dysfunctions; and (c) tertiary prevention is designed to help patients who are diagnosed with CKD through educational materials concerning food and liquid intake, social skills, and psychological or emotional issues that may develop. With awareness and education of the disease, individuals can make lifestyle choices that may prevent or slow down the progression of the disease (Li et al., 2020). Findings from my study suggest that educational workshops indeed have the potential to increase this much needed awareness.

Jonathan Purtle, (as cited in Beck, 2015) suggests that individuals within society have a growing need to address today's health issues. Because the lifestyle choices people make determine their outcomes, it imperative that they have the necessary information to make informed decisions about their health. Beck (2015) states that according to the American Journal of Public Health, there are approximately 200 official health awareness days covering various diseases; this number does not include local organizations within the communities. According to the research, World Autism Awareness Day is beneficial for raising money as well as awareness (Padgett, 2016); furthermore, World AIDS Day

has been cited as creating more awareness for society and supporting families (WHO, 2019). Awareness days are not limited to increasing knowledge about specific medical conditions; they can also be a significant step in developing social policies with the potential for greater impact on the population's health initiatives (Beck, 2015). Furthermore, Avery, Leggett, and Juncos (n.d.) state that people must be knowledgeable about the disease to understand the signs, symptoms, and implications for themselves and the greater society.

CKD/ESRD is projected to become a severe social and economic burden by 2040, moving up from the 9th to the 5th leading cause of death in the world. Furthermore, this disease will cause a significant blow to the healthcare industry (Li & Kalantar-Zadeh, 2020). Li et al. (2020) states that individuals receiving dialysis and kidney transplants in high-income countries like the U.S. spend upward of 2%-3% of the allocated healthcare budget though they comprise less than 0.3% or the entire population of these countries. Since CKD may be preventable or at the very least its progression may be slowed down with awareness, it becomes imperative to educate as many people as possible. According to Goel (2018), World Kidney Day was established in 2006 as a global campaign to create awareness of renal failure. This event is held each year on March 8 with different targeted populations; it should be noted, however, that community college students, university students, nor the African American community who are disproportionately at-risk fir CKD have ever been selected as a target population (Avery, Leggett, and Juncos (2015). The goal of World Kidney Day for 2020 was designed to create awareness and preventive initiatives for everyone (Li et al., 2020).

Perception of Severity of CKD

The health belief model (Chow et al., 2012) suggests the perception of severity is an essential component of knowledge required to prevent contracting a chronic disease. To that end, the second research question assessed community college students' perception of the severity of the CKD/ESRD. The perception of severity will have a significant impact on coping strategies an individual may develop to manage his/her diagnosis as well as determine their effectiveness at creating self-management behaviors (Clarke, Yates, Smith & Chilcot, 2016). Research Question 2 hypothesized a significant change in mean perception of the severity of the disease among students after the presentation of a workshop on CKD/ESRD to students in a community college. Contrary to the HBM, results showed a slight decrease in the post-severity survey after attending the workshop, suggesting that the participants perceived the disease as less severe. With this in mind, it may be necessary to conduct further research on attitudes, social expectations, insurance issues, ability to pay as well as medical provider availability in rural areas, to get a clearer picture of the reason for individuals of this population not taking chronic illnesses more seriously (Spleen, Lengerich, Camacho, & Vanderpool, 2014).

Furthermore, if individuals are unaware that medication cannot cure CKD, they may underestimate the severity (Chow et al. 2012); this may also explain the decrease in participants' perception of severity their attendance in a CKD/ESRD workshop notwithstanding. Waterman, Browne, Waterman, Gladstone, and Hostetter (2008) identified CKD as a significant health issue for African Americans. Two thousand

seventeen participants were asked about their perceived risk for developing kidney disease along with assessing for knowledge of CKD and its prevention. The results indicated that most of the participants had a limited understanding of CKD, nor did they perceive CKD as a major health problem, expressing little worry about getting screened for the disease. Because it is a steadily increasing cause of morbidity and mortality in the U. S., the failure to perceive the severity of CKD/ESRD is concerning, especially in the disproportionately afflicted African American population (Avery, Leggett, & Juncos, 2015).

Perceived Susceptibility

A person may hold certain beliefs regarding perceived susceptibility of CKD/ESRD, including beliefs about identity (genetics), timeline (onset), consequences of being diagnosed, cure/control of the disease progression, and the threat of their emotional well-being. Greer, Cooper, Crews, Powe, and Boulware (2011) suggest that most individuals considered at risk for developing CKD may have limited knowledge as well as a mistaken perception of their risk. Informed by the health belief model (Chow et al., 2012), research question 3 asked whether the level of knowledge and perception of severity would impact perceived susceptibility to CKD/ESRD. Chow et al. further stated that individuals who do not have basic knowledge of risk factors associated with CKD (e.g., high blood pressure, diabetes, medication) and the fact that stages 1 and 2 of CKD can be asymptomatic, may exhibit a low level of perceived susceptibility. Several factors may affect an individual's susceptibility to chronic illnesses, such as age, dietary habits, genetics, stress, the use of medication for an extended period, other chronic diseases, as

well as cultural influences including health education level (Clarke, Yates, Smith & Chilcot, 2014).

Findings from this study showed a significant correlation between knowledge gained and perceived susceptibility but not between perceived susceptibility severity and perceived susceptibility after attending a 75-minute workshop. Further research will be required to gain insight as to why severity was not taken seriously by the participants. It can be speculated that the regional environment affects health behavior attitudes and the severity of diseases. Spleen Lengerich, Camacho and Vanderpool (2014) suggest that individuals from rural areas may not be as attentive to the severity of diseases due to attitudes, social expectations, or an inability to pay for healthcare. Furthermore, the experiences an individual has with their healthcare provider may also impact the individual's perception of disease severity. While results of this study show that participants realize they may be at risk or susceptible to the disease, their limited reaction to its severity causes some concern.

Limitations of the Study

This study had several limitations. First, because I used a convenience sample, my participants were not randomly selected; participants were limited to one specific rural community college. Furthermore, because the student body at this community college lacks ethnic/racial diversity, i.e., the majority of the participants were single, African American females, my sample is not representative. Thus, the findings are generalizable only to single, female, African American students at rural community colleges.

Another limitation deals with the use of pre/post assessments; Kelly (2019) warns that when administering pre/post assessments, there may be a tendency to 'teach to the test.' In other words, participants are aware that information disseminated during the workshop will likely prepare them for taking the posttest. Furthermore, using the same test pre- and post, makes it more likely that pretesting familiarizes participants with requirements for posttest responses.

The study was limited to students enrolled in general education courses only; it may be that students enrolled in allied-health courses with a background in anatomy and physiology may have responded differently. Although I did find that knowledge about kidney disease interacted with perceived severity to significantly impact perceived susceptibility, there could have been other variables that were not assessed that may be implicated, e.g., socioeconomic status, access to medical facilities and physicians, and family support systems.

Recommendations

The purpose of this study was to measure the knowledge gained by community college students attending awareness workshops as an intervention to CKD/ESRD and whether or not that new knowledge increased participants' perception of severity and susceptibility. According to the World Health Organization (2014), millions of people are diagnosed with chronic diseases, leading to a high U.S. mortality rate. The incidence of CKD/ESRD impacts African Americans (16%), disproportionately, compared to Caucasians (13%), Hispanics (14%) and Asians (12%); therefore, awareness research should concentrate on African American communities (Avery, Leggett, & Juncos, 2015;

CDC, 2020). Findings from my study suggest that educational workshops can increase the awareness required for people to make informed decisions about their healthcare needs. According to Luyckx et al. (2017), there is a significant correlation between individuals diagnosed with diabetes, hypertension and obesity and the development of CKD, along with individuals who may be exposed to the development of kidney stones, fetal and maternal infections, kidney injury that may be acute, kidney problems that may occur due to medication as well as environmental issues—compelling the need for a broad approach to disease awareness. Since the spread of CKD is rapidly growing, Luyckx et al. suggest that the most vulnerable populations (e.g., African Americans) should be targeted for education to prevent the development of CKD.

Because my findings suggest that CKD/ESRD awareness workshops are successful in increasing kidney knowledge among community college students, the study should be repeated with more expansive, randomly sampled populations to increase generalizability, starting with community college students across all degree areas. This would eliminate the untested assumption that students majoring in the health sciences would know more about chronic disease than general education students. Additionally, demographics should be included (e.g., age, gender, religion, college major, geographic are, and socioeconomic status) as they may reveal different levels of knowledge about and attitudes toward chronic health conditions. For example, individuals who reside in rural areas may exhibit avoidant behaviors related to health care (Spleen, Lengerich, Camacho & Vanderpool, 2014). Attitudes toward chronic illnesses may also be

associated with the social expectations of a specific population based on religious beliefs, for example.

Developing a course for implementation within the community college setting to increase knowledge of chronic disease for all students is recommended. Informed by the health belief model (Chow et al., 2012), this course would focus on health promotion and disease prevention programs, including factors that influence an individual's perceived susceptibility, perceived severity, perceived benefit, perceived barriers to action, cues to action, and self-efficacy. In particular, cues to action are used to encourage individuals to make a change, even if it is a minor change, to increase individual self-efficacy (Boskey, 2019).

Implications

The function of kidneys in the human body is to filter the blood and remove waste products as well as regulate the daily balance of fluid and electrolytes. In essence, the QoL will be affected drastically if the kidneys are not functioning correctly (Stauffer & Fan, 2014). According to the Centers for Disease Control and Prevention, approximately 26 million Americans are affected by CKD, and the number is steadily rising. However, most of the affected individuals are unaware of or are undiagnosed (CDC, 2015). Over the next ten years, it is projected that there will be a 50% increase in CKD/ESRD diagnoses, thereby creating a major socioeconomic problem in addition to increased morbidity and mortality (Avery, Leggett, & Juncos, 2015).

Findings from this study could prompt the creation of a standardized awareness campaign to address CKD/ESRD to be held during National Kidney Week or World

Kidney Day. Invitations may be issued to include the National Kidney Foundation and local dialysis clinical managers to disseminate information that is accurate and beneficial to the students. The National Kidney Disease Education Program (NKDEP, 2016) provides educational tools that may be used for workshop materials.

This study addressed a gap in the literature by examining the effectiveness of a 75-minute workshop on CKD/ESRD among community college students. The study was designed to measure whether knowledge would be gained as well as whether a change would occur in perceived severity and perceived susceptibility of the students. The health belief model (Chow et al., 2012) is a theoretical framework that may be employed to explain and predict the outcome of an individual willing to change their health behaviors. This study was unique in that it attempted to research a specific population of individuals who are young yet mature enough to understand the devastation of chronic disease and make a lifestyle change. The results from this study can assist in positive social change by informing vulnerable individuals (e.g., who have diabetes, hypertension, use many medications, or have a family history of kidney failure), the relationship between perceived susceptibility and the development of CKD/ESRD. Since a vast majority of individuals at risk for developing CKD have limited knowledge and mistaken perception of the severity of CKD, education becomes crucial to preventing the disease; the earlier individuals are made aware of its impact, the sooner they will be able to make better lifestyle choices (Greer, Cooper, Crews, Power, and Boulware, 2011). To that end, taking proactive measures will reduce the medical and socioeconomic burden on society.

Furthermore, since studies have indicated that African Americans are at higher risk for developing CKD/ESRD, special attention can be given to this population (Avery, Leggett, & Juncos, 2015). Conducting a needs assessment within local communities have the potential to create positive social change. Seminars may be developed to convey the seriousness of health issues, communicate to a target population, disseminate information, assist in identifying medical facilities or agencies and to help with an action plan as well as help individuals develop and employ a self-care model for better health (Green, Ephriam, Hill-Briggs, Browne, Stirgo…...Boulware, 2018).

Conclusions

Awareness workshops are frequently used in today's society by health organizations and community organizations to educate the general public about specific diseases. This study was designed to evaluate whether a CKD/ESRD awareness workshop achieved that goal within a targeted population; results showed that rural community college students attending a 75-minute knowledge workshop had greater awareness of the severity and their susceptibility to CKD. According to the health belief model, knowledge enables individuals to make informed decisions concerning many facets of their lives, including perceptions of severity and susceptibility to chronic disease. Findings from this study may inform other educational workshops with the potential to reach broader and more diverse populations.

The study provided an understanding of community college students' awareness and knowledge of CKD. While there was a gain in knowledge, participants understated the severity of the disease, expressing little concern about its burden to society and its

rapidly increasing numbers. The promotion of early detection of CKD/ESRD can be more productive and less expensive in promoting proactive steps to decreasing CKD/ESRD diagnoses. To that end, education is the critical proactive tool.

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Appendix A: Workshop Outline

I. INTRODUCTION
   a. Terminology and Definition
      i. Chronic Kidney Disease
      ii. End Stage Renal Disease
      iii. Peritoneal Dialysis
      iv. renal
      v. Hemodialysis
      vi. Kidney transplant

II. How Normal Kidneys Work
   a. There are two kidneys in the body
   b. The human body can function with only one kidney
   c. Filter toxin and waste from the blood
   d. Maintain homeostasis—an internal balance of water and chemicals by filtering the blood.
   e. Every heartbeat pushes blood through your body –therefore kidneys work 24 hours a day, 7 days a week.
   f. Kidneys filter 2 quarts of extra fluid and wastes (urine) each day. Urine collects in the bladder slowly and is released through urination.
   g. Kidney release hormones
      i. to produce red-blood cells called erythropoietin
      ii. Calcitriol is a hormone that is also released to help keep bones healthy.
      iii. Renin—blood pressure hormone

III. Kidney Failure (3 types)
   a. Acute Renal Failure
   b. Chronic Kidney Disease
   c. End-Stage Renal Disease

IV. Causes of Chronic Kidney Disease
   a. Type 2 diabetes
   b. High Blood Pressure (Hypertension)

V. Stages of Chronic Kidney Disease according to National Kidney Foundation

VI. Suggestion for early detection of kidney problems
   a. Anemia treatment
   b. Medication
   c. Eating changes
   d. Avoiding certain pain pills
   e. Regular blood pressure checks
   f. Cut back or quit smoking

VII. Uremia—extra fluid in the body that should be filtered out
   a. Signs and symptoms
      i. Headaches, fatigue, and fuzzy thinking
      ii. Mouth—food has a metal taste
      iii. Lungs—shortness of breath
      iv. Stomach—loss appetite, nausea and vomiting
      v. Bladder—less or no urine may be produced
      vi. Hands—swelling can be caused by fluid build-up

vii. Feet—swelling can be caused by fluid build up
viii. Skin—build-up of waste causes itching
ix. Blood vessels—high blood pressure

VIII. Treatment of CKD/ESRD
a. Peritoneal Dialysis (home)
b. Hemodialysis (clinical or hospital setting)
c. Kidney Transplant

IX. Conclusion—question and answering session