STUDY ON THE TRENDS OF CHRONIC KIDNEY DISEASE AND ITS MANAGEMENT IN OWERRI, IMO STATE

BY

NZEH, NWAKAEGO EVANGELINE
REG. NO: 2015/4942888

A PROJECT SUBMITTED TO THE POST-GRADUATE SCHOOL FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER DEGREE IN PUBLIC HEALTH (MPH) TECHNOLOGY

DECEMBER, 2022

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DECEMBER, 2022

CERTIFICATION

This is to certify that this work **"Study on the Trends of Chronic Kidney Disease and its Management in Owerri, Imo State"** was carried out by **Nzeh, Evangeline Nwakaego (20154942888)** in partial fulfillment for the award of the degree of (MPH in Health Promotion) in the Department of Public Health, Federal University of Technology Owerri.

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DEDICATION

This work is dedicated to God Almighty for His infinite mercy and amazing grace and to our Mother Mary, the Mother of Jesus Christ for her unfailing intercession for me.

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ABSTRACT

Chronic Kidney Disease (CKD) has been reported as a major cause of death and nephrological disability in adults and it imposes a heavy emotional and financial burden on the family of the affected patient and society. The aim of the study was to determine the trends of chronic kidney disease and its management in Owerri, Imo State from January 2014 to December 2017. The study design was a retrospective survey on CKD cases and the data were collected from medical record cards with information on prevalence rate and risk factors of CKD. The sampling technique adopted for this study was purposive sampling technique because the variables of interest were defined. The collected data were sorted and entered into computer software called Statistical Package for Social Science version 21.0. It was analyzed using descriptive statistical analysis and the results were presented in frequency tables and charts. The results of the study showed the patients with CKD for the period of four years in the studied hospital, the overall prevalence rate of chronic kidney disease (CKD) was 9.9% and males had 67.8% while females 32.2%. Majority of the patients with CKD were found to be at the age group of 50-59 years with 35.5%.Also, 34.2% were traders.The cases of CKD were common in year 2016 with 294 cases from month of March to November due to high turnout of patients for the check of chronic kidney disease (CKD). The most strongly risk factors of CKD was hypertension with 48.6%.There is a significant relationship between the patterns of CKDand age(X^2 *=12.907;*df = 6; p-value*<0.05*) and sex (*2.105; df = 1 @ Pv =0.33*)within the study periodusing Chi-Square test. In conclusion, information got from the study was collated and proved significant relationship between risk factors such as hypertension, diabetes, age etc and occurrence of CKD. Therefore, there is a need for free screening of blood pressure and diabetes among people of above forty years of age.

Keywords: Chronic Kidney Disease, Nephrological, Hypertension, Diabetes, Blood pressure, Cardiovascular disease.

CHAPTER ONE

INTRODUCTION

1.1. Background Information

Chronic kidney disease (CKD) is a global health burden with a high economic cost to health systems and it is an independent risk factor for cardiovascular disease (CVD) (Egbi, Okafor, Kasia, Olowu, Unuigbe, 2014). According to the published evidence in the 2013 Global Burden of Disease Study, CKD resulted in almost one million deaths worldwide, and is the direct cause of one out of 57 fatal outcomes. It remains among the few growing causes of mortality which made Chronic Kidney Disease the 13th leading cause of death (Boris, 2013). Chronic Kidney Disease contributed to 956,200 deaths, a 134% increase from 1990 (Tedla, 2011). Studies have reported that CKD affects >10% of the population in several countries and >50% of high-risk subpopulations (Decker & Kendrick, 2014).

In developed countries, Chronic Kidney Disease affects nearly 7% of all individuals aged ≥ 30years, which translates to greater than 70 million individuals (GBD, 2013). Furthermore, the prevalence of CKD increases with age and exceeds 20% in individuals aged more than 60 years and 35% in individuals aged more than 70 years (GBD, 2013). Globally, it has been estimated that more than 1.4 million individuals that receive renal

replacement therapy with dialysis or transplantation (Abraham *et al.*, 2017). Comparable estimates have been reported in Asia, Australia, and across Europe. In the United States, approximately one in three adults aged 65 years and older has CKD defined as an estimated glomerular filtration rate (eGFR) <60 ml/min/1.73 m^2 (Fescher *et al*.,2012).

All stages of CKD are associated with increased risks of cardiovascular morbidity, premature mortality, and/or decreased quality of life (Hill *et al*., 2016). Africa and most developing countries are still bedeviled by the scourge of Chronic Kidney Disease. Previous studies proved that Sub Saharan African countries like Nigeria appears to be badly hit by the Chronic Kidney pandemic although there is a paucity of data on the CKD prevalence in Nigeria and other Sub Saharan African region and where data exists, they are mostly hospital based (Egbi, *et al*., 2014; Odenigbo., 2014). Emphatically argued that the prevalence of chronic kidney disease (CKD) is rising globally and causing enormous socio-economic burdens for societies and the health care systems across the globe.

In the 2012, for clinical practice guideline in the evaluation and management of Chronic Kidney Disease, which can be defined as ‘abnormalities of kidney structure or function, present for >3 months, with health implications. Further, the guidelines recommend that CKD be staged based

on the cause, glomerular filtration rate (GFR) category (Abraham, *et al.*, 2017; Kellum, 2015).

Chronic kidney disease includes conditions that damage the kidneys and decrease its ability to keep human healthy. If kidney disease gets worse, wastes can build to high levels in the blood and makes an individual feel sick. The individual may develop complications like high blood pressure, anemia (low blood count), weak bones, poor nutritional health and nerve damage. Also, kidney disease increases the risk of having heart and blood vessel disease. Chronic kidney disease (CKD) is associated with age-related renal function decline accelerated in hypertension, diabetes, obesity and primary renal disorders (Hill *et al*., 2016). Egbi *et al* (2014), petulantly stressed that the burden of CKD appears to be marked in Sub-Saharan Africa and disturbing is the fact that in Sub-Saharan Africa, CKD tends to affect relatively younger individuals, most of which are in the economically productive age group.

In Nigeria, the situation is such that CKD represents about 8–10% of hospital admission. This may be a huge underrepresentation of the true situation. It is well known that CKD is under recognized and under diagnosed; patients with end-stage renal disease (ESRD) are thought to represent the tip of the iceberg of the entire burden of CKD. This is more so

in developing countries like Nigeria where patients often present late or not at all to health facilities for several reasons which range from prohibitive cost of health care services to use of alternative treatment like spiritual healing and traditional/native healers. Hence in Nigeria where Renal Replacement Therapy is available, it is unaffordable by most patients. Also, in Nigeria there is no social security system or health insurance scheme in place to assist the patient and the burden is borne solely by the patient and relatives.

1.2. Problem Statement

A chronic kidney disease (CKD) is one of the diseases that has threatened mankind and continues to pose a critical health emergency in the global health system. Statistics shows that CKDS is increasing worldwide by approximately 8-16% annually (Anderson & Glynn, 2011; Arnold, Issar, Krishnan & Pussell, 2016). The incidence of CKD in Nigeria has been shown to be in a range between 1.6% and 12.4% respectively (Egbi *et al.*, 2014). CKD affects male and female, young and aged. It can be acute or chronic. It has been one of the major causes of disability and death in many parts of the world. Chronic kidney disease creates physical impairment as it creates weakness of the body and makes the body unable to carry out its

activities. A large budget in America is channeled every year into confronting the global challenge of CKD.

In Nigeria, there has been endemic health emergencies such as Ebola, Bird flu, Small Pox, Chicken Pox, Monkey pox to mention but a few, and very often, government have channeled its attention and resources to these health emergencies and little or no attention has been given to confronting the chronic kidney disease.

According to the hospital based statistics of health and human services statistics of the National Bureau of Statistics (NBS, 2016), 70% out of 100% of those diagnosed with chronic kidney disease are young people within the age bracket of 18years to 33years in Imo State and beyond. These individuals constitutes the workforce of Imo State and Nigeria, the implication remains that Imo State and Nigerian GPD continues to dwindle and as such achieving economic development that will accelerate reduction in poverty, unemployment and inequality continues to remain a pious hope.

Furthermore, the magnitude of the problem of chronic kidney disease (CKD) is enormous, and the prevalence of kidney failure is rising. Currently, CKD is emerging as a worldwide public health problem (Ulasi & Ijeoma, 2010).

1.3 General Objective

The general objective of the study was to determine the trends of chronic kidney disease and its management in Owerri, Imo State

1.3.1 Specific Objectives

The specific objectives include;

1. To determine the incidence of chronic kidney disease in Owerri Zone, Imo State.
2. To find out the risk factors influencing the occurrence of chronic kidney disease in Owerri Zone, Imo State.
3. To ascertain the management strategies of chronic kidney disease in Owerri Zone, Imo State

1.4 Research Questions

The following questions constitutes the questions to address the research topic and problem

1. What is the incidence of chronic kidney disease in Owerri Zone, Imo State?
2. What are the risks factors influencing the occurrence chronic kidney disease in Owerri Zone, Imo State?

3. How is the management strategies of chronic kidney disease

1.5 Research Hypothesis

There is no significant relationship between the age and sex of patients living with chronic kidney disease in Owerri Zone, Imo State.

1.6 Significance of the Study

This study will be of great importance to people of Imo State and beyond. First, the research result will increase knowledge and awareness of people on the incidence of chronic kidney disease among patients through education.

It will contribute to the existing body of knowledge on the incidence of CKD in Nigeria, Africa and the global community.

The study will also broaden the existing body of knowledge on the best practices and strategies to tackle individual and family health challenges especially as it relates to chronic kidney disease.

Findings of the study may provide a policy framework for government intervention on the plight of the CKD patients.

It will also provide clue to a more effective management of CKD among patients and may finally provide a new approach to understanding CKD diagnosis, treatment and management.

1.7 Scope/Delimitation of the Study

This research study is delimited to the CKD among hospitalized patients in Owerri Zone. The study has its scope to all the hospitalized patients who have presented themselves for Heamodialysis from 2014-2017 at the MTN Foundation Dialysis Center, Federal Medical Center Owerri (F.M.C).

It is further delimited to independent variables of age, gender, body mass index, BP measurement and weight. It is also delimited to the use of administrative or time series data for data collection. The study is finally delimited to the use of descriptive statistics such as simple percentage (%), mean age for data analysis.

1.8 Definition of Terms

Hypertension- Hypertension (HTN or HT), also known as high blood pressure (HBP), is a long-term medical condition in which the blood pressure in the arteries is persistently elevated. Blood pressure is the force of blood pushing against the walls of arteries as it flows through them. Arteries are the blood vessels that carry oxygenated blood from the heart to the body's tissues.

Kidney Failure- Kidney failure, also known as end-stage kidney disease, is a medical condition in which the kidneys no longer work.

Patient- is a person receiving or registered to receive medical treatment.

CHAPTER TWO

LITERATURE REVIEW

2.1. CONCEPT OF CHRONIC KIDNEY DISEASE (CKD)

2.1.1 Meaning of Chronic Kidney Disease (CKD)

Over the past decade, chronic kidney disease (CKD) has become an area of intensive clinical and epidemiological research. Despite the clarity provided by the Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines, there appears to be within the CKD research literature significant disagreement on how to define CKD and measure kidney function (Anderson & Glynn, 2011). The kidneys are two bean-shaped organs, each about the size of a fist. They are located just below the rib cage, one on each side of the spine. Every day, the two kidneys filter about 120 to 150 quarts of blood to produce about 1 to 2 quarts of urine, composed of wastes and extra fluid. Chronic kidney disease includes conditions that damage the kidneys and decrease their ability to keep person healthy by doing the jobs listed. If kidney disease gets worse, wastes can build to high levels in the blood and make someone feel sick. Someone can develop complications like high blood pressure, anemia (low blood count), weak bones, poor nutritional health and nerve damage. Also, kidney disease increases the risk of having heart and blood vessel disease. These problems

may happen slowly over a long period of time. Chronic kidney disease may be caused by diabetes, high blood pressure and other disorders. Early detection and treatment can often keep chronic kidney disease from getting worse. When kidney disease progresses, it may eventually lead to kidney failure and such requires dialysis or a kidney transplant to maintain life. Chronic Kidney Disease is defined as either kidney damage, estimated by using such markers as albuminuria, or estimated glomerular filtration rate (eGFR) less than 60 mL/min/1.73 $m^{2.}$ The severity of CKD can be classified into 5 stages by the Kidney Disease Outcome Quality Initiative (K/DOQI) guideline, stage 0: eGFR> 90 mL/min/1.73 m^2, and; no proteinuria; normal kidney function, stage 1: eGFR> 90 mL/min/1.73 m^2 and with evidence of kidney damage, stage 2: eGFR 60–89 mL/min/1.73 m^2; mild decrease in GFR; stage 3: eGFR 30–59 mL/min/1.73 m^2 and moderate decrease in GFR; stage 4: eGFR 15–29 mL/min/1.73 m^2 and severe decrease in GFR; and stage 5: eGFR< 15 mL/min/1.73 m^2 or in dialysis, kidney failure (Malekmakan *et al*., 2013)

2.1.2 Causes of Chronic Kidney Disease (CKD)

In developed countries and many developing nations, diabetes and hypertension are the first two leading causes of CKD. In the Western world, diabetes is the leading cause, whereas in many undeveloped countries it is

hypertension. CKD is a common pathology in Africa however, its prevalence and incidence among the general population are unknown; the existing data relate to CKD in hospital setting.

2.1.3 Hypertension

A condition present when blood flows through the blood vessels with a force greater than normal and such can be called high blood pressure. Hypertension can strain the heart, damage blood vessels, and increase the risk of heart attack, stroke, kidney problems, and death. According to American Heart Association, hypertension, also known as high blood pressure is when the pressure of the blood being pumped through the arteries is higher than it should be (Al-Aly, 2017). Put differently, High blood pressure, also called "hypertension," is a serious medical condition. It happens when the force of the blood pumping through arteries is too strong. When heart beats, it pushes blood through arteries to the rest of the body. When the blood pushes harder against the walls of arteries, the blood pressure goes up. Blood pressure may be different at different times of the day. It is usually higher when first wake up, after exercise, or when under stress. Having higher blood pressure for short amounts of time is normal. However, when blood pressure stays high for most of the time, it can cause serious health problems such as kidney failure.

Hypertension is one of the potent causes of CKD and there is an association between hypertension and CKD**.** Hypertension is strongly associated with CKD. Several large, prospective, observational trials conducted in the general population have demonstrated that hypertension is a strong independent risk factor for ESRD and contributes to the disease itself or most commonly, to its progression. In the Multiple Risk Factor Intervention Trial, stage 4 hypertension (systolic blood pressure SBP >210 mmHg or diastolic blood pressure [DBP] >120 mmHg) compared to optimal BP (SBP/DBP <120/80 mmHg) was associated with a 20-fold higher relative risk for ESRD. The study, which included 46,881 men and 51,878 women undergoing dialysis, categorized blood pressure as optimal (110±6/68±6 mmHg), normal (121±4/–75±6 mmHg), high normal (131±4/79±6 mmHg), mild hypertension (142±8/86±7 mmHg), moderate hypertension (160±11/94±9 mmHg), and severe hypertension (181±16/105±12 mmHg). Other causes of CKD include older age, family history of CKD, reduced kidney mass, low birth weight, and low income or educational level. Initiation factors refer to factors that directly initiate kidney damage and include diabetes mellitus, high blood pressure, autoimmune diseases, systemic infections, urinary tract infections, urinary stones, lower urinary tract obstruction, and drug toxicity. Progression factors are of cases of

chronic renal failure, while hypertensive nephropathy and chronic pyelonephritis, each contribute to 10% cases of chronic renal failure (Agboton, 2017). Dubey and Sanjeev (2017), argued that *Daturastramonium* (Acute Renal Failure: A Complication of Datura Poisoning), also known as thorn apple, mad apple, devil's apple, apple of Peru, angel's trumpet, devil's trumpet, stinkweed, Jamestown or Jimson weeds, moon flower, witch's thimble, green dragon or tolguacha is a poisonous plant found in many parts of the world. All parts of the plant are poisonous and are ingested, smoked or absorbed topically for recreation. Ingestion of datura root, however, is unheard of and so is subsequent renal failure. There have been, however, reports of elevated creatinine kinase with or without rhabdomyolysis.

2.1.4 Obesity

In 2014, over 600 million adults worldwide were obese. Obesity increases the risk of developing major risk factors for Chronic Kidney Disease (CKD), like diabetes and hypertension, and it has a direct impact on the development of Chronic Kidney Disease and end-stage renal disease (ESRD) (Kovesdy, Furth & Zoccali, 2017). Numerous studies have shown an association between measures of obesity and both the development and the progression of CKD. In general, the associations between obesity and poorer renal outcomes persist even after adjustments for possible mediators of obesity's

cardiovascular and metabolic effects, suggesting that obesity may affect kidney function through mechanisms in part unrelated to these complications. The deleterious effect of obesity on the kidneys extends to other complications such as nephrolithiasis and kidney malignancies (Kovesdy, et al., 2017). However, it is argued that the exact mechanisms whereby obesity may worsen or cause CKD remain unclear. Some of the deleterious renal consequences of obesity may be mediated by comorbid conditions such as diabetes mellitus or hypertension, but there are also effects of adiposity which impact the kidneys directly via production of (among others) adiponectin, leptin and resistin. These include the development of inflammation, oxidative stress, abnormal lipid metabolism, activation of the renin-angiotensin-aldosterone system, and increased production of insulin and insulin resistance.

2.1.5 Air Pollution

Air pollution may lead to kidney damage. According to Al-Aly (2017), exposure to particulate matter air pollution increased, so did the risk of poorer kidney function, kidney disease, and kidney failure. He maintained that the strongest link between air pollution and kidney damage was seen in southern California and large swaths of the Midwest, the Northeast, and the South. Thus, the results of his study suggest that each year in the United

States, 44,793 new cases of chronic kidney disease and 2438 new cases of kidney failure are associated with particle pollution exceeding the Environmental Protection Agency (EPA) recommended limit.

2.1.6 Diabetes

Diabetes and high blood pressure are the most common causes of kidney disease, and people often have both. Māori and Pacific people with diabetes have an increased risk of CKD. Diabetes not only causes damage directly to the filtering membranes in the kidney; it also damages blood vessels throughout the body, increasing the risk of high blood pressure, which in itself can cause kidney damage. The presence of protein in the urine in patients with diabetes is an indicator of the extent of damage to the filters of the kidneys. End-stage kidney disease in people with diabetes is becoming more common, especially in those with type II diabetes (adult onset diabetes), but there is convincing evidence that good control of blood sugar levels and of blood pressure can reduce or, in some cases, prevent progressive kidney damage (Ministry of Health and Kidney Health New Zealand, 2014).

2.1.7 Reflux nephropathy

Primary vesicoureteric reflux (VUR) is a common congenital abnormality of the urinary tract that may be inherited. Some patients with VUR have

frequent urinary tract infections, even as children. The condition is most commonly picked up on an antenatal scan or during tests to explain a urinary tract infection in early childhood. Vesicoureteric reflux may progress to cause kidney scarring and CKD, in which case it is known as reflux nephropathy. Reflux nephropathy is an important cause of high blood pressure in children, which can further damage the kidneys. Reflux nephropathy is responsible for approximately 10 percent of all cases of treated ESKD, and is the commonest cause of ESKD in children. Vesicoureteric reflux often resolves spontaneously, although sometimes operations are performed to correct it. Some doctors give children with VUR daily antibiotics to reduce the chance of further infections and further scarring. It is rare for children to develop reflux nephropathy if their kidneys are normal when they have their first urine infection. In most cases of reflux nephropathy kidney damage is already quite extensive when the problem first comes to medical attention (Ministry of Health and Kidney Health New Zealand, 2014)

2.1.8 Vascular conditions

Smoking, too many fatty foods, high cholesterol, lack of exercise and obesity all place a strain on the body's vascular system (the system of blood

vessels). Many older people have atherosclerotic vascular disease, where fatty plaques completely or partially block small vessels. This problem commonly causes heart attacks and strokes, but can also cause kidney disease. In fact, any condition which blocks blood flow to the kidneys, in either large blood vessels leading to the kidney or smaller blood vessels within the kidney, can cause CKD.

2.1.9Acute tubular necrosis

Acute tubular necrosis (ATN) is the most common cause of acute kidney injury (AKI) in the renal category (that is, AKI in which the pathology lies within the kidney itself. ATN is generally caused by an acute event, either ischemic or toxic. The tubule cell damage and cell death that characterize ATN usually result from an acute ischemic or toxic event. Nephrotoxic mechanisms of ATN include direct drug toxicity, intrarenal vasoconstriction, and intratubular obstruction (Shah & Batum, 2016).

2.1.10 Polycystic kidney disease

Autosomal dominant polycystic kidney disease (ADPKD) is one of the most common inherited disorders in humans. It is the most frequent genetic cause of renal failure in adults, accounting for 6-8% of patients on dialysis in the United States. Autosomal dominant polycystic kidney disease (ADPKD) is a multisystem and progressive disorder characterized by cyst formation and

enlargement in the kidney and other organs (eg, liver, pancreas, spleen). Clinical features usually begin in the third to fourth decade of life, but cysts may be detectable in childhood and in utero (Stangel, 2010).

2.1.11Interstitial Nephritis

Interstitial nephritis is a kidney condition characterized by swelling in between the kidney tubules. Interstitial nephritis (IN) is frequently the result of an allergic reaction. Most cases of interstitial nephritis (IN) are from bad reactions to drugs. More than 100 different medications may trigger interstitial nephritis (IN). Many of these medications fall into the following; antibiotics nonsteroidal anti-inflammatory drugs (NSAIDS), which are often used as pain relievers proton pump inhibitors, which are medications used to treat excess stomach acid to mention but a few (Morrison, 2016).

2.1.12 Glomerulo Nephritis

Several different types of kidney disease are grouped together under this category, including autoimmune diseases, infection-related diseases, and sclerotic diseases. As the name indicates, glomerular diseases attack the tiny blood vessels (glomeruli) within the kidney. The most common primary glomerular diseases include membranous nephropathy, IgA nephropathy, and focal segmental glomerulosclerosis (United States Renal Data System (USRDS, 2004).

2.1.13 Cancer

Chronic kidney disease (CKD) and cancer are connected in a number of ways in both directions, cancer can cause Chronic Kidney Disease either directly or indirectly through the adverse effects of therapies, Chronic Kidney Disease may conversely be a risk factor for cancer, and both may be associated because they share common risk factors, often toxins. The most frequent situation in which nephrologists have to face CKD in patients with cancer is that following the assessment of kidney function for dosage adjustment before chemotherapy. Although association, however, does not mean causation, and the cure of most cancers is unlikely to improve the course of CKD. The issue here is that of the prevention of adverse drug effect from over dosage due to renal impairment. In contrast, cancer-associated glomerulopathies are scarce, but more likely causally-related events. In a comprehensive review of paraneoplastic glomerulopathies, Ronco (1999), pointed the heterogeneity of this entity and the diversity of both glomerular injuries and cancers that have been reported. Most often, associations are described as case reports or case series making risk assessment difficult. Clinical remission of the glomerulopathy after cancer removal or chemotherapy in many of the reported cases, however, provides

indirect evidence for a causal link between cancer and Chronic Kidney Disease (Stengel, 2010).

2.1.14 Pathophysiology of Chronic Kidney Disease (CKD)

A normal kidney contains approximately 1 million nephrons, each of which contributes to the total glomerular filtration rate (GFR). In the face of renal injury (regardless of the etiology), the kidney has an innate ability to maintain GFR, despite progressive destruction of nephrons, as the remaining healthy nephrons manifest hyper-filtration and compensatory hypertrophy. This nephron adaptability allows for continued normal clearance of plasma solutes. Plasma levels of substances such as urea and creatinine start to show measurable increases only after total GFR has decreased to 50%. The plasma creatinine value will approximately double with a 50% reduction in GFR. For example, a rise in plasma creatinine from a baseline value of 0.6 mg/dL to 1.2 mg/dL in a patient, although still within the adult reference range, actually represents a loss of 50% of functioning nephron mass. The hyper-filtration and hypertrophy of residual nephrons, although beneficial for the reasons noted, has been hypothesized to represent a major cause of progressive renal dysfunction. The increased glomerular capillary pressure may damage the capillaries, leading initially to secondary focal and segmental glomerulosclerosis (FSGS) and eventually to global

glomerulosclerosis. This hypothesis is supported by studies of five-sixths nephrectomized rats, which develop lesions identical to those observed in humans with chronic kidney disease (CKD). Factors other than the underlying disease process and glomerular hypertension that may cause progressive renal injury include, Systemic hypertension, nephrotoxins (eg, nonsteroidal anti-inflammatory drugs [NSAIDs], intravenous contrast media), decreased perfusion (eg, from severe dehydration or episodes of shock), proteinuria (in addition to being a marker of CKD), hyperlipidemia, hyperphosphatemia with calcium phosphate deposition, smoking, uncontrolled diabetes. Tedla (2011), found a strong association between episodes of acute kidney injury (AKI) and cumulative risk for the development of advanced Chronic Kidney Disease in multiple hospitalized patients with diabetes mellitus. Any AKI versus no AKI was a risk factor for stage 4 Chronic Kidney Disease, and each additional AKI episode doubled that risk.

Findings from the Atherosclerosis Risk in Communities (ARIC) Study, a prospective observational cohort, suggest that inflammation and hemostasis are antecedent pathways for Chronic Kidney Disease. This study used data from 1787 cases of Chronic Kidney Disease that developed between 1987 and 2004 (Arora & Batuman, 2017).

Acute tubular necrosis (ATN) follows a well defined three part sequence of i nitiation, maintenance, and recovery (Carlos et al., 2009). The tubule cell damage and cell death that characterize ATN usually result from an acute ischemic or toxic event. Most of the pathophysiologic features of ischemic ATN, as described below, are shared by the nephrotoxic forms. In Chronic Glomerulonephritis, reduction in nephron mass from the initial injury reduces the GFR. This reduction leads to hypertrophy and hyperfiltration of the remaining nephrons and to the initiation of intra-glomerular hypertension. These changes occur in order to increase the GFR of the remaining nephrons, thus minimizing the functional consequences of nephron loss. The changes, however, are ultimately detrimental because they lead to glomerulosclerosis and further nephron loss. In early renal disease (stages 1-3), a substantial decline in the GFR may lead to only slight increases in serum creatinine levels. Azotemia (ie, a rise in blood urea nitrogen [BUN] and serum creatinine levels) is apparent when the GFR decreases to less than 60-70 mL/min. In addition to a rise in BUN and creatinine levels, the substantial reduction in the GFR results in, decreased production of erythropoietin, thus resulting in anemia, decreased production of vitamin D, resulting in hypocalcemia, secondary hyperparathyroidism, hyperphosphatemia, and renal osteodystrophy, reduction in acid, potassium,

salt, and water excretion, resulting in acidosis, hyperkalemia, hypertension, and edema, platelet dysfunction, leading to increased bleeding tendencies. Accumulation of toxic waste products (uremic toxins) affects virtually all organ systems (Salifu & Batuman, 2017). Tubulointerstitial nephritis involves the immune-mediated infiltration of the kidney interstitium by inflammatory cells. Lethal or sublethal injury to renal cells leads to expression of new local antigens, inflammatory cell infiltration, and activation of proinflammatory and chemoattractant cytokines (Roser & Batuman, 2017). These cytokines are produced by inflammatory cells (ie, macrophages, lymphocytes) and also by the renal cells (ie, proximal tubule, vascular endothelial cells, interstitial cells, fibroblasts).

The outcome can be acute or chronic nephritis. In acute interstitial nephritis, the tubular damage leads to renal tubular dysfunction, with or without renal failure. Regardless of the severity of the damage to the tubular epithelium, the renal dysfunction is generally reversible, possibly reflecting the regenerative capacity of tubules with preserved basement membrane. Conversely, chronic tubulointerstitial nephritis is characterized by interstitial scarring, fibrosis, and tubule atrophy, resulting in progressive chronic renal insufficiency. The principal mechanism in acute tubulointerstitial nephritis is hypersensitivity reaction to drugs such as penicillins, nonsteroidal anti-

inflammatory drugs (NSAIDs), and sulfa drugs. Another mechanism is acute cellular injury caused by infection, viral or bacterial, often associated with obstruction or reflux. The kidney is remarkably resistant to structural damage in bacterial infections, and, in the absence of obstruction, damage from bacterial infection in the kidney parenchyma is extremely unlikely to occur. Studies have revealed transforming growth factor beta (TGF-β) as a major participant in fibrogenesis. TGF-β favors accumulation of collagen and noncollagen basement membrane components by direct stimulation of production and by inhibiting matrix degradation enzymes such as collagenases and metalloproteinases (Alper & Batuman, 2017).

2.1.15 Signs and Symptoms of Chronic Kidney Disease (CKD)

Most people with chronic kidney disease (CKD) are unaware they have the condition. Symptoms often only develop when CKD is advanced. Many of the signs and symptoms of CKD are common in other conditions, and so may be attributed to other causes. They include; discomfort or burning when passing urine, passing blood in the urine, a change in the frequency and quantity of urine, needing to pass urine frequently at night, frothing (or foaming) urine, pain in the loin area, ankle swelling, persistent puffiness around the eyes, especially in the morning, headaches tiredness, lack of concentration, shortness of breath, high blood pressure, loss of appetite to

mention but a few (Ministry of Health and Kidney Health New Zealand, 2014). A person with Chronic Kidney Disease may experience all or only some of these symptoms, and sometimes advanced Chronic Kidney Disease can be present without any warning signs or symptoms at all.

2.1.16 Risk Factors of Chronic Kidney Disease (CKD)

Family History

Family members of CKD patients have a high prevalence of CKD and its risk factors. The participants were asked to complete a voluntary questionnaire on family history of ESRD. After the exclusion of patients with ESRD due to hereditary disorders and urologic causes, nearly 23% of incident dialysis patients had close relatives with ESRD. Hence, it is advised to screen the high-risk family members of those with CKD, in an attempt to prevent any kidney disease (American Society of Nephrology, 2010).

Gender

Many registries including the *Japanese Society for Dialysis Therapy* have demonstrated that ESRD is more frequent among men. In one study, a total of 107,192 subjects over 18 years of age (51,122 men and 56,070 women) from Okinawa, Japan participated in a 10-year follow-up where odds ratio for ESRD was 1.41 among male participants. In contrast, the CREDIT study

demonstrated that CKD is higher in women than in men (18.4 vs. 12.8%) in Turkey.

Ethnicity

Several studies performed in the United States have confirmed an increased risk for the development of ESRD in African Americans compared with Caucasians. Moreover, the risk of hypertensive ESRD is approximately fivefold higher in African Americans. In a recent study, it was found that the lifetime risk of ESRD was 7.8% for 20 year old black women, 7.3% for black men, 1.8% for white women, and 2.5% for white men (Alper & Batuman, 2017).

Age

Renal function decreases with age in both men and women. Among the elderly population, more than one-half of the subjects screened had CKD stages 3–5 (GFR<60 ml/min per 1.73 m^2) according to the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines. Thus, the elderly population is more prone to develop CKD after various renal insults. In the CREDIT study the odds ratios of CKD ranged from 1.45 to 2.18 for every 10-year increase in age among subjects older than 30 years of age in Turkey.

Low Birth Weight

In the 1980s, Brenner and colleagues hypothesized that intrauterine growth restriction might cause a low nephron number, which could predispose to hypertension and renal disease (also known as the Barker hypothesis). In support of this hypothesis, it has been shown that there is an increase in nephron numbers by 257,426 glomeruli per kg increase in birth weight. Low nephron number leads to intra-glomerular hypertension and hyperfiltration in the available nephrons and lower over-all GFR and higher urine albumin-to-creatinine ratio. In a recent cohort study with a maximum follow-up of 38 years, low birth weight and intrauterine growth restriction were significantly associated with increased risk for ESRD among Norwegians (Kazancioğlu, 2011).

2.1.16 Complications/Consequences of Chronic Kidney Disease (CKD)

Complications in Chronic Kidney Disease can result to the following,

Anemia: Anemia is a reduction in one or more of the major red blood cell measurements; hemoglobin concentration, hematocrit, or red blood cell count. The World Health Organization defines anemia as a hemoglobin level less than 13 g/dL in men and post-menopausal women, and less than 12 g/dL in pre-menopausal women. The NKF defines anemia as hemoglobin of less than 13.5 g/dL in men and less than 12.0 g/dL in women. A normochromic,

normocytic anemia usually accompanies progressive CKD, and the overall prevalence of CKD-associated anemia is approximately 50%. Although anemia may be diagnosed in patients at any stage of CKD, there is a strong correlation between the prevalence of anemia and the severity of CKD. One quarter of stage 1 CKD patients, half of those stratified to CKD stages 2, 3, and 4 and three quarters of CKD patients starting dialysis suffer from anemia. While anemia in CKD can result from multiple mechanisms (iron, folate, or vitamin B12 deficiency; gastrointestinal bleeding; severe hyperparathyroidism, systemic inflammation, and shortened red blood cell survival), decreased erythropoietin synthesis is the most important and specific etiology causing CKD-associated anemia. Erythropoietin is a glycoprotein secreted by the kidney interstitial fibroblasts and is essential for the growth and differentiation of red blood cells in the bone marrow. In CKD, tubular atrophy generates tubulointerstitial fibrosis, which compromises renal erythropoietin synthetic capacity and results in anemia.

The anemia of Chronic Kidney Disease increases morbidity and mortality from cardiovascular complications (angina, left ventricular hypertrophy (LVH) and worsening heart failure), which may lead to further deterioration of renal function and the establishment of a vicious cycle termed the "cardiorenal anemia syndrome". The presence of left ventricular

hypertrophy (LVH) is associated with decreased survival of patients on dialysis. In fact, end stage renal disease patients with LVH have a 30% lower five-year survival rate than individuals lacking LVH. In addition, anemia is an independent predictor of death in stable coronary artery disease patients with CKD (Thomas, Kanso, & Sedor, 2008)

Mineral and Bone Disorder: CKD-associated mineral and bone disorders" comprises abnormalities in bone and mineral metabolism and/or extra-skeletal calcification secondary to CKD pathophysiology. Renal osteodystrophy is the spectrum of histological changes, which occur in bone architecture of patients with CKD. The kidney is the primary site for phosphate excretion and 1-α-hydroxylation of vitamin D. CKD patients develop hyperphosphatemia as a result of inadequate 1, 25 dihydroxy-vitamin D levels that reflect reduced synthesis from parenchymal scarring. In addition, renal phosphate excretion is reduced. Together both processes cause, serum calcium levels to fall resulting in increased secretion of parathyroid hormone (secondary hyperparathyroidism).

Parathyroid hormone has a phosphaturic effect. It also increases the calcium levels by increasing bone resorption and promoting 1-α-hydroxylation of 25-hydroxy vitamin D synthesized by the liver (limited effect because of

reduced kidney reserve from scarring). Rising phosphorus levels are almost universally observed in stage 3 CKD patients. However, secondary hyperparathyroidism often begins to distort bone architecture earlier before serum phosphorus is noted to be abnormal, indicating that phosphate binder therapy needs to be initiated when EGFRs have declined below 50 ml/min per 1.73 m^2. Changes in bone architecture can be caused by either a high bone turnover state or a low bone turnover state. Four types of bone phenotypes (renal osteodystrophy) can be diagnosed in CKD patients: osteitisfibrosacystica (high bone turnover with secondary hyperparathyroidism), osteomalacia (low bone turnover and inadequate mineralization, primarily related to diminished vitamin D synthesis), adynamic bone disorder (low bone turnover from excessive suppression of the parathyroid glands), and mixed osteodystrophy (with elements of both high and low bone turnover). The predominant type of renal osteodystrophy and CKD-mineral and bone disorder differs between pre-dialysis and end stage renal disease patients. In pre-dialysis patients, high bone turnover bone disease is most prevalent. In contrast, low bone turnover predominates in dialysis patients. Patients with low turnover disease represent the majority of cases of renal osteodystrophy. CKD-associated mineral bone disorders significantly increase mortality in CKD patients. In fact, hyperphosphatemia

is one of the most important risk factors associated with cardiovascular disease in CKD patients (Thomas et. al., 2008)

Cardiovascular Risk: The cardiovascular risk associated with renal impairment increases earlier in the course of kidney disease progression than was initially hypothesized. More specifically, there is evidence that even mild to moderate degrees of renal impairment are associated with increased cardiovascular risk. Many traditional cardiovascular risk factors, documented in the general population, contribute to cardiovascular risk in CKD patients. Hypertension is a traditional cardiovascular risk factor which contributes to the cardiovascular risk associated with CKD. Szcech and colleagues demonstrated that patients with hypertension are at increased risk for new or recurrent cardiovascular events in individuals with stage 2–3 CKD. Systolic blood pressure is more strongly associated with cardiovascular death in dialysis patients than either pulse or diastolic pressure. However, a U-shaped relationship exist between systolic blood pressure and mortality in which high or low systolic blood pressures appear to be associated with increased mortality rates in stage 5 CKD patients. Low systolic pressures may identify a sicker group of patients rather than being an etiology for excess mortality. KDOQI guidelines recommend target blood pressure less than 130/85 mm Hg for all patients with kidney disease and

less than 125/75 mmHg for patients with urinary protein excretion greater than 1g/24h (Thomas, et. al., 2008).

2.1.18 Treatment of Chronic Kidney Disease (CKD)

Blood pressure drugs or anti-hypertensive

Blood pressure drugs or anti-hypertensives are medications designed to lower your blood pressure. Untreated high blood pressure can cause permanent damage to the small arteries of the kidneys, as well as to the heart and the brain. Different types of blood pressure tablets work in different ways, and often more than one type of tablet needs to be prescribed. The health provider may alter the dose of a blood pressure tablet from time to time, according to individual requirements. The blood pressure tablets known as angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) are believed to have specific kidney protective effects, and are often the preferred choice for patients with high blood pressure and CKD.

Erythropoietin

Erythropoietin (EPO) medication is used to treat anaemia. Anaemia is common with Chronic Kidney Disease and ESKD and causes many symptoms, including tiredness and lethargy, loss of appetite, reduced

exercise ability and sometimes breathlessness. Although there are many causes of anaemia, the main one in patients with kidney disease is reduced production of EPO, which a healthy kidney normally produces. Synthetic EPO acts just like natural EPO to stimulate the production of new red blood cells in the bone marrow. Your doctor will monitor your haemoglobin levels to determine the EPO dose required to treat anaemia. EPO treatment has to be administered by injection (using a prefilled syringe) (Ministry of Health and Kidney Health New Zealand, 2014).

Iron replacement therapy

To make red blood cells the body also needs iron. Patients with both kidney disease and anaemia also need extra iron to make healthy red blood cells. Erythropoietin **(**EPO) therapy may not work if there is shortage of iron. Blood tests can show whether a patient have enough iron. If the iron levels and blood count are low, there is a situation of iron deficient anaemia. Iron supplements are required to correct this. There are two forms of supplement oral or intravenous (IV). Oral iron comes in a tablet form. Although it can be effective in restoring iron levels, it is often not very well tolerated, and may not provide enough replacement iron. Intravenous iron is very effective at correcting iron deficient anaemia. Treatment can be given as a once only

total dose or as a number of smaller doses. IV iron is given by a drip and usually requires a visit to the hospital.

Phosphate binders

Phosphate binders are medications to help control the amount of phosphate in the body. Blood phosphate concentrations usually increase as the kidneys fail, because the kidneys cannot remove phosphate efficiently. When blood phosphate increases, the parathyroid glands become overactive and make more parathyroid hormone (PTH). This can lead to thinning of the bones and abnormal bone formation, which may weaken the skeleton and increase the risk of fractures, and may contribute to blood vessel disease. Phosphate binders reduce the amount of phosphate absorbed into the blood stream by binding to phosphate in food. To be effective phosphate binders should be taken with meals.

Vitamins and minerals

Water-soluble vitamins are removed during dialysis, and need to be replaced. This is particularly important for older people and people with a small appetite. The active form of vitamin D is produced by normal kidneys, and so extra vitamin D is commonly prescribed for people with CKD. Some patients may need extra calcium. Calcium-containing medications are often used as phosphate binders.

Cholesterol-lowering drugs

High blood cholesterol is common, and is associated with an increased risk of a heart attack. Kidney disease patients are more at risk than most people of developing vascular diseases (heart attack, stroke and peripheral vascular disease). It is unclear if the usual cholesterol-lowering agents are effective in people on dialysis, but they appear to be beneficial at earlier stages of kidney disease.

Diuretics

Diuretics help in the passage of more urine. They are often used together with other drugs, to treat high blood pressure. They are sometimes used in severe CKD to help the kidneys remove excess water from the body.

Dialysis

When the kidneys have failed completely – that is, when a person has end-stage kidney disease (ESKD) – dialysis can take over the kidneys' job of filtering and cleaning the blood. While dialysis is more hassle than having healthy kidneys it takes time and effort it gives people with ESKD a chance to lead a reasonable life. There are two types of dialysis: haemodialysis and peritoneal dialysis. Most people can choose the type of dialysis that best suits them, but in other cases doctors may recommend a particular type of dialysis because of a patient's other medical problems. The choice of

haemodialysis or peritoneal dialysis depends on many factors, including the availability of resources, age, overall health and lifestyle.

Haemodialysis

The ‘haemo’ in haemodialysis means blood. With this treatment, the filtering happens outside the body using a dialysis machine (also called a kidney machine). When someone ‘go on the machine’, needles connected to tubes are put into a special vein in the arm called a fistula (which is made by a small surgical operation. The blood flows through these tubes out of body into a filter (called a dialyser) attached to the dialysis machine and then back into body.

The dialyser consists of a plastic cylinder that contains thousands of very fine tubes. Each of these has tiny pores in its walls that are only small enough for waste and extra fluid to pass through. Blood cells and protein cannot fit through them. Blood is pumped to the dialyser and flows through the fibres. A specially formulated fluid called ‘dialysate’ washes around the fibres. Dialysate has a similar chemical composition to healthy blood, and so the various salts and other chemicals in the blood of the patient that are at abnormal levels can equilibrate (balance) against it and be returned to the normal range. The dialysate also helps to draw waste and excess fluid out across the pores of the fibres, leaving clean blood to flow out of the dialyser

and be transported back to the body. The impurities and fluid removed into the dialysate during dialysis go down a drain into the ordinary sewage waste. Germs (bacteria or viruses) cannot cross the walls of the fine tubes in the dialyser, so there is no risk of introducing infection to a patient (Ministry of Health and Kidney Health New Zealand, 2014).

Peritoneal dialysis

With peritoneal dialysis (PD) the cleaning of the blood is done inside the body instead of in an artificial filter. The peritoneal membrane lines the peritoneal or abdominal cavity and covers the abdominal organs (stomach, liver, spleen and intestines). It has a lot of blood vessels, and is an ideal dialysis membrane. Special dialysis fluid is put into peritoneal cavity from a plastic bag through a soft tube called a catheter (put in place by a small surgical operation). Part of the catheter is in the body and the rest remains outside the body. The skin heals around the catheter, which causes no discomfort apart from the time immediately after the initial operation to insert it. During PD the peritoneal cavity is filled with dialysis fluid through the catheter. Waste and extra fluid are drawn out of the blood vessels and transferred to the dialysis solution. After a set period, the fluid is drained out of the body and replaced with fresh fluid. Each time this cycle is repeated is called an ‘exchange’. The number of exchanges performed each day varies

for each person. The amount or volume of the PD fluid used for each exchange also varies, depending upon body size and individual need. Adults can usually hold a volume of 2–3 litres per exchange comfortably. Children require smaller volumes. There are two types of PD: continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis (APD). With CAPD, connect a bag of sterile peritoneal dialysis fluid to a short plastic tube attached to peritoneal catheter. When the fluid bag is raised to shoulder level or higher, the fluid flows into the peritoneal cavity under the influence of gravity. When the bag is empty it simply disconnects it, place a protective cap on the catheter set and discard the tubing and bag. Complete dialysis begins straight away, and it is free to continue normal daily activities. After a few hours (usually 4–6) remove the protective cap from the catheter set and attaches it to a new sterile exchange set, which has tubing, a drain bag and a peritoneal dialysis solution bag. Simply lower the drain bag to drain the waste-filled fluid from peritoneal cavity, and then run the new peritoneal dialysis fluid into peritoneal cavity. CAPD is usually performed four times each day. Each exchange takes about 45 minutes to perform, and can be done almost anywhere, provided the area is clean. In between each exchange you are free to undertake the regular activities of daily living.

2.1.19 Prevention of Chronic Kidney Disease (CKD)

Knowledge of risk: Become knowledgeable about CKD and determine whether or not you might be at risk for developing the disease.

Keeping blood pressure under control: This can be done through a combination of diet, exercise, low salt and alcohol intake, as well as to stop smoking

Monitoring blood sugar if you are diabetic: Maintaining strict control of your blood sugar levels can slow the progression of CKD. Again, this can be done through diet and proper daily monitoring of your glucose.

Maintain Normal Weight: Being overweight or obsessed increases your risk of developing type ii diabetes which is a cause of rena failure. Find out the ideal weight for your height, gender and ethnic city and try to stay close to that through healthy diet and exercise. A healthy weight helps you fight fatigue which is a common symptom of kidney disease.

Control Blood Pressure: Hypertension or high blood pressure is often referred to a silent killer. Uncontrolled hypertension leads to renal failure. Make sure you check your blood pressure at least once a month if you are less than 40 years and do not have any family history of this condition or any other such as obesity.

Monitor Your Blood Sugar Level: Keeping blood glucose level close to normal range decreases the risk of developing type ii diabetes and kidney damage. The first step is to get tested as many do not know they have diabetes.

Effectively Treat Diabetes: Diabetes impairs insulin function or cause lack of insulin production with resultant rise in blood sugar level. Consult your doctor to develop an effective treatment plan for your stage of diabetes, and to suit your life style using insulin therapy, diet or exercise.

Get Enough Rest: Lack of rest or sleep increases the risk of developing hypertension.

Exercise: This is one of the most important tests to .prevent kidney disease, type ii diabetes and hypertension. Exercise helps you to improve insulin sensitivity to maintain normal blood glucose level and improve cardiovascular function, sleep pattern and boost energy level throughout the day.

Treat Infections Immediately: Infections such urinary tract infections (UTI's) arid bladder infections can increase the risk of developing kidney disease. So early diagnosis and prompt treatment of infections can prevent this.

Limit Alcohol Intake: Abusing alcohol can damage kidney functions. It disrupts electrolyte balance in the body and the hormonal control mechanism that influence kidney function Health professionals recommend' that women drink not more than 1 glass of alcohol per day and men not more than 2 glasses per clay.

Limit Sodium Intake: Excessive sodium or excess sodium consumption increases the risk of developing hypertension which damages the glomeruli (tiny filtering units the kidney).

Take Supplements Safely: Both vitamins and herbal supplements can damage the kidneys. Excessive consumption of creatine, ephedia and vitamin D' has been linked with kidney damage. So consult your naturopath or do research before taking supplements; and avoid over the counter drugs or self-s medication.

2.3.1 Theoretical framework

A theoretical framework in this topic is a foundational review of existing theories that serves as a roadmap for developing the arguments on chronic kidney disease and its management. They are stated as follows;

Common Sense Model

The Common-Sense Model (CSM) explains ways in which patients are conscious of and able to formulate interventions to cure their health threat. The concepts of this model include illness stimuli, illness representation, coping responses and appraisal (Leventhal *et al* 2016). Illness stimuli refer to the pool of somatic or symptomatic information which is either stored in the memory or given by external sources (McManus, 2020). Cognitive and emotional attributes form illness representation which is explained in terms of cause, consequences, control, identity and timeline (Rees *et al*., 2018). Coping strategies include approach coping (active seeking of advice, help or medicine) and avoidance coping (the denial of symptoms and/or diagnosis and refusal to seek help) (Leventhal *et al* 2016). Following the implementation of coping strategies, either appraisal occurs as the individual determines that equilibrium has been restored or there is identification of failures and the need to develop and change their coping strategies.

CKD patients report difficulty in attributing their physical symptoms to their CKD (Lin *et al*., 2014; Meuleman *et al*., 2015) and the specified clinical manifestations of CKD and the related medication use affect self-management behaviours such as medication adherence and physical activity (Hagger & Orbell, 2013). O'connor et al. assessed the utilization of

Leventhal's Common Sense Model in the prediction of dietary, medication and fluid regime self-care behaviours among advanced CKD patients and the model was found to predict the adherence behaviours related to these factors (O'Connor et al., 2018). McManus, however, did a study to establish the relationship between illness perceptions and medication adherence in patients with CKD and determined that illness perceptions did not have any effect on medication adherence, i.e. there was no significant relationship between the two variables (McManus, 2021).

Theory of Planned Behaviour

The Theory of Planned Behaviour emanated from reasoned action with the components: perceived behavioural control, behavioural intention, attitudes, perceived power, and subjective and social norms (Ajzen, 1998; Fleming *et al*., 2018). Attitudes entails the consideration of the outcomes of performing the behaviour; behavioural intention encompasses the motivational factors that influence a given behaviour; and subjective norms relates to a person's beliefs about whether peers and people of importance to the person think he or she should engage in the behavior (Brandes & Mullan, 2016; Fleming *et al*., 2018). Moreover, social norms are the customary codes of behaviour in a population with perceived power referring to the perceived presence of factors that may facilitate or impede the performance of a behaviour.

Perceived behavioural control refers to a person's perception of the ease or difficulty of performing the behaviour of interest (Fleming *et al*., 2018). The additional component of perceived behavioural control in the Theory of Planned Behaviour predicts and establishes the relationship between the need to change behaviour and the actual behavior (Engel, 1998), meaning that the relationship between intention to adhere and the actual adherence behaviour can be elicited among CKD patients. Finchman and Moosa revealed the Theory of Planned Behaviour (TPB) in the self-reported treatment adherence of haemodialysis patients in the South African context as only partially applicable (Fincham *et al*., 2018). The results revealed possible decreased medical complications and mortality as a result of improved adherence to the dietary and fluid restrictions among the haemodialysis population, (Fincham *et al*., 2018). Therefore the study concluded this theory as applicable in predicting dietary and fluid adherence among haemodialysis patients.

Orem Self-care

One of the models which facilitates care of CKD patients is Orem's Self-care Model. The three basic nursing systems in Orem's theory are the wholly compensatory nursing system, the partly compensatory nursing system and the supportive educative system (Orem, 1985). According to Orem, the

wholly compensatory system relates to individuals who are not able to be involved in any self-care actions hence they are totally dependent on nurses for their wellbeing. The partly compensatory system is a mutual relationship in which both the patient and the nurse are involved in the provision of care. Lastly, the supportive educative system relates to patients being able to perform their oriented therapeutic care with assistance from health care providers (Orem, 1985).

Theory of Reasoned Action

The Theory of Reasoned Action predicts consumer intentions and behaviour and provides the basis for identifying target consumers (Sheppard *et al*., 1998). The model reveals a socio-psychological approach in understanding and predicting the determinants of health behavior (Montano & Kasprzyk, 2015). According to Hale, the aim of the model is to explain volitional behaviours and its explanatory scope excludes a wide range of behaviours which include spontaneous, impulsive or habitual behaviours (Hale *et al*., 2013). According to this theory, behavioural intention is the central predictor of behaviour and theorists of reasoned action centre on the prediction of behavioural intention rather than on the behaviour itself (Baranowski, 2012). In the context of a health-related behaviour situation such as adherence behaviour among CKD patients, most adherence

behaviour is influenced by emotions and affect, which is a decisive drawback for predicting health-related behavior (Dutta-Bergman, 2015). Moreover, the model is based on cognitive processes and level of behaviour change, not taking into consideration the emotional variables such as fear and mood. The factor of fear brings in another theory named the Extended Parallel Process Model (EPPM) (Sahbaei *et al*., 2016).

Social Cognitive

Theory Social Cognitive Theory is a behavioural prediction theory that represents a clinical approach to health behaviour change (Bandura, 2998). In this approach human motivation and actions are based on three types of expectancies namely situation-outcome, action-outcome and perceived self-efficacy (Bandura, 2998). The Social Cognitive Theory has been used in the prediction of health behaviours which include prevention, health promotion and the modification of unhealthy lifestyles (Bandura, 2998). Situation-outcome entails beliefs about consequences that will occur without interfering personal action whilst action-outcome includes the belief that a given behaviour will result in a given outcome (Schwarzer & Luszczynska, 2015). Self-efficacy expectancy is the belief that a type of behaviour is or is not within an individual's control, therefore an individual who is not capable of performing a particular adherence behaviour is regarded as self-efficacy

lacking (Schwarzer & Luszczynska, 2015). Adherence to medication requirements or suggested treatment is related to the self-regulatory belief. A study by Patterson et al. revealed positive significant relationships between physical activity behaviours and the constructs of Social Cognitive Theory namely self-efficacy, outcome expectations and self-regulation among dialysis patients (Patterson *et al*., 2014). This highlights the importance of using Social Cognitive Theory in explaining the physical activity behaviours in the dialysis population (Patterson *et al*., 2014). Key concepts associated with renal failure patients include personal characteristics, emotional coping, behavioural capacity, self-efficacy, expectations and reinforcement.[55] Physical, social, cultural, economic and political factors can influence and predict adherence behaviours in Chronic Renal Failure patients, (Baranowski *et al.*, 2017) and good adherence behaviours in renal failure patients can predict a reduction in complications of the disease. However, as the model has a wide-range of focus it is difficult to fully predict adherence behaviours. Currently selected parts of the theory are used and this poses questions regarding the applicability of the theory in predicting and improving adherence behaviours among patients with kidney disease.

Cognitive behavioral therapy was propounded by a renowned psychiatrist, Aaron Beck, in the 1960s (Martin, 2016). Martins was doing psychoanalysis

at the time and observed that during his analytical sessions, his patients tended to have what he called "*Internal Dialogue"* going on in their minds almost as if they were talking to themselves. But they would only report a fraction of this kind of thinking to him. Thus, CBT is based on a model or theory that it is not events themselves that upset us, but the meanings we give them. If people's thoughts are too negative, it can block us seeing things or doing things that do not fit that disconfirm what we believe is true. In other words, we continue to hold on to the same old thoughts and fail to learn anything new (Martin, 2016). Aaron Beck maintained that in a therapy session the client might be thinking to herself: "He (the therapist) has not said much today and wonder if he is annoyed". These thoughts might make the client feel slightly anxious or perhaps annoyed. He or she could then respond to this thought with a further thought: "He's probably tired, or perhaps I have not been talking about the most important things." The second thought might change how the client was feeling.

Beck also realized that the link between *thoughts* and *feelings* was very important. He invented the term "*Automatic Thoughts"* to describe emotion-filled thoughts that might pop up in the mind. Beck found that people weren't always fully aware of such thoughts, but could learn to identify and report them. If a person was feeling upset in some way, the thoughts were

usually negative and neither realistic nor helpful. Beck found that identifying these thoughts was the key to the client understanding and overcoming his or her difficulties and health challenges. Beck called it cognitive therapy because of the importance it places on thinking. It's now known as cognitive-behavioral therapy (CBT) because the therapy employs behavioral techniques as well. The balance between the cognitive and the behavioral elements varies among the different therapies of this type, but all come under the umbrella term cognitive behavior therapy. CBT has since undergone successful scientific trials in many places by different teams, and has been applied to a wide variety of problems. The Cognitive Behavioral Therapy is a short-term, goal-oriented psychotherapy treatment that takes a hand on, practical approach to problem-solving such as the issue of Chronic Kidney Disease (CKD). Its goal is to change patterns of thinking or behavior that are behind difficulties and health challenges of the Chronic Kidney Disease patients, and so change the way they feel. Cognitive Behavioral Therapy (CBT), impact on both the feeling and behavior of the Chronic Kidney patients. Thus, it follows that if the feeling of Chronic Kidney disease patient's changes from negative to positive, it gives them the impetus to engage in behaviors that can improve their condition by following the rules or guidelines for treatment and management of the

disease. Put differently, the Cognitive Behavioral Therapy helps people to change negative feelings to positive feelings and thereby helps them to correct misinterpretations and change their behavior to enable them fight life threatening disease like the Chronic Kidney Disease.

Trans-theoretical Model

Trans-theoretical Model based research incorporates behaviour change such as medication adherence (Prochaska, 2013). Medication nonadherence behaviours are paramount in clinical and public health as they are associated with increased morbidity, increased mortality and reduced quality of life (Clark *et al*., 2014). García-Llanaet al. revealed improved adherence behaviours in advanced CKD patients after the application of individual psycho-educational intervention programmes based on motivational interviewing and using the Stages of Change Model (García-Llana *et al*., 2014). A Lifestyle Modification Programme based on the readiness to change health-promotion lifestyle behaviours was applied to CKD patients in the early stages of the disease. The results of this intervention revealed improved diet behaviour modifications showing the applicability of the components of Transtheoretical Model in improving adherence behaviours among CKD patients (García-Llana *et al*., 2014).

Health Belief Model

The Health Belief Model is the most widely used social cognitive theory in health psychology; it basically predicts and explains health behaviours and that behaviour change is based on the balance of the barriers and benefits of health action (Green & Murphy, 2014). According to this model, the perceived threat of a disease such as CKD is determined by the perceived seriousness and perceived susceptibility of and to that condition (Green & Murphy, 2014). The effectiveness of any health behaviour is affected by its perceived benefits and barriers (Becker *et al*., 2019). Apparently the Health Belief Model has included self-efficacy as a key factor and it is influenced by mediating variables such as demographic, structural and social variables (Skinner *et al*., 2015). Elliot et al. did a descriptive study to establish any relationships between modifying factors, individual health beliefs and haemodialysis patients' adherence to a low-phosphorus diet. Modifying factors such as age, level of education and knowledge of the disease were found to be associated with dietary adherence, and individual health beliefs like self-efficacy to execute positive behaviours and the perceived benefits thereof were also found to be associated with dietary adherence (Elliott *et al*., 2015).

2.3.2 Empirical Studies

Egbi *et al.* (2014), used the survey research design where questionnaire was administered to 179 Civil Servants in Bayelsa State carried out a study to determine the prevalence and correlates of Chronic Kidney Disease in an urban civil service population in Bayelsa State, Nigeria. They found that the prevalence of Chronic Kidney Disease in the study was 7.8%. Age >50 years was associated with Chronic Kidney Disease in univariate analysis but none of age, gender, body mass index, BP or hyperglycemia independently predicted it.

Plantinga, Tuot and Powe (2010), also studied the Chronic Kidney Disease among Patients and Providers and used the analytical research design found that the current estimates of CKD which indicate that both patient and provider level of knowledge remain unacceptably low. The study recommend that further research is necessary to continue to design and refine awareness campaigns aimed at both patients and providers, but there is an immediate need for dissemination of basic Chronic Kidney Disease information, given both the high prevalence of Chronic Kidney Disease and its risk factors and the low estimated awareness of Chronic Kidney Disease.

Ulasi & Ifeoma (2010), researched on the Enormity of Chronic Kidney Disease in Nigeria: The Situation in a Teaching Hospital in South-East

Nigeria. The study adopted the case study research design and found that a total of 1001 male versus 537 female patients were reviewed. About 593 male versus 315 female patients had haemodialysis. The mean age was 4 2.5 5 ± 1 5.4 3 years and 86.5% were <60 years. Primary renal disease could not be determined in 51.6% while hypertension and glomerulonephritis accounted for −17.2% and 14.6%, respectively. Death from renal causes constituted 22.03% of medical deaths. The study underscores the need for preventive measures to reduce the impact of CKD in the society.

Fescher *et al* (2012), studied the Prevalence of chronic kidney disease in patients with spinal cord injuries/disorder. Using the logistic regression models, it found that among 9,333 SCI/D Veterans with an available eGFR, the proportion with CKD was substantially higher based on the MDRD-SCI/D equation (35.2%) than based on the MDRD equation (10.2%). In adjusted analyses, while older age (OR for >65 years = 2.53; 95% CI: 2.21-2.89), female sex (OR 2.18; 95% CI: 1.62-2.92), and a non-traumatic cause for injury (OR 1.39; 95% CI: 1.23-1.57) were associated with an increased odds of CKD, black race (OR 0.64; 95% CI: 0.56-0.72) and a duration of injury of ≥10 years (OR 0.76; 95% CI: 0.67-0.86) were associated with a decreased odds of CKD. Diagnostic codes for CKD and nephrology visits

were infrequent for SCI/D Veterans with CKD (27.51 and 6.58%, respectively).

Coresh *et al* (2004), researched on chronic kidney disease awareness, prevalence, and trends among U.S. Adults, 1999 to 2000. It adopted the survey research design and found that, it is unknown how often adults with CKD are aware that they have kidney disease even though patient and physician education is a major goal of the National Kidney Disease Education Program. It recommends for timely screening of chronic kidney disease.

Hsu *et al* (2006), studied High prevalence and low awareness of CKD in Taiwan: a study on the relationship between serum creatinine and awareness from a nationally representative survey. The study adopted the descriptive research design and found that the prevalence of CKD stages 3 to 5 in Taiwan is 6.9% (95% confidence interval, 4.4 to 9.4). Awareness rates for CKD in Taiwan are low: 8.0% for individuals with stage 3, 25.0% for those with stage 4, and 71.4% for those with stage 5. Awareness rate is related closely to serum creatinine level: those with creatinine levels greater than 1.6 mg/dL (>141 micromol/L) are more likely to be informed of having a kidney disease. It recommended the establishment of a mandated automatic

GFR reporting system may be the first priority needed to accomplish in Taiwan to improve kidney well-being.

Ravera, Deferrari, Vettoretti and Deferrari (2006), studied the importance of blood pressure control in chronic kidney disease. They found that chronic kidney disease is associated with elevated cardiovascular morbidity and mortality and it recommend that strategies that are aimed at identifying, preventing, and treating CKD and its related risk factors are needed.

Eandi (2012), studied Erythropoiesis stimulating agents in patients with chronic kidney disease, the study presented an update on the latest available evidence in the treatment of anemia in CKD patients, with particular reference to the definition of the correct conversion ratio EPO: DARB.

It recommended the use of erythropoiesis-stimulating agents for correcting renal anemia and increasing hemoglobin levels. Hill et al. (2016), researched on the global prevalence of chronic kidney disease a systematic review and meta-analysis. Using a random effect model, the study found that of 5,842 potential articles, 100 studies of diverse quality was included, comprising 6,908,440 patients. Global mean (95%CI) CKD prevalence of 5 stages 13·4% (11·7–15·1%), and stages 3–5 was 10·6% (9·2–12·2%). Weighting by study quality did not affect prevalence estimates. CKD prevalence by stage was Stage-1 (eGFR>90+ACR>30): 3·5% (2·8–4·2%); Stage-2 (eGFR

60–89+ACR>30): 3·9% (2·7–5·3%); Stage-3 (eGFR 30–59): 7·6% (6·4–8·9%); Stage-4 =(eGFR 29–15): 0·4% (0·3–0·5%); and Stage-5 (eGFR<15): 0·1% (0·1–0·1%). CKD has a high global prevalence with a consistent estimated global CKD prevalence of between 11 to 13% with the majority stage it recommend that future research should evaluate intervention strategies deliverable at scale to delay the progression of Chronic Kidney Disease and improve cardiovascular disease (CVD) outcomes. In another related study tilted the prevalence of chronic kidney disease in apparently healthy retired subjects in Asaba, Nigeria,

Odenigbo et al (2014), adopted the descriptive design found that a total of 170 subjects with age ranged between 50 and 86 years, with a mean age of 68.1 (7.7) years (95% confidence interval [CI = 66.9-69.3]) completed this study. Male: Female ratio was 2:1 and 66.5% (113/170) of subjects were elderly (above 65 years). eGFR of subjects ranged from 31 to 114 ml/min/1.73 m^2, with a mean of 64.5 (16.5) ml/min/1.73 m^2 (95% CI = 62.0-67.0). The prevalence of CKD in the general population studied was 43.5% (74/170), whereas that in the elderly sub-population was 40.7% (46/113). In the non-elderly subjects, CKD was observed in 49.1% (28/57) of subjects. There was no statistically significant difference between the prevalence of CKD in both groups (P = 0.53). The prevalence of CKD was significantly

higher in the female subjects than their male counterparts. Subjects with CKD had 33.33% (38/74) males and 64.3% (36/74) females. The study recommended that prevalence of Chronic Kidney Disease in the studied population is quite high. More aggressive public health measures are required to stem the tide.

2.4 Summary of the Literature Reviewed

The reviewed literatures in this study has fairly and painstakingly reviewed both theoretical and empirical studies which have been conducted over the years on the subject matter of chronic kidney disease especially over the past two decades. It reviewed all the variables in the conceptual review such as the meaning of chronic kidney disease, causes of chronic kidney disease, and symptoms of chronic kidney disease, treatment and prevention of chronic kidney disease. It adopted the cognitive behavioral therapy as its theoretical framework. It also explored extant empirical studies that relates to the study explicating the variables, designs, findings and recommendations of the studies.

CHAPTER THREE

MATERIALS AND METHODS

3.1. Research Design

This research was carried out among patients living with chronic kidney disease in Owerri Zone. The study design was a retrospective survey on CKD cases where the data was collected from medical record unit with information on incidence rate and risk factors of CKD. The study used all the patients who have presented themselves for Heamodialysis from 2014-2017 at the MTN Foundation Dialysis Center, Federal Medical Center Owerri (FMC).

3.2. Area of the Study

The area of study of this research work was Owerri Zonal of Imo State comprising of nine Local Government Areas viz, Owerri Municipal, Owerri West, Owerri North, Ikeduru, Aboh Mbaise, Ahiazu Mbaise, Ngorokpuala, Mbaitolu, Owerri Zone is located in Imo State Nigeria; it is approximately 100 square kilometers (40 sq mi) in area, bordered by Obowo in the North, Isiala Mbano in the east, Elele in the west.

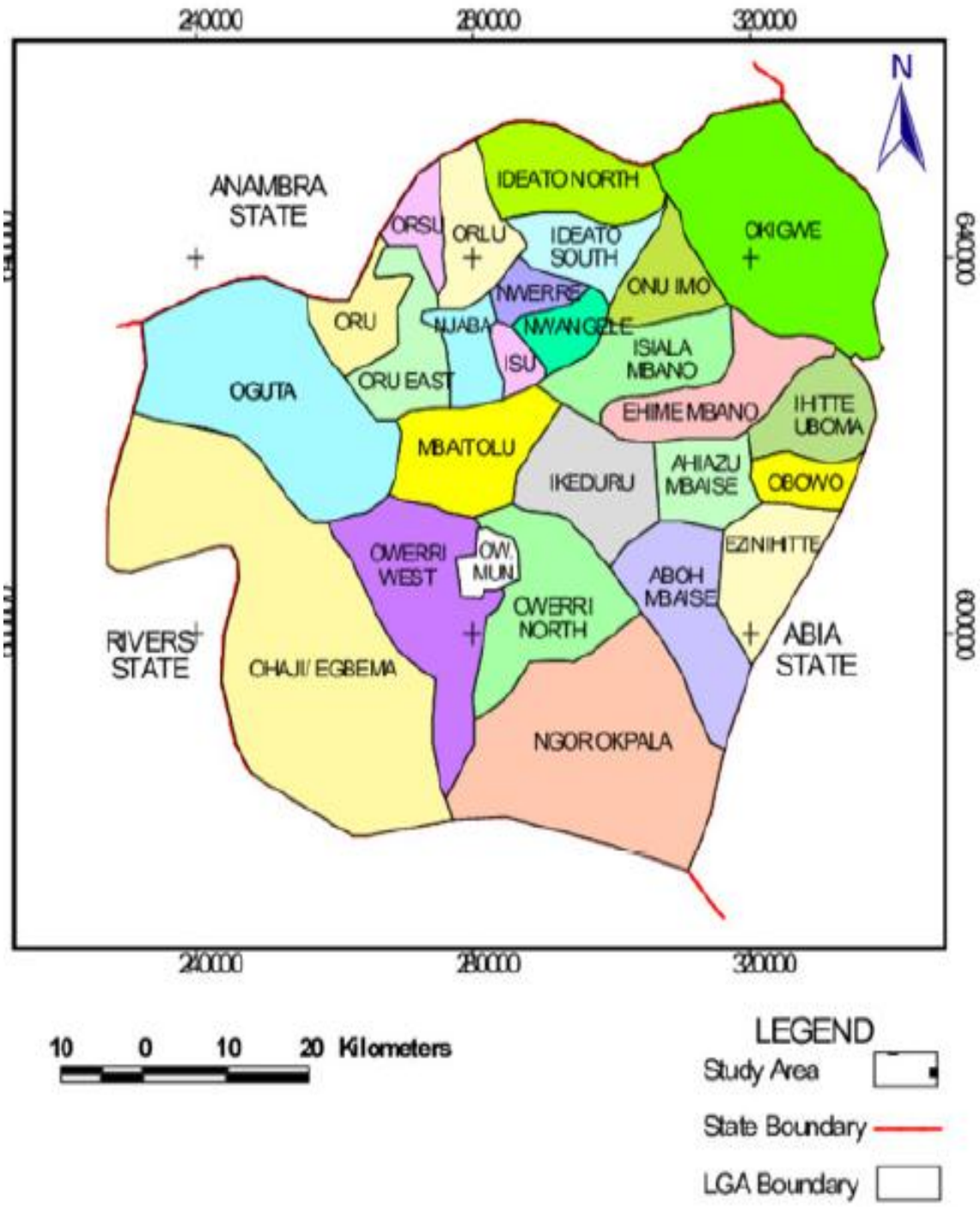

Figure 1: Map of Imo State showing the State Local Government Areas.

Source: National Population Commission (2016).

3.3 Population of the Study

The population of this study comprised of all the patients who attended Haemodailyis at the MTN Foundation Dialysis Center Federal Medical Center Owerri for the past four years was estimated to be 961 but 611 patients had a clear medical record of chronic kidney disease.

3.4 Sampling Technique

This study is a total population study that employed a purposive sampling technique in extracting data from MTN Foundation Dialysis Center that deals with record of chronic kidney disease at Federal Medical Center Owerri from 2014-17. This is because it is only the hospital that has data on kidney disease patients. All records of CKD from the age of 15 years and above who attended MTN Foundation Dialysis Center at Federal Medical Center Owerri from 2014-17, were included in the study.

3.5 Instrument of Data Collection

The instrument of data collection of this study comprises data collection guide or time series data for secondary data at MTN Foundation Haemodailysis Center at Federal Medical Center Owerri.

3.6 Validity of Instrument

The process of validating the proform (instrument of the research) was carried out by the supervisor and other educators and professionals at Imo

State University Owerri and Federal Medical Center Owerri. This was done in order to see:

Whether the data variables were clear enough and easily understood through the approved variables of the researcher's interest;

Whether there is the need to include more items in certain areas in the experts in the field have gone through the proform and approved the necessary ones. The research experts made a recommendation on how to determine the feasibility of the proposed method of data analysis for the study.

3.7 Reliability of Instruments

The proform that served as the research instrument was reliable as the required variables were contained in it and they were not replicated. The result obtained was compared for consistency using Chrombach Alpha Coefficient of Reliability test and a reliability coefficient of 0.78 was considered reliable.

3.8 Methods of Data Collection

The collection of data was done through the reviewed of the medical records of patients from 15 years and above at MTN Foundation Dialysis Center Owerri at the Federal Medical Center Owerri, Imo State. The following data, including age at the time of medical service, hypertension, kidney disease,

systemic infection, diabetes mellitus, unhealthy diet, lower urinary tract obstruction and autoimmune diseases, family history, months, years and others were collected.

3.9 Methods of Data Analysis

The data collected were entered into computer software called Statistical package for Social Science (SPSS) version 21.0. It was analyzed using descriptive statistical analysis and the results were presented in frequency tables and charts. Chi-square was used to determine the variables and 95% confidence intervals (CI) are presented in order to analyze the risk factors related with CKD.

3.10. Ethical Considerations/Informed Consent

The study was approved by the Institutional Research Review Committee of Department of Public Health, Federal University of Technology, Owerri and it was endorsed by Medical Ethical committee of the MTN Foundation Dialysis Center Owerri at the Federal Medical Center Owerri, Imo State.

CHAPTER FOUR

RESULTS

Table 1: Demographic characteristics of Patients

Demographic characteristics	Frequency (n = 611)	Percentage (%)
Age		
< 20 years	18	2.9
20 – 29 years	58	9.5
30 - 39 years	43	7.0
40 - 49 years	122	20.0
50 - 59 years	217	35.5
60 - 69 years	109	17.8
70+ years	44	7.2
Sex		
Male	414	67.8
Female	197	32.2

Demographic characteristics of Patients

The results in table 1 presented the age and sex of patients attending MTN Foundation Dialysis Centre Owerri, for chronic kidney disease (CKD) screening; out of 611 patients assessed through their hospital medical card, majority 217(35.5%) of the patients between 50-50 years were diagnosed of CKD, followed by those between 40-49 years with 122(20%), between 60-69 had 109(17.8%),between 20-29 years had 58(9.5%) while the least was those at less than 20 years with 18(2.9%).

In regards to sex; 414 (67.8%) of males were diagnosed of CKD while 197 (32.2%) of females were also diagnosed of CKD over the period from 2014 to 2017.

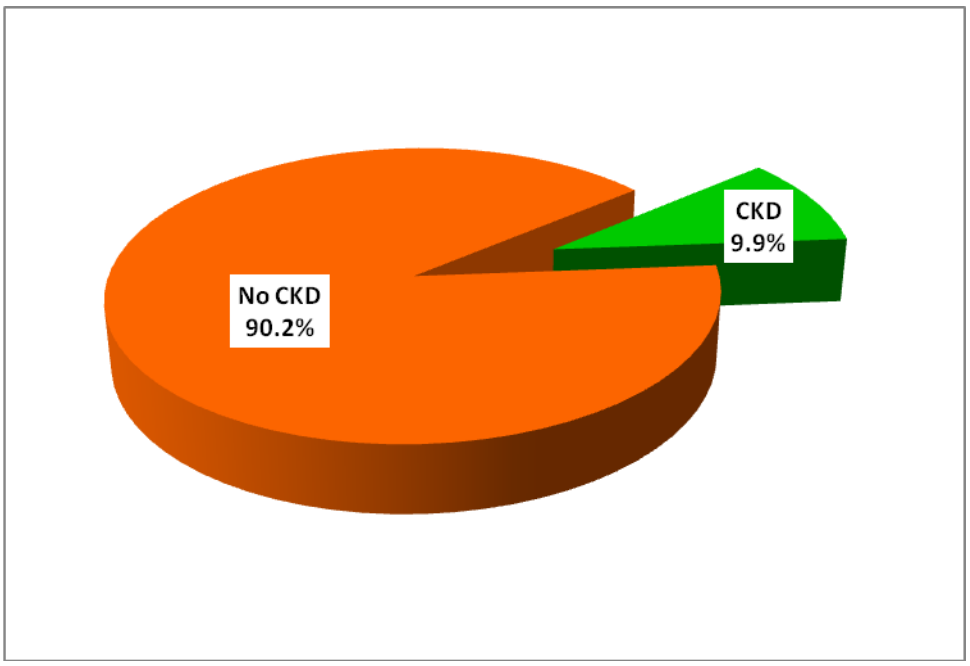

Figure 2: Incidence of Chronic Kidney Disease (CKD)

The figure 1 presented the percentage of chronic kidney disease (CKD) at MTN Foundation Dialysis Centre, Owerri; only 9.9% had chronic kidney disease while highest percentage (90.1%) has no chronic kidney disease.

Table 2: Relationship between age of patients and those living with chronic kidney disease in Owerri Zone, Imo State

		Patients with CKD		
Age of the patients		**Yes**	**No**	**Total**
Age of the patients	less 20 years	18	0	18
	20 – 29 years	58	0	58
	30 - 39 years	43	0	43
	40 - 49 years	122	0	122
	50 - 59 years	217	0	217
	60 - 69 years	109	0	109
	70+ years	43	1	44
Total		610	1	611
Pearson Chi-Square = 12.907				
Df = 6				
Pv = Pv<0.05				

Using Pearson Chi-Square, there is significant relationship between age of patients and those living with chronic kidney disease (*Pearson Chi-Square= 12.907; df = 6 @ Pv<0.05*

Table 3: Relationship between sex of patients and those living with chronic kidney disease in Owerri Zone, Imo State

	Sex of the patients	Patients with CKD		
		Yes	**No**	**Total**
Sex	Male	414	0	414
	Female	196	1	197
Total		610	1	611
		Pearson Chi-Square = 2.105		
		Df = 1		
		Pv = 0.33		

Using Pearson Chi-Square, there is not significant relationship between age of patients and those living with chronic kidney disease (*Pearson Chi-Square= 2.105; df = 1 @ Pv =0.33*

Table 4: Incidence of Chronic Kidney Disease (CKD) by Year

Year	Total number of hypertensive patients	Total number of CKD cases	Incidence rate
2014	1215	36	2.9%
2015	975	18	1.8%
2016	2517	294	11.7%
2017	1496	263	17.6%
Total	**6203**	**611**	**9.9%**

The results in table 4 showed the incidence of chronic kidney disease (CKD) by year, from the analyzed data, hypertensive patients recorded highest in the year 2017 with 263(17.6%) while the least percent was found in 2015 with 1.8 percent incidence rate.

Table 5: Trend of Chronic Kidney Disease (CKD) and hypertension by Months

Year	Total number of hypertensive patients	Total number of CKD cases	Incidence rate
January	427	28	6.6%
February	372	75	20.2%
March	574	68	11.8%
April	633	60	9.5%
May	539	74	13.7%
June	530	74	13.9%
July	560	82	14.6%
August	580	58	10.0%
September	488	13	2.7%
October	502	28	5.6%
November	514	26	5.1%
December	484	25	5.2%
Total	**6203**	**611**	9.9 %

Table 5: Trend of CKD and hypertension by Months

The overall incidence of CKD and hypertension as table 5 depicted for four years period from 2014 to 2017, the hypertensive patients were higher in the following months; April with 633(9.5%) and CKD had 60 cases, August with 580(10%) and CKD had 58 cases, March recorded 574(11.8%) and CKD had 68 cases, July recorded 560(14.6%) and CKD had 82 cases, May recorded 539(13.7%) and CKD had 74 cases, June recorded 530(13.9%) and CKD had 74 cases compared to other months while the least was found on February 372(20.2%) and CKD had 75 cases.

Table 6: Trend of Chronic Kidney Disease (CKD) by Month and Year

Month	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	Total n (%)
January	7 (19.4)	0	13 (4.4)	8 (3.0)	28 (4.6)
February	9 (25.0)	1 (5.6)	29 (9.9)	36 (13.7)	75 (12.3)
March	0	6 (33.3)	22 (7.5)	40 (15.2)	68 (11.1)
April	0	6 (33.3)	9 (3.1)	45 (17.1)	60 (9.8)
May	8 (22.2)	3 (16.7)	10(3.4)	53 (20.2)	74 (12.1)
June	2 (5.6)	0	21 (7.1)	51 (19.4)	74 (12.1)
July	6 (16.7)	0	46 (15.6)	30 (11.4)	82 (13.4)
August	0	0	58 (19.7)	0	58 (9.5)
September	1 (2.8)	0	12 (4.1)	0	13 (2.1)
October	2 (5.6)	1 (5.6)	25 (8.5)	0	28 (4.6)
November	1 (2.8)	1 (5.6)	24 (8.2)	0	26 (4.3)
December	0	0	25 (8.5)	0	25 (4.1)
Total	36(100.0)	18(100.0)	294 (100.0)	25 (100.0)	611 (100.0)

Chi-square = 293.977, p-value < 0.001

Monthly and Year Trend of CKD

Table 6 presented the overall cases of Chronic Kidney Disease (CKD) were recorded highest with 82(13.4%) in July for period of four years from 2014-2017 while the least was found on September with 13(2.1%). In 2014; February recorded highest with 9(25%) followed by May with 8(22.2%) and the least was on September and November with 1(2.8%) cases of CKD.

In 2015; March and April recorded highest with 6(33.3%) followed by May with 3(16.7%) and the least was on February, October and November with 1(5.6%) cases of CKD.

In 2016; August recorded highest with 58(19.7%) followed by July with 46(15.6%) and the least was on April with 9 (3.1%) cases of CKD.

In 2017; May recorded highest with 53(20.2%) followed by June with 51(19.4%) and the least was on January with 8(3%) cases of CKD.

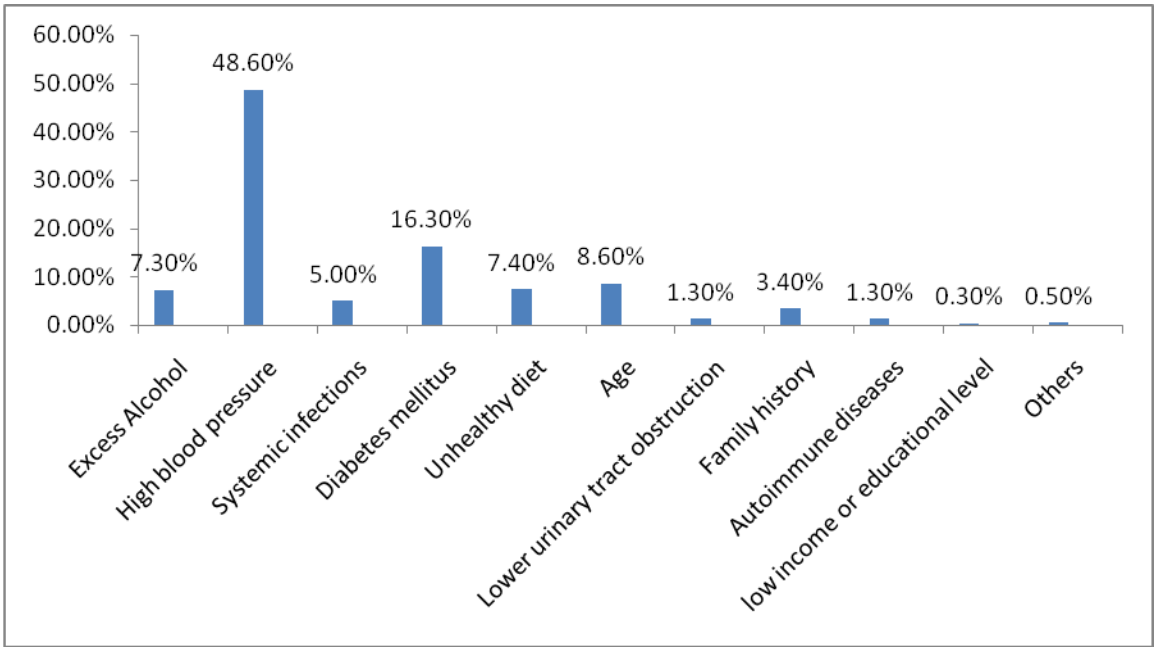

Figure 3: Shows the factors affecting CKD occurrence

Figure 2 showed the factors affecting the hypertension and CKD among the studied patients were recorded as follows; 44(7.3%) of the patients' record reported excess alcohol; 298(48.6%) high blood pressure to influence CKD occurrence; 31(5%) reported systemic infection, diabetes mellitus was 100(16.3%); unhealthy diet recorded 46(7.4%); age has 52(8.6%); lower urinary tract obstruction and autoimmune diseases had 8(1.3%) each; family history has 21(3.4%) and others were 3(0.5%).

Table 7: Management of Chronic Kidney Disease (CKD)

Management of CKD	Frequency	Percentage (%)
Lisinopril, dialysis, iron succrose, normal saline	175	28.6
Amilodipine, dialysis, iron succrose, normal saline	257	42.1
Glucophage, dialysis, iron succrose, normal saline	103	16.9
Prosca, dialysis, iron succrose, normal saline	18	2.9
Haemoglobine 12, dialysis, iron succrose, normal saline	5	0.8
Norvase, dialysis, iron succrose, normal saline	42	6.8
Adomet, dialysis, iron succrose, normal saline	11	1.8
Total	611	100.0

The results in table 7 presented the management of hypertension; 175(28.6%) applied lisinopril, dialysis, iron succrose, normal saline, 127(42.1%) applied amilodipine, dialysis, iron succrose, normal saline, 103(16.9%) applied glucophage, dialysis, iron succrose, normal saline, 18(2.9%) applied prosca, dialysis, iron succrose, normal saline, 42(6.8%) applied norvase, dialysis, iron succrose, normal saline and 11(1.8%) applied adomet, dialysis, iron succrose, normal saline.

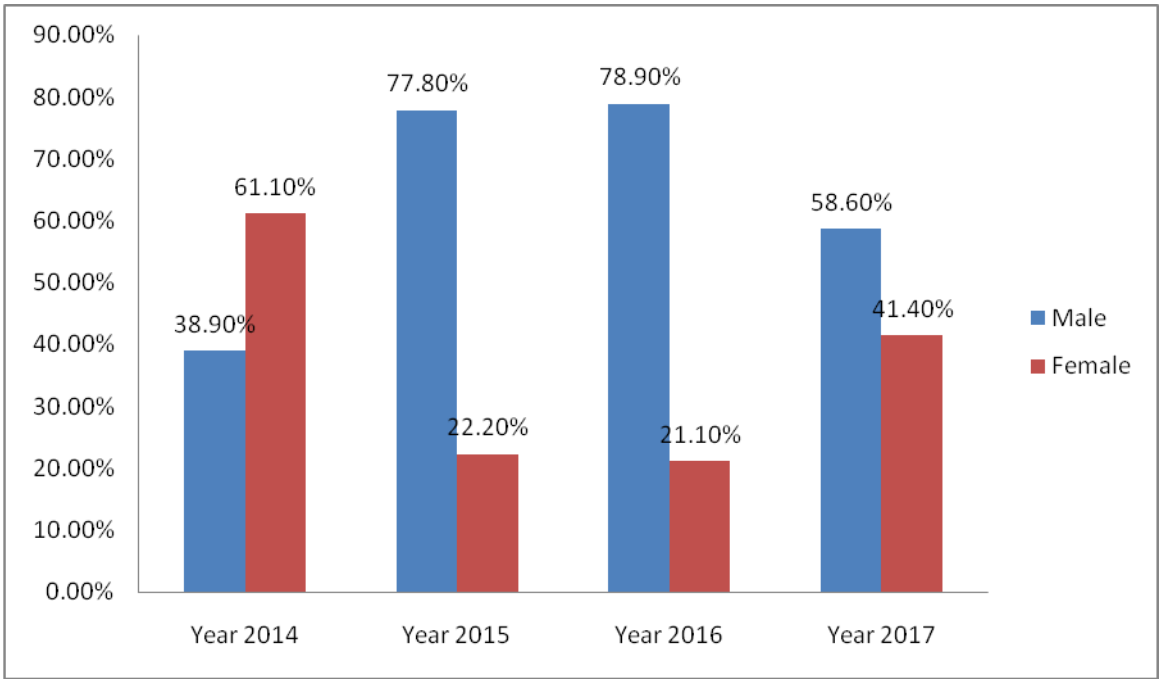

Figure 4: Trend of CKD by Gender

Chi-square = 41.498, p-value < 0.001

The figure 3 below presented the trend of CKD by gender in four years period. In 2014, male has 14(38.9%) while female has 22(61.1%). In 2015, 14(778%) were for male while 4(22.2%) were for female. In 2016, 232(78.9%) were for male while 62(21.1%) for female. In 2017, males had 154(58.6%) while females had 109(41.4%).

Table 8: Trend of Chronic Kidney Disease (CKD) by Age and Year

Age group	2014 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	Total n (%)
< 20	0	0	14 (4.8)	4 (1.5)	18 (2.9)
20 – 29	3 (8.3)	0	41 (13.9)	14 (5.3)	58 (9.5)
30 – 39	2 (5.6)	1 (5.6)	22 (7.5)	18 (6.8)	43 (7.0)
40 – 49	4 (11.1)	4 (22.2)	42 (14.3)	72 (27.4)	122 (20.0)
50 – 59	22 (61.1)	7 (38.9)	96 (32.7)	92 (35.0)	217 (35.5)
60 – 69	4 (11.1)	4 (22.2)	54 (18.4)	47 (17.9)	109 (17.8)
70+	1 (2.8)	2 (11.1)	25 (8.5)	16 (6.1)	44 (7.2)
Total	36(100.0)	18(100.0)	294 (100.0)	25 (100.0)	611 (100.0)

Chi-square = 44.181, p-value = 0.001

Trend of Chronic Kidney Disease (CKD) by Age and Year

Table 8 presented the trend of CKD by age and year; cases of CKD were recorded highest with 217(35.5%) between 50-59 years for period of four years from 2014-2017 while the least was found on September with 18(2.9%) in those less than 20 years.

In 2014; between 50– 59 years recorded highest with 22(61.1%) followed by 40 – 49 years and 60–69 years with 4(11.1%) and the least was on above 70 years with 1(2.8%) cases of CKD.

In 2015; between 50–59 years recorded highest with 7(38.9%) followed by 40 – 49 years and 60–69 years with 4(22.2%) and the least was between 30–39 years with 1(5.6%) cases of CKD.

In 2016; between 50–59 years recorded highest with 96(32.7%) followed by 60 – 69 years with 54(18.4%) and the least was on less than 20 years with 14(4.8%) cases of CKD.

In 2017; between 50–59 years recorded highest with 92(35%) followed by 40 – 49 years with 72(27.4%) and the least was on less than 20 years with 4 (1.5%) cases of CKD.

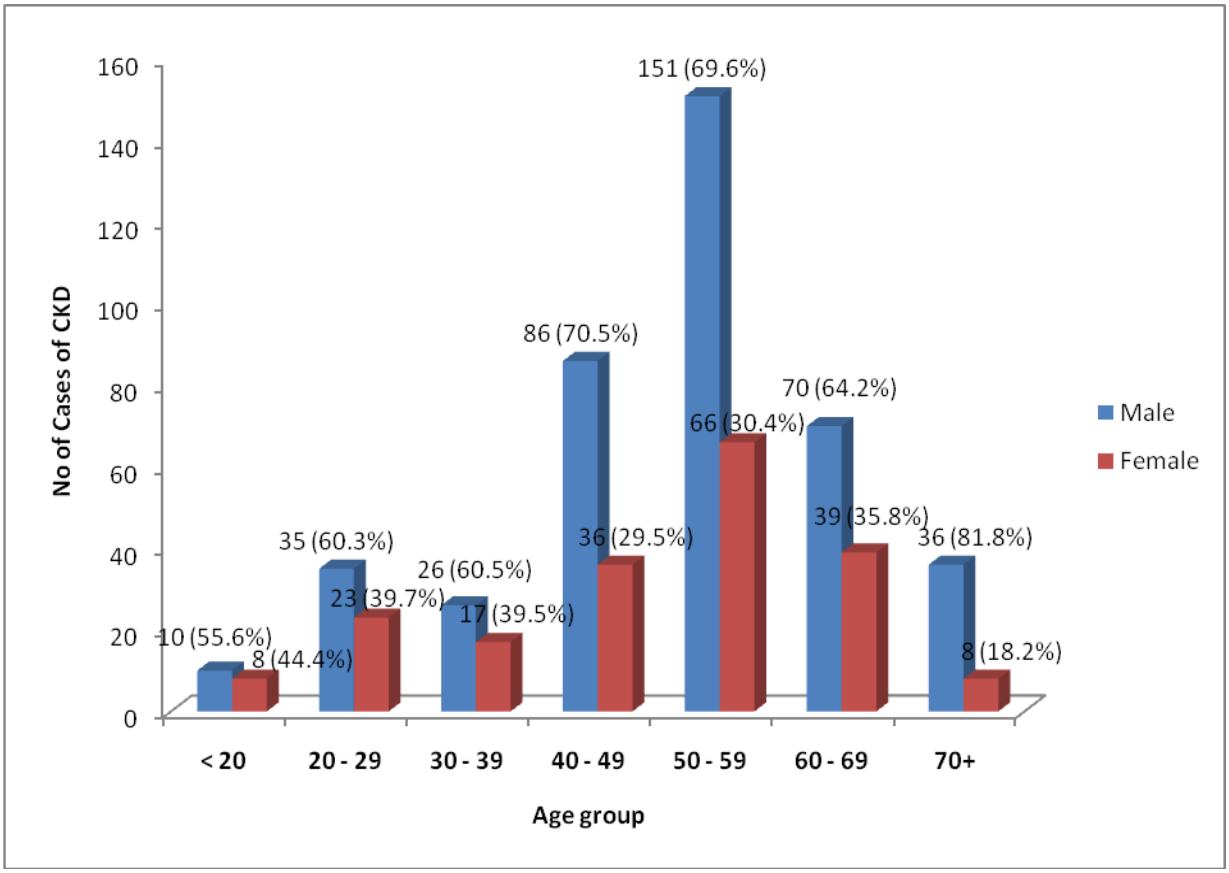

Figure 5: Trend of Chronic Kidney Disease (CKD) by Age

Chi-square = 9.088, p-value = 0.169

The figure 4 below presented the trend of CKD by gender for the period of four years in the studied hospitals. Majority 151(69.6%) were male between 50-59 years while female has 66(30.4%). In all the age group, the lowest was on those less than 20 years with 10(55.6%) for male and 8(44.4%) for female

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 DISCUSSION

The findings from a retrospective survey on time trend in the epidemiology of chronic kidney disease in Foundation Dialysis Centre in Owerri, Imo State from January 2014 to December 2017; showed that 9.9% had chronic kidney disease and it was similar to the result gotten from Egbi *et al.* (2014) among Civil Servants in Bayelsa State using survey research and they found that the prevalence of chronic kidney disease in the study was 7.8%, prevalence rate (14.6%) of hypertension was high in month of July and some risk factors for chronic diseases are excess alcohol, tobacco smoking, inadequate physical activity, high salt intake, unhealthy diet, age, obesity, family history and abnormal blood lipids are highly responsible for the occurrence of chronic kidney disease. Although chronic kidney disease (CKD) cases are increasing globally, incidence of the disease in Nigeria is more pathetic as experts say it is largely caused by preventable risk factors as mentioned earlier and lack of proper health care facilities (Egbi *et al*., 2014).

According to Boris (2013), stated that one million deaths worldwide resulted from CKD and it remains among the few growing causes of mortality which

made chronic kidney disease the 13th leading cause of death in 2013 (Boris, 2013). All increase in CKD as observed in some studies such as in Taiwan, CKD was 6.9% (Hsu *et al*., 2006), in Teaching Hospital in South-East Nigeria, CKD was (Ulasi and Ifeoma, 2010). The studies proved that increase in prevalence of CKD was due to low awareness on the risk factors of CKD.

In relation to the causes of chronic kidney disease, diabetes and hypertension are the first two leading causes of CKD. In the Western world, diabetes is the leading cause, whereas in many undeveloped countries it is hypertension and the findings showed high cases of hypertension. According to Agboton, (2017), family history, high blood pressure, diabetes mellitus, autoimmune diseases, systemic infections, urinary tract infections, urinary stones, lower urinary tract obstruction, low income or educational level etc are progression factors that can 10% cases of chronic renal failure.

Following the reported Ministry of Health and Kidney Health of New Zealand in (2014), there is convincing evidence that good control of blood sugar levels and blood pressure can reduce or, in some cases, prevent progressive kidney damage among people which was similar to the observed factors in this study. After the exclusion of patients with cardiovascular

problem due to hereditary disorders and urologic causes, nearly 23% of incident dialysis patients had close relatives with CKD and in line with this result. Hence, it is advised to screen the high-risk family members of those with CKD, in an attempt to prevent any kidney disease (Alper and Batuman, 2017).

Many studies have demonstrated that CKD is more frequent among men compared to women. In one study, a total of 107,192 subjects over 18 years of age (51,122 men and 56,070 women) from Okinawa, Japan participated in a 10-year follow-up where odds ratio for CKD was 1.41 among male participants. In contrast, on another study demonstrated that CKD is higher in women than in men (18.4 vs. 12.8%) in Turkey but in this study, greater percentage (67.8%) was for men compared to women with 32.2% (Kazancioğlu, 2011).

In terms of management aspect of CKD, blood pressure drugs or anti-hypertensives are medications designed to lower blood pressure. Untreated high blood pressure can cause permanent damage to the small arteries of the kidneys, as well as to the heart and the brain. From the findings of this study; the major management practice in prevention of CKD was with the application of amilodipine, dialysis, iron succrose, normal saline followed

by lisinopril, dialysis, iron succrose, normal saline. The reason could that, they are commonly available to patient and perform good efficacy on patients.

5.2 Conclusion

The base line information got from the study was collated and analyzed and it showed that there a significant relationship between risk factors such as age, family history, high blood pressure, diabetes mellitus, autoimmune diseases, systemic infections, urinary tract infections, urinary stones, lower urinary tract obstruction etc and occurrence of CKD. Therefore, time trend in the epidemiology of CKD in Imo State was high in men compared to women counterpart in regard to CKD admissions and incidence from the assessed medical recorded in the hospitals.

5.3 Recommendations

Based on the findings of the study, the following recommendations were necessary such as;

1. They should encourage free screening of blood pressure and sugar level on people of above forty years of age
2. They should be awareness on the risk factors that can lead to the occurrence of CKD.

3. Government should empower health workers at local level on the equipment for screening of people that are at risk of developing CKD
4. Heavy drinkers and smokers should be encouraged to reduce it in order to avoid the cases of CKD.
5. Clinicians should encourage patients to treat systemic infection and do weight reduction through an appropriate balance of calorie intake, physical activity, and behavioral counseling.
6. They should be a proper documentation of data on CKD cases so that the policy makers can use of it for health decision purposes

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