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Knowledge of chronic kidney disease among University students

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CHAPTER ONE

OVERVIEW OF THE STUDY

1.0 INTRODUCTION

This chapter provides an outline of the study. The outline is divided into separate parts namely, background to the study, problem statement, purpose of the study, research questions, objectives and significance of the study, paradigmatic perspective, definition of terms, an overview of research methodology used, chapter division and summary. Harvard Style referencing is used in this research report. Where the publications contain four or more authors, the initial citing will include only the first three authors. In subsequent citings only the name of the primary author will be used. All authors will be included in the referencing at the end of the report

1.1 BACKGROUND TO THE STUDY

Chronic kidney disease (CKD) has been observed to be a major threat to the world's health, and has been found to be associated with an increased mortality and morbidity rate over the years. In the past, communicable diseases were the leading cause of death in sub Saharan Africa (SSA), but recently as the disease pattern is changing the non communicable diseases and their complications are coming to the fore in developing countries (Naicker, 2013).

This change in disease pattern has been recognized and prioritized by the developed world but unfortunately chronic kidney disease is still not on the health agenda of most African countries (Katz, Gerntholtz and Naicker, 2011). Based on this concern and an increased prevalence of chronic kidney disease in the region, a call for research on chronic kidney disease in SSA was made by Yirsaw, (2012). Awareness of chronic kidney disease has been observed to be relatively low worldwide with under diagnosis and under treatment. Many physicians are not aware of the risk factor of chronic kidney disease (Bakris and Ritz, 2009).

Chronic kidney disease is one of the chronic diseases with worldwide public health concern (Yirsaw, 2012) and it affects economically productive young adults between the ages of 20-50 in SSA versus the middle age and elderly in the developed world (Naicker, 2010 a, b).

As defined by Bonner and Douglas (2012), chronic kidney disease is alteration in the kidney function which persists for 3 months or more, and the stage of the disease is graded based on the degree of dysfunction. According to the National Institute of Diabetes and Digestive and Kidney diseases (NIDDK, 2014) hypertension is the leading cause of chronic kidney disease and hypertension frequently goes unnoticed unless symptoms such as headaches occur. A recent study by Bakris and Ritz, (2009) found that hypertension is a universal problem that is anticipated to get worse and will potentially increase by 24% in the developed world as against 80% in developing regions like Africa.

From the literature reviewed no study was found on the awareness and prevalence of chronic kidney disease among young adults in South Africa but from the study conducted by Lloyd-Sherlock, Baird, Minicuci et al. (2014), it was reported that South Africa has the highest prevalence of hypertension among people 50 years and over.

At present, human resources are a big challenge in SSA as there is a problem of brain drain with very few nephrologists in many areas. South Africa has the highest number of nephrologists in the African region where the incidence varies from 0.5 per million people (pmp) in Kenya; 0.6 pmp in Nigeria; 0.7pmp in Sudan to 1.1 pmp in South Africa as against 16.7 pmp in the United States of America (Naicker, 2013). Chronic Kidney disease caused by hypertension is known as the "silent killer" because it shows no symptoms and many people in SSA only present to the hospital when complications have developed and by then they will need renal replacement therapy (Naicker, 2010a).

Renal replacement therapy (RRT) is the treatment of choice for chronic kidney disease but it has a great financial burden on the individual and the economy of the country. In almost all African countries there is still rationalization of care (RRT) with laid down inclusion and exclusion criteria before a patient can be considered for renal replacement therapy.

Because of the cost of care, inadequate qualified personnel and lack of manpower at the grassroots to conduct early assessment, some researchers (Naicker, 2010a; Bonner and Douglas,2012; Remuzzi, Benigni and Finkelstein et al. 2013), emphasized that one key point in reducing this burden is to focus on preventive measures.

Knowledge of chronic kidney disease is a key point to successful prevention (Chow, Joshi, and Tin et al. 2012). It would be difficult to plan an education program without first understanding the knowledge deficit therefore "data on knowledge of chronic kidney disease is an essential tool to understanding knowledge gaps and formulating education programs" (Chow, Szeto and Kwan et al. 2014). Basic knowledge of chronic kidney disease, risk factors and source of knowledge among young adults will help determine the appropriate intervention needed to keep the study population informed further reducing the burden of chronic kidney disease. This study is

therefore designed to discover the knowledge of chronic kidney disease among university students between the ages of 18 and 25 years.

1.2 PROBLEM STATEMENT

It has been widely stated that about 10% of the global population has some degree of CKD, and this can be statistically estimated to affect about 5 million South Africans with higher prevalence among the black community (Meyers, 2015). Documentation in Africa is a big challenge as there are no renal registries in many African countries (Naicker 2010a). From literatures reviewed, chronic kidney disease has become a global burden with increased prevalence in all regions especially in Africa and has a strong relationship with hypertension and diabetes. It has been found to affect the economically productive young adults and the level of awareness among this group is not known.

In 2012, Levey and Coresh identified education as one of the key strategies to improve awareness of chronic kidney disease and thereby reducing the incidence. In order to implement this strategy baseline knowledge of the chronic kidney disease and source of information among the high risk group will be needed to identify the knowledge gap and develop appropriate intervention. It is therefore imperative to assess the knowledge of chronic kidney disease among the relevant age group and university students meet these criteria.

1.3 PURPOSE OF THE STUDY

The purpose of this study is to describe the knowledge of chronic kidney disease among university students. As this study is set to identify the knowledge and source of knowledge of

chronic kidney disease among university students, it was expected to identify the knowledge gap of this disease and will prompt the development and implementation of educational programs for prevention of chronic kidney disease among young adults.

1.4 RESEARCH QUESTIONS

The researcher will attempt to answer the following research questions:

What knowledge do university students have regarding chronic kidney disease?

What is the source of knowledge of chronic kidney disease among university students?

1.5 RESEARCH OBJECTIVES

The objectives of the study are:

- To investigate the knowledge of university students regarding chronic kidney disease using self administered questionnaire.
- To determine the source of knowledge of chronic kidney disease among university students using self administered questionnaire.

1.6 SIGNIFICANCE OF THE STUDY

As stated earlier this study will explore both knowledge and source of knowledge of chronic kidney disease among young adult. This study is significant because it affects economically active young adults in SSA and the treatment of choice, RRT, requires frequent treatment or visits to the hospital. Haemodialysis for patients with chronic kidney disease is done 3 times a

week with an average of 4 hours per session. Apart from the time factor, Levey and Coresh (2012) stated that RRT is very costly and this restricts its availability worldwide with many patients with chronic kidney disease dying because of poor availability, accessibility and affordability of care. In SSA poor access to RRT is attributed to high costs and shortage of skilled personnel leading to increased morbidity and mortality (Naicker, 2010a).

To reduce the incidence of chronic kidney disease, preventive measures as identified by Naicker (2010a) should involve a comprehensive health care system and public education. This should commence at an early stage of life such as school going age and should be ongoing. Quantification of this knowledge will contribute to appropriate educational programs. Development and implementation of the program should further reduce the incidence of chronic kidney disease.

1.7 PARADIGMATIC PERSPECTIVES

A paradigm is a world view, a general perspective on complexities of the world and reveals how humans respond to basic philosophical questions (Polit and Beck, 2012). It reveals how entities interact.

1.7.1 Meta- Theoretical Assumptions

Polit and Beck, (2012) stated that assumptions are basic principles believed to be true without proof or verification. The meta-theoretical assumptions in nursing comprise four key concepts: the person, the environment, nursing care and health/illness. This study is based on the meta-theoretical assumptions regarding these four concepts.

Person

Person refers to the general population especially those at risk of chronic kidney disease. A person is a complex being in which a problem with a sub-system affects the stability of the whole system. The kidneys are important organs in the body and any alteration in their function causes complications in the entire body. Persons acquire knowledge on a daily basis and it is believed that knowledge acquired early in life can influence the choice of healthy behaviour later in life. This acquired information can be shared with other people.

Environment

Environment can include internal and external environment. External environment can affect the stability of the internal environment and the internal environment leading to poor maintenance of homeostasis. The external environment is always changing and internal environment must adjust to maintain internal stability. Individual knowledge and understanding can affect the way the person deals with the environmental factors which may influence one's health.

Health

Health is the opposite of illness and can be defined as being in a balance and stable state. It is regarded as being fit in all spheres of life, that is physical, mental, social, and emotional. Level of knowledge especially health literacy can affect decision-making and may promote healthy living. As chronic kidney disease is a silent disease individuals must be aware of its causes, sign and symptoms and available options for managing the disease.

Nursing

Nursing is a helping profession that provides a comprehensive approach to meet patients' needs. Nurses form a therapeutic interpersonal relationship by cooperating with the individual, family or community to achieve a healthy society. Nurses should be able to give education to

the general population and screen for chronic kidney disease in order to make prompt referrals and follow up.

1.7.2 Theoretical Assumptions

This study is based on the theoretical assumptions of the health belief model that was developed in the 1950s by a group of public health service social psychologists, Hochbaum, Rosenstock and Kegels, from the United States. They wanted to explain why so few people were participating in programs to prevent and detect disease. There are four main constructs: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers.

Perceived seriousness: It focuses on individual belief/understanding about seriousness and severity of a disease condition. It may be based on medical information or individual beliefs about how chronic kidney disease affects the quality of life.

Perceived susceptibility: This is one of the strongest constructs as a person tends to adhere to healthier behaviour provided they know they are at risk. It is rational for people to want to prevent occurrence of a disease if they know they are susceptible to it.

Perceived benefits: This refers to the expected benefit an individual expects from living a healthier life. It can be in the form of regular check-ups or screening to prevent disease conditions.

Perceived barrier**s:** This refers to individual understanding of obstacles to health care and this promotes healthy life style.

Modifying factors: These are factors that affect the four constructs and can be due to culture, gender, education level; age, past experience, social class etc. These characteristics can affect

perceived seriousness, susceptibility, benefits and barriers which can promote a healthy life style.

Cues to Action: These are prompts or signals that make people aware of a disease condition and influence their choice. It can be education from health care providers, mass media campaigns, illness of a friend or family member, warning on a product or health education classes in school.

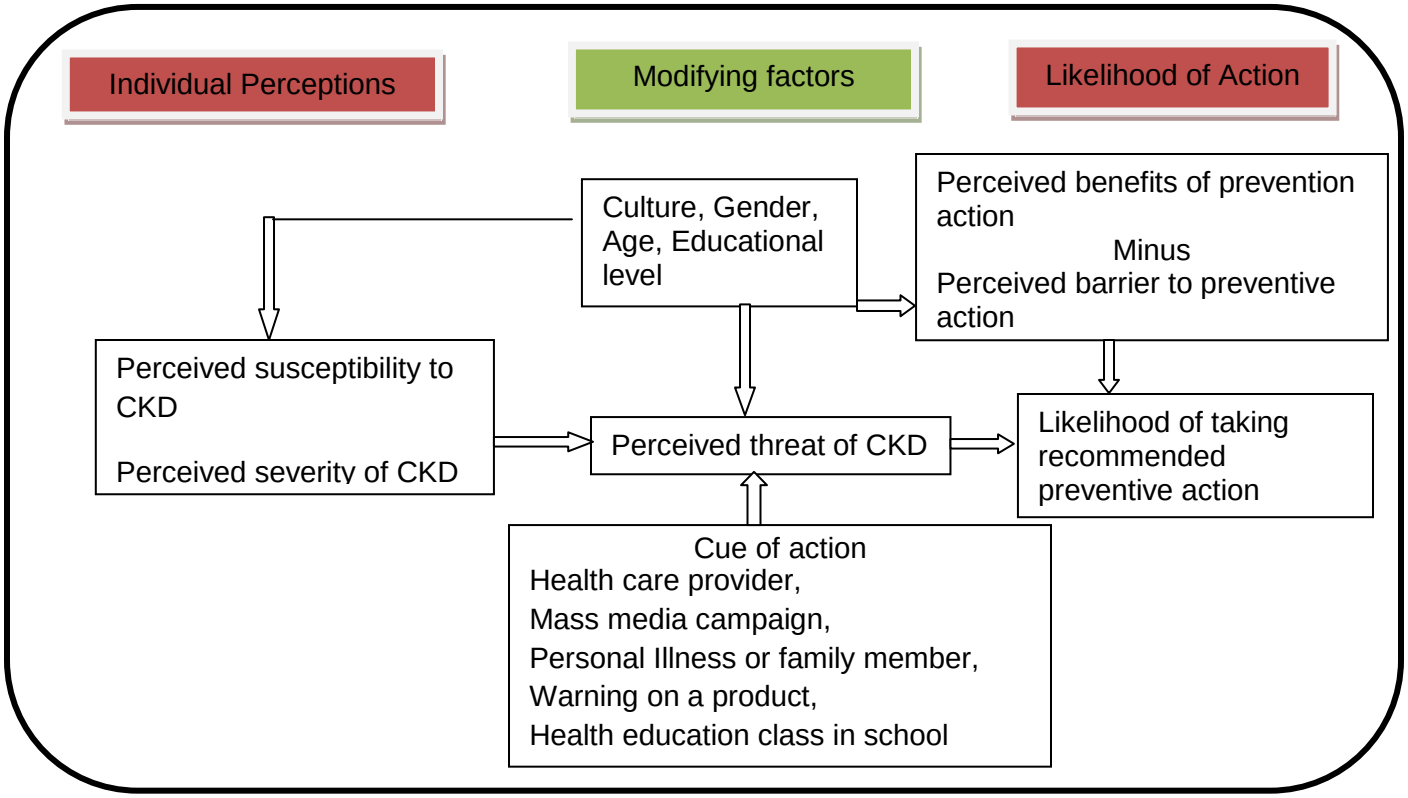

Image From: http://currentnursing.com/nursing_theory/health_belief_model.html

Figure 1.1: Theoretical assumption of health belief model

The central theoretical statement of this study is the ability of university students who fall within the susceptible age of chronic kidney disease to internalize what they have learnt from health care providers, sick family members, mass media campaigns and health education classes in high school and make an independent healthy decision later in life. They should also be able to understand what put them at risk, identify signs and symptoms, and seek proper health care.

1.8 DEFINITION OF TERMS

The operational definitions consistently used in this study are as follows:

Knowledge: Is the facts, information, understanding and skills acquired through experience or education; the theoretical or practical understanding of a subject (Oxford advance learner's dictionary, 2015). In this study it signifies the understanding of chronic kidney disease among university students which might have been gained from school or experience.

Students: This refers to a person who is studying at a university or other place of education; denoting someone who is studying in order to enter a particular profession (Oxford advance learner's dictionary, 2015). In this study it signifies students who are studying at the University of the Witwatersrand, South Africa.

Chronic kidney disease: Chronic kidney disease can be define as a disease characterized with sustained reduction in glomerular filtration rate or evidence of abnormalities of the kidney on urinalysis, biopsy or imaging greater than 3 months (James, Hemmelgarn and Tonelli, 2010).

Residence: Refers to person's home, especially a large and impressive one (Oxford advance learner's dictionary, 2015). In this study it refers to university residences provided for students.

1.9 OVERVIEW OF RESEARCH METHODOLOGY

A non-experimental quantitative descriptive cross-sectional design was utilised to achieve the objectives of the study. The study respondents were undergraduate students of the University of Witwatersrand, living in four of the university residences. Eighty male and eighty female students between the ages of 18 years to 25 years were included in the study.

Permission was sought and granted by Faculty of Health Sciences post-graduate committee, Human Research and Ethics committee (medical), Dean of student affairs, University of Witwatersrand, South Africa and the residence manager. Permission to use the questionnaire was also sought and granted by the authors.

After permission was granted by the institution and various committees, consent was obtained from undergraduate students living in male only and female only residence who agreed to participate in the research.

Descriptive and inferential statistics were used to analyze the results of the study, with IBM SPSS 21. Reliability of the study was maintained by ensuring the principal researcher was the sole data collector, the sample size was achieved using convenience sampling technique. Face validity was done by a panel of experts to remove any ambiguous questions and a pilot study was done to test for internal consistency.

1.10 CHAPTER DIVISION

The study is presented in the following chapters:

Chapter 1: Overview of the study

Chapter 2: Literature review

Chapter 3: Research methods and design

Chapter 4: Findings

Chapter 5: Discussion of research findings, limitations, conclusions, and recommendations

1.11 SUMMARY

Chapter one has presented background to this research and explored the problem statement, purpose of study, research questions, objectives and significance of the study, paradigmatic perspective, definition of terms, an overview of research methodology .

The next chapter will present literature review. This will explain the overview of chronic kidney disease, classification of chronic kidney diseases, conceptual model of chronic kidney disease, burden, and causes of chronic kidney disease, knowledge of chronic kidney disease, resource for renal care and measures to combat the upsurge of chronic kidney disease.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

In the previous chapter the background of the study, problem statement, purpose of study, research questions, objectives and significance of the study, paradigmatic perspective, definition of terms and an overview of research methodology were discussed. In this chapter the researcher describes the literature reviewed in relation to chronic kidney disease. The review begins with an overview of chronic kidney disease, classification of chronic kidney disease, a conceptual model of chronic kidney disease, the burden of chronic kidney disease, causes of chronic kidney disease, knowledge of chronic kidney disease, resources for renal care and prevention of chronic kidney disease.

2.2 OVERVIEW OF CHRONIC KIDNEY DISEASE

Chronic kidney disease (CKD) has posed a great threat on global health but it is still not recognized as a potentially devastating cause of morbidity and mortality in many low-resourced countries (Yeates, Ghosh and Kilonzo, 2013). There has been a lot of redefining and reclassification of chronic kidney disease which has improved its recognition globally, with many developed countries scaling up their health systems to cater for the burden of chronic kidney disease but due to lack of reliable statistics in Africa it is yet to be recognized as a public health problem by most countries in the region (Katz et al., 2011)

Chronic kidney disease can be defined as a heterogeneous disorder that affects the structure and function of the kidney. The clinical presentation varies with cause, pathology, severity and rate of progression (Levey and Coresh, 2012) and it affects economically productive young adults between the ages of 20-50 years in SSA (Naicker, 2010a).

The incidence and prevalence of chronic kidney disease varies geographically.It is difficult to ascertain because of difference in underlying disease conditions and lack of a renal register especially in many African countries but it is estimated to be as high as 200 cases per million per year in many countries (Levey and Coresh, 2012). In developed countries, chronic kidney disease is estimated to affect between 5% to 7% of the total adult population (Couser, Remuzzi, Mendis et al., 2011) and it is said to be 3–4 times more common in Africa than in the developed world (Naicker, (2009). Data from Statistics South Africa (2014) reveals that renal failure was the 11th leading cause of death in South Africa in 2013 having a 5.1% of the total percentage of all death.

Bakris and Ritz, (2009) stated that chronic kidney disease awareness is poor worldwide and is under-diagnosed and under-treated. A survey conducted in the United States in a primary care setting revealed that one-third of primary care physicians were not aware that family history was a risk factor for chronic kidney disease. The recent “kidney early evaluation program (KEEP)” study in Mexico, reveals that participants in which chronic kidney disease was detected were unaware of the diagnosis despite the fact that 71% of them had seen a doctor in the previous year(Katz, Gerntholtz and Van Deventer et al., 2010).

Prevention has been identified as the backbone of global efforts to reduce chronic kidney disease in all settings and to adequately plan for public health intervention. In order to appreciate the benefit of screening and timely treatment, accurate estimates of chronic kidney disease are necessary but this is quite challenging in many low resourced countries because of

poor record keeping (Yeates et al., 2013). One key strategy to effectively prevent and manage chronic kidney disease is to offer prevention programs and raise awareness of the disease (Chen, Hsu and Yamagata et al., 2010).

The recommended preventive measure to reduce the incidence and prevalence of chronic kidney disease includes improved surveillance, screening, education and awareness of kidney disease. This should be directed at high risk individuals, health care providers and the general public (Levey and Coresh, 2012).

Chronic kidney disease is a public health problem which needs a public health approach, therefore, in order to strategically plan a public health education program, the knowledge gap of the disease must be well understood and (Chow, Szeto and Kwan et al., 2014). Assessment of disease knowledge has been found to be relevant as it reveals the knowledge gap among patients and aids development of educational programs that specifically targets the realm of poor knowledge (Wright, Wallston and Elasy et al., 2012) .

2.3 CLASSIFICATION OF CHRONIC KIDNEY DISEASE

Chronic kidney disease can be defined as a disease characterized with a sustained reduction in glomerular filtration rate (GFR) or evidence of abnormalities of the kidney on urinalysis, biopsy or imaging (James, Hemmelgarn and Tonelli, 2010). Levey, Stevens and Coresh, (2009) define chronic kidney disease as a heterogeneous condition that varies among individual patients and is somehow related to the cause and pathological characteristics of kidney disease, rate of progression, and presence of co morbid conditions. Glomerular filtration rate has been confirmed to play a key role in the classification and stages of chronic kidney disease. (Levey, Stevens and Coresh, 2009; Levey and Coresh, 2012).

Generally it is classified into five stages :

GFR more than 90 mL/min per 1·73 m² (stage 1),

60–89 mL/min per 1·73 m² (stage 2),

30–59 mL/min per 1·73 m² (stage 3),

15–29 mL/min per 1·73 m² (stage 4), and

less than 15 mL/min per 1·73 m² (stage 5).

Prognosis of CKD by GFR and albuminuria categories: KDIGO 2012

GFR categories (ml/min per 1.73 m²) Description and range				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–300 mg/g 3–30 mg/mmol	>300 mg/g >30 mg/mmol
	G1	Normal or high	≥90			
	G2	Mildly decreased	60–89			
	G3a	Mildly to moderately decreased	45–59			
	G3b	Moderately to severely decreased	30–44			
	G4	Severely decreased	15–29			
	G5	Kidney failure	<15			

Green: low risk (if no other markers of kidney disease, no CKD); yellow: moderately increased risk; orange: high risk; red, very high risk.

Figure 2.1: stages of CKD. Reprinted with permission from Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group (2013) KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease

According to KDIGO 2012, Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease, Chronic kidney disease classification was based on cause, GFR category, and albuminuria category (CGA), it was classified into 6 stages with stage 3 divided into two. This staging and incorporation of albuminuria was necessitated by the need for a more comprehensive approach for easy diagnosing and management. Levey and Coresh, (2012:) stated that both experimental and clinical studies have suggested the "important role for proteinuria in the pathogenesis of disease progression" and this has been supported by epidemiological studies which show “a graded relationship between increased albuminuria, mortality, and kidney outcomes" in different populations.

2.4 CONCEPTUAL MODEL OF CHRONIC KIDNEY DISEASE

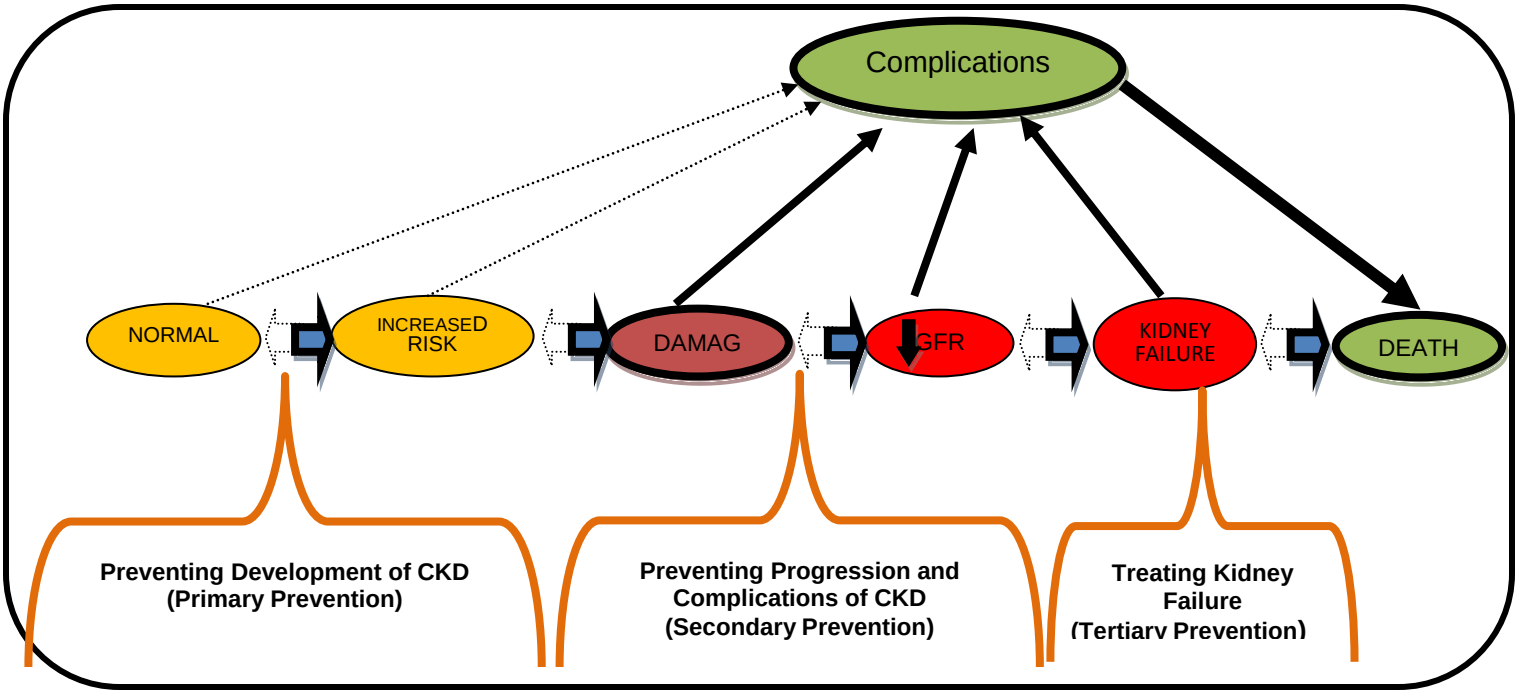

Figure 2.2: Conceptual model of CKD: Applications and implications; reproduced with permission from Levey, Stevens and Coresh,(2009) and National Kidney Foundation.
Horizontal arrows between Circles represent development, progression, and remission of CKD. Left-pointing horizontal arrowheads signify that remission is less frequent than progression. Diagonal arrows represent occurrence of complications of CKD. Stages of prevention are divided into three, primary, secondary, and tertiary.

Chronic kidney disease has been widely accepted as a silent disease that occurs over a period of time and is frequently asymptomatic in its early stage. The above model identifies and explains the progressive nature of chronic kidney disease. It is like a continuum which flows from left to right and can be halted or delayed. Reversal by means of a kidney transplant is the ultimate goal. Levey, Stevens and Coresh, (2009) state that the initial stages of the disease if detected early can be reversible and kidney function in patients who have already progressed to kidney failure can be reversed through kidney transplant. A normal kidney can be damaged by other chronic diseases such as hypertension, diabetes, HIV/AIDS and other risk factors such as genetics. Exposure to toxic substances can also affect the kidneys and this emphasizes why early and continuous screening is needed for people at risk of chronic kidney disease. Usually damage exists in the kidney before abnormalities can be seen in the urine, and the presence of one or more of the following i.e. albuminuria {AER ≥30 mg/24 hours}; urine sediment abnormalities ; electrolyte and other abnormalities due to tubular disorders; abnormalities detected by histology; and structural abnormalities detected by imaging, have been identified as markers of kidney damage by KDIGO 2012, Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. This damage can be further complicated by a decrease in glomerular filtration rate and if not prevented or treated, it may progress to Kidney failure which can be managed by dialysis or transplantation however it may ultimately can lead death.

2.5 BURDEN OF CHRONIC KIDNEY DISEASE

Over time there has been change in the world's disease profile and chronic diseases are now reported to account for 60% of all death with 80% of these death occurring in low and middle income countries (Yirsaw, 2012). Chronic kidney disease (CKD) is increasingly recognized as a global public health problem and a key determinant of the poor health outcomes (Couser et al.,

2011; Garcia-garcia and Jha, 2014). Africa is experiencing an accelerated increase in hypertension and diabetes which are the underlying cause of chronic kidney disease (Ojo, 2014). Katz et al. (2010) stated that chronic kidney disease has a strong relationship with both communicable and non-communicable disease and the high prevalence of hypertension, diabetes and infection with HIV in developing world will result in a high risk for the development of chronic kidney disease. In South Africa, prevention and treatment of non communicable disease are marginalized because of the overwhelming prevalence of communicable diseases such as HIV/AIDS and tuberculosis (Mayosi, Flisher and Sitas et al., 2009)**.**

With population aging, lifestyle changes and rapid urbanization occurring, the importance of non-communicable disease in low and middle income countries cannot be over emphasized. It is estimated that by 2030, more than 70% of patients with end- stage renal disease will be living in developing countries including SSA (Stanifer, Jing and Tolan et al., 2014). Lack of a kidney disease registry in SSA makes it difficult to estimate the extent of chronic kidney disease but data from USA suggest that for every patient with ESRD there are more than 200 with overt chronic kidney disease and almost 5000 with unknown renal disease(Pozo, Leow and Groen et al., 2012). Kidney disease imposes a great human suffering and economic burden on the African continent. ESRD is projected to increase at the rate of 6% to 8% in Africa (Ojo, 2014).

2.6 CAUSES OF CHRONIC KIDNEY DISEASE

Data from South Africa renal registry reveals that the causes of chronic kidney disease in South Africa varies from idiopathic (36.1%), hypertensive renal disease (32.5%), diabetic nephropathy (12.4%), glomerulonephritis (9.5%) to cystic kidney disease (3.3%). Global prevalence of hypertension in the adult population was estimated to be 26% with most of the cases localized

to developing countries while diabetes was estimated to be 6.4% and is expected to rise to 7.7% by 2030 (Khalil and Abdalrahim, 2014).

Hypertension

"Hypertension is an important worldwide public health challenge because of its frequency and associated risk of cardiovascular and kidney disease"(Seedat, 2012) and it is expected to get worse with a 24% estimated increase in the developed world as against 80% in developing regions such as Africa (Bakris and Ritz, 2009). This is supported by Ibrahim and Damasceno, (2012) who stated that about three-quarters of people living with hypertension live in developing countries where health care resources are limited. It has emerged as a significant problem with great concern after HIV/AIDS, tuberculosis and malaria in SSA (Peer, 2013). In 2013, the World Health Organization, (WHO) dedicated the World Health Day to hypertension because it was observed to be the leading risk factor of death worldwide and it is said to kill nearly 8 million people every year with the African region having the highest prevalence of high blood pressure (45%) while the American region has the lowest (35%) prevalence rate.

Hypertension has been fluctuating between the eighth and seventh leading cause of death in South Africa between 2011 and 2013. The percentage increases by 0.3% every year from 3.1% in 2011 to 3.4% in 2012 and 3.7% in 2013(Statistics South Africa, 2014). A study in 2008 reported that almost 1billion individuals globally have hypertension with a prevalence rate of about 40% worldwide in ≥25 years old age group with SSA having the highest rate of 46% (Peer, 2013b).

Naicker, (2009) stated that Hypertension affects approximately 25% of the adult population and accounts for 21% of patients on renal replacement therapy in South Africa. As with chronic kidney disease, awareness of hypertension is poor as most people with hypertension were not

aware of it. This may be worse in developing countries (Couser, Remuzzi and Mendis et al., 2011).

Diabetes mellitus

Diabetes affected 2.8% of the global population in 2000 and this will triple to 6.8% by 2030 By that time 81% of those with diabetes will be living in developing countries (Remuzzi, 2010). The prevalence of diabetic nephropathy is estimated to be between 6-16% in SSA (Naicker, 2013). In South Africa, Diabetes has been identified as the fifth leading cause of death from 2011 to 2013 with the percentage ranging from 4.1% in 2011 to 4.4% in 2012 and 4.8% in 2013 (Statistics South Africa, 2014). The incidence of diabetes has increased generally over the past decades but the increased prevalence will be most rapid in developing countries and 30% of the predicted global cost of dialysis in the current decade will result from diabetic nephropathy (Couser et al., 2011)

HIV infection

Statistics show that about 33 million people were infected with HIV with 68% living in SSA (Naicker and Fabian, 2010). HIV associated nephropathy , acute kidney injury and chronic kidney disease are some of the complication of HIV infection and may become more pronounced as patients live longer especially in the era of combined antiretroviral therapy (Flandre, Pugliese and Cuzin et al., 2011).

Naicker, (2013) emphasize the need for SSA to prepare for an escalated burden of HIV CKD because of increase life expectancy from use of ART among HIV infected population and nephrotoxicity of the drugs. It has been opined by Naicker and Fabian (2010) that people living with HIV should be screened for proteinuria and have their glomerular filtration rate (GFR) checked at presentation and thereafter annually. It is difficult to estimate the prevalence of HIV

related glomerular disease in SSA because most patients present to the hospital late. Some studies have reported a range of 6-45% prevalence rate of chronic kidney disease among HIV infected antiretroviral therapy (ART) naive patients in SSA (Naicker, 2013). Khalil and Abdalrahim, (2014) stated that "wrong assumption about chronic kidney disease risk factors, sign and symptoms, disease stage and related management plan" may account for reasons why patients present late for medical care.

Others

Glomerular disease is more common in Africa than western countries and has been reported as a one of the major cause of end stage renal disease (ESRD) in SSA(Naicker, 2013b). The relationship between intrauterine factors and development of chronic kidney disease in adulthood has been postulated but not well explored, for example low birth weight due to maternal nutritional status and traditional herbal medicine is common among the disadvantaged populations and it has been found to be associated with kidney disease (Jha, Wang and Wang, 2012). More than 80% of the population in SSA is estimated to use herbal or traditional medicines. This is thought to have been associated with 35% of all new cases of acute kidney injury (Stanifer et al., 2014).

2.7 KNOWLEDGE OF CHRONIC KIDNEY DISEASE

Generally CKD patients are unaware of their kidney disease before being diagnosed. The knowledge is also poor among chronic kidney disease patients under the care of a Nephrologist. A study conducted among chronic kidney disease patients (stage 1-5) shows a limited knowledge regarding basic information about kidneys as over a third of the respondents did not know that kidneys make urine (Wright et al., 2012). Chow, Szeto and Kwan et al. (2014) stated

that awareness of chronic kidney disease is poor and this poses a great barrier to disease prevention.

A study among chronic kidney disease patient between stage 3-5 reveals that 35% of the respondents reported little or no knowledge about their chronic kidney diagnoses and close to half reported no knowledge about treatment options for kidney failure (Wright et al., 2012). Patients need to be knowledgeable about the kidney and its physiology, signs and symptoms, and risk factors in order to reduce the chances chronic kidney disease occurring by implementing healthy behaviour that will lead to a positive health outcome (Khalil and Abdalrahim, 2014).

Assessment of disease-specific knowledge is clinically relevant as it may reveal areas difficult for patient to understand. This will help to develop educational intervention programs that will focus on areas of poor knowledge (Wright et al., 2012). Khalil and Abdalrahim (2014) stated that screening programs and population education programs regarding chronic kidney disease has shown improvement in patient understanding of chronic kidney disease and medical outcomes, therefore such programs can be used to reduce the medical burden and related cost and thus may improve quality of life.

Health literacy can be defined as " ability to obtain, process, and understand basic health information to make appropriate health decisions about one's health and medical care," and has been linked to good health outcomes (Cavanaugh, Wingard and Hakim et al., 2010). Health literacy is still low and is attracting public health attention because it has an impact on the patient outcome (Devraj, Borrego and Gordon et al., 2015).

A recent study on health literacy among university students in Greece reveals that their health status is very good with a health literacy level ranging between medium and high Demographic

data such as gender appears to influence the level of health literacy and health status as male students are associated with lower health literacy (Vozikis, Drivas and Milioris, 2014). Both education at an early age and early intervention can help understand health information and foster interaction with the health care system that will probably lead to positive health outcomes in life (Manganello, 2008) Formal schools have been identified as a settings not meant for studying alone but for developing health related attitudes and behaviour (Yu, Yang, Wang et al., 2012). Despite the well-established global prevalence of chronic disease, higher education has paid scant attention to this public health issue and academic response has been muted with only few if any universities preparing their students for the vital role they need to play in health promotion (Codreanu, Perico and Sharma et al., 2006).

2.8 RESOURCES FOR NEPHROLOGY CARE

Chronic kidney disease is a progressive disease which jeopardises survival and quality of life but can be managed therapeutically by RRT (Vanholder, Biesen and Lameire, 2014) Evidence revealed that many countries lack Nephrologists and nephrology training programs with no chronic kidney disease prevention and treatment programs to prevent the epidemic of ESRD that will occur in the next few decades (Yeates, Ghosh and Kilonzo, 2013).

The number of people requiring RRT globally was estimated to be 4.9-9million and only 2.6 million people are on dialysis which suggests that at least 2.3 million died prematurely because of lack of access to RRT (Garcia-garcia and Jha, 2014).

2.8.1 Renal Replacement Therapy

In Africa, a continent where 80% of people live on less than $2.5 per day, the average cost of haemodialysis is $100 per session with in-centre haemodialysis being the most common method of treatment whilst peritoneal dialysis is very scarce because of the cost of treatment as dialysis solutions are often imported (Naicker, 2013). Provision of RRT is a challenge in Africa and rationing of services is a common practice resulting in small numbers of patients being accepted on dialysis programs (Naicker, 2010b). South Africa is the wealthiest country on the continent but there is still a lot of rationalization of RRT as only patients without co-morbid disease are accepted on the program. Considering the problem of hypertension, diabetes, obesity and HIV/AIDS in South Africa, it is expected that the population in need RRT over the next few years will increase. The total number of centres offering RRT in South Africa at the moment is said to be 191 with 85.3% of the centres in the private sector (Davids, Marais and Jacobs, 2014). Equity is still a big problem in South Africa as data released from the South African renal registry (2014) shows that there are still two provinces (Mpumalanga and Limpopo) of the nine provinces without public dialysis centres making public renal care unavailable to a population of about nine million . Kidney transplantation has been reported to be the cheapest long term treatment of RRT but infrastructure problems such as trained staff, histocompatibility testing, laboratory monitoring, back-up dialysis and resources affects kidney transplant and the high prevalence of HIV infection also limits the potential pool of donors (Luyckx, Naicker and Mckee, 2013).

Seven of the 45 countries in SSA are providing renal transplant to their patients. The majority of the transplants make use of living donors with the exception of South Africa where deceased donor transplants are practiced to a greater extent (Naicker, 2013). In South Africa at the moment, 67.1% of patients are on HD, 14.1% are on Peritoneal Dialysis while 18.8% are on the transplant program. There has been a great decrease in the transplant rate from 55% in 1994 to 18.8% in 2012 (Davids et al. , 2014).

2.8.2 Manpower

In a developed world such as America there are 19 doctors and 49 nursing and midwifery personnel per 10,000 population. Europe has about 32 doctors and 78 nursing and midwifery personnel per 10,000 of the population but in the African region there are 2 doctors and 11 nursing and midwifery personnel per 10,000 of the population (Naicker, Eastwood and Tutt, 2010).

Nephrologists are scarce in Africa and the migration of nurses in all disciplines, from highly trained dialysis and intensive care nurses to general nurses and nursing assistants has created a great threat to the public health system on the continent. In South Africa there is internal brain drain of dialysis nurses from the public sector to the private sector. There is also an external drain to more developed countries (Naicker, Eastwood and Tutt, 2010). Renal care in Africa is quite challenging and is in a critical stage as there is a short supply of dialysis health workers as well as the great financial burden of RRT.

2.9 PREVENTION OF CHRONIC KIDNEY DISEASE

Health Education and promotion, screening and early referral is the key to successful prevention of chronic kidney disease (Naicker, 2009). To promote early detection and prevention, the needs of chronic kidney disease patients such as screening for chronic kidney disease and a prevention program should be integrated into the primary health care sector. It should not be established as a stand-alone program but rather integrated into the primary healthcare management of other chronic illnesses such as hypertension. Primary health care nurses must be involved at the grass root level (Katz et al., 2010).

Preventive measures have been recognized as a key strategy in the management of chronic kidney disease but it is still in its infancy stage in Africa. This is mainly due to lack of manpower and funding (Katz, Gerntholtz and Naicker, 2011). Early screening, management, and innovative therapy can delay the progress of the disease and the patients may enjoy healthier and more productive lives (Braun et al., 2012). Screening programs should not be rigid as they can be strategically designed and take many formats such as a special event run in the community, work place or selected location. Opportunistic screening of high risk people in either a general practice or primary health care clinic can be carried out (Katz et al., 2010).

2.10 SUMMARY

In this chapter the overview of chronic kidney disease, classification, a conceptual model, theburden of chronic kidney disease, causes of chronic kidney disease, knowledge of chronic kidney disease, resources for renal care and prevention of chronic kidney disease were discussed.

The following chapter will discuss the methodology of the study, research design, settings, population, sample and sampling technique, inclusion and exclusion criteria, data collection method and ethical issues.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter presented the overview of the study, classification of chronic kidney disease, conceptual model, burden of chronic kidney disease, causes of chronic kidney disease, knowledge of chronic kidney disease, resource for renal care and prevention of chronic kidney disease. This chapter will discuss the research methods which will include study design, settings, population, sample, inclusion and exclusion criteria, pilot study, description of instrument, data collection, and ethical consideration.

3.2 AIMS AND OBJECTIVES OF THE STUDY

The aim of this study was to describe the knowledge of chronic kidney disease among university students. As this study is set to identify the knowledge and source of knowledge of chronic kidney disease among university students, it was expected to identify the knowledge gap of this disease and will prompt the development and implementation of educational programs for prevention of chronic kidney disease among young adults.

For consistency and easy reading the objectives are repeated here. They were:

- To investigate the knowledge of university students regarding chronic kidney disease using a self administered questionnaire.
- To determine the source of knowledge of chronic kidney disease among university students using a self administered questionnaire.

3.3 RESEARCH DESIGN

An overview of the research design and methods will now be discussed.

3.3.1 Research design

This study is a non experimental, quantitative, descriptive, cross sectional survey. The study was conducted at University of Witwatersrand in four undergraduate student residences.

- Non experimental.

A non-experimental research design is a type of quantitative research design applicable in situations where it is unethical and inherently difficult to manipulate the independent variable (Polit and Beck, 2012). This design was chosen because the researcher did not manipulate the settings or any situation. This allows the researcher to obtain and describe the knowledge of the respondents in their natural environment without interfering with nature

- Quantitative research.

This is a systematic and controlled scientific method of collecting and analyzing numerical information. It is used to generate quantifiable data (Polit and Beck, 2012). A structured questionnaire was utilized by the researcher to quantify the knowledge of the respondents and to conduct a statistical analysis. According to Polit and Beck (2012) quantitative methods typically focus on a relatively small portion of the human experience in a single study. A quantitative method was therefore chosen by the researcher as it allows the researcher to measure and quantify respondents' knowledge with the use of statistical procedures.

- Descriptive research.

This entails making observations with the intention of describing and documenting features characteristic of naturally occurring events (Polit and Beck, 2012). The purpose of using a descriptive approach is to describe the knowledge of chronic kidney disease among University students.

- Cross sectional survey.

A survey is designed to obtain information about the prevalence, distribution and interrelations of variables within a population (Polit and Beck, 2012). As there is no study on the knowledge of chronic kidney disease among young adults in South Africa, this design will help to gather information about the understanding of the disease among young university students. Cross sectional means that data was collected at the same time from respondents.

3.4 METHODS

3.4.1 Research Setting

The study was conducted at the University of Witwatersrand, Johannesburg, South Africa. The University of the Witwatersrand has 16 residences in total which are encompassed in five divisions (i.e. East campus cluster, West campus cluster, Parktown cluster, Highfield cluster and Braamfontein Cluster). Of these 17 residences, 11 are for undergraduate students only, 2 are for postgraduate students only while the last 3 accommodate both undergraduate and postgraduate students. Of the 11 undergraduate residences, three are male only residences, five are female only residences and the rest are mixed.

Main campus and its environment has 1 male only residence and 2 female only residences while Parktown campus and its environment has 3 female only and 2 male only residence.

Based on information received from the director of residences, that students are accommodated in the residence closest to their campus of study, one male only and one female only residence were selected from both the main campus location and the Parktown campus location simultaneously. For the purpose of this study, Jubilee hall; Reith hall; Knockando hall and Men's hall were found suitable for the study as they give equal representation of the population.

Table 3.1: List of residences

	Gender	Residence
1	Male only	Res 1
2	Male only	Res 2
3	Female only	Res 3
4	Female only	Res 4

This population was selected because firstly they are in a transitional stage to adulthood and secondly they are easily accessible. Literature reviewed (Katz,et al. 2010; Katz,et al. 2011 and Naiker, et al. 2010a) shows that chronic kidney disease in SSA is prevalent among 20-50 years old. It is anecdotally believed that knowledge about one's own health at this stage may influence the choice of healthy life style later in life. With this in mind it seems appropriate to target the younger population when considering educational approaches.

3.4.2 Study Population

According to Polit and Beck (2012), population refers to the entire set of individuals or objects having some common characteristics which a researcher is interested in. In this study, the target population were undergraduate students living in the residences of the University of Witwatersrand. The University of Witwatersrand is a reputable institution which has 5 faculties and 34 schools. It is located in Johannesburg, South Africa.

A preliminary record review shows that 11 out of the 16 residences are occupied by only undergraduate students with a total population 3309 students.

The number of students in the four residences included in the study totalled 1451.

The researcher personally went to each of the residences. After confirming with the director of residences, the researcher addressed the residents to inform them of the research study. The questionnaires, information and permission documents were handed out during periods when most of the residents were present.

3.4.3 Sampling

Convenience sampling is a sampling method used to select the most readily available persons as participants in a study (Polit and Beck, 2012). A convenience sampling method was utilised in this study, with the sample being taken from two male and two female residences with average of 42 participants per residence

Following discussions with a statistician a sample size of 168 students (n=168) was decided upon to provide good representation of the total population of 1451. This ensured a power of 95% accuracy with a margin error (d) of no more than 10%.

Calculation of power in study population

N*= sample size base of population

n= sample size base knowledge from previous research = 191

N= population of students in residences = 1451

N*= n =168 N*(sample size based on population) = 168

1+ n/N

With a sample of size of only 160, power calculation was found to be 0.72 (72%)

Inclusion criteria

All males and females between the ages of 18 and 25 years of age were included in the study. Participants were living in four selected residences, one male and one female residence on Main campus and one male and one female residence on the Parktown campus. Participants who willingly agreed to participate and signed had signed a consent (Appendix G) were included.

Exclusion criteria

This study excluded undergraduate students who were not living in the residences chosen for the study. The residence used for the pilot study was not included in the main study.

3.5 PILOT TEST

A pilot study was conducted prior to the commencement of the study. A sample size of ten participants (n=10) was used. A mixed residence was used for the pilot study and the results obtained from the pilot study were not used in the main study The purpose of the pilot study was to determine the most appropriate entry point to the population and to assess whether the statements in the questionnaire were easily understandable by the study participants in the

South African setting. The internal consistency of the results of the pilot group was calculated using Cronbach alpha. The Cronbach alpha is the most frequently used method for evaluating internal consistency (Polit and Beck, 2012) and the normal range is 0.00 to 1.00. The higher the value of the calculation, the higher the internal consistency. Respondents in the pilot study did not indicate any difficulty in completing the questionnaire and reported that the questions were clear and not ambiguous.

3.6 DESCRIPTION OF THE INSTRUMENT

A research instrument is a tool or device that is used to collect data and it can be in the form of a questionnaire, test, or observation schedule (Polit and Beck, 2012). A questionnaire as defined by Polit and Beck (2012), is a document used to gather self-reported data and is usually done by self-administration. In this study, a questionnaire designed by Chow et al. (2012) to assess the knowledge of chronic kidney disease among primary care patients was used. Following the development of the tool by Chow et al. (2012) it was pre-tested and subjected to face validity and content saturation. It was further refined and reviewed by Nephrologists and Primary Care Physicians before being used in the survey.

The questionnaire used for this study consisted of 16 questions divided into three sections. Section A and B are closed ended while section C is open ended.

Section A

This section collects information about demographic variables such as age, gender, year of study, high school attended, nationality, family history of a medical condition and whether or not the participant had heard about kidney diseases. It consists of 8 questions. Section A of the tool

designed by Chow et al. (2012) was altered to reflect the South African scenario. Questions regarding schooling were directed to Government or Private education and identification of nationality was adjusted to indicate South African or Non South African citizenship.

Section B

This section is a selection of multiple choice questions regarding information about chronic kidney disease. Seven domains, namely: anatomy; physiology; aetiology; symptoms; progression; treatment and resources available for chronic kidney disease patients are dealt with by this section. Two examples of the questions with the domain are listed below. Respondents were asked to choose the best options for each question from the multiple possibilities offered.

Examples of questions

What is the function of a kidney in a human body? (Physiology)

What can cause kidney disease? (Aetiology)

Section C

This is an open ended question which is set to gather information about source of knowledge among respondents. It consists of one question only requiring a short response.

3.7 DATA COLLECTION

Data collection is a way of gathering of information to address a research problem (Polit and Beck, 2012). Data was collected over a period of one month and a response rate of 85.7% was achieved.

After receiving approval from the institution and appropriate committees, data were collected from the respondents in their residence. Respondents who met the inclusion criteria were invited to participate in the study.

Residence 1

Potential respondents were approached in groups in the dining hall during dinner. The background and purpose of the study was explained to them and thereafter they were invited to participate. Questionnaires together with a detailed information sheet and consent form were handed to voluntary participants. The questionnaires were anonymous.

Respondents were asked to drop a completed questionnaire in a survey box at the reception to be collected by the researcher later.

Residence 3

The researcher was given an opportunity to address the students living in the residence during their house meeting at the beginning of the semester. Study participants were recruited at the meeting and questionnaires together with a detailed information sheet and consent form were handed to voluntary participants. Respondents were asked to return a completed questionnaire to the reception. These were collected by the researcher.

Residence 2 and 4

These two residences shared a dining hall with another residence which made it difficult to have direct access to the occupants of the residences included in the study. However the researcher was able to make contact with the committees at a house meeting of each residence attended by the occupants. A meeting was organized between the house committee members and the researcher with the committee members agreeing to participate. They also volunteered to distribute the questionnaire to the occupants. The questionnaire was collected weekly over four weeks from the survey box placed at reception.

Sample size based on population in previous research

n= 2* (Zα/2)2 *P* (1-P) Zα/2 (two tailed) = 1.96 at 95% confidence level

d2

$$n = \frac{2*(1.96)2*0.54*0.46}{(0.1)2} = \frac{1.909}{0.01} = 191$$

Calculation of power in study population

N*= sample size base of population

n= sample size base knowledge from previous research = 191

N= population of students in residences = 1451

$$N^* = \frac{n}{1+ n/N} = 168$$

N*(sample size based on population) = 168

With a sample of size of only 160, power calculation was found to be 0.72 (72%)

3. 8 DATA ANALYSIS

The aim of data analysis is to organise, measure and extract meaningful results from the data (Polit and Beck, 2012).

The collected questionnaires were thoroughly checked for completeness before coding and placing into a Microsoft Excel spreadsheet. A total of 144 returned copies of questionnaires were coded and inputted into a password secured personal computer**.**

After data coding and loading onto the spreadsheet the data were then imported into IBM SPSS 22 for analysis. Descriptive and inferential statistics were used to obtain the results of the study.

The following statistical tests were used.

The measure of central tendency (mean, median, mode and standard deviation) was used for demographic data.

Descriptive statistics for frequency and percentage were calculated for the knowledge and source of knowledge of chronic kidney disease. In keeping with the study carried out by Chow et al. (2012), one point was allocated for each correct answer in the knowledge domain, giving a maximum possible score of 7 and a minimum of 0. Again using the study of Chow et al. (2012) a score of <4 indicates poor knowledge whilst >4 indicates good knowledge.

Fisher's exact test was used to check the significance relationship between gender, nationality, faculty, type of high school attended and knowledge of chronic kidney diseases at a 0.05 level of significance.

Multivariate logistic regression was used to test for association between age, year of study and knowledge of chronic kidney disease.

3.10 ETHICAL CONSIDERATIONS

Before conducting the study, approval was obtained in writing from the following institutions:

Permission from the authors of the questionnaire (Centre for Health Services Research, Singapore) (Appendix E).

Permission to proceed was granted by the University Post Graduate Research Committee (Appendix A).

Permission was sought and gotten from the University Human Research Ethics Committee (Medical), Johannesburg, clearance certificate number M150510 (Appendix D).

Permission was sought from the office of the registrar of the University (Appendix C).

Permission from residence manager of the University was obtained (Appendix B).

Informed consent of the participants was also obtained (Appendix G).

The researcher also ensured anonymity and confidentiality as no identification was disclosed or reported in the study. Data was inputted in a password coded computer and only the researcher and supervisor had access to the data.

3.11 SUMMARY

This chapter has explained the method used in conducting the study, the study setting and the population used as well as the sampling procedure adopted. Other information includes the descriptive process of the pilot study, data collection method, data coding, entry into Microsoft excel spread sheet and importing into IBM SPSS statistical package version 22 for analysis. The next chapter will focus on data interpretation and analysis, findings of the research will be discussed and descriptions are done in line with the research objectives.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

In the previous chapter, research methodology was discussed. This includes study design, settings, population, sample, inclusion and exclusion criteria, pilot study, description of instrument, data collection, and ethical consideration.

This chapter describes analysis and interpretation of quantitative data obtained during this study. This study investigates the knowledge and source of knowledge of chronic kidney disease among university students. A convenience sample of 168 respondents was included in the study. Data was collected with the use of a self administered questionnaire, consisting of three sections. Section A collected the demographic data of the respondents, section B consisted of knowledge of respondents on chronic kidney disease and section C captured source of knowledge among respondents. A total of 144 (n=144) respondents returned the questionnaire, four of which are blank; therefore a response rate of 85.7% was obtained, a little less than a similar survey conducted by Okaka & Ojogwu, (2012) among non-medical student who reported a response rate of 92.2%.

4.2 APPROACHES TO DATA ANALYSIS

Section one contained the demographic details. Descriptive statistics in the form of frequency, percentage, mean and standard deviation were used to discuss the demographic data of the respondents (i.e. age, gender, high school attended, nationality, year of study, the faculty of

study, personal and family history of medical condition). This information is presented in a table. The faculty of study has been represented as a pie chart. Interestingly only a small portion of students (3.47%) were from the Health Sciences Faculty.

The knowledge of the respondents in respect of chronic kidney disease is obtained from 7 multiple choice questions in Section two. Respondent's results from each question in the knowledge domain were divided into correct and incorrect responses. These responses are presented with the use of histograms. The knowledge domain score ranges from 0 - 7 and the distribution of respondents was presented with the use of a line graph. The scores were added together with a minimum score of zero and a maximum score of seven. These are further divided into good knowledge ($n \geq 4$) and poor knowledge ($n < 4$) and a frequency table was used to present the faculty of respondents and their level of knowledge. A line graph was also used to present the mean score in knowledge domain with respect to the faculty of study.

The open ended question which gathers information about the source of knowledge among respondents is also presented in the form of a histogram.

Finally the data were analysed with the use of inferential statistics. Fisher’s exact and logistic regression was used to measure the association between demographic variables and knowledge domain as well as the overall knowledge rating. Testing was done at 0.05 level of significance ($p=0.05$) with 95% confidence interval, all percentages were rounded up to one decimal place for easy presentation.

4.3 RESULTS AND FINDINGS

4.3.1 Section A: Demographic data

This section consists of the demographic data of the respondents. It has 7 questions in total: age, gender, high school attended, nationality, year of study, faculty, personal history of medical condition, and family history of medical condition. Six of the items were presented in tables while one is presented as a chart. The six items were grouped and are summarized in table.

4.1.**Table 4.1: Demographic data of respondents** (n=144)

Demographic Variables	Freq	Percent	Mean
Age			19.28 ±
18-19 Years	95	66.0	1.11
20 Years and above	49	34.0	--
			--
Gender			
Male	77	53.5	--
Female	67	46.5	--
High School Attended			
Government owned	119	82.6	--
Private owned	24	16.7	--
No response	1	0.7	--
Nationality			
South African	138	95.8	--
Non-South African	6	4.2	--
Year of Study			
Year 1	92	63.9	--
Year 2	30	20.8	--
Year 3	17	11.8	--
Year 4	5	3.5	--
Personal History Of Medical Condition			
Diabetes	3	2.1	--
Hypertension	1	0.7	--
Kidney disease	2	1.4	--
None of the above	137	95.1	--
Diabetes, Hypertension & kidney disease	1	0.7	--
Family History Of Medical Condition			
Diabetes	25	17.4	--
Hypertension	10	6.9	--
Kidney disease	4	2.8	--
None of the above	87	60.4	--
Diabetes & Hypertension	13	9.0	--
Hypertension & kidney disease	3	2.1	--
Diabetes & kidney disease	1	0.7	--
Diabetes, Hypertension & kidney disease	1	0.7	--

The demographic data presented in Table 4.1 will be explained.

The mean age of the respondents was 19.3 ±1.107 years. Sixty six percent (n=95) are between 18-19 years while 34.0% (n=49) are 20 years and above. These findings are not surprising as this is the expected age group among university students.

Gender is equally distributed as 53.5% (n=77) of the respondents are male while 46.5% (n=67) are female. This helps the researcher to maintain equity as both gender are well represented.

Eighty three percent (n=119) of the respondents went to government owned high schools with only 16.7% (n=24) having attended privately owned schools. One respondent (0.7%) gave no response. It is quite interesting that the majority of the university students went to government owned schools. This may show that the standard of education at these schools is of a level that allows movement into tertiary education.

The majority (95.8%; n=138) of the respondents are South African while 4.2% (n=6) are non South African. This is in contrast to the researchers' expectation of finding more foreign students in the residence.

The year of study showed that more than half (63.9%; n=92) of the respondents are in first year, 20.8% (n=30) are in second year, 11.8% (n=17) are in third year while 3.5% (n=5) are in fourth year. The small number of senior students may show that as students' progress in their university studies, they tend to live off campus.

The question on the personal history of any medical condition indicated that the majority (95.1%, n=137) of the respondents have no personal history of a medical condition. Just over two percent (2.1%, n=3) of the respondents have a personal history of diabetes, 0.7% (n=1) have personal history of hypertension, and 1.4% (n=2) have personal history of kidney disease. Only one individual, 0.7% (n=1) had a personal history of diabetes, hypertension and kidney disease. These findings may not reflect the true picture of the medical condition among this population because respondents are young and some of them may not know that they are at risk for one of these medical conditions. Most people will not report to clinic until the disease process affects their activities of daily living.

Results concerning the personal history of medical conditions show that 60.4% (n=87) of the respondents have no family history of a medical condition, 17.4% (n=25) of the respondents have a family history of diabetes, 6.9% (n=10) have a family history of hypertension, 9.0% (n=13) have a family history of hypertension and diabetes, 2.1% (n=3) have a family history of hypertension and kidney disease, 0.7% (n=1) have a family history of diabetes and kidney disease while 0.7% (n=1) have a family history of diabetes, hypertension and kidney disease.

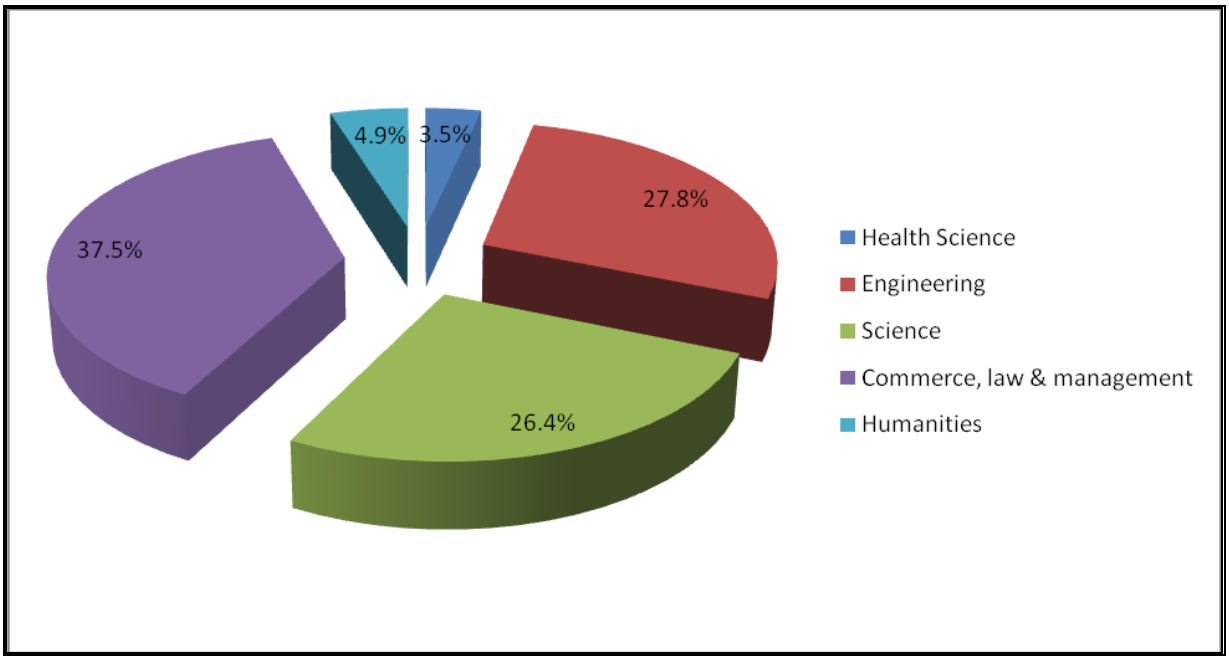

Figure 4.1: Respondents faculty of study

When analysing the faculties of study represented by the total sample (n=144), 3.47% (n=5) are in health sciences, 27.78 %(n=40) are in engineering, 26.39% (n=38) are in science, 37.50% (n=54) are in commerce, law, and management while 4.86% (n=7) are in humanities. (Figure 4.1)

4.3.2 Section B: Respondents' Knowledge of Chronic Kidney Disease

In this section, there are 7 questions directed at examining respondent's knowledge about anatomy, physiology, aetiology, symptoms, progress, treatment, and resources. Results are presented in a number of histograms.

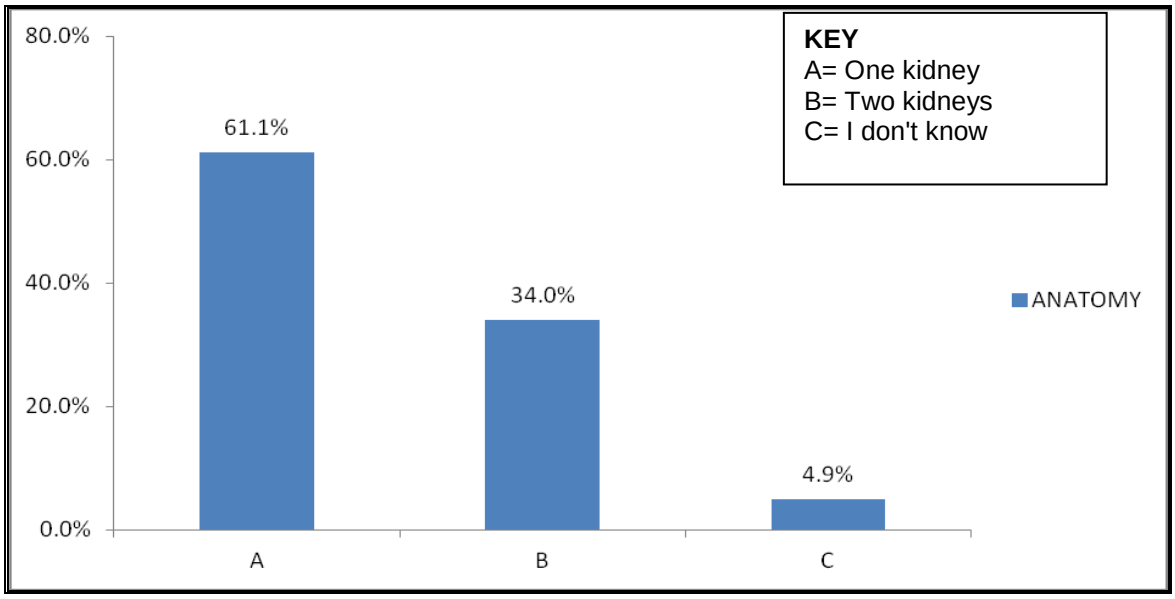

Figure 4.2: Respondents knowledge to the number of kidneys needed for normal life.

How many kidneys are needed for a normal life? (n=144)

Respondents were asked about the number of kidneys a person needs to live a normal life. Eighty eight (61.1%) respondents indicated that one healthy kidney is enough to live a normal life, 34.0% (n=49) indicated that two healthy kidneys are required to live a normal life while 4.9% (n=7) did not know. **(**Figure 4.2)

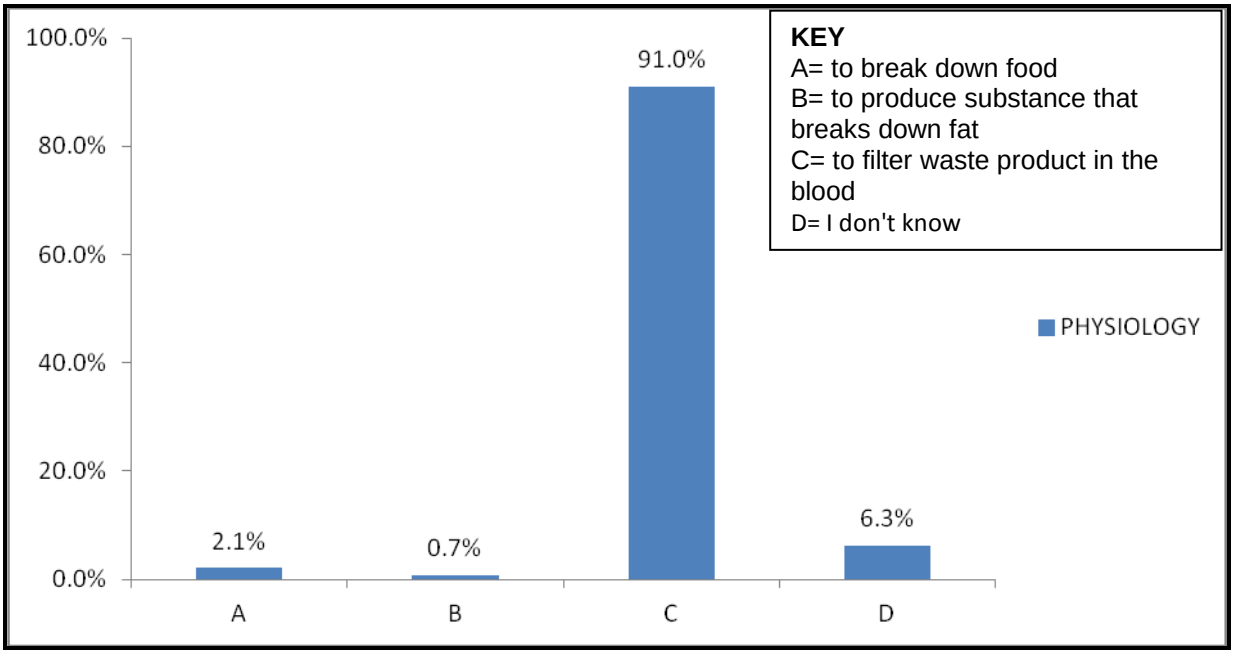

Figure 4.3: Respondents knowledge about the functions of the kidney.

What is the function of the kidneys in a human body? (n=144)

With regard to the questions on the function of kidneys in the human body, the majority (91.0%; n=131) of the respondents identified that the function of the kidney is to filter waste products in the body, 6.3% (n=9) do not know, 2.1% (n=3) indicated that its breaks down food while 0.7% (n=1) indicated that kidney helps produce substances that breakdown fat. (Figure 4.3).

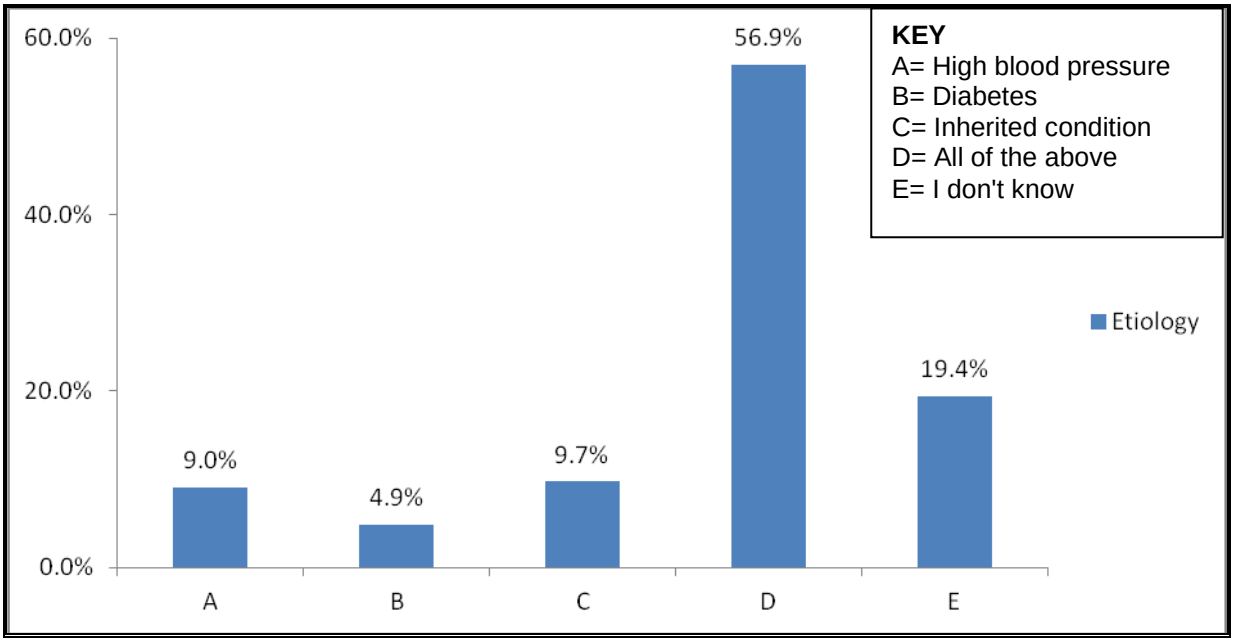

Figure 4.4: **Respondents knowledge about the cause of kidney disease**

What can cause kidney disease? (n=144)

More than half (56.9%; n=82) of the respondents indicated that chronic kidney disease can be caused by high blood pressure, diabetes and/or an inherited condition, 19.4% (n=28) of the respondents do not know the cause of chronic kidney disease, 9.7% (n=14) indicated that it can be caused by an inherited condition, 9.0% (n=13) indicated that it can be caused by high blood pressure while 4.9% (n=7) indicated that it can be caused by diabetes.(Figure 4.4)

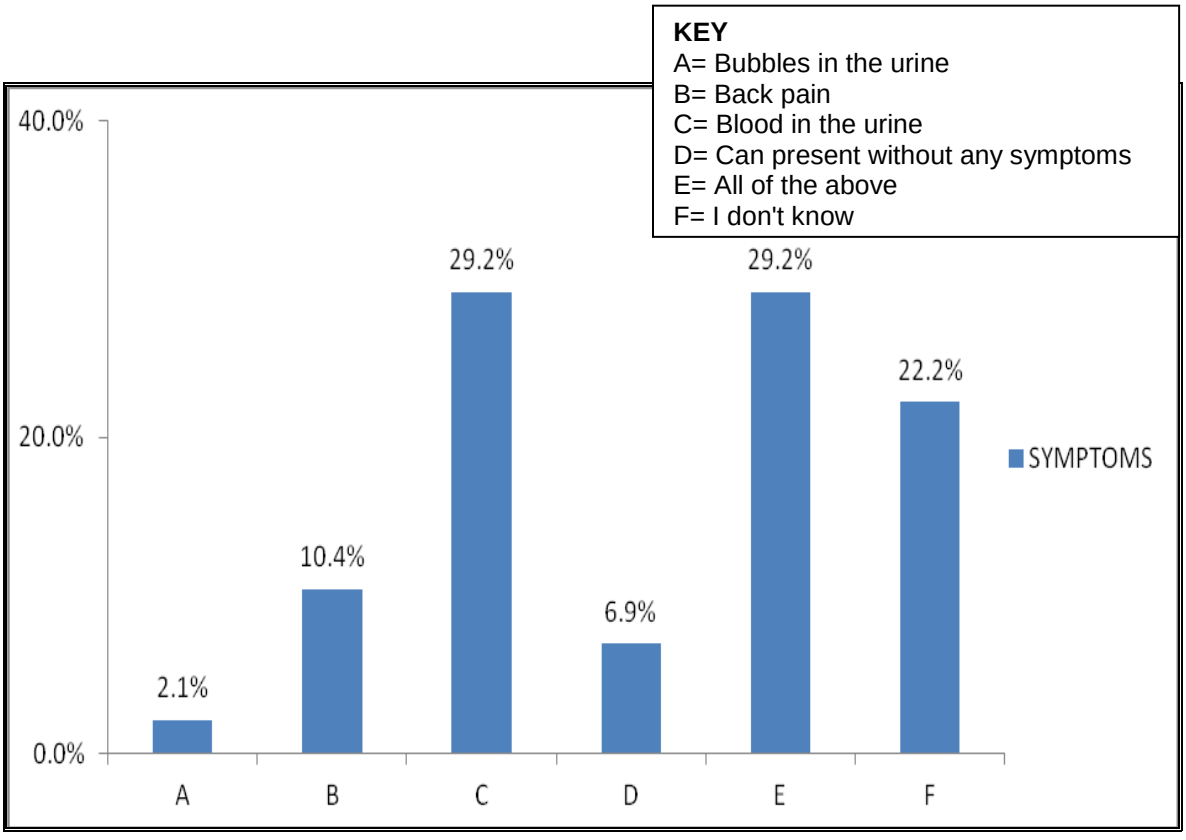

Figure 4.5: **Respondents knowledge about early symptoms of kidney disease**

What are the early symptoms? (n=144)

Respondents were asked about the early symptoms of kidney disease and results (Figure 4.5) show that 2.1% (n=3) of the respondents identified bubbles in the urine as one of the early symptoms of kidney disease that can progress to kidney failure, 6.9% (n=10) indicated that it can present without symptoms, 10.4% (n=15) indicated that it can present with back pain, 22.2% (n=32) do not know, 29.2% (n=42%) indicated that blood in the urine is an early sign. Forty two or 29.2% indicated that it can be due to all the symptoms listed.

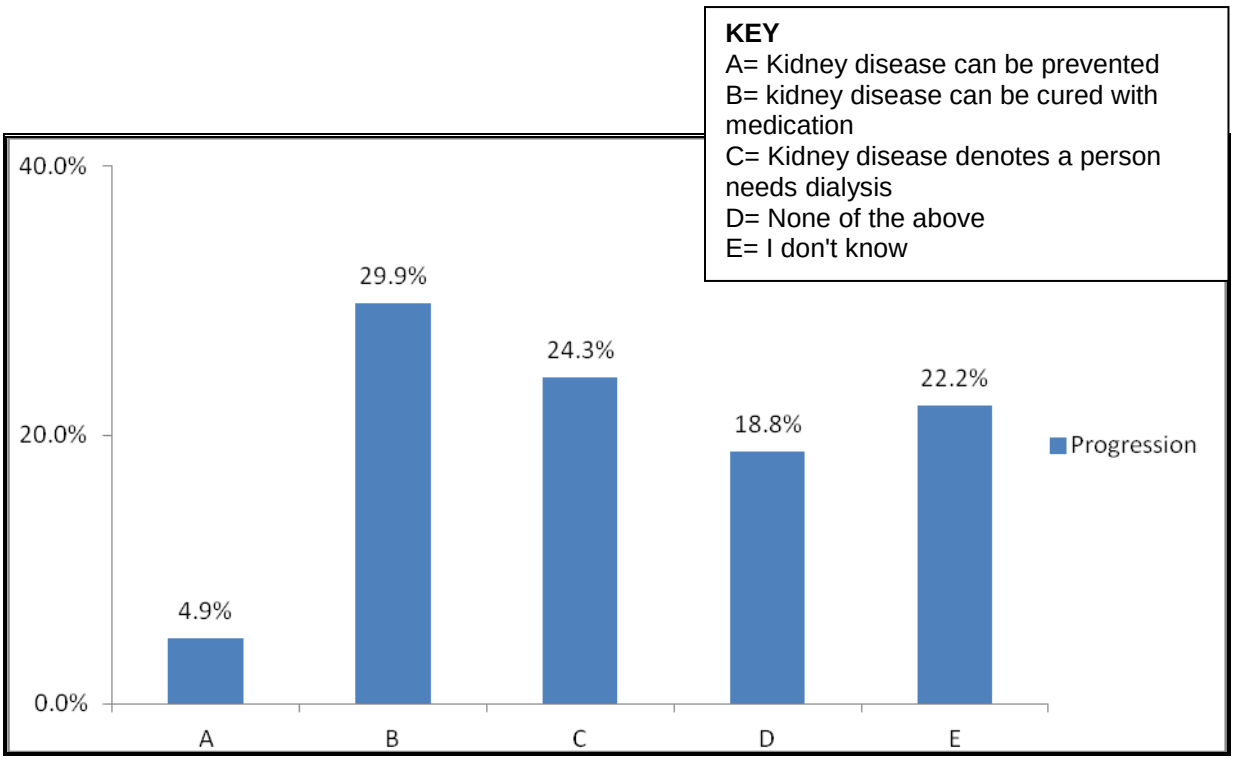

Figure 4.6: Respondents knowledge about progress of kidney disease

Progression of the disease (n=144)

Considering the progress of kidney disease, seven (4.9%) respondents indicated that kidney disease cannot be prevented, 29.9% (n=43) indicated that kidney disease cannot be cured with medication, 24.3% (n=35) indicated that a person's need for dialysis does not confirm kidney disease, 18.8% (n= 27) indicated that none of the above is correct, while 22.2% (n=32) do not know. (Figure 4.6)

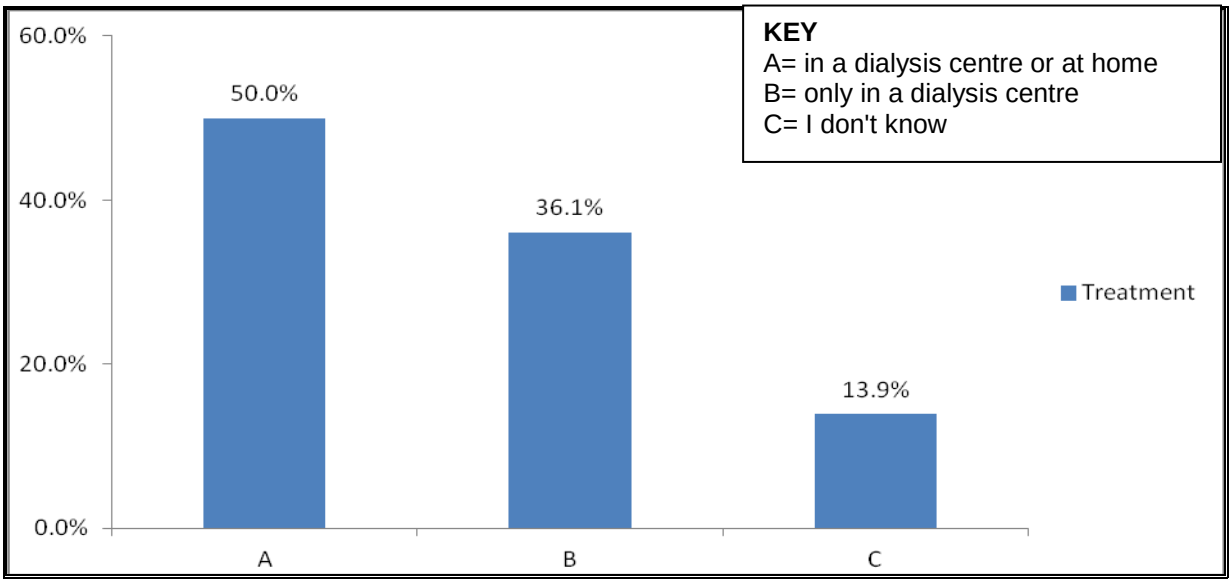

Figure 4.7: Respondents knowledge about where treatment of kidney disease is carried out.

Where is treatment for kidney disease carried out? (n=144)

Respondents were asked about where dialysis treatment can be carried out and half of the respondents (50.0%; n=72) indicated that dialysis treatment can be carried out in a dialysis

centre or at home, 36.1% (n=52) identified that it can only be done in a dialysis centre while 13.9% (n=20) do not know. (Figure 4.7)

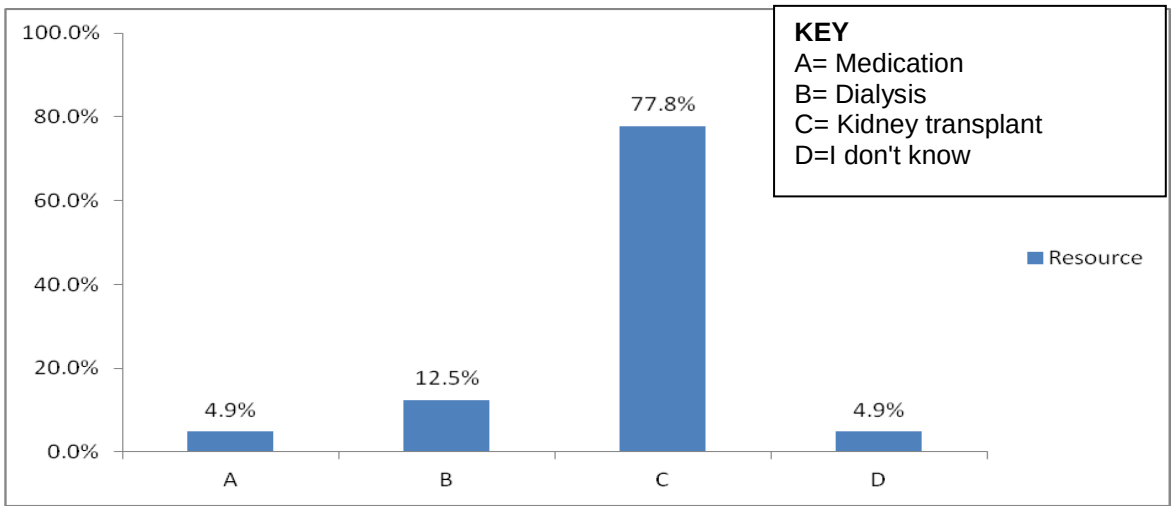

Figure 4.8: Respondents knowledge about resources available for kidney disease

The best medical treatment available for End Stage Kidney Disease (n=144)

The majority (77.8%; n=112) of the respondents identified kidney transplant as the best treatment for kidney failure, 12.5% (n=18) chose dialysis as the best treatment. Seven (4.9%) chose medication while 4.9% (n=7) do not know.(Figure 4.8).

4.3.3 Section C: Source of Knowledge

This section contains only one open ended question. The question gathers information about the respondents' source of knowledge about kidney disease and the results are presented with a histogram.

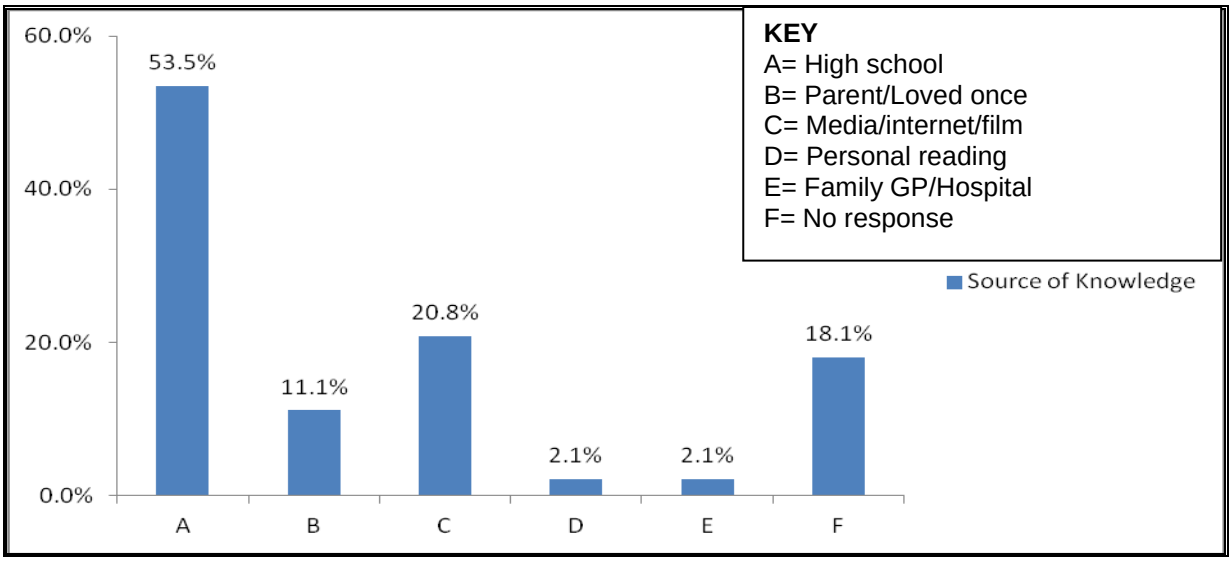

Figure 4.9: Respondents source of knowledge about kidney disease

Seventy seven (53.5%; n=77) respondents heard about kidney disease from high school, 20.8% (n=30) heard from media, internet and films, 18.1% (n=26) gave no response, 11.1% (n=16) heard from parents or loved ones, 2.1% (n=3) heard from personal reading and asking from people, while only 2.1% (n=3) heard about kidney disease from their general practitioner or hospital (Figure 4.9). The total percentage is greater than 100% as more than one source was reported by some respondents.

4.3.4 Descriptive Analysis of Quantitative Data from Section B (Knowledge)

The respondent's answers in each knowledge domain were then further coded as correct or incorrect. The percentages of the correct answers are presented in the histogram in Figure 4.10.

KEY
A= Number of kidneys
B= Functions
C= Causes
D= Symptoms
E= Progress of disease
F= Dialysis treatment
G= Medical treatment

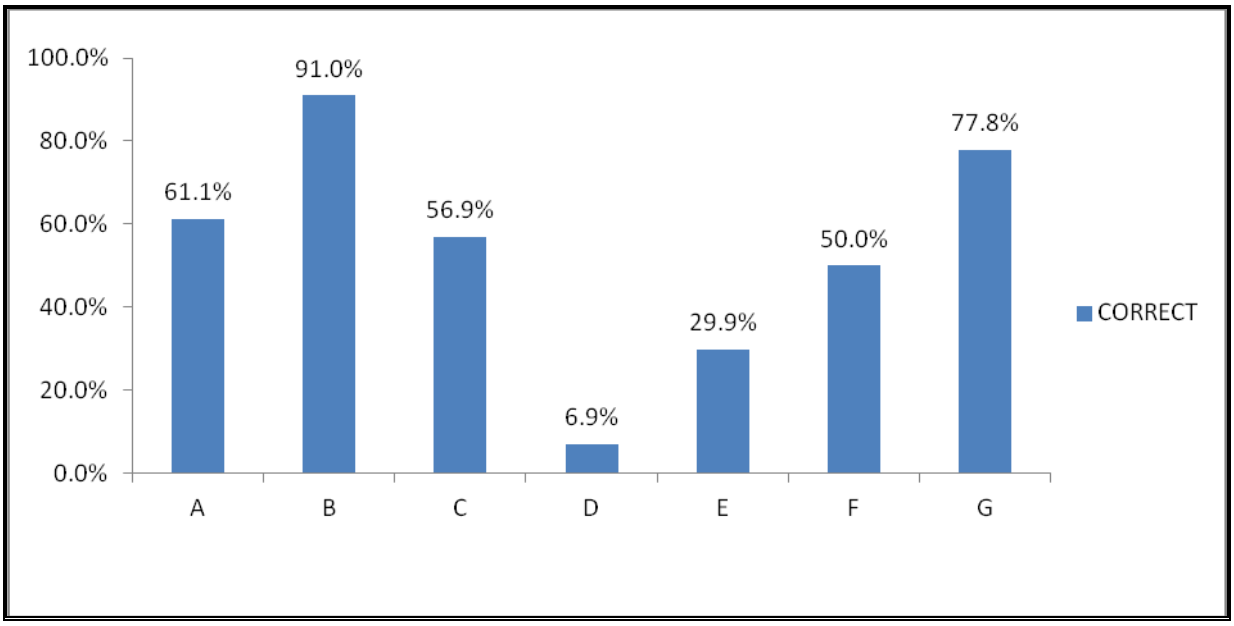

Figure 4.10: **Frequency of respondents who answered correctly**

The majority (91.0 %; n=131) of the respondents knew that the main function of the kidneys is to filter waste products in the blood. Just less than 78% (n=112) agreed that a kidney transplant was the best treatment for end stage renal failure. Sixty one percent (n=88) of the respondents knew that only one kidney is needed for a human being to live a normal life. However, only 56.9% (n=82) knew that kidney disease can be caused by hypertension, diabetes and inherited conditions. Fifty percent (n=72) knew that dialysis treatment can be carried out either at home or at a dialysis centre. A third of the respondents, 29.9% (n=43) correctly identified that CKD cannot be cured with medications but only 6.9% (n=10) knew that early kidney disease could present without any symptoms or complaints.

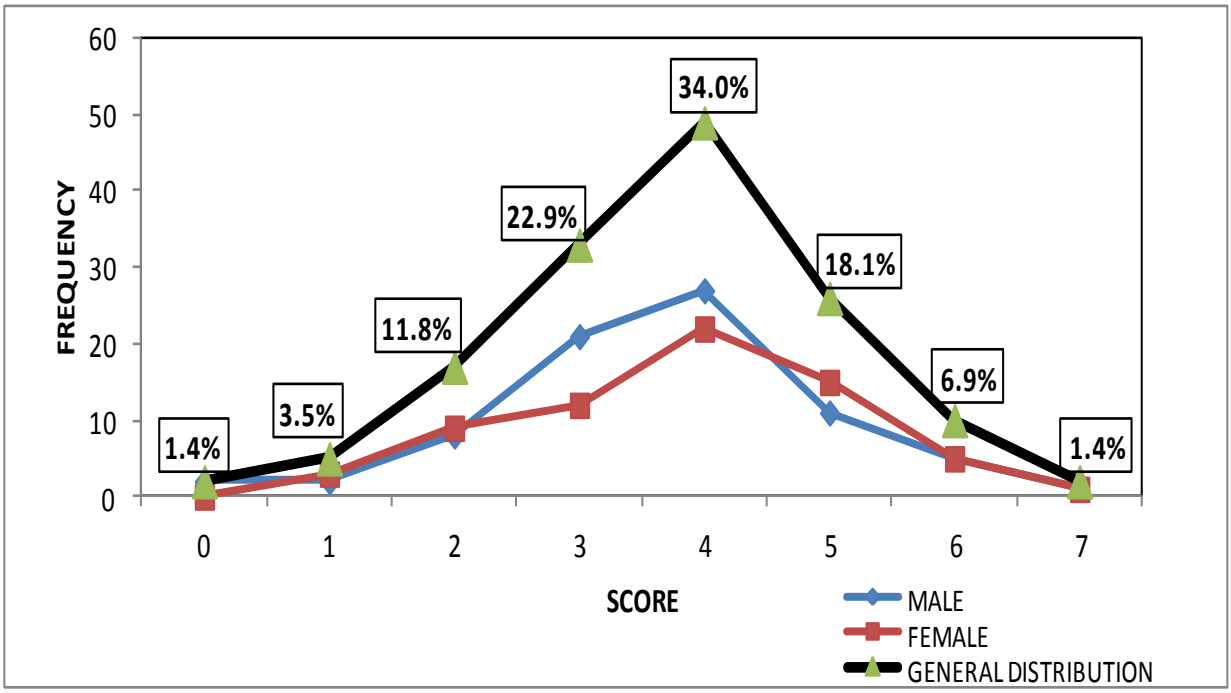

Figure 4 Error! No text of specified style in document.**.11**: **Comparison between male and female scores**

A comparison between male and female scores was considered and the general distribution of correct answers is shown in this graph. The mean score is 3.74 ± 1.33 while majority scored (mode) 4. Three quarters (75.01%; n=108) of the respondents scored between 3 and 5 points, 6.94% (n=10) and 1.39% (n=2) of the respondents scored 6 and 7 points respectively. Just over one percent (1.39%; n=2) of the respondents had no knowledge of kidney disease and coincidentally they are both male. In summary, most of the respondents (60.42%; n=87) had good knowledge (points ≥4) of chronic kidney disease while 39.59% (n=57) of the respondents had a poor knowledge of chronic kidney disease. (Figure 4.11)

In order to establish each respondent's individual knowledge the responses to the seven questions in Section B were individually totalled. A total of <4 correct indicated poor knowledge whilst >4 indicated good knowledge. These results were then grouped according to the faculty

of study in an attempt to determine whether this variable was a factor. This data is presented in Table 4.2.

Table 4.2: Respondents knowledge according to the faculty of study.

Faculty	Poor knowledge		Good knowledge	
	n	%	n	%
Health Sciences	-	-	5	100%
Science	12	31.58	26	68.42
Engineering	15	37.50	25	62.50
Commerce, Law & Management (CLM)	26	48.15	28	51.85
Humanities	4	57.14	3	42.86

All the respondents in the Faculty of Health Science scored over 4 points and thus were considered to have a good knowledge of chronic kidney disease. Many (68.42%) of the respondents in Science had good knowledge, 62.50% of the respondents in Engineering had good knowledge and half (51.85%) of the respondents in CLM had good knowledge. Only 42.86% of respondents in Humanities had a good knowledge of chronic kidney disease.

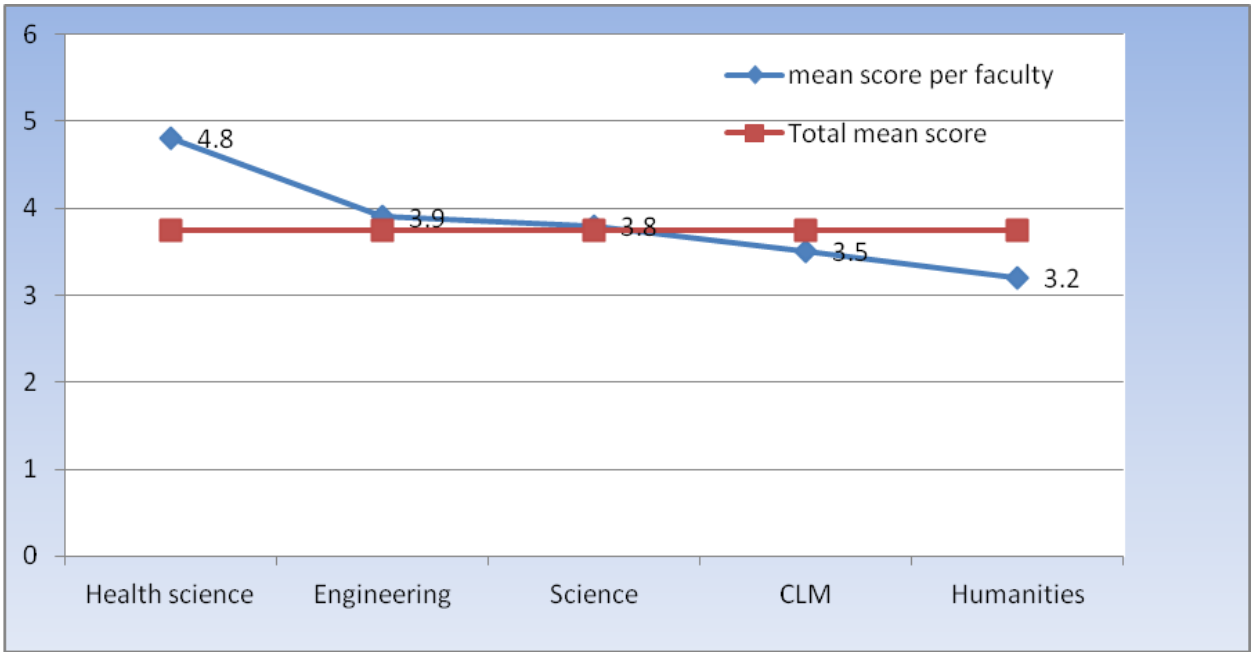

Figure 4.12: Comparison of the mean scores within different faculties

The overall mean score for the entire domain is 3.74 from a total of 7. Respondents in the Faculty of Health Science have a mean score of 4.8, Engineering, a mean score of 3.9, Science had a mean score of 3.8, Commerce, Law and Management (CLM) had a mean score of 3.5 while humanities had a mean score 3.2. Findings are displayed in Figure 4.12.

4.3.5 Inferential analysis of quantitative data

In this section, the Fisher's Exact test was used to test for significant relationship between demographic variables (i.e. age, gender, year of study, high school attended, and family history of medical condition), having heard about kidney disease and knowledge about each domain (i.e. anatomy, physiology, aetiology, symptoms, progress, treatment and resources) and the overall knowledge about kidney disease.

Data were further analysed with logistic regression to check if any of the demographic factors (i.e. gender, year of study, age, high school attended and family history of medical condition) has an influence on respondent's knowledge.

The result of inferential statistics are presented in tables below

Table 4.3: Relationship between demographic data and the domains of anatomy and physiology using Fisher's Exact Test.

	NORMAL NUMBER OF KIDNEYS		*p-value (0.05)*	***PHYSIOLOGY***		*p-value (0.05)*
	Correct	*Incorrect*		*Correct*	*incorrect*	
Age			***0.032****			0.763
18-19 years	64(67.37%)	31(32.63%)		87(91.58%)	08(8.42%)	
≥ 20 years	24(48.98%)	25(51.02)		44(89.90%)	05(10.02%)	
Gender			1.000			0.383
Male	47(61.04%)	30(38.96%)		72(93.51%)	05(6.49%)	
Female	41(61.19%)	26(38.81%)		59(88.01%)	08(11.94%)	
Year of study			***0.021****			1.000
Year 1	63(68.48%)	29(31.52%)		84(91.30%)	08(8.70%)	
Year 2 and above	25(48.08%)	27(51.98%)		47(90.39%)	05(9.62%)	
High school attended			0.113			1.000
Private owned	11(45.83%)	13(54.17%)		22(91.67%)	02(8.33%)	
Government owned	76(63.87%)	43(36.13%)		108(90.76%)	11(9.24%)	
Family history of medical condition			0.488			0.770
Yes	37 (64.91%)	20(35.09%)		55(96.49%)	02(3.51%)	
No	51(58.62%)	36(41.38%)		76 (87.36%)	11(12.64%)	
Have you heard about kidney disease			0.383			0.704
Yes	70(59.32%)	48(40.68%)		108(91.53%)	10(8.47%)	
No	18(69.23%)	08(30.77%)		23(88.46%)	03(11.54%)	

Key= * statistically significant

Results show that there is a significant relationship between age (p=0.032), year of study (p=0.021) and the anatomy domain whereas in the domain of physiology there is no significant relationship between physiology and all the demographic variables (all values p>0.05). Findings are presented in table 4.3

Table 4.4: Relationship between the demographic data and the causes and symptoms using Fisher's Exact Test.

	CAUSES		*p-value*	***SYMPTOMS***		*p-value*
	Correct	*incorrect*		*Correct*	*Incorrect*	
Age			0.483			***0.003****
18-19 years	52(54.74%)	43(45.26%)		02(2.11%)	93(97.89%)	
≥ 20 years	30(61.22%)	*19(38.78%)*		08(16.33%)	41(83.67%)	
Gender			0.400			0.106
Male	41(53.25%)	*36(46.75%)*		08(10.39%)	69(89.61%)	
Female	41(61.19%)	*26(38.81%)*		02(2.99%)	65(97.02%)	
Year of study			0.484			***0.036****
Year 1	50(54.35%)	*42(45.65%)*		03(3.26%)	89(96.74%)	
Year 2 and above	32(61.54%)	*20(38.46%)*		07(13.46%)	45(86.54%)	
High school attended			O.114			0.675
Private owned	10(41.67%)	*14(58.33%)*		02(8.33%)	22(91.67%)	
Government owned	72(60.50%)	*47(39.50%)*		08(5.75%)	111(93.28%)	
Family history of medical condition			0.611			0.517
Yes	34(59.65%)	*23(40.35%)*		05(8.77%)	52(91.23%)	
No	48(55.17%)	*39(44.83%)*		05(5.75%)	82(93.28%)	
Have you heard about kidney disease			1.000			1.000
Yes	67(56.78%)	*51(43.22%)*		08(6.78%)	110(93.22%)	
No	15(57.69%)	*11(42.31%)*		24 (7.69%)	24(92.31%)	

Key= * statistically significant

As seen in Table 4.4 the results show that there is a significant relationship between age (p=0.003), year of study (p=0.036) and the symptoms domain whereas in the domain of aetiology there is no significant relationship between aetiology and any of the demographic variables (all values p>0.05).

Table 4.5: Relationship between demographic data and the progress and treatment of chronic kidney disease using Fisher's Exact Test.

	PROGRESS		*p-value*	***TREATMENT***		*p-value*
	Correct	*Incorrect*		*Correct*	*Incorrect*	
Age *18-19 years*			0.249			0.482
≥ 20 years	25(26.32%)	70(73.68%)		45(47.37%)	50(52.63%)	
	18(36.73%)	31(63.27%)		27(55.10%)	22(44.90%)	
Gender			0.720			1.000
Male	22(28.57%)	55(71.43%)		39(50.65%)	38(49.35%)	
Female	21(31.34%)	46(68.66%)		33(49.25%)	34(50.75)	
Year of study			0.255			0.862
Year 1	24(26.09%)	68(73.91%)		45(48.91%)	47(51.09%)	
Year 2 and above	19(36.54%)	33(63.46%)		27	25(48.08%)	
High school attended			0.808			0.263
Private owned	08(33.33%)	16(66.67%)		09(37.50%)	15(62.05%)	
Government owned	35(29.41%)	84(70.59%)		62(52.10%)	57(47.90%)	
Family history of medical condition			1.000			1.000
Yes	17(29.82%)	40(70.18%)		29(50.88%)	28(49.12%)	
No	26(29.89%)	61(70.11%)		43(49.43%)	44(50.57%)	
Have you heard about kidney disease			0.240			0.516
Yes	38(32.30%)	80(67.80%)		61(51.69%)	57(48.31%)	
No	05(19.23%)	21(80.77%)		11(42.31%)	15(57.69%)	

Key= * statistically significant

The findings displayed in Table 4.5 show that there are no significant relationships between the demographic variables (age, gender, year of study, high school attended, family history of medical condition) and the respondents' knowledge of progress or the treatment domain of chronic kidney disease (all p-values are > 0.05).

Table 4.6:Relationship between demographic data and resources and total knowledge using Fisher's Exact test.

	RESOURCE		*p-value*	***SUM KNOWLEDGE***		*p-value*
	Correct	*Incorrect*		*<4*	*≥4*	
Age			1.000			0.593
18-19 years	74(77.89%)	21(22.10%)		36(37.89%)	59(62.12%)	
≥ 20 years	38(77.55%)	11(22.45%)		21(42.86%)	28(57.14%	
Gender			***0.002****			0.400
Male	52(67.53%)	25(32.47%)		33(42.86%)	44(57.14%)	
Female	60(89.55%)	07(10.45%)		24(25.82%)	43(64.18%)	
Year of study			0.210			0.287
Year 1	75(81.52%)	17(18.48%)		33(35.87%)	59(64.13%)	
Year 2 and above	37(71.15%)	15(28.85%)		24(46.15%)	28(53.85%)	
High school attended			0.786			0.113
Private owned	18(75.00%)	06(25.00%)		13(54.17%)	11(45.83%)	
Government owned	94(78.99%)	25(21.01%)		43(36.13%)	76(63.87%)	
Family history of medical condition			***0.024****			0.228
Yes	50(87.72%)	07(12.28%)		19(33.33%)	38(66.66%)	
No	62(71.26%)	25(28.74%)		38(43.68%)	49(56.32%)	
Have you heard about kidney disease			0.118			0.826
Yes	95(80.51%)	23(19.49%)		46(38.98%)	72(61.02%)	
No	17(65.38%)	09(34.62%)		11(42.31%)	14(57.69%)	

Key= * statistically significant

Table 4.6 compares the demographic data to the knowledge of resources available for treatment of chronic kidney disease as well as comparing the demographic data to the total knowledge. There is a significant relationship in both the gender (p=0.002) and the family history of medical condition components (p=0.024) in the resource domain, whereas there is no significant relationship between the demographic data and the overall knowledge about chronic kidney disease.

Table 4.7: Multivariate logistic regression comparing demographic data and good knowledge of chronic kidney disease.

	B	Sig.	Odd ratio	95% C.I.for OR	
				Lower	Upper
GENDER RECODE	0.26	0.48	1.29	0.64	2.62
YEAR	-0.75	0.03	0.47	0.24	0.91
SCHOOL	0.69	0.14	1.99	0.80	4.96
FAM HIS RECODE	-0.44	0.24	0.64	0.31	1.34
AGE	0.48	0.06	1.62	0.99	2.66

Multivariate logistic regression was performed to assess the impact of some demographic factors on the likelihood that respondents will report good knowledge about chronic kidney disease. The model contains 5 independent variables, three categorical, and two continuous variables (gender, age, year of study, gender, family history of medical condition and high school attended). As shown in the table above only one of the independent variables has a statistical contribution to the model. The only predictor of having poor knowledge of chronic kidney disease is the year of study, recording an odds ratio of 0.471(P=0.025). This indicates that with every one year increase in the years of study respondents are 0.471 more likely to have poor5 knowledge about kidney disease. Findings are displayed in table 4.7

4.4 DISCUSSION AND FINDINGS

Age and gender

In this study, two third of the respondents (65.97%) are between 18-19 years old, with a mean age of 19.28 ±1.11 while gender is almost evenly distributed among the respondents with 53.47% male and 46.53% female amounting to male/female ratio of 1.18:1. Findings from this

study show that university students in South Africa are a little bit younger with almost equal gender distribution when compared to their counterparts in the United States of America. A national survey of health assessment conducted by Primack et al. (2013) among university students in the United States of America reported a mean age of 22.1 ± 5.5 years. The majority of the respondents were female (65.7%) with a male to female ratio of 0.5:1. However, findings about gender in this study is relatively similar to a study conducted by Okaka & Ojogwu, (2012) in Nigeria where a male to female ratio of 1.6:1 was reported but the findings on age in the same study seems to be at variance with this study as a mean age of 27.8 ± 3.2 years was reported in their study. This discrepancy may be due to the fact that only third and fourth year non- medical students were included in their study.

With respect to nationality and faculty of study, a large portion of the respondents were South African (95.8%). Three faculties are well represented in the study with commerce, law, and management having the highest respondents (37.50%), followed by engineering (27.78%) and science (26.39%). Respondents from a similar survey conducted in Nigeria by Okaka & Ojogwu, (2012) were distributed between students in linguistics(34.2%), accounting (27.5%) and engineering (38.3%).

When considering personal history of the condition, most (95.14%; n=137) of the respondents had no personal history of chronic kidney disease. Only 1.39% (n=2) and 0.69% (n=1) respondents report a personal history of kidney disease and hypertension respectively. This finding is different from a telephonic survey conducted in Hong Kong by Chow et al. (2014) who examined public knowledge of chronic kidney disease. In that study 62.6% had no personal history of a medical condition, 3.7% had a personal history of kidney disease while 19.0% confirmed a history of hypertension. This discrepancy may be due to the fact that respondents

in this study were younger and may not be have been aware of any chronic diseases. Chow et al. (2014) undertook a national survey that captured a wide age range.

Considering a family history of medical conditions, 39.58% (n=57) of the respondents had one or more family member with a history of a medical condition, diabetes being the most commonly reported (17.36%; n=25) while 60.4% (n=87) indicated no family history of any medical condition. Thus our findings show that about two thirds of the respondents have no family history of any medical condition. This differs from the result of a survey conducted in Hong Kong by Chow et al. (2014) where hypertension (42.8%) was the most reported family medical condition and 34.5% (n=178) having no family history of medical condition at all.

With respect to question on anatomy 61.11% (n=88) of the respondents indicated that one kidney is needed to live a normal life, which means that about two thirds of the respondents in this study have good knowledge about renal anatomy. However, these findings are not in line with the results of similar studies conducted in Singapore and Hong Kong where 40.8 % (Chow et al., 2012), and 27.9% (Chow et al., 2014) of the respondents indicated that one kidney is needed to live a normal life.

With respect to question on physiology, the majority (90.97%; n=131) of the respondents knew that the primary function of a kidney is to filter waste product. The result of this study is consistent with similar studies in Singapore and Hong Kong where 82.4% (Chow et al., 2012), and 84.7% (Chow et al., 2014) indicated that the function of the kidney is to filter waste products in the blood. Also, a recent study conducted in Nigeria reported a good level of knowledge about the function of kidney as 94.6% of the respondents indicated that the function of a kidney is to form urine while 90.4% of the respondents indicated that the function of the kidney is to filter waste product (Akpan & Ekrikpo, 2015).

Considering the aetiology**,** 56.94% (n=82) of the respondents knew that kidney disease can be caused by hypertension, diabetes and inherited conditions, while 9.0%, 4.9% and 9.7% of the respondents choose hypertension, diabetes and inherited condition respectively. The findings in this study are consistent with a similar study that was conducted in Singapore where 51.2% knew that kidney disease can be caused by hypertension, diabetes and inherited conditions (Chow et al., 2012). Furthermore, respondents in a recent study conducted by Akpan and Ekrikpo, (2015) indicated that hypertension(38.9%) and diabetes(46.9%) can cause kidney disease but questions about the causes of kidney disease are asked separately in their study as compared to this study where the causes are listed and respondents are asked to choose one.

With respect to question on symptoms**,** only 6.94% (n=10) of the respondents indicated that kidney disease can present without any symptoms or complaint. This implies that the majority of the respondents are not aware of the silent nature of chronic kidney disease. However, a similar study in Singapore reports a poor knowledge of symptoms of chronic kidney disease as only 4.5% knew that early kidney disease could present without any symptoms or complaints(Chow et al., 2012) whilst 17.8% of the respondents who participated in the Hong Kong study reported that kidney disease could present without any symptoms or complaints (Chow et al., 2014). This shows that despite the poor knowledge about the symptoms of chronic kidney across the board, respondents in the study conducted in Hong Kong seem to be more knowledgeable in this aspect when compared to this study.

Just less than a third (29.89%; n=43) knew that kidney disease could not be cured with medication. This is much lower in the Singapore study as 19.4% correctly identified that chronic kidney disease cannot be cured with medications (Chow et al., 2012). Surprisingly, 48% of

respondents in a study conducted in Nigeria by Akpan and Ekrikpo, (2015) believe in the use of alternative medical practice to treat kidney disease.

Knowledge pertaining to treatment differed to the published results. Half of the respondents (50.00%; n=72) reported that dialysis can be carried out in a dialysis centre or at home. However, a much higher percentage (61.7%) of respondents in a Singapore study knew this information (Chow et al., 2012). Only 37% of the respondents in a study conducted in Nigeria were aware of dialysis as a means of renal replacement therapy (Okaka & Ojogwu, 2012).

When considering the question on the best options for treatment of end stage renal disease 77.78% (n=112) knew that kidney transplant is the best treatment while 79.4% of respondents who participated in the Singapore study knew that kidney transplant is the best treatment for end stage renal failure (Chow et al., 2012). Most (89%) of the respondents in the study in Nigeria were aware of kidney transplant as a means of renal replacement therapy (Okaka & Ojogwu, 2012) but their preference for kidney transplant as the best treatment is not known.

The source of knowledge was varied with about half (53.5%) of the respondents learning about chronic kidney disease in high school while 18.1% had not heard of it before. No similar study about the source of knowledge was found from the developed world. Doctors and media top the source of knowledge among respondents in a study conducted by Akpan & Ekrikpo, (2015) in Nigeria while information from schools scored the least as only 3.9% of the respondents identify school as their source of knowledge about chronic kidney disease.

Most respondents in this study demonstrate good knowledge of chronic kidney disease but knowledge about some domains is still lacking especially symptoms of kidney disease. Results of a study conducted in the United States of America by Wright et al., (2012) shows limited

knowledge as over a third do not know that kidney makes urine and only 22% correctly identified that kidney disease may present without any symptoms.

Respondents in an Iranian study that was conducted by Roomizadeh, Taheri, Abedini, Mortazavi, Larry, Mehdikhani, Mousavi, Hosseini, Parnia and Nakhjavani. (2014), demonstrates poor knowledge of asymptomatic nature of chronic kidney disease as only 10% of the respondents identified that chronic kidney disease can occur without symptoms. In order to prevent CKD occurrence, Khalil and Abdalrahim, (2014) stated that there is a need to "gain knowledge about the kidney and its physiology, signs and symptoms, and risk factors".

4.5 SUMMARY

This chapter discussed the descriptive and inferential statistics used to describe and analyze the data collected. The data and interpretation were presented in the form of Pie charts, bar graphs, line graph, and tables.

Overall, there was a response rate of 85.7% with 60.4% (n=87) of the respondents demonstrating good knowledge about kidney disease. The results were first presented in frequency and percentages and discussed accordingly. A descriptive analysis was further used to discuss the respondents who answered correctly in each domain, total mean score, and range of score as well as knowledge level with regards to faculty.

Inferential statistics was used to test for significant relationship between demographic variable (age, gender, year of study, high school attended, family history of medical condition, and having heard about kidney diseases) and each domain and overall knowledge.

The following chapter will present a summary of the study, the main findings and discussions, conclusion and recommendations.

CHAPTER FIVE

SUMMARY, DISCUSSION OF RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 INTRODUCTION

In the previous chapter, the data obtained from each section of the returned questionnaire was statistically analyzed and presented in graph, figures, and tabular formats.

This final chapter will present the summary of the study, discussion research findings based on the research results obtained from the previous chapter. This is followed by the limitations of the study, recommendations, and conclusion.

5.2 SUMMARY OF THE STUDY

Globally, chronic kidney disease has been identified as a public health problem that needs urgent attention, and in the developed world like, Europe and the US, kidney disease occurs in their 60s, but in sub Saharan Africa it occurs at a much younger age, and this greatly affects the economically productive young adult.

The importance of prevention by improving public awareness has been emphasized by various researchers but programs directed at preventing kidney disease are not on the health agenda of many countries and this is particularly true of Africa. Education to improve knowledge plays an important role in chronic kidney disease prevention but it is difficult to plan an intervention program without first assessing the basic knowledge gaps.

In order to understand the knowledge gap, this study was therefore focused on describing the knowledge of university students with regards to chronic kidney disease and their source of knowledge. It is important to understand the source of knowledge as this serve as the entry point for strengthening public knowledge about chronic kidney disease.

5.2.1 Purpose of the study

The main purpose of this study was to assess knowledge of university students regarding chronic kidney disease. If younger patients are well informed about kidney disease, they may be able to identify their risk potential and those who are at risk could put measures in place to reduce the risk.

5.2.2 Objectives of the study

This study was directed by its objectives, as specified in chapter 1. For ease of reading they are repeated here.

The objectives of this study were:

- To investigate the knowledge of university students regarding chronic kidney disease using a self administered questionnaire.
- To determine the source of knowledge of chronic kidney disease among university students using a self administered questionnaire.

A pilot study which consisted of 10 respondents was conducted prior to the main study to examine the suitability of the data collection instrument, the internal consistency, and ambiguity in the questions. Following consultation with a statistician a sample size of 168 was agreed upon. This was to ensure a Confidence Interval of 95% accuracy to achieve ($p<0.05$) testing.

Convenience sampling was used to recruit respondents and data was collected over a period of two months (July - August, 2015).

To meet the study objectives, a non experimental, quantitative, descriptive, cross sectional survey approach was used. The instrument used for data collection was adapted - from the study conducted by Chow et al., (2012) in Singapore. The questionnaire contained three sections: section one gathers demographic information about respondents, section two is divided into 7 domains (anatomy; physiology; aetiology; symptoms; progression; treatment and resource available), section three is an open ended question which asked respondents about their source of knowledge.

Descriptive and inferential statistics were used to analyze the data with the assistance of a statistician. Results were presented in figures, charts, and tables.

5.3 FINDINGS

Objective 1

The first objective is to investigate the knowledge of university students regarding chronic kidney disease using a self-administered questionnaire.

Of the seven domains covered in the study, physiology had the highest percentage of correct response, followed by resource, anatomy, aetiology, treatment, progress, and symptoms.

Three quarters (75.0%; n=108) scored between 3 and 5 while more than half (60.4%) had good knowledge about kidney disease (≥ 4). These results are a little better than the findings of Chow et al. (2012) where 63.5% of the respondents scored between 3 and 5 with 55% demonstrating good knowledge (≥ 4). However, a study conducted in Nigeria by Okaka and Ojogwu, (2012)

among 3rd and 4th year students of a public university in Nigeria revealed that knowledge of kidney disease among university students was relatively poor with 25.1%, 35.3% and 39.7% of the respondents having good knowledge, some knowledge and poor knowledge respectively.

Age, gender, high school attended and family history of medical condition had no significant relationship to the overall knowledge of CKD. This result is similar to the findings of Roomizadeh et al. (2014) where no significant relationship was found between socio-demographic data and knowledge of chronic kidney disease. However, the results of Chow et al., (2012) show a significant relationship between demographic variables and knowledge of kidney disease.

Age and year of study was significantly associated with anatomy and symptoms while gender and family history of medical condition has a significant relationship with resource.

A further analysis was done using logistic regression to assess the effect of a number of factors on respondents knowledge on CKD (<4 = poor knowledge; ≥ 4 = good knowledge). The model contains five independent variable, (three categorical and two continuous). The year of study was found to have a significant relationship with knowledge domain; it indicates that with an increase in the year of study, respondents are 0.471 more likely to demonstrate poor knowledge about kidney disease. In a study conducted by Akpan and Ekrikpo, (2015), the relationship between educational status and knowledge of kidney disease was examined and results showed that most of the well educated respondents believed that kidney disease can be caused by hypertension, diabetes, familial cause , diarrhoea and fake drugs but surprisingly they also identify wrong doing as a cause of kidney disease which reveals some level of poor knowledge about the disease condition.

To summarise, the results show that three quarters of the respondents had a good knowledge of kidney disease. The demographic data showed no relationship whatsoever. There was some indication that the longer the participant was at university, the less the participant knew about

CKD. This was more evident in students who were not studying in the Health Sciences. This may have been because the respondents were more focused on their area of study and less on the general knowledge obtained.

Objective 2

The second objective was set to determine the source of knowledge of chronic kidney disease among university students using self administered questionnaire.

About half (53.47%, n=77) of the respondents report that they had heard about kidney disease in high school, about one fifth (20.83%, n=30) of the respondents reported to have heard about kidney disease from the media, internet and film. Only 2.08% (n=3) of the respondents reports to have heard about kidney disease from family, a general practitioner or a hospital. These findings are quite different from the results of a survey conducted by Akpan and Ekrikpo, (2015), where the respondents sources of knowledge about kidney disease were identified as doctors (29.4%), nurses (10.9%), friends (14.6%), media (28.9%), relatives (13.0%) and school (3,9%).

The findings from this study show:

A good percentage (60.42%) of the respondents demonstrate a good overall knowledge of chronic kidney disease (mean score ≥4).

Respondents appeared to have poor knowledge about symptoms of chronic kidney disease with majority unable to identify the silent nature of the presentation of chronic kidney disease. This may indicate that the majority of the respondents would not seek assistance fo renal care until symptoms are present and the condition more advanced. This was supported by Khalil and Abdalrahim (2014), who stated that "wrong

assumption about CKD risk factors, sign and symptoms, disease stage and related management plan" may account for reasons why patients present late for medical care.

Unfortunately the presence of family history of a medical condition had no effect on knowledge about kidney disease. This is a concern as there may be a familial link in certain conditions such as hypertension.

High school tends to be the major source of knowledge of respondents with very few (2.1%; n=3) reporting family, doctor, or hospital visit as their source of knowledge.

There appears to be a breach in health literacy from high school to university as no respondents' reported to have learnt about kidney disease whilst at university.

There appears to be a relationship between poor knowledge and increase in year of study. As respondents move from one level to another they are likely to report poor knowledge of kidney disease possibly because it was not seen as important in the field of study.

This study has made some progress in establishing the current status of knowledge and source of knowledge of chronic kidney disease among university students. The above findings have been able to identify the knowledge gap as well as areas of misconception and the immediate need for an ongoing public health education program most especially to tackle the area of knowledge deficit with the aim of early detection and early treatment thereby reducing the overall burden of disease.

5.4 LIMITATIONS OF THE STUDY

The following were the limitations acknowledged by the researcher in this study:

- Some residences were quite difficult to access and this had a significant effect on the response rate.
- The study was conducted in a single institution and convenience sampling method was used by the researcher. This may generate some bias in the result.
- As stated earlier, this study only reflects knowledge of kidney disease in a single institution, having more international students in the study would have generated a broader picture of knowledge of kidney disease in Africa. The researcher initially believed that students living in residences were more likely to be international students. This was not the case.
- The use of a self-administered questionnaire for data collection may have some inherent limitations, i.e. respondents may misunderstand questions, or they may choose any option that seems familiar which might not be a true reflection of their knowledge.
- The questionnaire used in this study does not assess lifestyle of respondents, for example unhealthy lifestyles can predispose individuals to chronic diseases which can further leads to kidney failure and knowledge about a disease condition may not necessarily influence healthy lifestyle practice.

With reference to the above mentioned limitations, it is difficult to generalize the findings from the current research. However, replica studies may be conducted in a national survey to complement or contrast these findings.

5.5 RECOMMENDATIONS FROM THE STUDY

Findings from this study has identified the knowledge gap and the need to create more awareness, therefore the recommendations for this study were based on Improving nursing practice, development of policy and the need for further research.

5.5.1 Recommendations for Nursing Practice

The following recommendations are made for nursing practice

- As this study reveals that only 2.1% (n=3) of the respondents reported to have heard about kidney disease from hospital, family or GP it signifies the need for more nurses to be trained and positioned in a variety of healthcare settings to identify and screen individuals at high risk and provide education, early management, and referral.

- As the incidence of CKD is on the increase, there is need to put in place a national screening program and population based educational program to enlighten people and influence people's attitude towards routine check-up and follow up.

- It is recommended that a nurse driven intervention program that will focus on health promotion, health education, early screening, and management of kidney diseases be taken to institutions such as the banking industry, higher education, construction companies, mining industries etc.

5.5.2 Recommendations for Policy Development

- The second Thursday of March each year has been dedicated to world kidney day and it is usually focused on protection of kidneys, prevention of kidney disease, early detection and awareness of kidney diseases. It is recommended that world kidney day be celebrated by using the opportunity to direct education by nephrology nurses towards

people at risk with the aim of creating awareness, carrying out screening and referral to treatment facilities.

- Apart from the world kidney day, there is need for a national screening program for CKD, for example a national program that supports screening and promotes public awareness of kidney disease. A screening program like kidney Early Evaluation Program (KEEP) can be adopted and refined to suit the South African context.
- It is recommended that a policy be put in place where all chronic medical conditions like hypertension, diabetes, and HIV/AIDS are reviewed in a single clinic. Katz et al. (2010), proposed the need to involve primary care nurses at grass roots in the screening and prevention of CKD. Such a program should not be established as a stand-alone program but rather integrated into the primary healthcare management of other chronic illnesses.

5.5.3 Recommendations for Further Research

The following recommendations are made for nursing research:

- From the literature review, there has been limited studies done on knowledge of chronic kidney disease especially among the population at risk in sub Saharan Africa and no study was found within the South African context. Therefore it is recommended that further research on this topic should be undertaken in a broader population.
- There seems to be an urgent need to develop and validate a comprehensive data collecting instrument about knowledge of CKD in order to better assess the actual knowledge level in the general public and formulate educational programs based on the gaps identified.
- Khalil and Abdalrahim (2014), stated that knowledge about a disease condition may help in the choosing and implementing of healthy behaviour that will lead to a desirable outcome. Therefore, it is recommended that research be conducted on unhealthy

lifestyles and behaviours that may predispose individuals to renal failure and also identify interventions that might improve the knowledge of CKD especially among those who are at risk of developing CKD.

5.6 CONCLUSION

This chapter concludes the research report. This study reveals that university students possess some level of knowledge about chronic kidney disease and their most identified source of knowledge is from high school. The findings of the present study unravel the knowledge of CKD among university students, knowledge gap, and the need to develop educational program in order to tackle the area with poor knowledge.

This chapter provided a summary of the study, a presentation of the main findings of the study, limitations of the study, recommendations, and conclusion.

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LIST OF APPENDICES

APPENDIX A

UNIVERSITY OF THE
WITWATERSRAND
JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Ms Thokozile Nhlapo
E-mail: thokozile.nhlapo@wits.ac.za

08 June 2015
Person No: 791401
PAG

Mr SB Ogundele
Po Box 135
Nigeria

Dear Mr Ogundele

Master of Science in Nursing: Approval of Title

We have pleasure in advising that your proposal entitled *Knowledge of chronic kidney disease among University students* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

APPENDIX B



Samuel Ogundele <791401@students.wits.ac.za>

Research in Residences - July/August 2015

Robert Sharman <Robert.Sharman@wits.ac.za> 29 June 2015 at 10:27
To: Doreen Musemwa <Doreen.Musemwa@wits.ac.za>, Lydia Sekati <Lydia.Sekati@wits.ac.za>, Nazime Randera <Nazime.Randera@wits.ac.za>
Cc: "791401@students.wits.ac.za" <791401@students.wits.ac.za>, Yvonne Matimba <Yvonne.Matimba@wits.ac.za>

Dear Colleagues

I have granted permission for a Masters student in Nursing to conduct interviews regarding health awareness in the following residences during July/August 2015:

Jubilee Hall

Reith Hall

Knockando Halls (Lighton & Williams)

Men's Halls (College & Dalrymple)

Please assist Mr Samuel Ogundele (791401) to access the residences and to interview students.

Many thanks,

Robert V
Sharman

Robert V Sharman
Director
Campus Housing & Residence Life
T +27 (0)11 717 5010 / 12
F +27 (0)11 717 5011
E robert.sharman@wits.ac.za
W www.wits.ac.za

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

APPENDIX C

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

OFFICE OF THE REGISTRAR

TO WHOM IT MAY CONCERN

"Knowledge of Chronic Kidney Disease among University Students"

It is hereby confirmed that the enclosed research material has been distributed in accordance with the University's approval procedures for such a project. Please be advised that it is your right to withdraw from participating in the process if you find the contents intrusive, too time-consuming, or inappropriate. The necessary ethical clearance has been obtained.

Should the University's internal mailing system be the mechanism whereby this questionnaire has been distributed, this notice serves as proof that permission to use it has been granted.

Students conducting surveys must seek permission in advance from Heads of Schools or individual academics concerned should surveys be conducted during teaching time.

Carol Crosley
University Registrar
15th July 2015

Private Bag 3, WITS 2050, South Africa | **T:** +27 11 717 1201/2 | **F:** +27 11 717 1217 | **E:** registrar@wits.ac.za

APPENDIX D

R14/49 Samuel Babajide Ogundele

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M150510

NAME: (Principal Investigator)	Samuel Babajide Ogundele
DEPARTMENT:	Nursing Education University of the Witwatersrand Student Residences
PROJECT TITLE:	Knowledge of Chronic Kidney Disease Among University Students
DATE CONSIDERED:	29 May 2015
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	A Hayward
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	17/07/2015

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature _____ Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX E

Permission

Inbox

Sat, Aug 9, 2014 at 12:11 PM

Samuel Jide

<tosley2000@gmail.com>
To: wailengc@gmail.com
Reply | Reply to all | Forward | Print | Delete | Show original

Good day
My name is Samuel, a masters student at wits university, Johannesburg, South Africa. Am currently rounding up my coursework and preparing for my research. I Am working on Knowledge of Chronic Kidney Disease among university students in which ì found your article so useful "Limited Knowledge of chronic kidney disease among primary care patient"
Ì want to seek permission to use the second domain of your questionnaire in my study.
Thank you in anticipation for a favorable reply.

Regards,
Samuel.

Thu, Aug 14, 2014 at 8:27 AM

Wai Leng

<wailengc@gmail.com>
To: Samuel Jide <tosley2000@gmail.com>
Reply | Reply to all | Forward | Print | Delete | Show original

Dear Samuel,

All the coauthors have no objections to your request to use our questionnaire.

Kindly acknowledge and cite the paper in all your publications.

All the best in your study!

Regards,
WaiLeng

Sent from my iPhone
- Show quoted text -

APPENDIX F

KNOWLEDGE OF CHRONIC KIDNEY DISEASE AMONG UNIVERSITY STUDENTS
INFORMATION LETTER

My name is Samuel Ogundele. I am a postgraduate student at university of Witwatersrand, in the Department of Nursing Education. I am registered for the degree of Master of Science in Nursing (Nephrology Nursing). I wish to conduct research on Knowledge of chronic kidney disease among University Students which is part of the requirement for the award of the degree. The title of the study is: "*Knowledge of Chronic Kidney Disease among university students".*

A self-administered questionnaire with three sections will be used. The first section will collect demographic data, whereas the second and third sections will explore your knowledge and source of knowledge about chronic kidney disease

I invite you to participate in the study. You will be asked to sign an informed consent. Participation is voluntary and you may choose not to participate or to withdraw from the study at any time, without any penalties.

Anonymity and confidentiality will be ensured and your identification will not be disclosed or reported in the study. You will derive no direct benefit from participating in the study. The result of this study will be kept confidential. I hope that the results of the study will provide valuable information about your understanding of the disease and can be use for planning and implementation of educational programs. There is no risk involve in the study.

The Human Research and Ethics Committee and Postgraduate Committee of the University of the Witwatersrand have approved the study.

Thank you for taking time to read this information letter. Should you require any further information regarding the study or your rights as a study participant, please contact me in the Department of Nursing Education or on the following telephone number: 0616498988 or email me using the following address: tosley2000@gmail.com.

Yours Faithfully,

Samuel Ogundele,
Msc Nursing Student (0616498988)

Supervisor: A. Hayward
011 488 4271

APPENDIX G

KNOWLEDGE OF CHRONIC KIDNEY DISEASE AMONG UNIVERSITY STUDENTS

CONSENT FORM

I hereby confirm that I have been satisfactorily informed by the researcher, Samuel B. Ogundele, about the nature of his study entitled “Knowledge of chronic kidney disease among university students.”

I have received, read and understood the written information sheet regarding the study.

I am also aware that the results of the study, including personal details and my level of knowledge and understanding about chronic kidney disease will be anonymously processed into a study report and all information will remain confidential and there will be no penalty or loss of benefits resulting from my responses or participation.

I may, at any stage, without prejudice, withdraw consent and participation in the study and there will be no penalty or loss of benefits to my withdrawal.

I have had sufficient opportunity to ask questions and, of my own free will, am prepared to participate in the study.

……..... ……
Participant Signature Date

……..... ……
Researchers Signature Date

Supervisor: A. Hayward
011 488 4271

For any ethical clarification regarding this study, please contact any of the following people

Prof. Cleaton Jones
Chairman HREC (medical)
(011 717 2301)

Ms Zanele Ndlovu
(011 717 1253)

Mr Langutani Masingi
(011 717 2656)

APPENDIX H

KNOWLEDGE OF CHRONIC KIDNEY DISEASE AMONG UNIVERSITY STUDENTS QUESTIONNAIRE

SECTION A

Demographic data

Please tick/fill the best option for each of the following questions.

1. **Age** ☐

2. **Sex** Male ☐ Female ☐

3. High School Attended Government owned ☐ Private owned ☐

4. Nationality South African citizen ☐ Non South African citizen ☐

5. Year of study ☐

6. Faculty ☐

7. Personal history of medical condition

Diabetes mellitus ☐ Hypertension ☐

Kidney disease ☐ none of the above ☐

8. Family history of medical condition

Diabetes mellitus ☐ Hypertension ☐

Kidney disease ☐ none of the above ☐

SECTION B

Questions on chronic kidney disease

Please tick the best option for each of the following questions.

9. How many healthy kidney(s) does a person need to live a normal life?

1. One
2. Two
3. I don't know.

10. What is the function of a kidney in a human body?

1. To break down food.
2. To produce substances that break down fats.
3. To filter waste products in the blood.
4. I don't know.

11. What can cause kidney disease?

1. High blood pressure
2. Diabetes
3. Inherited condition
4. All of the above
5. I don't know

12. What are the symptoms of early kidney disease that might progress to kidney failure?

1. Bubbles in the urine
2. Back pain
3. Blood in the urine
4. Can present without any symptoms/ complaints
5. All of the above
6. I don't know

13. Which of the following statement about kidney disease is INCORRECT?

1. Kidney disease can be prevented.
2. Kidney disease can be cured with medications.
3. A person is said to have kidney disease when he/she needs dialysis.
4. None of the above
5. I don’t know

14. Where can dialysis treatment be carried out?

1. In a dialysis centre or at home.
2. Only in a dialysis centre.
3. Only at home.
4. I don’t know.

15. What is the best medical treatment for End Stage Kidney Failure?

1. Medication.
2. Dialysis.
3. Kidney transplant.
4. I don't know.

SECTION C

SOURCE OF KNOWLEDGE

16. In one sentence, how did you get to know about Chronic Kidney Disease?

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