KNOWLEDGE AND PERCEIVED SUSCEPTIBILITY TO CHRONIC KIDNEY DISEASE AMONG AUTO-MECHANICS AND ALLIED PROFESSIONALS IN BODIJA COMMUNITY OF IBADAN NORTH LOCAL GOVERNMENT AREA, NIGERIA

BY

Opeyemi Agnes IGE
B. TECH MEDICAL PHYSIOLOGY (LAUTECH)
MATRIC. NO.: 209463

A Project in the Department of Health Promotion and Education submitted to the Faculty of Public Health

In partial fulfilment of the requirements for the degree of

MASTERS OF PUBLIC HEALTH

of the

UNIVERSITY OF IBADAN

FEBRUARY, 2021

CERTIFICATION

I hereby certify that this study was carried out by Opeyemi Agnes IGE under my supervision in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Nigeria

_____

SUPERVISOR

OYEWOLE OYEDIRAN EMMANUEL
B.Sc., M.Sc., MPH, Ph.D. (Ibadan)
Associate Professor
Department of Health Promotion and Education,
Faculty of Public Health, College of Medicine,
University of Ibadan, Nigeria.

DEDICATION

This project is dedicated to the memory of my late father, Dr Akin Ige, a great lover of research who instilled in me the quest for more knowledge

ACKNOWLEDGEMENTS

I would like to extend my sincere gratitude towards the many people who have contributed to the development and completion of this project, and also provided me with indescribable support.

Firstly, my project supervisor, Dr O.E. Oyewole, for his unending constructive criticisms and constant editing suggestions, for sitting through long hours to ensure this project becomes a masterpiece.

My sincere appreciation goes to all the lecturers in the department of Health Promotion and Education-; The Acting Head of the Department, Dr. M.A Titiloye, Professors O. Oladepo and A. J. Ajuwon, Drs Mojisola M. Oluwasanu, Adeyimika T. Desmennu, I.O. Dipeolu, Yetunde John-Akinola and all the non-academic staff for their teachings and guidance.

The leadership and entire Auto-mechanic and Allied professionals in Bodija community, who facilitated and provided a peaceful environment during the conduct of the research, and took valuable time to participate in the study despite their busy schedule, I am indeed grateful.

Oluwatomi Olunuga who sat for hours and allowed me bounce off ideas from her, Tayo Olabode who helped in recruiting research assistants, colleagues in Health Promotion and Education department who assisted in peer review of the research instrument, I really cannot thank them enough.

Iseoluwa Adelokiki, who has been a constant support for me over the entire program, aside research and reading together, I was also provided a source of friendship that helped in combating the rigors of the program.

To my mum, Pastor Mrs Ige for the relentless effort and encouragement, I could not have done it without her.

My caring and supportive husband, who waited while I went back to school, I am deeply grateful

My daughter, Mercy Adeniran, I am indebted.

To God, for making it all possible, to Him be the glory.

ABSTRACT

Chronic kidney diseases (CKD) is a worldwide public health problem with adverse outcomes of kidney failure, cardiovascular disease, and premature death. The level of exposure to heavy metals including lead from petrol leaded battery, radiator, spray paints and soldering wires increases the risk of developing CKDs among auto-mechanics and allied professionals. There is a dearth of literature on the knowledge of risk factors and preventive measures against chronic kidney diseases among this population as most of the studies conducted in this regard were Hospital-based and was also among health care workers. This study was therefore designed to investigate the knowledge and perceived susceptibility to chronic kidney disease among auto mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Oyo State.

This study was a community-based descriptive cross-sectional study, in which a purposive sampling technique was used for the recruitment and selection of the accredited auto-mechanics and allied professionals while snowballing was used for the recruitment and selection of the non-accredited ones within the community. Pretested semi-structured interviewer-administered questionnaire was administered to two hundred and nine respondents. Knowledge, perceived susceptibility and preventive practices were measured on a 32-point,14-point and 24–point scales respectively. Data were analysed using descriptive statistics and Fisher's exact test at 5% level of significance.

The age of the respondent ranges from 20 to above 60, with the highest age range being 40-49 years old making up of 32.1% of the respondents and more than half (52.2%) of the respondents had secondary school as their highest level of education. The mean knowledge score was 12.9±6.4, most (71.3%) of the respondents had poor knowledge, 82.3% of the respondents stated that herbal supplements could be effective in treating chronic kidney disease and only 34.4% mentioned high blood pressure as a cause of chronic kidney disease. The mean perceived susceptibility score was 5.2±3.1 and most (73.2%) of the respondents had negative perceived susceptibility to chronic kidney disease. Many (74.6%) of the respondents agreed that long term exposure to car batteries, gasoline cannot make them have

CKDs and few 1.9% wore gloves and nose masks while using lead-containing materials or substances. Respondents had a mean practice score of 6.8±2.6 and almost all (98.1%) of the respondents had poor practice. There was a significant difference between the respondents perceived susceptibility to chronic kidney disease and preventive measures of chronic kidney disease (*p=0.001).*

Most of the respondents had poor knowledge about chronic kidney disease and most of the respondents had negative perceived susceptibility and poor preventive practice towards chronic kidney disease. A concerted effort should be made by healthcare professional to improve the knowledge on CKDs by providing health promotion and education, which would therefore lead to a change in attitude and behaviour thereby reducing the risk factors of chronic kidney disease and ultimately reducing the burden of chronic kidney disease.

Keywords: Chronic Kidney Disease, Auto-Mechanics, Allied Professionals.
Word count: 471

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

APPENDICES

GLOSSARY OF ABBREVIATIONS

CKD	-	Chronic Kidney Disease
ESRD	-	End Stage Renal Disease
HBM	–	Health Belief Model
WHO	-	World Health Organisation
NCDs	-	Non-Communicable Disease
PPE	-	Personal Protective Equipment

OPERATIONAL DEFINITION OF TERMS

Chronic Kidney Disease: the damage of kidney for ≥3 months which could be due to unhealthy diets, alcohol consumption, cigarette smoking, poor handwashing practices

Perceived Susceptibility: perception of the risk or the chances of developing Chronic Kidney Disease.

Auto-Mechanics: people who are responsible for the repair of cars

Allied Professionals: these are a group of people asides auto-mechanics who work in auto-mechanic workshops e.g. Panel Beaters, Rewire, Vulcanizers

Bodija Community: this is a community within Ibadan North Local Government Area located between Awolowo Avenue and Trans-Amusement Park

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Chronic kidney disease (CKD) can be defined as all conditions of the kidney, lasting for at least three (3) months, affecting the filtration and removal of waste from the blood by the kidneys (indicating kidney dysfunction), and/or leakage of protein or albumin in the urine (indicating kidney damage). Chronic kidney disease is common, costly and often detected too late to be reversible, but it is largely preventable because many of its risk factors are modifiable (Cass *et al.,* 2010; Wyld *et al*., 2015). According to Levey *et al.* (2007) chronic kidney disease is defined as evidence of structural or functional kidney impairment for 3 or more months. It is therefore generally progressive and irreversible, affecting multiple metabolic pathways.

About 10% of the world's population is affected by chronic kidney disease (World Kidney Day, 2015). Atleast 2.4million deaths per year are now attributed to chronic kidney disease, and hence documented as the 6th fastest-growing cause of death (World Kidney Day 2019) In Nigeria, the prevalence of CKD is not known, but several studies, mostly hospital-based, suggest a range of 1.6 to 12.4% (Odubanjo *et al.,* 2011). Chronic kidney disease sufferers in Nigeria are mostly from the young or middle-aged group who make a majority of the workforce (Okaka and Unuigbe, 2014).

Hypertension and diabetes mellitus (chronic non-communicable diseases [NCDs]) are the two major causes of CKD worldwide. Diabetes initially was not a common cause of end-stage kidney disease among Nigerians, but it is now becoming a more prominent aetiological factor (Alebiosu and Ayodele, 2006). However, chronic glomerulonephritis and interstitial nephritis are the major causes of chronic kidney disease in developing countries of the world. This is a reflection of the high prevalence of bacterial, parasitic, and viral infections (communicable diseases) that affect the kidneys in these countries (Barsoum, 2006).

Further studies have, however, shown the influence of heavy metals on kidney functions. The major routes of heavy metals exposure to human includes:inhalation, ingestion and skin

absorption. All these occur in a number of places including mechanic workshops. Associated effects of long-term exposure to heavy metals include toxicological effects on the kidney (Lenntech, N.D). Also, increasing number of malfunctioning automobiles and a subsequent rise in emissions and waste handling has grown into an environmental concern for Nigeria. One of the main causative agents of chronic kidney disease remains to be lead, a chemical substance found in the environment air, water and soil combined as well as in other biological systems. Lead is a highly reactive heavy metal, which can accumulate in the body although it has no known biological function in the body. Instead, lead has been found to increase the risk for both the environment and human health, with harmful effects that can even exceed those of other known inorganic toxicants.

It is usual to spot automobile workshops spread all over most cities in Nigeria. These workshops have since been recognized as a main source of pollution to the environment. Unfortunately, despite the global recognition of chronic kidney disease as a global public health epidemic, many Nigerians are still unaware of the location of the kidney, functions of the kidney, symptoms of the disease and causes of kidney failure (Okwuonu *et al*., 2015).

1.2 Statement of the Problem

The major known risk factors for the development of chronic kidney diseases include; unhealthy eating habits (Bruce *et al,.*2009), behavioural lifestyles (i.e. smoking, alcohol consumption), diabetes, hypertension and long-term exposure to heavy metals (Amah *et al*., 2014). The level of exposure to heavy metals including lead from petrol leaded battery, radiator, spray paints and soldering wires increases the risk of developing chronic kidney diseases (Amah *et al*., 2014) among mechanics and auto-professionals. Improper hand washing before eating and regular consumption of local herbs and concoction which may be very toxic to the body and coupled with poor health-seeking behaviour (Ulasi and Ijeoma, 2010) are predominant among auto-mechanic and allied professionals.

When these sets of persons come down with chronic kidney disease, they increase the burden on the health sector and increase the financial needs of their family as a lot would be spent to ensure their survival. Also, they will not be able to play vital roles in society such as ensuring the persistent running and maintenance of machines, automobiles, and equipment that makes work

easier for other sectors like transportation, works, and industry. When machines that make work easier are faulty and no one is there to repair them, it creates a lag for other sectors that need those machines to function and make their work easier. To an extent, the auto-mechanics and allied professionals provide employment and training for out-of-school youths. When this group begins to fall sick, it will increase the rate of unemployment and social vices in the country.

1.3 Justification for the Study

There is a dearth of literature on the knowledge of risk factors and preventive measures against chronic kidney diseases as most of the studies conducted in this regard were Hospital-based and was also among health care workers (Egbi, Okafor, Miebodei, Kasia, Kunle-Olowu and Unuigbe, 2014).Even though some studies have been done to assess the prevalence of kidney diseases in Nigeria which were hospital-based, little or none has been done on the knowledge and perceived susceptibility to the disease especially among the auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area despite being at a risk of developing the disease.

Auto-mechanics and Allied professionals play a vital role in the society and economy by ensuring the persistent running and maintenance of machines, automobiles, and equipment that make work easier for other sectors like transportation, works, and industry. They also provide informal training to unemployed and out-of-school youths, thereby reducing the rate of unemployment and social vices in the country. Therefore, the health and wellbeing of individuals in this sector are paramount, due to their indispensable contribution to the day to day running of members of the society and the community at large.

The outcome of this study will, reveal the knowledge of chronic kidney disease among the Auto-mechanics and Allied professionals and therefore serve as source of information that would be useful for health promoters in creating awareness about kidney diseases and preventive measures in subsequent future intervention programmes. It will also serve as source of information for other researchers who intend to conduct a more in-depth study on kidney-related problems among this group of individuals. Furthermore, Ibadan North Local Government being the largest local government with the highest population in the state, carrying out the study in this location

will ensure that the results and recommendations from the study can be adopted by other local governments in the state and the country as a whole.

1.4 Research Questions

1. What is the level of knowledge of chronic kidney diseases among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Oyo State, Nigeria?
2. What is the perceived susceptibility to chronic kidney disease among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Nigeria?
3. What are the predisposing factors to chronic kidney diseases among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Nigeria?
4. What are the preventive practices against chronic kidney disease among artisans among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Nigeria?

1.5Objectives of the Study

1.5.1 Broad Objective

The broad objective of this study is to investigate the knowledge and perceived susceptibility to chronic kidney disease among auto mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Oyo State.

1.5.2 Specific Objectives

1. To assess the knowledge about chronic kidney disease among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Nigeria.
2. To determine the perceived susceptibility to chronic kidney disease among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Nigeria.

3. To identify predisposing factors to chronic kidney disease among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Nigeria.
4. To identify the preventive practices against chronic kidney diseases among auto-mechanics and allied professionals in Bodija community of Ibadan North Local Government Area, Nigeria.

1.6 Research Hypotheses

HO_1: There will be no significant difference between socio-demographic (Occupation, Level of education) characteristics of the respondents and knowledge of chronic kidney disease.

HO_2:There will be no significant difference between knowledge of chronic kidney Diseases and preventive measures

HO_3: There will be no significant difference between respondents' perceived susceptibility to chronic kidney disease and preventive measures of chronic kidney Diseases.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of Chronic Kidney Disease

The main function of the kidney is to get rid of waste products and excess water from the blood. The kidneys process about 200 litres of blood every day and produce about 2 litres of urine. The waste products are generated from normal metabolic processes including the breakdown of active tissues, ingested foods, and other substances. The kidneys allow consumption of a variety of foods, drugs, vitamins, dietary and herbal supplements, food additives, and excess fluids without worry that toxic by-products will build up to harmful levels. The kidney also plays a major role in regulating levels of various minerals such as calcium, sodium, and potassium in the blood.

As the first step in filtration, blood is delivered into the glomeruli by microscopic leaky blood vessels called capillaries. Here, blood is filtered of waste products and fluid while red blood cells, proteins, and large molecules are retained in the capillaries. In addition to wastes, some useful substances are also filtered out. The filtrate collects in a sac called Bowman's capsule. The tubules are the next step in the filtration process. The tubules are lined with highly functional cells which process the filtrate, reabsorbing water and chemicals useful to the body while secreting some additional waste products into the tubule. The kidneys also produce certain hormones that have important functions in the body, including active form of vitamin D (calcitriol or 1,25 dihydroxycholecalciferol), erythropoietin (EPO), which stimulates the bone marrow to produce red blood cells and renin, which regulates blood volume and blood pressure in association with aldosterone manufactured in the adrenal glands, located just above the kidneys.

Kidney disease is a worldwide public health problem, with adverse outcomes of kidney failure, cardiovascular disease, and premature death. Presently, there is an increase in the prevalence of chronic kidney disease, as it was ranked 27th in the list of causes of the total number of global deaths in 1990; however, by 2010, it had dropped to 18th in the list of causes of global deaths. This degree of movement up the list was noted to be second only to that of HIV and AIDS (Jha *et al*., 2013). Most recently is the assertion that at least 2.4million deaths per year are now

attributed to chronic kidney disease, and hence documented as the 6th fastest-growing cause of death (World Kidney Day, 2019). It is also one of the chronic non-communicable diseases that affect one in every ten adults or more than 500million people across the world (Meguid *et al.,* 2005).

The inevitable attrition in numbers of nephron and functions as a result of multiple etiologies leading to end-stage renal disease is Chronic Kidney Disease (Shorecki *et al*., 2005).Wide geographical variations in the incidence of disorders causing CKD exist. The most common cause of glomerulonephritis in sub-Saharan Africa is malaria. The leading cause of chronic kidney disease is high blood pressure globally, with chronic glomerulonephritis coming next to hypertension in many developing countries.CKD is the progressive and irreversible destruction of the kidneys. Kidneys area unit serve as an essential component of the body,and they help in many functions, which includes maintenance of minerals and electrolytes balance in the body, like metal, sodium, and atomic number, take an important role in the production of red blood cells, maintaining the fragile acid-base (pH) balance of the blood and expelling soluble wastes from the body

Apart from the impact on urinary organ operation, kidney harm may be a major determinant for the event of progression of accelerated coronary artery disease, ischaemic vascular disease, and cardiovascular diseases. People with even the earliest signs of CKD are at increased risk of cardiovascular disease and could die long before they reach end-stage renal disease (Gall *et al*., 1995).Complications arising from chronic kidney disease include end-stage kidney disease, an overly increased risk of cardiovascular disease and stroke. However, as catastrophic as the disease can be in tandem with the complications that arise from the disease, developing countries including Nigeria are burdened with the insufficiency of resources to deal with chronic kidney disease epidemic and long-term complications (Aderemi *et al.,* 2017).

The high cost of dialysis and a need for transplantation that becomes a necessity once end-stage kidney disease has been diagnosed, and the weakness of low and middle income countries (including Nigeria) as regards provision of adequate transplantation services which is unfortunately limited or non-existent, increases the likelihood of patients with chronic kidney

diseases to die as a result of cardiovascular disease as chronic kidney disease remains a strong independent cardiovascular risk factor (Tonelli *et al.,*2006).

Recent research shows that multiple socio-cultural factors in Africa may influence existing kidney disease disparity**.** For example, Bruce *et al*, (2009) outlined multiple pathways through which economic and social environmental stressors and also psychological factors can influence kidney disease development and progression. Factors such as poor environmental conditions and economic deprivation at the household level, can influence the development, progression, and complications of kidney disease or predispose to other psychological conditions including anxiety, depression, anger and stress all which has an influence on kidney disease development (Bruce *et al*., 2009).

Despite the global recognition of kidney disease as a global public health epidemic, and Nigeria being one of the low and middle-income countries where the management of kidney diseases could pose a problem due to limited medical infrastructure and patients having to bear the required cost in developed countries, many Nigerians are still unaware of the location of the kidney, functions of the kidney, symptoms of the disease and causes of kidney failure (Okwuonu *et al*., 2015).

In Africa, there seems to be a dearth of data on chronic kidney disease; this can be attributed to the heavy funding on infectious diseases as compared to the non-infectious diseases. This has greatly contributed to the low awareness and understanding of the exact burden of kidney diseases among health workers, government, funders, and the general public at large. Hence, it has led to a decreased perception of kidney disease as an important health problem in Africa (Aderemi *et al*., 2017).

2.2 Stages of Chronic Kidney Disease

The categorization of chronic kidney disease (CKD) is through blood and urine tests; these tests enable CKD to be classified into five successive stages of severity of the disease. Early stages (stages 1-2) are marked by excessive protein (or albumin) loss in the urine indicating kidney damage, with or without a modest loss of kidney function thus, making diagnosis difficult.

Middle stages (stages 3–4) are marked by a moderate to a severe loss of kidney function, the kidney function slows down and the number of times urine is passed increases. The level of waste (urea and creatinine) in the blood rises and the person starts to feel unwell.

Stage 5 CKD or End-stage kidney disease requires regular dialysis or a kidney transplant to survive (Agarwal, Rizkala, Bastani, Kaskas, Leehey and Besarab, 2006)

2.3 Knowledge and Perceived Susceptibility to Chronic Kidney Disease

Currently, over 30 million (15%)young adults in the United States have chronic kidney disease. However, out of those 30 million people, 48% of them have experienced severely reduced kidney function but are not currently on dialysis because they are not aware that they have chronic kidney disease. Additionally, it is also estimated that almost 96% of the people with reduced kidney function are not aware they have chronic kidney disease, which is attributed to poor knowledge about the risk factors, symptoms, progression as well as other components of the disease. (Anupama and Uma, 2014). Chronic kidney disease for a fact is under-recognized and under-diagnosed such that patients with end-stage kidney failure are thought to represent a fraction of the entire population with chronic kidney disease in reality.

While Boulware *et al*., (2009) argued that early recognition of the chronic kidneys diseases is the most important first step to remedying the condition; Clarke *et al*., (2016) stated that raising awareness is the most important strategy since limited knowledge of the chronic kidney diseases is one of the main factors that have contributed to the prevalence of the disease. According to Spry (2008) promoting the national public health awareness programs can, therefore, be an effective way to create awareness and encourage people to seek medical screening and early intervention.

Limited knowledge and poor public awareness about kidney diseases have led to decreased perception of risk and susceptibility to the disease among the general population (Yamamoto, 2010). There are many countries where the laboratory estimated glomerular filtration rate (EGFR) testing and reporting are limited leading to the underreporting and thus lack of focus on the disease. Hu *et al*., (2018) in their work believes that the low perceived risk and susceptibility to chronic kidney disease is because of poor awareness (Hu *et al.,* 2018). Also, many

governments have been implicated as they have failed to raise clinical awareness and there are no adequate and visible data on the prevalence of the disease (Patel *et al.,* 2016).

Furthermore, many people are unaware of kidney disease because of poor health education and health awareness. Many people who are diagnosed with the disease do not have the opportunity or the platform to raise awareness about the condition because there are no proper structures or platforms for such awareness campaigns (Muhammad and Sen, 2014). Chronic kidney disease among young adults is associated with disenfranchisement, the perception of helplessness and feelings of disability and powerlessness which makes many feels stigmatized in the event that they learn about their condition (Clarke *et al.,* 2016). Also, most people cannot cope effectively with the condition and the feeling make them fear communicating to the public the risk factors and the factors that contributed to their medical condition (Chavers and Parekh, 2005; Eddy, 2005; Cook, 2009).

In a study carried out in the south-eastern part of Nigeria among the Efik, Ibibio and Annang ethnic groups, some symptoms of kidney failure especially body swelling is attributed to an evil spirit, an individual's wrongdoing or theft. In other instances, rituals are carried out to appease the local deities as well as mutilation of the corpse before burial thus preventing other family members from experiencing the same calamity (Akpan and Ekripko, 2015). Studies conducted in Tanzania, India, Australia, Hong Kong and Iranian reported that the level of knowledge of chronic kidney disease was poor among most of the study respondents (Chow *et al.,* 2012; Roomizadeh *et al.,*2014; Stanifer *et al.,*2016; Gheewala, Peterson, Zaidi, Jose and Castelino, 2018; Hussain, Habib, and Najmi, 2019). A study conducted in Nigeria is also stated that only 27.1% of the respondents had good knowledge of chronic kidney disease (Oluyombo *et al.,* 2016). Some people's knowledge on chronic kidney disease could be due to poor health education and health awareness of the disease. According to Muhammad and Sen (2014), many people who are diagnosed with the disease do not have the opportunity or the platform to raise awareness about the condition because there are no proper structures or platforms for such awareness campaigns.

A study carried out by Chow, Szeto, Bonnie, Kwan, Leung and Philip (2014) in Hong Kong on the knowledge of chronic disease in the general public using a telephone survey, reported that only 17.8% of respondents in the study recognized the asymptomatic nature of chronic kidney

disease. It was concluded that despite the wealth of evidence for hypertension being a risk factor of chronic kidney disease, less than half the general public in Hong Kong are aware of the association which implies that the general public in Hong Kong is poorly informed about chronic kidney disease, with major knowledge gaps regarding the influence of hypertension on kidney disease. The researchers recommended that future health education should target areas of knowledge deficits.

Improving the knowledge of the public on chronic kidney disease is one of the key factors that will reduce the prevalence of chronic disease (Clarke *et al*., 2016). According to Spry (2008)promoting the national public health awareness programs can, therefore, be an effective way to create awareness and encourage people to seek medical screening and early intervention.

Kabaye *et al.,* (2019) reported that only 38.5% and 44.2% of respondents knew hypertension and diabetes mellitus as causes of chronic kidney disease, respectively. It is also similar to Oluyombo *et al.,* (2016) findings in a rural community in South West but higher than Roomizadeh *et al.,* (2014) findings among Iranian community members. However, Chow *et al.,* (2012) study reported that more than half of the respondents could specify diabetes, hypertension and hereditary conditions as risk factors to chronic kidney disease.

In a study conducted in Ethiopia, Kabaye *et al.,* (2019) documented that less than half of the respondents identified keeping blood pressure under control as a means of preventing chronic kidney disease. Oluyombo *et al.*(2016) reported in the study conducted in South-West that less than half of the respondents agreed that herbal supplements can be effective in treating CKD

Poor awareness regarding kidney disease can be attributed to the fact that conventional channels used for mass education are not effective in the internet age hence; clinicians should be more engaged in the patient-led initiatives to get a better understanding of the perception and feelings of the people with chronic kidney disease (Mehrotra, 2006). The internet especially social media is one of the most effective ways to understand, teach and empower people about kidney diseases to share their experiences and raise awareness (Kim *et al.,* 2016). Social media can be effective in positively influencing young adults who are literate and can, in turn, create discussions in their environments thereby resulting in increased awareness about kidney diseases (Leventhal and Liu,

2015). It is also the most effective way to educate people to go for screening and seek early intervention (Eddy, 2005; Kim, Lee, Yoo, Boo, and Kang, 2016).

According to Boulware, (2009) who conducted research on the Perceived Susceptibility to Chronic Kidney Disease among High-Risk Patients Seen in Primary Care Practices, the patient's views tend to be poorly characterized. Most patients have a poor understanding of the risk for the development of CKD and the progression of the same (Muhammad and Sen, 2014). The young adults, both patient and non-patient are under-informed about their risks as well as the risk factors for the development of the CKD and the progression of the CKD. Boulware, (2009) assessed the independent precision of the kidney disease such as the socio-demographic, health literacy, clinical presence of chronic kidney disease, co-morbid conditions, and health behaviours as they are the main predictors of the perceived susceptibility.

They found that only the whites were very concerned about the chronic kidney disease development and progression (Plantinga, Tuot, and Powe, 2010, Ellam, 2015; Patel, Ferris and Rak, 2016). On the other hand, only African American (63%) population registered average perceived susceptibility. On the other hand, Cook (2009) also argued that female patients with low health literacy tend to have lower perceived susceptibility to chronic kidney disease as compared to their male counterparts. There were racial disparities in the perceived susceptibility to kidney disease as the whites had higher perceived susceptibility to kidney diseaseas compared to the minority groups and this can be attributed to the low health literacy (Neugarten and Golestaneh, 2013, Díaz-González de Ferris *et al.,* 2017).

The fact that not many people go for screening and testing means that not many people seek medical help or report their condition leading to lower prevalence rates (Holley, 2007; Goldstein and Devarajan, 2008; Heiwe and Jacobson, 2011).

Progressive kidney impairment and consequent kidney replacement therapy that are most expansive and expensive can be prevented with the early recognition of kidney disease and early intervention (Watnick, 2007). The patient can prepare for these two if the condition is recognized early. In most cases, the real recognition can trigger early intervention to reduce or prevent progression and cardiovascular disease (Tuot and Boulware, 2017).

In Akpan and Ekrikpo (2015) cross-sectional survey on knowledge, awareness and perception of chronic kidney disease, a structured questionnaire was administered and data was analysed using STATA 10, Stata Corp, Texas, USA. It was reported 95.1% of respondents had heard about CKD with their major source of knowledge being from doctors 29.4% and media 28.9%. Only 43.3% of respondents knew the correct location of the kidneys. Poor level of awareness and knowledge have been reported to be reasons why chronic kidney patients report to the health centres late (Obrador *et al.,*2010; Vassalotti, Li, McCullough and Bakris, 2010). In Oluyombo *et al.,* (2016) study in South-West, Nigeria, the prevalence of awareness and good knowledge of kidney disease in the general population of participants was reported as 33.7% and 27.1%, respectively. Among the study respondents with chronic kidney disease as measured by GFR < 60 ml/min/m2, the prevalence of awareness and good knowledge was 18.4%and 14.0%, respectively.

A positive influence was reported of high level of education onawareness and knowledge of kidney disease in Oluyombo *et al.,* (2016) study. Respondents who were farmers and had a high level of education were reported to have increased awareness and knowledge of chronic kidney disease compared to their counterparts with low educational level. This shows that the level of education helps health literacy level and has been reported to influence significantly awareness and knowledge of chronic illnesses (Devins, Mendelssohn, Barre, Taub and Binik, 2005; Tan, Hoffman and Rosas, 2010). When the study respondents in Oluyombo *et al.,* (2016) study were asked about the causes of chronic kidney disease, it was reported that less than half agreed to hypertension as a cause and only one-third of the population agreed that diabetes could cause through chronic kidney disease. Also, majority (90.0%) of the respondents did not agree that chronic kidney disease could be passed via heredity.

2.4 The Predisposing Factors to Kidney Diseases among Auto mechanics and Allied Professionals

Early intervention in kidney diseases can only be successful if the individual with an increased risk of kidney disease is identified. Some of the most important risk factors include genetic makeup and phenotypes (Agarwal, 2008). Race, age, gender, and family history are a major

contributor as the Hispanics have increased risks of kidney disease. Kidney disease is also prevalent among adults than children. Young adults of African American descent, older aged and those who had low birth weight are at higher risk of developing kidney disease in their adult life as compared to the others (Khalid, 2012). Lifestyles factors such as smoking, exposure to heavy metals, drug abuse, alcohol abuse, unhealthy diets, obesity, hypertension as well as diabetes contribute to the risk of kidney disease and progression which makes adult engage in these habits or having these problems at more risk of CKD (Kohlhagen and Kelly, 2008; Leal and Soto, 2008; Madore *et al.*, 2008).

Exposure to lead toxicity is a widespread event that mostly occurs in developing countries such as Nigeria. Despite the alarming effect, many of the individuals at risk of being exposed do not know its effect (Amah *et al*., 2014).

There seems to be an increase in the prevalence of kidney disease among artisans even though the reasons are not quite clear, however, poor socioeconomic status, illiteracy, and ignorance may be implicated (Okwuonu *et al.,* 2015).

2.4.1 Smoking

Worldwide, over 1.1 billion people smoked tobacco, even though there is a decline in prevalence in many countries, smoking appears to be increasing in the African region (WHO., 2017). In the year 2000,about 1million deaths reported worldwide were attributed to cigarette smoking with most increase recorded in low and medium income countries(WHO., 2007) where more than 80% of the global tobacco users live(WHO, 2011)

According to WHO (2008), smoking is a preventable risk factor of many chronic diseases whose global prevalence is on the increase and calls for quick actions. Development of many chronic diseases such as cardiovascular diseases, chronic kidney diseases, cancer, and chronic obstructive pulmonary disease (COPD) has been linked to smoking (CDC., 2016)

Tobacco is therefore public health problem with an estimated worldwide tobacco-attributable death projected to be 8.3million in 2030, (Mathers and Loncar, 2006) and if by 2030 the current trend continues, one in six people will die due to cigarette smoking attributable disease (WHO., 2008).

In India, increased tobacco use was found to be associated with older age groups, male gender, having parents or colleagues who smoke (Sen *et al*., 2014), the rise can be largely attributed to inadequate or lack of awareness and knowledge concerning the long-term effect of smoking (Shomar *et al*., 2014)

Smoking has been established as a risk factor for chronic kidney disease (Hallan, de Mutsert, Carlsen, Dekker and Aasarod, 2006; Shankar, Klein and Klein, 2006; Yamagata *et al.,*2007). Irrespective of the smoker, be it active or passive, cigarette use plays a role in the commencement and end of diseases such as chronic kidney disease, type 2 diabetes mellitus and in the progression of diabetic nephropathy and cardiovascular complications of diabetes mellitus (DM) (Richard, 2013). The use of tobacco plays a role in the commencement of diverse diseases which ends up at chronic kidney diseases after a while. Disease such as: Diabetic nephropathy, ischemic nephropathy, nephrosclerosis, IgA nephropathy, metabolic syndrome, type 1 and 2 diabetes (Orth, 1997; Orth, 2004; Mercado and Jaimes, 2007; Wittmann, 2007; Orth, 2000; Bello *et al.,* 2010).

In a study carried out by Charlotte *et al.,* (2007) which involved the review of literatures, it was reported that there was a relationship between smoking and development of chronic kidney disease. Evidences of kidney disease in this study linked with smoking were based on measures of renal injury which included; declining renal function and development of overt proteinuria. It was established that increased cigarette consumption in terms of duration and intensity increases the association between cigarette smoking and chronic kidney disease (Charlotte *et al.,* 2007).

A cross-sectional analysis of the prevention of renal and vascular end stage disease (PREVEND) reported that there was an association between smoking and albuminuria which is a sign of kidney disease (Pinto-Sietsma *et al.,*2000). Findings from the 16 years Multiple Risk Factor Intervention Trial (MRFIT) reported that there was a dependent relation between cigarette smoking and the development of end stage renal disease in the general population (Klag *et al.*,1997).

Various epidemiological cross-sectional studies have revealed that in smokers, there is the presence of high glomerular filtration rate and an elevated risk for albuminuria or proteinuria in comparison to non-smokers (Halimi *et al.,* 2000; Pinto-Sietsma *et al.,* 2000; Janssen *et al.,*

2000). Halimi *et al.,* (2000) initial study reported lower systemic blood pressure among current smokers compared to non-smokers but another study conducted in 2002 revealed a higher risk of high blood pressure in persons who smoke cigarette. The after effect of the addiction to certain chemicals found in tobacco majorly a psychoactive ingredient known as nicotine leads to the constant occurrence of tobacco smoking among individuals (Leone, Landini and Leone, 2010). Findings from various studies (Wilson *et al*., 2012; Mukherjea, Morgan, Snowden, Ling and Ivey, 2012) reported that more than 1billion people globally are smoking and 80/5 of them are found in low- and middle-income countries of which Nigeria belongs to.

In a study conducted by Mayer, Simon, Heidrich, Cokkinos and De Bacquer (2004) among cardiac patients in the EUROASPIRE II sub-study, it was reported that smoking was significantly lower in men with secondary and higher education compared to those with only primary education. This shows that the level of education of individuals has a role to play in smoking habit. Auto-mechanics and Allied professionals are observed to have low level of education. It can be said that considering the level of education, smoking chances can be determined and the risk to chronic kidney disease also. Crone *et al*., (2003) opined that secondary or higher education may play a role in the prevention and the initiation of smoking or to reduce the frequency of smoking due to the fact that their level of education could increase their awareness about potential health hazards of smoking. West, Sweeting and Young (2007) reported that the chances of individuals with low level of education becoming smokers and smoking per day is high.

Two studies conducted in Dutch reported that adults find it easy to purchase tobacco products since it is readily available and its constant purchase and use leads to the risk of coming down with chronic diseases (Koopmans *et al*., 1999; de Vries, 1995). Auto-mechanics and allied professionals' workshops in Ibadan are observed to be surrounded by people who sell cigarettes, thereby making it readily available for them Other studies affirmed that Low socio-economic condition is strongly related to continuation of smoking among adult males, particularly in developing countries (Wilkinson, Vasudevan, Honn, Spitz and Chamberlain, 2009; Kim, Kim, Yun, Khang and Cho, 2009; Leinsalu, Tekkel and Kunst, 2007).

Continuous and high stress due to less access to adequate health care and financial difficulties can also lead to the use of tobacco (National Center for Chronic Disease Prevention and Health

Promotion, 2012; Crone *et al*., 2003). Fernando *et al*., (2019) study among adult males in Sri Lanka reported that majority of the smokers in the study apparently see the warning signs of cigarette packages but those smokers cannot read. It was concluded that government legislation of warning signs on cigarette packages (80% from the cigarette package) did not have much effect on the reduction of tobacco smoking (Fernando *et al.,* 2019).

In a study carried out in South-South, Nigeria, reasons given for smoking included; to relieve stress, "to cool off", to feel relaxed, to increase sexual performance and to increase work output (Owonaro and Eniojukan, 2015). Studies have shown that there is a correlation between smoking and socio-demographic factors such as gender, age, and education (Abikoye and Fusigboye, 2010; Hart*et al.,* 2010). Smoking also plays a role in increasing blood pressure which is a risk factor for chronic kidney disease. It does this by stimulating the sympathetic nervous system and also by rising plasma endothelin levels (Orth, 2003; Halimi and Mimran, 2000). Also, its excessive production of oxygen-free radicals in the body system can produce endothelial dysfunction and consequently be another factor implicated in the increase of blood pressure (Phaniendra, Jestadiand Periyasamy, 2015).

2.4.2 Consumption of alcohol

In the early decades of the 20th century, studies conducted on alcohol were specifically centred on its therapeutic uses, however in recent times, authorities have established that any level of alcohol consumption poses negative effects on health; hence, increased attention has been devoted to disease burdens attributable to alcohol use worldwide, (Iranpour and Nakhaee, 2019).

According to WHO (2018), alcohol remains the only psychoactive substance with addictive potential "that is not controlled at the international level by legally binding regulatory frameworks" despite its intriguing implications for populations and public health.

The contra-implications of alcohol on health have been the subject of a rising number of studies in recent years, (WHO., 2018).With such research asserting that even modest alcohol use contributes to over 60 acute and chronic health conditions (Griswold *et al.,* 2018).

It has been established that more than 200 diseases have association with alcohol consumption; however, its pathogenicity and lethality through chronic illnesses depend on the amount and quality of alcohol consumed and the patterns that underlie its intake,(Shield *et al*., 2013)

A major disturbing phenomenon about alcohol intake is that its health implications that occur through the mechanisms of other diseases, are likely to be underreported, (Burton and Sheron, 2018).Experimental studies confirmed that, moderate to high amounts of alcohol not only directly increases the risk of elevated albuminuria and the incidence of chronic kidney disease (CKD), but also causes kidney damage indirectly by increasing blood pressure, (Pan *et al*.,2018).

A study conducted among apparently healthy men reported that moderate alcohol consumption was not associated with increased risk of renal dysfunction (Schaeffner, Kurth, de Jong, Glynn, Buring and Gaziano, 2005) and(Shlipak *et al.,* 2005) study revealed that alcohol consumption was associated with low risk of cardiovascular mortality in chronic kidney disease patients. However, Shankar, Klein and Klein (2006) study reported that there was an association between heavy drinking of alcohol and the high risk of chronic kidney disease.

In a study conducted among 9,196 men, it was reported that there was an inverse association between frequency of drinking alcohol and chronic kidney disease, as shown in the logistic regression analysis conducted after adjusting for age, BMI, hypertension, diabetes, hyper-LDL-cholesterolemia, smoking, and physical activity (Yayoi *et al.,* 2012). The findings of Yayoi *et al.,* (2012) reported a relationship between frequency of drinking alcohol and chronic kidney disease in a 41 year prospective study among 11,023 men.

Among the diabetic, the uncontrolled smoking, and excessive consumption of alcohol and the long-term use of analgesic medication contribute to the risk of kidney disease (Marley and Metzger, 2015). The diabetes mellitus patients are at higher risk especially young adults aged between 18 years and 40 years. These adults with impaired glucose tolerances or poor fasting glucose tend to be at higher risk for CKD (McMahon, 2008).

The frequency of risk factors of chronic kidney disease includes obesity (12%) of the subjects followed by proteinuria and glycosuria 11%, hypertension 20% and hyperglycemia 4% (Menon, Gul and Sarnak, 2005). In young adults, exposure to heavy metals as well as acute kidney injury also leads to CKD. On the other hand, the patient with a history of cardiovascular disease,

hyperlipidemia, metabolic syndrome, hepatitis C virus, HIV infection, and malignancy also contribute to CKD (Yamagata, 2007).

2.4.3 High blood pressure

Chronic Kidney Disease can be due to or lead to high blood pressure, it can be as a result of the increase in blood pressure or conversely develop in the early stage of chronic kidney disease, (Pan *et al.,* 2018). This is consistent with Rao *et al*., (2008) where it was reported that hypertension occurs in 85% to 95% of patients with CKD (stages 3-5), thus making the relationship between hypertension and chronic kidney disease is cyclic in nature. Uncontrolled high blood pressure is a risk factor for developing chronic kidney disease, and it is associated with a more rapid progression of CKD, thereby making it the second leading cause of ESRD in the U.S, (Botdorf *et al*.,2011).

High blood pressure has the tendency of damaging the blood vessels throughout the body. This damage can lead to the reduction in the supply of blood to delicate/vital organs in the body of which the kidney is part. High blood pressure can also destroy the filtering units in the kidney hence, the kidney cease to remove wastes and extra body fluids from the blood, (Chobanian *et al*., 2003).

Klag *et al.* (1996) study showed that there was a relationship between both systolic (SBP) and diastolic BP (DBP) and ESRD in male respondents who participated in the study. The relative risk (RR) for ESRD in this study was >20-fold higher for patients with stage 4 hypertension (SBP >210 mmHg or DBP >120 mmHg) than for patients with optimal BP levels (SBP < 120 mmHg and DBP< 80 mmHg) (Klag *et al.,* 1996). The findings of Klag *et al.*(1996) was supported by another study carried out by Tozawa *et al.* (2003) among men and women. In Maura, Michela, Luca, Simone, and Giacomo (2006) study, the hypertension -related mechanisms that are involved in the development of renal damage was stated to include the systemic BP load, the degree to which it is transmitted to the renal microvasculature (i.e., renal auto-regulation), and local susceptibility factors to barotrauma, which is the degree of damage for any degree of BP load. It was further explained that proteinuria, glomerular hypertrophy, fibrogenic mediators, genetic factors, and age are the most important local susceptibility factors.

In a National survey of representative sample of non-institutionalized adults in United State of America, it was reported that hypertension occur in 23.3% of individuals without CKD, and 35.8% of stage 1, 48.1% of stage 2, 59.9% of stage 3, and 84.1% of stage 4-5 CKD patients (U S Renal Data System, 2010). Asides from the low level of awareness and control of hypertension among chronic kidney disease patients, adequate treatment of other cardiovascular risk factors is also low among them (Sarafidis *et al*.,2008; Snyder and Collins, 2009). Chanda and Fenves (2009) study reported that creatinine clearance, as a determinant of glomerular filtration rate (GFR), fell only by 0.92 ml/min peryear in hypertensive subjects as compared to 0.75 ml/min per year in normotensive subjects. It was further said that mild renal vascular changes are associated with non-malignant hypertension (Chanda and Fenves, 2009).

2.4.4 Obesity

Another risk factor for the occurrence of chronic kidney disease is obesity. Over the last 30 years, the worldwide prevalence of overweight and obese adults (BMI ≥25) has significantly increased (Forouzanfar *et al.,*2013). Obesity is mostly defined based on body mass index which is weight (kilograms) divided by the square of height (meters) The normal body mass index is between the range of 18.5 and 25 and a body mass index of >30 as obese is defined as obese. Despite the ease in the calculation of body mass index, it gives a poor estimate of fat mass distribution. Another means of defining obesity which captures the visceral fat include waist circumference (WC) and a waist-to-hip ratio of >102 cm and 0.9, respectively, for men and >88 cm and >0.8, respectively, for women. The waist-to-hip ratio can be selected over BMI for the correct classification of obesity in CKD.

An increase in body mass index is associated with the presence and development of proteinuria in individuals without kidney disease (Pinto-Sietsma *et al.,* 2003; Kramer *et al.,* 2005; Foster *et al.,* 2008; Chang *et al.,* 2013).

It is recognized that obesity could lead to the progression of CKD, in addition to deleterious renal effects in otherwise healthy subjects. A study conducted among 73 patients (of whom 14 were obese) with unilateral nephrectomy followed the respondents for 20 years to investigate the effects of obesity. Out of the obese patients, only 30–40% had normal renal function, while the majority of nonobese patients retained normal kidney function (Praga *et al.,* 2000). In a case

study conducted from Sweden where the relative risk for chronic kidney disease in relation to BMI was estimated. It was reported that threefold increased risk for CKD in overweight patients with a BMI of 25 kg/m2 or over in comparison with those with a BMI less than 25 kg/m2. Obese males with a BMI of 30 kg/m2 or more and morbid obesity in females with BMI of 35 kg/m2 or greater anytime during their lifetime were associated with a three- to four-fold increased risk for CKD. After adjusting for type 2 Diabetes Mellitus and hypertension, a similar association between BMI at age 20 years and incidence of advanced stages of CKD, even in those without these comorbidities was seen (Ejerblad *et al.,* 2006).

In another study where community-based screening registries data were used to examine the relationship between BMI and risk for CKD or ESRD, it was discovered that the incidence of ESRD increased with an increasing BMI, particularly in men (Iseki *et al*., 2004). A Japanese study (Yamagata *et al.,* 2007) investigated the risk factors for CKD in a community-based population and it was reported that there was an increased incidence of stage I and II in men compared with women. There was an association between obesity and an increased hazard ratio of developing proteinuria.

A longitudinal analysis study that recruited 2585 participants in the Framingham Offspring Study cohort without pre-existing kidney disease reported that higher BMI was associated with higher risk of developing CKD which was defined as an estimated glomerular filtration rate (eGFR) <59 and<64ml/min/1.73m2 in men and women, respectively, based on the Modification of Diet in Renal Disease formula over a mean follow-up of 19 years [adjusted odds ratio (95% confidence interval) 1.23 (1.08–1.41) per +1 SD of BMI] (Fox *et al.,* 2004). In a study carried out by Hsu *et al.,* (2006), it was reported that among more than 300000 patients in the Northern California Kaiser Permanente system whose medical information were linked with the United States Renal Data System (USRDS), those who were overweight or had class I, II, and extreme obesity (defined as BMI ranges of 25.0–29.9, 30.0–34.9, 35.0–39.9, and ≥40.0kg/ m2, respectively) had a 1.9, 3.6, 6.1, and 7.1-fold higher risk of developing ESRD compared with those of normal weight (BMI 18.0–24.9 kg/m2) independent of socio-demographics, comorbidities, and laboratory tests, including proteinuria. A study conducted among Israeli adolescents using their medical data which were linked to the national ESRD registry, and after a mean follow-up of 26 years, it was reported that those who were overweight and obese (85th–

95th and ≥95th percentiles of BMI, respectively) had a three and seven-fold higher risk of incident all-cause ESRD, independent of sex, country of origin, blood pressure, and enrollment period (Vivante *et al.,*2012).

It was reported in a study carried out by Pscheidt *et al*. (2015), that neither overweight nor obese body habitus (BMI levels 25–<30kg/m2 and ≥30kg/m2, respectively) were associated with a higher risk of incident ESRD after a mean follow-up interval of 18 years (reference: BMI 18.5–<25.0kg/m^2). In a meta-analysis of 25 cohorts, three cross-sectional studies, and 19 case-control studies carried out by Rao*et al.* (2008), it was reported that individuals who were overweight and obese (BMI 25.0–29.9 and ≥30.0kg/m2, respectively) had a higher risk of developing kidney disease ascertained by International Classification of Disease codes (hazard ratio (95% confidence interval) 1.40 (1.30–1.50) and 1.83 (1.57–2.13), respectively), with stronger associations observed in women vs. men.

Persons who are obese experience a compensatory mechanism of hyper-filtration which tries to meet the high metabolic demands of their body weight. The rise in the intraglomerular pressure has the ability to damage the kidney structure and raise the risk of developing chronic kidney disease (Botdorf *et al*.,2011).

2.4.5 Exposure to lead and gasoline products

Studies reported an association between Chronic Kidney Disease and gasoline products which is highly utilized by auto mechanics and allied professionals in Nigeria (Radican *et al.,*2006;Jacob *et al.,*2007). The exposure to lead was also reported to be associated with chronic kidney level in a study conducted by Muntner, He, Vupputuri, Coresh and Batuman (2003). Automechanics who are exposed to lead in Nigeria include battery manufacturers and repairers, panel beaters, spray painters, and radiator repairers (Anetor, Babalola, Adeniyi and Akingbola, 2002; Hareell, 2010). Some studies reported cases of mechanics ingesting and inhaling gasoline, leading to an increase in the amount of lead in their body system (Anetor, Babalola, Adeniyi and Akingbola, 2002; Oluwagbemi, 2007). It was also reported that auto-mechanic sucks petrol and make use of it to wash their hands(a practice they believed helped in killing micro-organisms) thereby leading to the absorption of lead via the mucosa into their bloodstream (Oluwagbemi, 2007). At times, the auto-mechanics feed with bare unwashed hands and due to these poor handwashing practices,

they feed with the gasoline contaminated hands. Also, some of them consume meals in their workshops placing themselves in a position where they are being exposed to lead (WHO., 1980).

Workers in the oil and gas sectors have been reported to have cases of kidney injury (Michel, 2010). It was reported that exposure to crude oil and refined petroleum products is associated with renal cell carcinoma, glomerulonephritis, and tubulointerstitial disease presenting as acute kidney injury or chronic kidney disease (CKD) (Phillip, Petrone, Hemstreet, 1988; Hurtig, San, 2002; Karami *et al*., 2011). One can come in contact with crude oil and other petroleum products via skin, inhalation contaminated air or soil, and ingestion of contaminated water or food and these leads to localized toxicity and other health effects (Gabrielson, 2013). The level of exposure to these chemicals also vary due to location, work and personal activities, age, diet, and use of protective equipment (Phillips, Petrone, Hemstreet, 1988; Gabrielson, 2013).

Studies have reported that lead exposure could be a cause of lead nephropathy and chronic renal failure (Brewster and Perazella, 2004; Wedeen, 2008). Low level of lead exposure from the environment contributes to the rise in cardiovascular mortality (Menke *et al.,* 2006; Schober *et al*., 2006) and also has an effect on high blood pressure (Cheng *et al*., 2001; Nawrot *et al.,* 2002). The presence of these diseases preceded the occurrence of kidney disease (Nawrot and Staessen, 2006). At toxic level, lead nephropathy presents minimal proteinuria, a benign urinary sediment, hyperuricemia, and often hypertension (Wedeen, 2008). In Wedeen, Mali and Batuman (1979) study showed that lead toxicity causes mitochondrial swelling in the renal tubular cells as well as impairment of energy production.

Nuyts *et al*. (1995) study measuring lead using the expert rating method for retrospective assessment of occupational exposures reported that the odds ratio (OR) for chronic renal failure association with lead exposure was 2.1 (95% confidence interval 1.2–4.4). A pilot study of African Americans reported that 55 patients with end-stage renal disease had significantly higher blood lead compared with 53 age and sex-matched controls whereas mean tibia lead did not differ significantly. The OR for end-stage renal disease associated with tibia lead ≥20 µg/g was 1.6 (95% confidence interval 0.6–4.4) and thus showed a non-significant positive association in the study (Muntner *et al*., 2007).

Some studies reported an association between the level of lead in the blood and blood pressure (Goyer, Weinberg, Victery and Miller, 1989; Cardenas *et al*., 1993) of which high blood pressure mediates chronic kidney disease. Other studies conducted among workers with a lower level of exposure to lead reported that there was no renal effect based on the level of exposure to lead (Pollock and Ibels, 1997)

Individuals with family history of chronic kidney disease have the likelihood to have the disease. It was revealed that it is more likely for an individual with a family history of kidney failure to have hypertensiom, diabetes and earlier stage of chronic kidney disease (Ramirez, McClellan, Port and Hsu, 2002). It was reported in McClellan *et al.* (2010) reported a significant association between the risk of end stage renal disease and family history (adjusted hazard ratio of 1.93; 95% confidence interval, 1.22-3.07).

2.4.6 Use of herbal medicine

In developing countries, alternative and native systems of medicine are commonly sought for as a substitute for orthodox medicine even though they are being adopted in developed countries in recent times, however, the source, composition and regulatory control differs in various countries (Vivekanand, 2010). Worthy of note is the fact that more than three-quarter of the entire population of sub-Saharan Africa have a major dependence on herbal medicine, (Brandt and Muller, 1995).

The importance of plants or herbs cannot be underestimated, according to Taylor(2010), there are at least 120 distinct chemical substances derived from plants that are considered as important drugs currently in use in major countries in the world. In his review, he explained the fact that many of the orthodox drugs sold today are simple synthetic modifications or copies of naturally obtained substances, citing the example of *taxol,* the name of a plant chemical originally discovered in a plant and was later copied by a pharmaceutical company and patented therein as *Paclitaxel*

Comparing the production of modern pharmaceutical compounds and traditional medicine, the former adhere strictly to good manufacturing practices (GMP), rigorous safety and efficacy studies, which are highly essential before being certified safe for human use, Unfortunately, traditional medicine or native herbs are prepared by quasi trained herbalists outside the confines

of regulatory control and are therefore not tested for safety, therefore imposing a greater risk of toxicity due to incorrect identification, leading to a seemingly harmless herb being substituted with a toxic one (Vivekanand, 2010).

Herbal medicine with an undefined level of toxicity may also induce kidney toxicity due to its inherent properties. Asif (2012) stated that asides the inherent properties of herbal products leading to kidney disorders, herb-drug interactions, mistakes in dosage and identification, and contaminants within the mixture are all issues of concern in terms of Chronic Kidney Disease. According to Nortier and Vanherweghem (2007), nephrotoxic tendencies of herbs can be heightened by a number of factors including; consumption of herbs with unknown toxicity, incorrect identification leading to substitution of an innocuous herb with a toxic one, deliberate contamination with nephrotoxic non herbal drugs e.g (non-steroidal anti-inflammatory agents), pesticides or chemicals e.g heavy metal contamination from soil or water, potentiation of the toxic effect of a conventional drug due to interaction with a compound present in the herb and consumption of meat of an animal that has grazed on toxic plants. This assertion is also consistent with Jha *et al*., (2008) where it was iterated that the use of alternative or native herbs is a common practice in developing countries. Issues for concern remains inadequate testing for efficacy, safety, major ingredients being unknown, dosage and route of administration that remains unstandardized, and potentially toxic chemical that are often added to increase their potency.

Herbal medicines often dispensed in crude packages are the mainstay of healthcare for a major proportion of the population in underdeveloped and developing countries due to a combination of factors including, non-availability of modern healthcare, ignorance and poverty, Jha and Rathi (2008).The kidneys which play a pivotal role in the metabolism and excretion of these substances is therefore exposed to their toxicity which is manifested as chronic kidney injury and often times patients present late to hospitals with multi-organ impairment,(Jha *et al*.,2010)

The role of herbs has thus been implicated in the development of chronic kidney disease in various parts of developing countries mostly among the rural population, Vivekanand (2010). It is therefore safe to say the use of herbal medicine by auto-repairers therefore predisposes them to Chronic Kidney Disease.

2.5 Preventive Practices against Chronic Kidney Diseases among Auto-Mechanics

Prevention and early detection of CKD are the main instruments for combating Chronic Kidney Disease in the world today (Oluseyi *et al.*, 2016). This assertion is different from the finding of Usman *et al*, 2013 that there is no firm evidence that prevention of chronic kidney disease translates into reductions in mortality.

However, early diagnosis could permit early intervention to reduce the risks of cardiovascular events, kidney failure, and death that are associated with chronic kidney disease. In developed countries, screening is most efficient when targeted at high-risk individuals such as elderly people and those with a concomitant illness such as diabetes and hypertension or a family history of chronic kidney disease (James*et al.*, 2010). In a study carried out by Hardy *et al.,* (2018), it was revealed that a decrease in blood pressure have a great effect on CKD prevention. The study reported a modest population-wide 1 mmHg or 2 mmHg decrement in SBP could prevent more CKD events per 100,000 person-years (Hardy *et al.,* 2018). It was further reported that primordial prevention of CKD will give more room for the reduction in CKD incidence.

In order to diagnose the presence of chronic kidney disease, a blood test for creatine (waste product from muscle breakdown) will be used to calculate the glomerular filtration rate. The glomerular filtration rate is a measure of the kidney function and a low glomerular filtration rate might mean that the kidney is not able to discharge wastes and extra fluid from the blood. Also, a urine test that measures the presence of protein will show if the kidney is damaged. The presence of protein in high quantity shows that the kidney is in need of great help and might result in further complications if not taken care of.

A study conducted by Plantinga, Tuot and Powe (2010) reported that despite the introduction of automated reporting of estimated GFR to improve early detection of chronic kidney disease, about 50% people with chronic kidney disease are still undiagnosed. This reveals that people are not being detected early at the asymptomatic phase of chronic kidney disease.

Due to the CKD initial asymptomatic presentation, early detection might prove difficult. Inpatients where CKD has remained undiagnosed or treated, it may progressively result in End-Stage Renal Disease (ESRD) (Plantinga, Tuot and Powe, 2010). There has been increasing cost burden associated with management of CKD over the past decade (Mahdavi-Mazdeh, 2010),

with exceedingly high impact on developing countries where resources are limited. This is why the prevention of CKD has been recommended as the most effective health policy for cost reduction in these countries (Barsoum, 2006; Mahdavi-Mazdeh, 2010).

Several studies have demonstrated the relationship between patient's awareness about Chronic Kidney Disease and its associated risk factors and their potential readiness to engage in lifestyle modifications and other health-promotion behaviours (Chow *et al.*, 2012; Wright-Nunes *et al.*, 2012) all aimed at preventing the occurrence and progression of the disease. Therefore, improved population knowledge about Chronic Kidney Disease and its risk factors remains a critical prevention approach, especially among vulnerable populations. Available evidence continues to indicate that when patients with Chronic Kidney Disease present late for treatment, the clinical outcomes tend to be poor (Chan *et al*., 2008). Some studies reported that few of the people with indicators of chronic kidney disease are aware that they have the disease (White, Polkinghorne, Atkins and Chadban, 2008; White *et al.,* 2010).

The primary prevention for Chronic Kidney Disease will target the education of the public, especially people at risk, promoting health lifestyles such as physical exercise among at risk people, so as to reduce the risk of developing Chronic Kidney Disease. The secondary prevention will focus on conducting screenings to monitor blood pressure and blood sugar levels, and conducting risk assessments to access level of risk to Chronic Kidney Disease (Stewart-Dixon, 2017).

Another angle to the prevention of chronic kidney disease is the tertiary prevention which helps to reduce the impact of the chronic kidney disease when one has it. Based on guidelines on chronic kidney disease, it was recommended that patients with chronic kidney disease should maintain a low sodium ingestion (70– 100mmol/day) (KDOQI, 2004; Joint Specialty Committee Guidelines, 2006; Levin *et al.,* 2008). This recommendation was due to proof that lower sodium intake is associated with reduced blood pressure, increase in the protective effect of ACE inhibitors in patients with proteinuria, and decline in the progression of renal failure (Heeg *et al.*, 1989; Sacks *et al.,* 2001). It is also recommended that chronic kidney disease should cultivate a healthy lifestyle that includes avoiding tobacco smoking and alcohol consumption.

Smoking has the tendency to increase the progression of chronic renal insufficiency in diabetic and non-diabetic nephropathies, independently of gender and race, so therefore, it is important to stop smoking before and after chronic kidney disease occurrence (Orth, 2003).

It is also important to reduce weight, this is important for patients who are obese and hypertensive. The more they reduce in weight, the more a reduction in the blood pressure, proteinuria and left ventricular hypertrophy, with benefits in terms of total cardiovascular outcomes (Praga and Morales, 2006; Elsa and Pedro, 2012). It has been reported that exercise may improve the control of blood pressure and endothelial function and decrease 52 Antihypertensive Drugs inflammation and insulin resistance (Johansen and Birkeland, 2007). Even though this might not have any effect on chronic kidney disease directly, it helps to prevent the progression of the disease indirectly. Exercise is important for the prevention of chronic kidney disease both at primary, secondary and tertiary level.

A major factor to the development of chronic kidney disease is diabetes and hypertension. In preventing diabetes, there are two major approaches in doing this; the high-risk approach and the whole population approach. The high-risk approach involves identifying and targeting those who are at high risk of diabetes while the population approach involves targeting all the population irrespective of their level of risk to the disease (Rose, Khawand Marmot, 2008). These approaches were suggested by the IDF in a consensus statement on diabetes prevention (Alberti, Zimmet and Shaw, 2007). Gregg*et al.*(2013) reported that diverse randomised controlled trials (RCTs) that studied the effectiveness of lifestyle and pharmacological interventions in high-risk groups and reported that with these interventions, the prevention or delay of onset of type 2 diabetes can be achieved. In a systematic review and meta-analysis of randomised controlled trials (RCTs), it was reported that lifestyle interventions reduced incidence of type 2 diabetes by around half and were as effective as pharmacological interventions (Gillies *et al.,*2007).

The Diabetes Prevention Program (DPP) (2002) also conducted a randomised controlled trial (RCTs) which is tagged as one of the largest ever conducted. It was conducted among 3,234 adults with blood glucose levels that were elevated but not yet diagnosed of diabetes (Diabetes Prevention Program Research Group, 2002). The participants of this study received an intensive lifestyle intervention or pharmacological intervention and were compared with another group who were receiving a placebo. The lifestyle intervention was aimed at reducing the body weight

of the participants by at least 7% and engaging in moderate intensity physical activity for at least 150 minutes a week. The intervention also cut across 16 face to face lessons over a 24-week period covering diet, exercise and behaviour modification followed by monthly individual and group sessions. At the end of the study, it was reported that the lifestyle intervention reduced the incidence of type 2 diabetes by 58% and 34% over an average follow up period of 2.8 years and over a 10 year follow period respectively(Diabetes Prevention Program Research Group, 2002; Diabetes Prevention Program Research Group, 2009). The pharmacological intervention carried out however reported a reduction by 31% over 2.8 years and 18% over 10 years (Diabetes Prevention Program Research Group, 2002; Diabetes Prevention Program Research Group, 2009). This shows that lifestyle intervention in the prevention of diabetes goes farther than pharmacological interventions. Lifestyle intervention can focus on reduction of weight, improving of diets and regular exercise. When diabetes is prevented, the occurrence of chronic kidney disease is reduced.

Hypertension which is another cause of chronic kidney disease has been reported to be hereditary. It was reported in Stabouli *et al*. (2011) study that several studies conducted support the fact that there is an association between primary hypertension at early age and overweight and excessive salt intake. When weight is gained in excess, it places pressure on the heart and excessive salt intake leads to the retention of fluid in the body which ends up placing a burden on the heart. In Bakx *et al*.(1999) study, it was predicted that weight gain will be a risk for hypertension.

Excess alcohol consumption is also linked with hypertension and diabetes amongst other medical and social conditions (STM, 2007). Heavy drinking is referred to as drinking patterns with high consumption of alcohol over a short period of time (Sundell, 2010). It was confirmed in a review by Campbell *et al.*(1999) that blood pressures increase with heavy alcohol consumption regardless of gender or age. Russell *et al.* (1991) who also studied drinking pattern reported that heavy drinking of alcohol increased the risk of developing HBP and other cardiovascular diseases.

This shows that with lifestyle intervention focusing on reduction of weight, improving of diets, reduction of alcohol intake and regular exercise, prevention of hypertension and prevent chronic

kidney disease can be achieved. It is therefore recommended that healthy lifestyle should be promoted among the general population in order to prevent the causes of chronic kidney disease.

In a study carried out in Rwanda, Ngendahayo *et al.* (2019) reported that half of the students (49.6%) had either a high level of participation in preventive practices or a moderate level, as opposed to a low level (50.4%) of participation. It was further reported that there was a weakly positive relationship (r = .426, n = 260, p= .01), as the level of knowledge increased, the level of preventive practices increased among the university students. Yusoff, Yusof and Kueh (2016) also stated in their study in Malaysia that despite the fact that the majority of respondents had poor knowledge (69.9%), they had a good attitude (68.9%,) and good practice (88.3%) to prevent the risk of CKD. Another study conducted in Jordon among 740 patients at outpatient clinics revealed that even though the respondents had adequate knowledge of the disease, half the sample had erroneous information about CKD signs and symptoms. Consequently, not having the correct information predisposed them to miss early warning signs, and adopting inappropriate preventives practices that were not promoting their health or improving their quality of life (Khalil and Abdalrahim, 2014)

Conceptual Framework

The Health Belief Model (HBM) which was developed around 1952 by Hochaum, Stephen and Rosenstock (McCormick-Brown, 1999). The HBM was developed initially in the 1950s by social psychologists in the U.S. Public Health Service to explain the widespread failure of people to participate in programs to prevent and detect disease (Hochbaum,1958; Rosenstock,1960,1974). Later the model was extended to study people's responses to symptoms (Kirscht, 1974) and their behaviours in response to a diagnosed illness, particularly adherence to medical regimens (Becker *et al.*, 1979). This theory marked the beginning of systematic theory-based research in health behaviour. It focused on the relationship between health behaviours, practices, and utilization of health services. The HBM contains several primary concepts that predict why people will take action to prevent, to screen for, or to control illness conditions; these include susceptibility, seriousness, benefits, and barriers to behaviour, cues to action, and most recently, self-efficacy.

2.7 Application of Health Belief Model

1. **Modifying Factors:** This refers to those factors like age, gender, level of education, knowledge, occupation, eating habit etc., that are peculiar to each individual and influence their perception about the health condition**.**
2. **Perceived Susceptibility:** This refers to beliefs about the possibility of getting chronic kidney disease. An individual who perceives himself or herself as susceptible will take preventive actions towards preventing chronic kidney disease.
3. **Perceived Severity**: This refers to the belief about how severe chronic kidney disease is and it's after effect. An individual who perceives the severity of chronic kidney disease will take preventive measures on chronic kidney disease
4. **Perceive Threat:** The combination of susceptibility and severity has been labelled as a perceived threat.
5. **Perceived Benefits**: This refers to the belief in the value of the recommended action to reduce risk or gravity of the impact of chronic kidney disease. Even if an individual identifies personal susceptibility to chronic kidney disease (perceived threat), whether this perception leads to behaviour change will be influenced by the individual's beliefs

concerning perceived benefits of the several existing and accessible actions for reducing chronic kidney disease.

6. **Perceived Barriers**: This refers to the belief about the concrete and psychological rates of the advised action. The perceived barrier act as obstructions or hindrances to undertaking the recommended behaviours to prevent chronic kidney disease.
7. **Cues to action**: These are events, experiences, interpersonal factors, environmental factors that motivate an individual to take preventive steps. An individual with cues to action to take preventive steps on chronic kidney disease will prevent chronic kidney disease.
8. **Self- efficacy:** This is the ability of an individual to successfully take preventive steps towards chronic kidney diseases. An individual who is capable of taking these steps performing breast self-examination correctly would be motivated to perform it and perform it consistently.

CONCEPTUAL FRAMEWORK

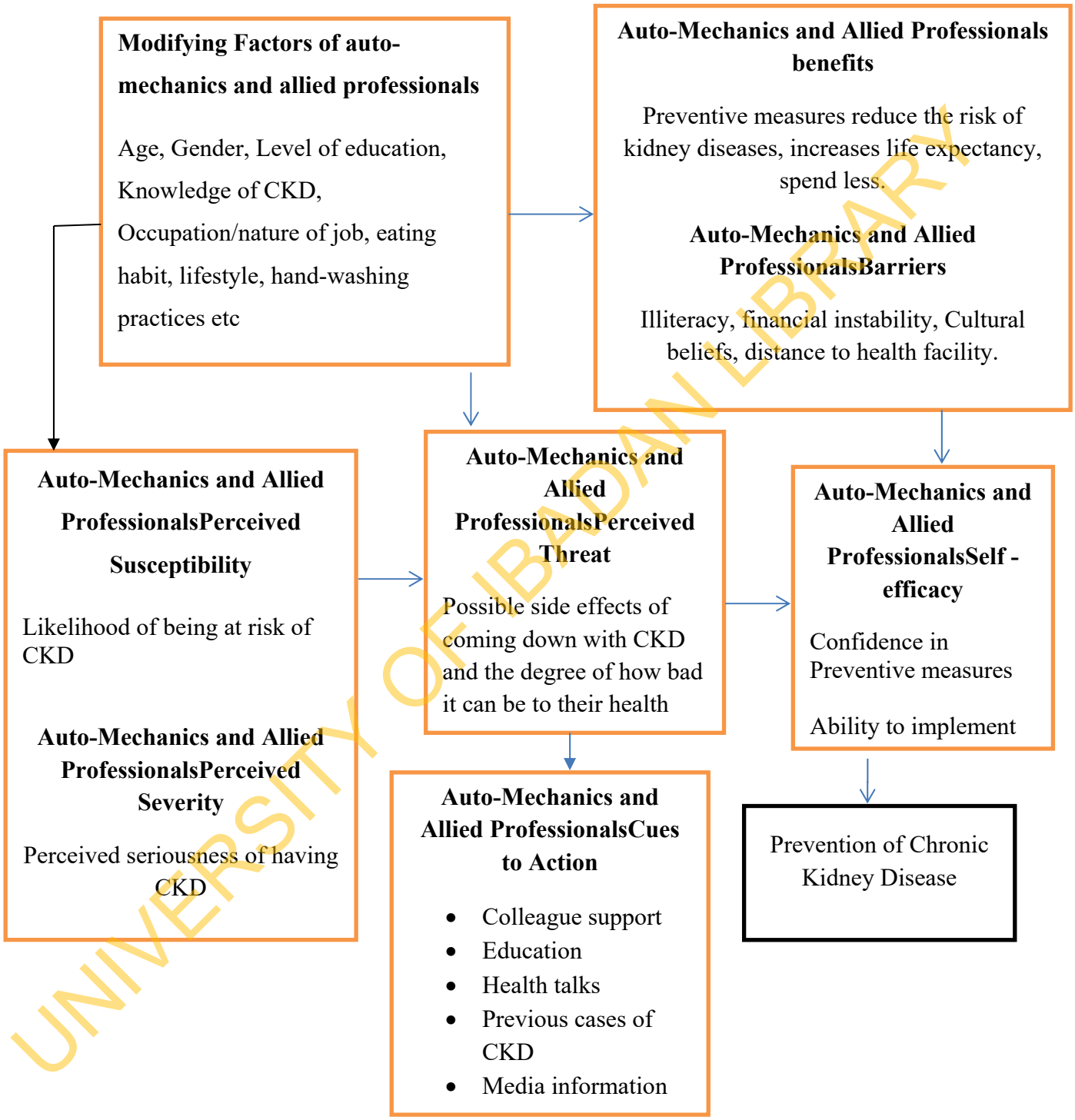

Figure 2.1:Adaptation of Health Belief Model to show the interplay between the individual factors and perception resulting into prevention of chronic kidney disease

CHAPTER THREE

METHODOLOGY

3.1 Study Design

This study was a descriptive cross-sectional design. A descriptive study design is one in which its primary goal is to assess a sample at one specific point in time without making inferences or causal statements in order to identify areas for further research, to help in planning resource allocation (needs assessment) and to provide informal information about a condition or disease.

3.2 Study Area

The study was carried out among auto-mechanics and allied professionals in mechanic village located in the Bodija area of Ibadan North Local Government Area of Oyo state Nigeria. Ibadan North Local Government has an area of 27km^2 and a population of 306,795 at the 2006 census. Major activities carried out in the mechanic village include repair of automobiles, painting of cars, charging of car batteries. The mechanic village is made up of one accredited workshop and ten non accredited workshops.

3.3 Study Population

The study population consists of auto-mechanics and allied professionals in mechanic villages located in Bodija area Ibadan North local government.

3.4 Sample Size

The sample size for this study was estimated from the Leslie Kish formula for single proportion which is as follows:

$$n = \frac{(Z_\alpha)^2 P(1-P)}{E^2}$$

P= Prevalence of chronic kidney disease in Olorunda, Osun state 12.3% (Chukwuonye*et al*., 2018)

E = Degree of accuracy set at 0.05

Z_α= Standardized value of α at 0.05 = 1.96

$$n = \frac{1.96^2 \times 0.123(1 - 0.123)}{0.05^2} = \frac{0.4149}{0.0025} = 165.96, approximated\ to\ 166$$

To adjust for 10% non-response rate

=166 /1-10%= 184

The total sample size was 184, which was the minimum population size that made the study valid.

3.5 Sampling Technique

A purposive sampling technique was used for accredited auto-mechanics and allied professionals while snowballing was used for the non- accredited ones within the Bodija community of Ibadan North Local Government Area. The accredited auto-mechanics are the ones who were registered under the state government and their contact information was used to access them. The non-accredited auto-mechanics were not registered and were contacted using snowballing.

3.6 Inclusion Criteria

All accredited and non-accredited auto-mechanics and allied professionals who consented to participate in the study were included.

3.7 Exclusion Criteria

All accredited and non-accredited auto-mechanics and allied professionals who does not have a designated workshop were excluded from the study.

3.8 Instrument for Data Collection

An interviewer administered semi structured questionnaire was used for data collection based on the specific objectives. The questionnaire was divided into five sections as shown below:

- Section A: Socio-demographic characteristics of the respondents
- Section B: Level of knowledge of the respondents of CKD
- Section C: Perceived susceptibility of the respondents to CKD
- Section D: Predisposing factors to CKD as perceived by the respondents

- Section E: Practice of preventive measures against the disease

3.9 Validity of the Instrument

There was an extensive review of the literature to ensure appropriate content and face validity. Construct validity was also ensured by making sure that variables in the specific objectives were well represented in the instrument. The instrument was also given to the project supervisor as well as some research experts in the Faculty of Public Health to help ascertain the quality of the instrument. The instrument was translated to Yoruba Language and was translated back to English to ensure that it retained its original meaning.

3.10 Reliability of the Instrument

The pre-testing of the instrument was carried out among auto-mechanics and allied professionals at Olorunsogo Molete in Ibadan South West Local Government, Oyo State, a similar population group. A Cronbach Alpha measurement and reliability co-efficient measure was carried out on the pre-test questionnaire to know how reliable the instrument is. A reliability coefficient of 0.82 was obtained.

3.11 Data Collection Procedure

For the study, a serially numbered interviewer-administered questionnaire was used. The data were collected by the researcher with the help of four research assistants who were trained prior to the time of data collection. Both the benefits and the possible harms that may arise as a result of participating in the study were explained to the research participants. The informed consent forms (attached to the questionnaires) were distributed to the potential participants after they had been given adequate information about the study. Each of the respondents was interviewed and thereafter the investigator checked for completeness and error before leaving the field.

3.12 Data Management and Analysis

A coding guide was developed along with the data collection tool in order to facilitate its analysis. Sorting, Cleaning, and coding of data for analysis was also done. Using the coding guide, the data collected was carefully entered into the Statistical Package for Social Science (SPSS version 21) and analysed. Descriptive analysis was done to report the mean and standard

deviation for quantitative variables. The results obtained from the analysis were summarized and presented in tables and charts. Fisher exact test was used to test the hypothesis at a significance level of 0.05.

Respondents' knowledge of chronic kidney diseases was measured on a 32-point knowledge scale. Knowledge Score (KS) of ≤16was rated as poor knowledge, KS of >16was considered as good knowledge. Code 1 and Code 2 were used to represent good and poor knowledge respectively.

Respondents perceived susceptibility was measured on a 14-point perception scale. Perception score (PS) of ≤7 and PS of >7was rated as negative and positive, respectively. Code 1 and Code 2 was used to represent good and poor perception respectively.

A 24–point scale was used for practices of preventive measures, where a score ≤12 represented poor preventive measures and a score >12 represented good preventive measures against kidney diseases. Code 1 and Code 2 were used to represent good and poor practice respectively.

3.13 Ethical Considerations

Ethical approval was sought and obtained from the Oyo State Ministry of Health research ethics committee before going to the field for data collection. Also, written informed consent was attached to the questionnaire. To ensure confidentiality of research participants, identifiers such as names and other information that can reveal the identity of research participants were not included in the research instruments. The nature of the study, benefits, and objectives was explained to the respondents and they were assured that the information given would be treated with the utmost confidentiality. Respondents were intimated about the opportunity to withdraw their consent freely at any point during the study. The confidentiality of each participant was maximally maintained during and after the collection of their information. Information gathered from the respondents was stored in the computer for analysis by the researcher while copies of the filled instruments were kept for maximum safety.

3.14 Study Limitation

Due to the nature of the study respondent's job, getting responses from each respondent took alot of time and patience, thereby extending the number of days apportioned for data collection.

CHAPTER FOUR

RESULTS

4.1 Socio-Demographic Characteristics

There were two hundred and nine respondents recruited for the study and almost all (99.5%) of them respondents were men. Less than half of the respondents (32.1%) age ranged from 40 to 49 years with the mean age of 38.0±9.5years, 50.7% were Christians and majority (96.7%) were Yoruba. Many (58.4%) of the respondents were allied professionals and the highest level of education of more than half (52.2%) was secondary school, just a few (1.4%) went to tertiary institution. Most (77.0%) of the respondents were married and more than half (53.6) were in a monogamous marital union (Table 4.1a).

Table 4.1b shows the awareness of previous cases of chronic kidney disease. The majority (98.1%) were not aware of the worker who died of chronic kidney disease, 97.6% had never gone for screening in any hospital for chronic kidney disease and the majority (96.2%) were willing to check the condition of their kidney.

Table 4.1a Socio-Demographic Characteristics of Respondents (n= 209)

Socio-Demographic Characteristics	Frequency	Percent (%)
Age		
20-29 years	55	26.3
30-39 years	54	25.8
40-49 years	67	32.1
50-59 years	31	14.8
60 years and above	2	1.0
Gender		
Male	208	99.5
Female	1	0.5
Ethnicity		
Yoruba	202	96.7
Igbo	7	3.3
Hausa	0	0.0
Religion		
Christianity	106	50.7
Islam	90	43.1
Traditional	13	6.2
Occupation		
Auto Mechanics	87	41.6
Allied Professionals	122	58.4
Level of Education		
Primary	81	38.8
Secondary	109	52.2
Tertiary	3	1.4
No Education	16	7.6
Marital Status		
Single	25	12.0
Married	161	77.0
Divorced	15	7.2
Widowed	4	1.9
Separated	4	1.9
Marital Union		
Monogamous	112	53.6
Polygamous	49	23.4

Table 4.1b Previous Cases of Chronic Kidney Disease (n=209)

	Frequency	Percent (%)
Number of deaths in the past five years due to any cause		
3	5	2.4
4	31	14.8
Don't Know	173	82.8
Causes of Death		
Accident	1	0.5
Sickness	2	1.0
Sudden Death	5	2.4
I don't know	201	96.1
Awareness of any worker who died of CKD		
Yes	4	1.9
No	205	98.1
Awareness of media to monitor the health of kidney		
Yes	5	2.4
No	204	97.6
Ever gone for CKD screening in a hospital before		
Yes	5	2.4
No	204	97.6
Willingness to check the condition of the kidney		
Yes	201	96.2
No	8	3.8

4.2 Knowledge of Chronic Kidney Disease

The mean knowledge score for chronic kidney disease was12.9± 6.4. Most (71.3%) of the respondents had poor knowledge (Fig 1). Most (83.9%) of the respondents knew chronic kidney disease to be the failure of the kidney and 34.4% mentioned high blood pressure as a cause of chronic kidney disease. More than one-tenth (13.3%) of the respondents said that increased fatigue is a symptom of chronic kidney disease. Less than half (40.2%) of the respondents agreed that preventing CKD is by keeping blood pressure under control and keeping weight under control and 34.0% said it is by keeping blood sugar level under control. Most (81.8%) of the respondents knew that taking prescribed medication is a way of managing chronic kidney disease (Table 4.2b). Most (82.3%) of the respondents agreed that herbal supplements can be effective in treating CKD (Table 4.2).

Table 4.2a Knowledge of Chronic Kidney Disease (n=209)

	Frequency	Percent (%)
Definition of Chronic Kidney Disease (n=56)		
Failure of the kidney	47	83.9
Inability to urinate	15	26.8
A disease of the kidney	24	42.9
Impaired kidney function	9	16.1
It is a disease caused by alcohol eating unhealthy foods	6	10.7
The stone inside the kidney	1	1.8
When someone can't see well	4	7.1
Causes of Chronic Kidney Disease (n=127)		
High blood pressure	72	56.7
Diabetes	55	43.3
Symptoms of Chronic Kidney Disease (n=188)		
Body parts become swollen	89	47.3
Increased Fatigue	25	13.3
Malaise	16	8.5
Difficulty urinating	14	7.5
Paralysis	11	5.9
Weight loss	9	4.8
Bloody urine	6	3.2
Shortness of breath	6	3.2
Loss of appetite	4	2.1
Erectile dysfunction	3	1.6
Others	5	2.7
Herbal supplements can be effective in treating chronic kidney disease		
Yes	172	82.3
No	37	17.7
Can orthodox drug help to slow down the worsening of chronic kidney disease		
Yes	164	78.5
No	45	21.5

Table 4.2bWays of preventing and managing chronic kidney disease (n=209)

	Frequency	Percent (%)
Ways of preventing chronic kidney disease		
Keeping blood pressure level under control	84	40.2
Keeping weight under control	84	40.2
Keeping blood sugar level under control	71	34.0
Proper washing of hands	65	31.1
Mouth sucking of petrol	48	23.0
Regular cutting of nails	48	23.0
Ways of managing chronic kidney disease		
Taking prescribed medication	171	81.8
Control blood pressure	72	34.4
Control blood glucose level	59	28.2

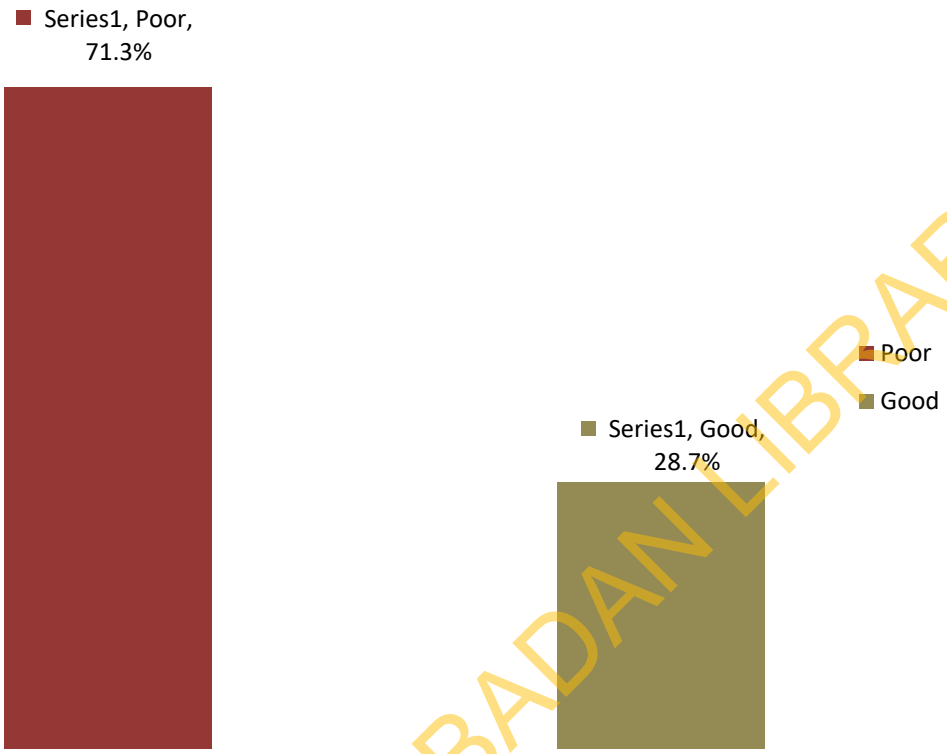

Figure 4.1: Level of Knowledge of Chronic Kidney Disease

4.3 Perceived susceptibility to Chronic Kidney Disease

The mean perceived susceptibility score was 5.2±3.1. Most (73.2%) of the respondents had a negative perceived susceptibility to chronic kidney disease (Fig 4.3). The majority of the respondents (89.0%) agreed that consumption of local herbs cannot predispose them to CKD, one-fourth (25.4%) of the respondents disagreed that long term exposure to car batteries, gasoline cannot make them have CKD. Many (64.1%) of the respondents disagreed that consumption of alcohol makes them active, more than half (57.9%) agreed that CKD is caused by witches and 54.1% disagreed that only very rich people are at risk of having CKD. Almost one fourth (24.4%) disagreed that hand washing has no relationship with CKD and most (77.5%) of the respondents agreed that drinking alcohol cannot predispose them to CKD (Table 4.3).

Table 4.3 Perceived susceptibility to Chronic Kidney Disease

Statements	Agree n (%)	Disagree n (%)
Consumption of Local herbs cannot predispose me to CKD	186 (89.0)	23 (11.0)
Long term exposure to car batteries, gasoline cannot make me have CKD	156 (74.6)	53 (25.4)
Consumption of alcohol makes me active	75 (35.9)	134 (64.1)
Chronic disease is caused by witches	88(42.1)	121 (57.9)
Only very rich people are at risk of having CKD	96 (45.9)	113 (54.1)
Hand washing has no relationship with CKD	158 (75.6)	51 (24.4)
Drinking alcohol cannot predispose me to CKD	162 (77.5)	47 (22.5)

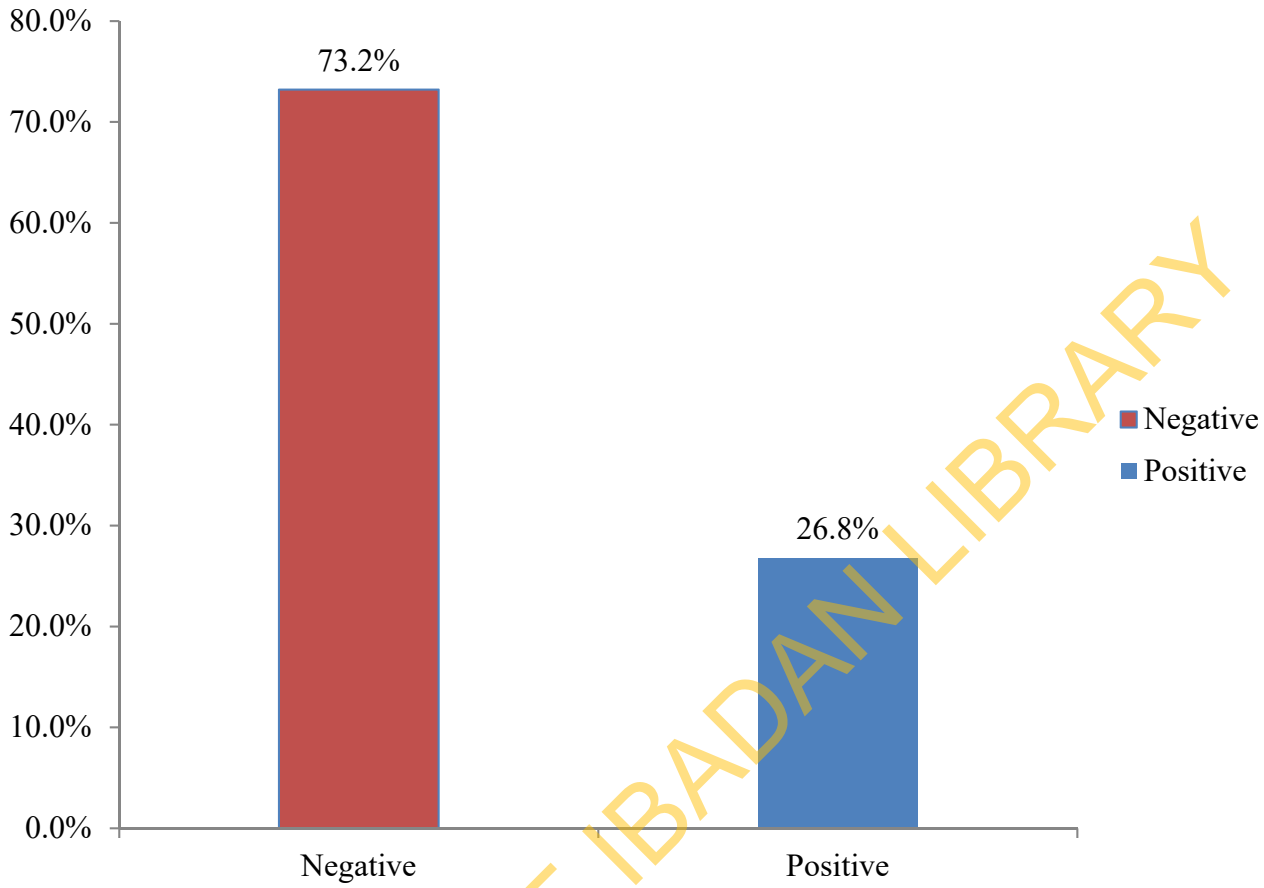

Figure 4.2: Perceived susceptibility to Chronic Kidney Disease

4.4 Predisposing Factors to Chronic Kidney Disease

The majority of the respondents (89.0%) consumed herbal concoction, most (76.1%) consumed pain killers, many (62.7%) takes alcohol and almost one- fifth (19.1%) had family members with chronic kidney disease. Few (16.7%) of the respondents smoked cigarette, 11.5% had diabetes mellitus 7.7% have hypertension and just a few 1.9% wore gloves and nose masks while using lead-containing materials or substances (Table 4.4).

Table 4.4 Predisposing Factors to Chronic Kidney Disease (n=209)

Statements	Frequency	Percent (%)
Consumption of herbal concoction	186	89.0
Use of pain killers	159	76.1
Consumption of alcohol	131	62.7
Having a family member with chronic kidney disease	40	19.1
Smoking Cigarette	35	16.7
Diagnosed with diabetes mellitus	24	11.5
Diagnosed with hypertension	16	7.7
Wearing of gloves and nose mask while using lead-containing materials/substances	4	1.9

**** Multiple response***

4.5 Practice of preventive measures against Chronic Kidney Disease

Respondents had a mean practice score of 6.8±2.6 and almost all (98.1%) of the respondents had poor practice (Fig 4.5). Most (70.8%) of the respondents reduced the level of stress faced every day, more than half (52.6%) exercised regularly, more than one-fourth (27.3%) do not smoke and 24.9% had never consumed alcohol. Few (3.8%) of the respondents washed hands with soap under running water after eating, 2.4% washed hands with soap under running water before eating and just 1.0% wore gloves and nose mask while using lead-containing materials/ substances (Table 4.5).

Table 4.5 Practice of preventive measures against Chronic Kidney Disease (n=209)

Statements	Frequency	Percent (%)
Check body weight regularly in a hospital	15	7.2
Exercise regularly	110	52.6
Check blood pressure in a hospital regularly	24	11.5
Reduce the level of stress faced every day	148	70.8
Check blood sugar level in a hospital regularly	22	10.5
Wash hands with soap under running water before eating	5	2.4
Wash hands with soap under running water after eating	8	3.8
Does not smoke	57	27.3
Never consumed alcohol	52	24.9
Stopped alcohol consumption	33	15.8
Wear gloves and nose mask while using lead-containing materials/substances	2	1.0

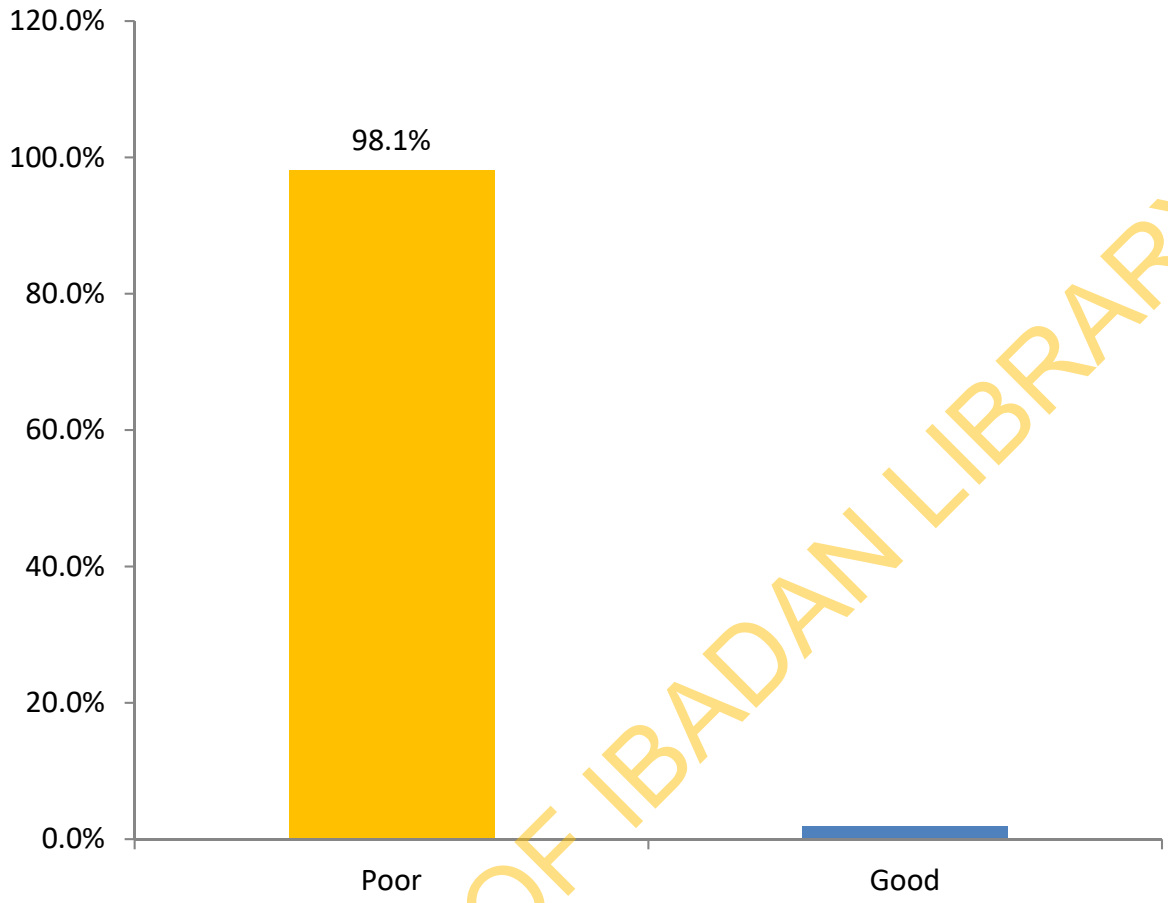

Figure 4.3: Practice of preventive measures against Chronic Kidney Disease

4.6 Hypothesis 1

"There is no significant difference between socio-demographic (age, gender, ethnicity, level of education) characteristics of the respondents and knowledge of chronic kidney Disease"

Table 4.6: Respondents' Socio-demographic characteristics and knowledge of chronic kidney disease

Variables	Knowledge Score Category		Df	Fisher's Exact	p-value
	Poor	Good			
Age					
20-29 years	39 (70.9%)	16 (29.1%)	4	7.453	0.114
30-39 years	40 (74.1%)	14 (25.9%)			
40-49 years	51(76.1%)	16 (23.9%)			
50-59 years	19 (61.3%)	12 (38.7%)			
60 years and above	0 (0.0%)	2 (100.0%)			
Gender					
Male	148 (71.2%)	60 (28.8%)	1	0.405	0.525
Female	1(100.0%)	0 (0.0%)			
Ethnicity					
Yoruba	143(70.8%)	59 (29.2%)	1	0.736	0.391
Igbo	6 (85.7%)	1 (14.3%)			
Education					
Primary	60 (74.1%)	21 (25.9%)	3	0.774	0.856
Secondary	75 (68.8%)	34 (31.2%)			
Tertiary	2 (66.7%)	1 (33.3%)			
No education	12 (75.0%)	4 (25.0%)			

Fisher's Exact analysis showed no significant difference between socio-demographic (age, gender, ethnicity, level of education) characteristics of the respondents and knowledge of Chronic Kidney Disease. This suggests that the hypothesis is true and we fail to reject the null hypothesis that there is no significant difference at p value <0.05.

4.7 Hypothesis 2

"There is no significant difference between the respondent's level of knowledge of chronic kidney diseases and preventive measures"

Table 4.7 Difference between respondent's level of knowledge of chronic kidney diseases and preventive measures.

Level of Knowledge of CKD	Preventive measures of CKD				
	Poor	Good	Df	Fisher's Exact	p-value
Poor	146 (98.0%)	3 (2.0 %)	1	0.027	0.675
Good	59 (98.3%)	1 (1.7%)			

Fisher's exact analysis showed no significant difference between the respondent's level of knowledge of chronic kidney diseases and preventive measures. This suggests that the hypothesis is true. However, we fail to reject the null hypothesis that there is no significant difference at p value <0.05.

4.8 Hypothesis 3

"There will be no significant difference between respondents perceived susceptibility to chronic kidney disease and preventive measures of chronic kidney Diseases".

Table 4.8 Difference between respondents perceived susceptibility to chronic kidney disease and preventive measures of chronic kidney Diseases"

Perceived susceptibility to chronic kidney disease	preventive measures of CKD				
	Poor	Good	Df	Fisher's Exact	p-value
Negative	153 (100.0%)	0 (0.0%)	1	11.142	0.001
Positive	52 (92.9%)	4 (7.1%)			

Fisher's exact analysis showed a significant difference between the respondents' perceived susceptibility to chronic kidney disease and preventive measures of chronic kidney disease. This suggests that the hypothesis is false and is therefore rejected.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Socio-demographic of the respondents

Almost all of the respondents were men. This supports Auto-Mechanic Edu (2018) opinion on the auto-mechanic field that it is dominated by men with few women developing a career in the field of recent. Less than half of the respondent's ages ranged from 40 to 49 years old which is close to a study by Adejumo *et al*.,(2018) who recorded 28% in a study carried out in Ondo state. Majority of the respondents were Yoruba; this is majorly as a result of the study area. The highest level of the education of more than half of the respondents was the secondary school which implies that more than half of the respondents were literate. Most of the respondents were married. This shows that most of the respondents have the responsibility as men to meet the needs of their families.

Very few of the respondents were aware of any worker who died of chronic kidney disease which reveals that a number of auto mechanics and allied professionals have died of chronic kidney disease. Almost all of the respondents had never gone for screening in any hospital for chronic kidney disease and this could be due to the fact that just a few of them were aware of death cases due to the disease which could have prompted to get screened off the disease. It could also be because of inadequate information and knowledge on chronic kidney disease, religious factors, cultural factors, access to chronic kidney screening services and insufficient funds to access the services (Ebele *et al.,* 2018). In a study conducted in New South Wales, Australia, it was revealed that the financial capacity of the respondents was a major barrier to utilizing CKD screening provided by the hospital (Sinclair, Day, LevettJones and Kable, 2017). The majority of the respondents were, however, willing to check the condition of their kidney.

5.1.2 Knowledge of Chronic Kidney Disease

Most of the respondents had poor knowledge of chronic kidney disease. This finding is similar to that of studies conducted in Tanzania, India, Australia, Hong Kong and Iranian where it was

reported that the level of knowledge of chronic kidney disease was poor among most of the study respondents (Stanifer *et al.,*2016; Gheewala, Peterson, Zaidi, Jose and Castelino, 2018; Hussain, Habib, and Najmi, 2019; Chow *et al.,* 2012; Roomizadeh *et al.,*2014). A study conducted in Nigeria is also in line with the study finding with just 27.1% of the respondents with good knowledge of chronic kidney disease (Oluyombo *et al.,* 2016). Some people's knowledge on chronic kidney disease could be due to poor health education and health awareness of the disease. According to Muhammad and Sen (2014), many people who are diagnosed with the disease do not have the opportunity or the platform to raise awareness about the condition because there are no proper structures or platforms for such awareness campaigns.

Improving the knowledge of the public on chronic kidney disease is one of the key factors that will reduce the prevalence of chronic disease (Clarke *et al*., 2016). According to Spry (2008) promoting the national public health awareness programs can, therefore, be an effective way to create awareness and encourage people to seek medical screening and early intervention.

Less than half of the respondents mentioned high blood pressure and diabetes as a cause of chronic kidney disease. This shows that the respondents who might have high blood pressure and diabetes are not well informed that the conditions place them at risk of chronic kidney diseases. Kabaye *et al.* (2019) reported that only 38.5% and 44.2% of respondents knew hypertension and diabetes mellitus as causes of chronic kidney disease, respectively, which is in line with the study findings. It is also similar to Oluyombo *et al.* (2016) findings in a rural community in South West but higher than Roomizadeh *et al.* (2014) findings among Iranian community members. Despite the differences in locations, the similarity in findings reveals the need to focus on increasing knowledge on chronic kidney disease in all countries. The study findings, however, contrasts Chow *et al.* (2012) study where it was reported that more than half of the respondents could specify diabetes, hypertension and hereditary conditions as risk factors to chronic kidney disease.

More than one-tenth of the respondents said that increased fatigue is a symptom of chronic kidney disease which might be due to the nature of their work which exhausts them most of the time but no major record of chronic kidney disease. Less than half of the respondents mentioned ways of preventing CKD to be keeping blood pressure under control. This is similar to Kabaye*et*

al.(2019) study where it was documented that less than half of the respondents identified keeping blood pressure under control as a means of preventing chronic kidney disease. Also, less than half of the respondents reported that keeping weight under control and more than one-third of the respondents said it is by keeping blood sugar level under control which is lower compared to a study by Dada *et al.* (2015) which 42.4% was documented.

Most of the respondents knew that taking prescribed medication is a way of managing chronic kidney. This could be attributed to the general belief in the curative effect of drugs. Most of the respondents agreed that herbal supplements can be effective in treating CKD which is in contrast to Oluyombo *et al*(2016) study where less than half of the respondents agreed that herbal supplements can be effective in treating CKD. However, this could be due to the cultural belief in herbal supplements in the south-west of Nigeria. Less than half of the respondents reported mouth sucking of petrol as a means of preventing chronic kidney disease. This act increases the risk of increasing lead in their blood concentration. Due to this knowledge, the auto-mechanics and allied professionals will be taking in more of lead that increases their chances of developing Chronic Kidney Diseases. This knowledge needs to be corrected.

5.1.3 Perceived susceptibility to Chronic Kidney Disease

Most of the respondents had a negatively perceived susceptibility to chronic kidney disease. This result is similar to that of a study by Boulware *et al.,* (2009) where most did not feel susceptible to chronic kidney disease. The majority of the respondents agreed that the consumption of local herbs cannot predispose them to CKD. This could be due to the perception of the healing benefits of herbs without having any side effects. One-fourth of the respondents disagreed that long term exposure to car batteries; gasoline cannot make them have CKD. The respondents might have this perception because they are exposed to car batteries, gasoline almost every day and might not have had any signs or symptoms that could be traced to the use of these materials. Also, some might have the perception that some of their mentors in the auto-mechanic field are still alive without signs or symptoms of chronic kidney disease, so there might not be a possibility of those materials making them susceptible to the disease which many of the respondents disagreed that consumption of alcohol makes them active.

More than half of the respondents agreed that CKD is caused by witches. This might be because of the spiritual dominancy in the study area. Almost one fourth disagreed that hand washing has no relationship with CKD. This perception will increase the ingestion of lead substances while food is being consumed. At times, the auto-mechanics fed with bare hands and due to low handwashing practice, they feed with the gasoline contaminated hands. Also, some of them consume meals in their workshops, placing themselves in a position where they are being exposed to lead (WHO., 1980).

5.1.4 Predisposing Factors to Chronic Kidney Disease

The majority of the take herbal concoction and this could also be due to cultural belief in herbs to cure all diseases. Herbal medicine with an undefined level of toxicity may also induce kidney toxicity due to its inherent properties. Asif (2012) stated that asides the inherent properties of herbal products leading to kidney disorders, herb-drug interactions, mistakes in dosage and identification, and contaminants within the mixture are all issues of concern in terms of Chronic Kidney Disease. The use of herbal medicine by most of the study respondents predisposes them to Chronic Kidney Disease.

Most of the respondents take pain-killers. This could be a result of the strenuous nature of their job and the findings support Ahmed *et al*. (2018) findings where it was reported that the majority of the respondents take pain killers. Many of the respondents take alcohol and almost one- fifth have family members with chronic kidney disease which is in proximity with the findings of William *et al.* (2007) where 14.0% of the respondents have family members with chronic kidney disease. Few of the respondents smoke cigarettes. This is close to a study by Oluyombo *et al.* (2016) where it was recorded that few of the respondents smoke cigarettes. Few of the respondents have diabetes mellitus and it is similar to Ahmed *et al.* (2019). Being diabetic, uncontrolled smoking habit and excessive consumption of alcohol and the long-term use of analgesic medication contribute to the risk of kidney disease (Marley and Metzger, 2015). This shows that some of the respondents have predisposing factors for chronic kidney disease.

Only a few of the respondents wear gloves and nose mask while using lead-containing materials or substances. Not using these protective materials exposes the study respondents to lead-containing materials or substances like gasoline. The exposure to lead was reported to be

associated with chronic kidney level in a study conducted by Muntner, He, Vupputuri, Coresh and Batuman (2003). Some studies reported cases of mechanics ingesting and inhaling gasoline, leading to an increase in the amount of lead in their body system (Anetor, Babalola, Adeniyi and Akingbola, 2002;Oluwagbemi, 2007). It was also reported that auto-mechanic sucks petrol and make use of it to wash their hands, thereby leading to the absorption of lead via the mucosa into their bloodstream (Oluwagbemi, 2007).

5.1.5Practice of preventive measures against Chronic Kidney Disease

Almost all of the respondents had a poor practice of preventive measures. This could be a result of their poor knowledge of chronic kidney disease. Several studies have demonstrated the relationship between patient's awareness about chronic kidney disease and its associated risk factors and their potential readiness to engage in lifestyle modifications and other health-promotion behaviors (Chow *et al.*, 2012; Wright-Nunes *et al.*,2012) all aimed at preventing the occurrence and progression of the disease. Therefore, improved population knowledge about chronic kidney disease and its risk factors remains a critical prevention approach, especially among vulnerable populations.

Most of the respondents reduced the level of stress faced every day. This could be as a result of the experience and faster ways of getting their job done. Few of the respondents do not smoke, had never consumed alcohol, wears gloves and nose mask while using lead-containing materials/ substances and wash hands with soap and running water. The handwashing lifestyle could be due to the fact that the nature of their job which makes their hands dirty at all times and it could be stressful having to wash all the time.

The hypothesis revealed that there is no difference between the respondent's level of knowledge of chronic kidney disease and preventive measures. This shows that the knowledge level of CKD disease doesn't translate into preventive measures practices of the auto-mechanics and allied professionals. However, there was a difference between their perceived susceptibility to CKD and preventive measures of CKD. This shows that their level of perceived susceptibility has a role to play on their preventive measures. Therefore, interventions targeting the auto-mobiles and

allied professionals' perception should be given attention to so as to promote preventive measures of chronic kidney disease

5.1.6Implications of the findings for health promotion and education

The findings of this study have several implications for planning, development and implementation of sensitization and advocacy program for promoting Chronic Kidney Diseases prevention among Auto-Mechanics and Allied professionals in Bodija community, Ibadan North local government area. It was revealed that there is a gap in the knowledge of the auto-mechanics and allied professionals in Bodija community as majority of the respondents have poor knowledge of chronic kidney disease. Also they are certain predisposing factors associated with Chronic Kidney Disease that they are exposed to due to the nature of their job. This population needs to be known about this disease, their risk to it and various ways to prevent themselves from chronic kidney disease.

The role of knowledge in influencing perception and prevention practices cannot be over emphasized. Therefore, health promoters and educators should target this population and educate them on chronic kidney disease. Also, communication materials on chronic kidney disease prevention such as fliers, pamphlets, posters, should be designed to suit the Auto-mechanics and Allied professionals, so as to increase their knowledge on chronic kidney disease and its prevention. They should also be educated on the predisposing factors to CKD and how they can reduce their risk to chronic kidney disease as regards their occupation.

Health outreaches could be planned among this population to aid primary prevention of the disease before its occurrence. Activities such as BMI check, blood pressure check and blood sugar checkup, should be carried out during these outreaches so as to monitor BMI, BP and blood sugar level of the population. Also, members of this population with diabetes and high-blood pressure should be encouraged to ensure secondary prevention of the disease by going for chronic kidney disease screening.

The stakeholders in the community should also be worked with so as to advocate for the implementation of policies that will ensure the use of personal protective equipment such as gloves, while working with lead materials.

5.2 Conclusions

Most of the respondents had poor knowledge about CKD among the populace and most of them had negative perceived susceptibility towards chronic kidney disease. The majority of the respondents believe in the use of herbs in the prevention and the management of CKD which shows a gap in the adequate knowledge about the disease. Predisposing factors according to chronic kidney disease among the respondents include the use of herbal concoctions, self-medication using analgesics, smoking, drinking alcohol and not wearing gloves and nose masks while using lead-containing materials or substances. The level of preventive practices among the respondents was poor. However, majority are willing to check the condition of their kidney.

5.3 Recommendations

Based on the findings of this study the following recommendations are made;

1. Further studies should be done to fully understand the factors and consequences associated with CKD awareness and education, so as to design and refine awareness campaigns aimed at the dissemination of basic CKD information.
2. Stakeholders in the medical community and government should follow the example of community campaigns as done for other communicable diseases like human deficiency virus (HIV) and malaria to promote awareness about CKD.
3. Concerted effort should be made to improve the level of the dwellers in the community with a view to a better understanding of the burden of CKD and the solutions to reduce the burden of its related risk factors community.
4. Policies should be set among this population to promote the use of personal protective equipments while working
5. NGOs and health professionals should ensure that while celebrating CKD day or month, the automobiles mechanics and allied professionals should be targeted considering the predisposing factors associated with them.
6. Associations and bodies in charge of the auto-mechanics and allied professionals should ensure regular monitoring of the use of personal protective equipments among the mechanics.

REFERENCES

Abikoye, G. E. and Fusigboye, A. 2010. Gender locus of control and smoking habits of undergraduate students. African Journal of Drug and Alcohol Studies; 9(2): 71-80

Adejumo O. A., Akinbodewa A. A., Iyawe I. O., Emmanuel A. and Ogungbemi O. 2018. Assessment of knowledge of chronic kidney disease among non-nephrology nurses in Akure, South-West Nigeria. *Saudi J Kidney Dis Transpl.* 29:1417-23

Aderemi B. A., Carien E. L., Jimmy A. V. and Razeen D., 2017. Prevalence of chronic kidney disease and association with cardiovascular risk factors among teachers in Cape Town, South Africa, Clinical Kidney Journal, Volume 10, Issue 3, Pages 363–369,

Adham M. L., 1997. Renal effects of environmental and occupational lead exposure. Environ Health Perspect. 105:928–38

Agarwal R., Rizkala A. R., Bastani B., Kaskas M. O., Leehey D. J. and Besarab A. 2006. A Randomized Controlled Trial of Oral versus Intravenous Iron in Chronic Kidney Disease.*Am J Nephrol.*26:445-454.DOI: 10.1159/000096174.

Agarwal, R. 2008. The challenge of discovering patient-level cardiovascular risk factors in chronic kidney disease.*Kidney International*, 73(12), pp.1340-1342.

Ahmad Paras Akhtar, Usman Chaudhry, Ahmed Rashid, Usman Saif, and Sarmad Asif Jawaad. 2019. Repercussions of diabetes mellitus on the oral cavity. 8. 55-62. 10.4103/ejgd.ejgd-28-19.

Akpan, E. and Ekrikpo, U. 2015. Chronic Kidney Failure: Knowledge of Kidney Disease, Perception of Causes and Symptomatology in Uyo, Nigeria. *Open Journal of Nephrology*, **5**, 91-97. DOI: 10.4236/ojneph.2015.53014

Alberti, K. M., Zimmet, P. and Shaw, J. 2007. International Diabetes Federation: a consensus on Type 2 diabetes prevention. Diabetic Medicine, 24 (5), pp. 451-463.

Albright, A. L. and Gregg, E. W. 2013. Preventing type 2 diabetes in communities across the US: he National Diabetes Prevention Program. American Journal of Preventative Medicine, 44 (suppl 4), pp. 346-351

Alebiosu C. O, Ayodele O. E. 2006. The increasing prevalence of diabetic nephropathy as a cause of end-stagerenal disease in Nigeria.*Trop Doct*. 36:218-9

Amah, Ubuo Madu, Nnamdi Ahaneku, Joseph Ahaneku, Gladys Onah, Christian Onuegbu, Anaelechi Olisekodiaka, Japhet Okwara, John Dioka, and Chudi Meludu Samuel 2014. Evaluation of nephrotoxic effect of lead exposure among automobile repairers in Nnewi Metropolis. International Journal of Research in Medical Sciences. 2. 1107. 10.5455/2320-6012.ijrms20140893.

Anetor J. I., Babalola O. O., Adeniyi F. A. A., Akingbola T. S. 2002. Observations on the haematopoietic systems in tropical lead poisoning.Nigerian Journal of Physiological Sciences. 17(1-2):9–15.

Anupama, Y. and Uma, G. 2014. Prevalence of chronic kidney disease among adults in a rural community in South India: Results from the kidney disease screening (KIDS) project. *Indian Journal of Nephrology*.24(4), p.214.

Anyabolu E. N., Chukwuonye I I., Arodiwe E., Ijoma C. K. and Ulasi I. 2016. Prevalence and predictors of chronic kidney disease in newly diagnosed human immunodeficiency virus patients in Owerri, Nigeria. *Indian J Nephrol*.26(1):10–15.

Asif M. 2012. A brief study of the toxic effects of some medicinal herbs on the kidney. *Advanced biomedical research*. 44. DOI:10.4103/2277-9175.100144

Auto mechanic Edu. 2018. Women in the auto repair industry. Retrieved from: https://www.automechanicschooledu.org/2018/05/women-in-the-auto-repair-industry

Bakx, J. C., van den Hoogen, H. J., van den Bosch, W. J., van Schayck, C. P., van Ree, J. W., Thien, T., and van Weel, C. 1999. Development of blood pressure and the incidence of hypertension in men and women over an 18-year period: results of the Nijmegen Cohort Study. *Journal of clinical epidemiology*, *52*(6), 531–538. https://doi.org/10.1016/s0895-4356(99)00023-2

Barsoum R. S., 2006. Chronic kidney disease in the developing world. *N Engl J Med*. 354(10):997–999.

Becker M. H., Maiman L. A., Kirscht J. P., Haefner D. P., Drachman R. H., and Taylor D. W. 1979. Patient perceptions and compliance: Recent studies of the Health Belief Model. In: Haynes RB, Taylor DW, editors. Compliance in Health Care.

Bello A., Kawar B. and El Kossi M., 2010. Epidemiology and pathophysiology of chronic kidneydisease. In: Floege J, Johnson RJ, Feehally J: Compehensive Clinical Nephrology FourthEdition. Section XV. Chapter 75: 3251 Riverport Lane St. Louis, Missouri 63043. Elsevier Saunders; P:912.

Bhat M. 2014. Tobacco use and awareness patterns among students of an industrial training Institute in Mangalore, South India. *Int J Biomed Res*.5:368–70.

Botdorf J., Chaudhary K., and Whaley-Connell A. 2011. Hypertension in cardiovascular and kidney disease. *Cardiorenal Med*. 1:183-192.

Boulware, L., Carson, K., Troll, M., Powe, N., and Cooper, L. 2009. Perceived Susceptibility to Chronic Kidney Disease among High-risk Patients Seen in Primary Care Practices.*Journal of General InternalMedicine*.24(10), pp.1123-1129.

Brandt H. D. and Muller G. J. 1995. Traditional medicine. CME;13: 1053-60

Brewster, U. C. and Perazella, M. A. 2004. A review of chronic lead intoxication: an unrecognized cause of chronic kidney disease**.** *Am J Med Sci*. 327: 341–347

Bruce R. J., Djamali A., Shinki K., Michel S. J., Fine J. P. and Pozniak M. A. 2009. Background fluctuation of kidney function versus contrast-induced nephrotoxicity. AJR Am J Roentgenol.;192(3):711-8. doi: 10.2214/AJR.08.1413. PMID: 19234268.

Bruce, J., Tarullo, A. R., and Gunnar, M. R. 2009.Disinhibited social behavior among internationally adopted children.*Development and psychopathology.21*(01), 157-171.

Burton R. and Sheron N. 2018. No level of alcohol consumption improves health. *Lancet.*;392(10152):987–8.

Campbell, N. R., Ashley, M.J., Carruthers, S.G., Lacourciere, Y., and McKay, D.W. 1999. Lifestyle modifications to prevent and control hypertension. 3. Recommendations on alcohol consumption. Canadian Hypertension Society, Canadian Coalition for High Blood Pressure Prevention and Control, Laboratory Centre for Disease Control at Health Canada. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/10333849.

Cardenas A., Roels H., Bernard A. M., Barbon R., Buchet J. P. and Lauwerys R. R. 1993. Markers of early renal changes induced by industrial pollutants: II, Application to worker exposed to lead. *Br J Ind Med*. 50:28–36

Cass A. The Economic Impact of End-Stage Kidney Disease in Australia: Projections to 2020. 2010. Kidney Health Australia

CDC. 2009. An overview of chronic kidney disease in Australia, 2009. 7th ed. Canberra: Australian Institute of Health and Welfare.

Centers for Disease Control and Prevention. 2008. Global Youth Tobacco Survey (GYTS) Core Questionnaire, Surveillance Summaries, 2000-2007. MMWR 2008;57 (No.SS-1). http://www.cdc.gov/tobacco/global/GYTS/ factsheets/pdf.

Chadban, S. J. 2015. Cost to government and society of chronic kidney disease stage 1-5: A national cohort study. *Internal Medicine Journal*. 45(7), 741–747.

Chan M., Kelly J., Batterham M. and Tapsell L. A. 2008. High Prevalence of Abnormal Nutrition Parameters Found in Pre-Dialysis End-Stage KidneyDisease: Is it a Result of Uraemia or Poor Eating Habits? *J RenNutr*. 24 (5), 292-302

Chanda R. and Fenves A. Z. 2009. Hypertension in patients with chronic kidney disease. *Curr Hypertens Rep*. 11(5): 329-336. doi: 10.1007/s11906-009-0056-z

Chang A., Van H. L., Jacobs D. R., Liu K., Muntner P., Newsome B., Shoham D. A., Durazo-Arvizu R., Bibbins-Domingo K., Reis J., and Kramer H. 2013. Lifestyle-related factors, obesity, and incident microalbuminuria: the CARDIA (Coronary Artery Risk Development in Young Adults) study. *Am J Kidney Dis*. 62:267–275

Charlotte Jones-Burton, Stephen L. Seliger, Roberta W. Scherer, Shiraz I. Mishra, Ghazal Vessal, Jeanine Brown, Matthew R. Weir, Jeffrey C. Fink. 2007. Cigarette Smoking and Incident Chronic Kidney Disease: A Systematic Review. *Am J Nephrol* ;27:342–351

Chavers, B. and Parekh, R. 2005. Getting Serious About Pediatric Chronic Kidney Disease. *Advances in Chronic Kidney Disease*.12(4), pp.341-342.

Cheng, Y., Schwartz, J., and Sparrow, D. 2001. Bone lead and blood lead levels in relation to baseline blood pressure and the prospective development of hypertension the Normative Aging Study. *Am J Epidemiol*. 2001; 153: 164–171

Chobanian A. V., Bakris G. L. and Black H. R., 2003. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA*.;289:2560-2572.

Chow W. L., Joshi V. D., Tin A. S., van der Erf S., Lim J. F. and Swah T. S. 2012. Limited knowledge of chronic kidney disease among primary care patients--a cross-sectional survey. BMC Nephrol. 13:54. doi: 10.1186/1471-2369-13-54.

Chow, K. M., Szeto, C. C., Kwan, B. C., Chung, K. Y., Leung, C. B., and Li, P. K. 2009. Factors associated with sudden death in peritoneal dialysis patients. *Peritoneal dialysis international : journal of the International Society for Peritoneal Dialysis*, *29*(1), 58–63.

Christiansen J. S. 1978. Cigarette smoking and prevalence of microangiopathy in juvenile-onset insulin-dependent diabetes mellitus. *Diabetes Care*. 1(3):146-149.

Chukwuonye II, Oviasu E. 2012. The plight of chronic kidney disease patients in Nigeria.*J Dental Med Sci*. 2(2):52–55

Clarke, A., Yates, T., Smith, A. and Chilcot, J. 2016. Patient's perceptions of chronic kidney disease and their association with psychosocial and clinical outcomes: a narrative review. *Clinical Kidney Journal*.9(3), pp.494-502.

Conrad K. M., Flay B. R., Hill D. 1992. Why children start smoking cigarettes: predictors of onset. British J Addict. 87:1711–24.

Cook, W. 2009. The Intersection of Geriatrics and Chronic Kidney Disease: Frailty and Disability Among Older Adults with Kidney Disease. *Advances in Chronic Kidney Disease*, 16(6), pp.420-429.

Crone M. R., Reijneveld S. A., Willemsen M. C., van Leerdam F. M., Spruijt R. D. and Sing RADH. 2003. Prevention of smoking in adolescents with lower education: a school based intervention study. *J Epidemiol Community Health.* 57:675–80.

Dada, Samuel Ayokunle, Olanrewaju, Timothy Olusegun, Aderibigbe, Ademola, Chijioke, Adindu, Rafiu, Mojeed Olaitan, and Ajayi, Akande Oladimeji. 2015. Prevalence of Chronic Kidney Disease in newly diagnosed patients with Human immunodeficiency virus in Ilorin, Nigeria. *Brazilian Journal of Nephrology*. 37(2), 177-184. https://dx.doi.org/10.5935/0101-2800.20150029

de Vries H. 1995. Socio-economic differences in smoking: Dutch adolescents' beliefs and behaviour. *Soc Sci Med*.41:419–24.

Devins G. M., Mendelssohn D C., Barre P. E., Taub K., and Binik Y. M. 2005. Predialysis psychoeducational intervention extends survival in CKD: A 20-year follow-up. *Am J Kidney Dis*. 68:1777-83.

Diabetes Prevention Program Research Group. 2002. Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin. New England Medical Journal, 346 (6), pp. 393-403.

Diabetes Prevention Program Research Group. 2009. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. Lancet, 374 (9702), pp. 1677-1686.

Díaz-González de Ferris, M., Del Villar-Vilchis, M., Guerrero, R., Barajas-Valencia, V., Vander-Schaaf, E., de Pomposo, A., Medeiros, M., Rak, E., Cantu-Quintanilla, G., Raina, R. and Alvarez-Elias, A. 2017. Self-Management and Health Care Transition AmongAdolescents and Young Adults with Chronic Kidney Disease: Medical and Psychosocial Considerations. *Advances in Chronic Kidney Disease*.24(6), pp.405-409.

Ebele M., Umeukeje, Marcus G., Wild, SaugarMaripuri, Teresa Davidson, Margaret Rutherford, Khaled Abdel-Kader, Julia Lewis, Consuelo H. Wilkins, and Kerri Cavanaugh. 2018. Black Americans' Perspectives of Barriers and Facilitators of Community Screening for Kidney Disease. *CJASN*. 13 (4) 551-559; DOI: https://doi.org/10.2215/CJN.07580717

Eddy, A. 2005.Progression in Chronic Kidney Disease. *Advances in Chronic Kidney Disease*.12(4), pp.353-365.

Egbi O. G., Okafor U. H., Miebodei K. E., Kasia B. E., Kunle-Olowu O. E. and Unuigbe E. I. 2014. Prevalence and correlates of chronic kidney disease among civil servants in Bayelsa state, Nigeria. Niger J Clin Pract. Sep-Oct;17(5):602-7. doi: 10.4103/1119-3077.141426. PMID: 25244271.

Egbi O. G., Unuigbe E, Oviasu E. 2014. Prevalence of chronic kidney disease in patients with metabolic syndrome: a single-center experience in Nigeria. *Afr J Nephrol*. 17(1):28–34.

Ejerblad E., Fored M. C. and Lindblad P. 2006. Obesity and risk for chronic renal failure. *J. Am. Soc. Nephrol.* 17, 1695–1702

Ellam, T. 2015. The Gerontologist, 55 (Suppl_2), pp.70-70.

Elsa Morgado and Pedro Leão Neves 2012. Hypertension and Chronic Kidney Disease: Cause and Consequence – Therapeutic Considerations, Antihypertensive Drugs, Hossein Babaei, IntechOpen, DOI: 10.5772/36916. Available from: https://www.intechopen.com/books/antihypertensive-drugs/hypertension-in-chronic-kidney-disease-cause-and-consequence-therapeutic-considerations-

Fernando, H.N., Wimaladasa, I.T.P., Sathkoralage, A.N., 2019. Socioeconomic factors associated with tobacco smoking among adult males in Sri Lanka. *BMC Public Health* **19,** 778. doi:10.1186/s12889-019-7147-9

Forouzanfar M H., Alexander L, Anderson H. R. and Bachman V. F. 2013. Global, regional, and national comparative risk assessment of 79behavioural, environmental and occupational, and metabolic risks or clusters of risks in188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study. Lancet 2015;386:2287–2323.

Foster M. C., Hwang S. J., Larson M. G., Lichtman J. H., Parikh N. I., Vasan R S., Levy D and Fox C. S. 2008. Overweight, obesity, and the development ofstage 3 CKD: the Framingham Heart Study. *Am J Kidney Dis*. 52:39–48.

Fox C. S., Larson M. G. and Leip E. P. 2004. Predictors of new-onset kidney disease in a community-based population. JAMA. 2004; 291:844–850

Gabrielson K. 2013. Renal Toxicological Pathology. Retrieved from: http://www.hopkinsmedicine.org.

Gall M. A., Borch-Johnsen K., Hougaard P., *et al*. 1995. Albuminuria and poor glycemic control predict mortality in NIDDM. **Diabetes**. ; *44*: 1303–1309.

Gheewala P. A., Peterson G. M., Zaidi S. T., Jose M. D. and Castelino R. L. 2018. Public knowledge of chronic kidney disease evaluated using a validated questionnaire: a cross-sectional study. BMC Public Health. Mar 20;18(1):371. doi: 10.1186/s12889-018-5301-4. PMID: 29554891; PMCID: PMC5859642.

Gillies, C.L., Abrams, K.R., Lambert, P.C., Cooper, N.J., Sutton, A.J., Hsu, R.T. and Khunti, K. 2007. Pharmacological and lifestyle interventions to prevent or delay type 2 diabetes in people with impaired glucose tolerance: systematic review and meta analysis. British Medical Journal, 334, 299. Available: doi:10.1136/bmj.39063.689375.55

Goldstein, S. and Devarajan, P. 2008. Progression from Acute Kidney Injury to Chronic Kidney Disease: A Pediatric Perspective. *Advances in Chronic Kidney Disease*.15(3), pp.278-283.

Goyer R. A., Weinberg C. R., Victery W. M. and Miller C. R. 1989. Lead induced nephrotoxicity: Kideny calcium as an indicator of tubular injury. In: Bach PH, Lock EA, editors. Nephrotoxicity: Invitro to invivo Animals to man. New York: Plenum Press. 1989. pp. 11–20

Gregg, E.W., Boyle, J.P., Thompson, T.J. *et al.* 2013. Modeling the impact of prevention policies on future diabetes prevalence in the United States: 2010–2030. *Popul Health Metrics* **11,** 18 . https://doi.org/10.1186/1478-7954-11-18

Griswold M. G., Fullman N., Hawley C., Arian N., Zimsen S. M. and Tymeson H. D. 2018. Alcohol use and burden for 195 countries and territories, 1990-2016: A systematic analysis for the Global Burden of Disease Study 2016. Lancet.;392(10152):1015–35.

Halimi J. M., Giraudeau B., Vol S *et al*. 2000. Effects of current smoking and smoking discontinuation on renal function and proteinuria in the general population. *Kidney Int.* 58: 1285-92

Halimi J. M., Giraudeau B., Vol S *et al*.: 2002. The risk of hypertension in men: direct and indirect
effects of chronic smoking. *J. Hypertens.* 20: 187-193

Halimi, J. M. and Mimran A. 2000. Renal effects of smoking: potential mechanisms and perspectives. Nephrol Dial Transplant. Vol.15, No. 7, pp. 938-940

Hallan S., de Mutsert R., Carlsen S., Dekker F. W., Aasarød K. and Holmen J. 2006. Obesity, smoking, and physical inactivity as risk factors for CKD: are men more vulnerable? *Am J Kidney Dis*. 47:396–405.

Hardy, S. T., Zeng, D., Kshirsagar, A. V., Viera, A. J., Avery, C. L., and Heiss, G. (2018). Primary prevention of chronic kidney disease through population-based strategies for blood pressure control: The ARIC study. *Journal of clinical hypertension* (Greenwich, Conn.), 20(6), 1018–1026. doi:10.1111/jch.13311

Hareell E. 2010. Hundreds die of lead poisoning in Nigeria. *Time: Health and Science*. Retrieved from: http://science.time.com/category/ecocentric/

Hart C. L., Smith G. D., Gruer L., *et al*. 2010. The combined effect of smoking tobacco and drinking alcohol on cause-specific mortality: a 30year cohort study. J.BMC Public Health; 10;789–80

Heeg, J. E. 1989. Efficacy and variability of the antiproteinuric effect of ACE inhibition by lisinopril. Kidney Int, Vol. 35, No.1, pp. 272-279.

Heiwe, S. and Jacobson, S. 2011. Exercise training for adults with chronic kidney disease. *Cochrane Database of Systematic Reviews*.

Holley, J. 2007. Pregnancy and Chronic Kidney Disease. *Advances in Chronic Kidney Disease*.14(2), p.115.

Hsu C. Y., McCulloch C. E., Iribarren C., *et al*. 2006. Body mass index and risk for end-stage renal disease. *Ann Inter Med*. 144:21–28

Hu, X., Sang, Y., Yang, M., Chen, X. and Tang, W. 2018. Prevalence of chronic kidney disease-associated pruritus among adult dialysis patients. *Medicine*.97(21), p.e10633.

Hurtig A K., San Sebastián M. 2002. Geographical differences in cancer incidence in the Amazon basin of Ecuador in relation to residence near oil fields. *Int J Epidemiol* . 31:1021-7.

Hussain, S., Habib, A. and Najmi, A. K. 2019. 'Limited Knowledge of Chronic Kidney Disease among Type 2 Diabetes Mellitus Patients in India'.

Iranpour, A., and Nakhaee, N. 2019. A Review of Alcohol-Related Harms: A Recent Update. *Addiction and health*, *11*(2), 129–137. https://doi.org/10.22122/ahj.v11i2.225

Iseki K., Ikemiya Y., Kinjo K *et al.* 2004. Bodymass index and the risk of development of end-stage renal disease in a screened cohort.*Kidney Int.* 65(5), 1870–1876

Jacob S., Hery M., Protois J. C., Rossert J. and Stengel B. 2007. New insight into solvent-related end-stage renal disease: occupations, products, and types of solvents at risk. *Occup Environ Med.* 64:843–848.

James, M. T., Hemmelgarn, B. R., and Tonelli, M. 2010. Early recognition and prevention of chronic kidney disease. *Lancet (London, England)*, *375*(9722), 1296–1309. https://doi.org/10.1016/S0140-6736(09)62004-3

Janssen W. M., Hillege H., Pinto-Sietsma S. J *et al*. 2000. Low levels of urinary albumin excretion

are associated with cardiovascular risk factors in the general population *Clin. Chem. Lab. Med.* 38: 1107-1110

Jha V and Rathi M. Natural medicines causing acute kidney injury. *Semin. Nephrol. 2008; 28: 416-28.*

Jha V., Garcia-Garcia G., Iseki K., *et al*. 2013. Chronic kidney disease: global dimension and perspectives. *Lancet*. 382(9888):260–272.

Johansen, O. E., and Birkeland, K. I. 2007. Defining the role of repaglinide in the management of type 2 diabetes mellitus: a review. *American journal of cardiovascular drugs : drugs, devices, and other interventions*, *7*(5), 319–335. https://doi.org/10.2165/00129784-200707050-00002

Joint Specialty Committee on Renal Medicine of the Royal College of Physicians and the Renal Association, and the Royal College of General Practitioners. 2006. Chronic Kidney Disease in Adults: UK Guidelines for Identification, Management and Referral. London. Royal College of Physicians. 186016 276 2, London, United Kingdom

Kabaye Kumela Goro, Amare Desalegn Wolide, FantuKerga Dibaba, 2019. Patient Awareness, Prevalence, and Risk Factors of Chronic Kidney Disease among Diabetes Mellitus and Hypertensive Patients at Jimma University Medical Center, Ethiopia. *BioMed Research International*. https://doi.org/10.1155/2019/2383508.

Karami S., Boffetta P., Brennan P., *et al*. 2011. Renal cancer risk and occupational exposure to polycyclic aromatic hydrocarbons and plastics *J Occup Environ Med*..53:218-23.

Kattelmann K.K., *et al*. 2014. Development of Young Adults Eating and Active for Health Internet-Based Intervention via a Community-Based Participatory Research Model.*Journal of Nutrition Education Behaviour*.Vol 46(2) 10-25.

KDOQI. 2004. Clinical Practice Guidelines on Hypertension and Antihypertensive Agents in Chronic Kidney Disease. Am J Kidney Dis, Vol. 43, Suppl. 1, (May, 2004), pp. S65-S230

Khalid, S. 2012. Frailty in Chronic Kidney Disease: Prevalence and Associated Risk Factors. *American Journal of Kidney Diseases,* 59(4), p.B54.

Khalil, A. and Abdalrahim, M. 2014. Knowledge regarding CKD. Int Nurs Rev, 61: 237-245. https://doi.org/10.1111/inr.12085

Khrone, E. 2017. Prevalence and Risk of Pulmonary Hypertension in Chronic Kidney Disease. *International Journal of Science and Research (IJSR)*, 6(7), pp.947-950.

Kim S. R., Kim O K., Yun K E., Khang Y H., Cho HJ. 2009. Socioeconomic factors associated with initiating and quitting cigarette smoking among Korean men. Korean J Fam Med. 30:415–25.

Kim, M., Lee, J., Yoo, M., Boo, S. and Kang, N. 2016. Impact of Chronic Kidney Disease Among Koreans Adults with Chronic Obstructive Pulmonary Disease. *Nephrology Dialysis Transplantation*, 31(suppl_1), pp. i452-i452.

Klag M. J., Whelton P. K., Randall B. L., Neaton J. D., Brancati F. L., Ford C. E., Shulman N. B., Stamler J. 1996. Blood pressure and endstage renal disease in men. *N Engl J Med*. 334: 13–18

Klag M. J., Whelton P. K., Randall B. L., Neaton J. D., Brancati F. L. and Stamler J. 1997. End-stage renal disease in African-American and white men. 16-year MRFIT findings. JAMA.
30;277(16):1293-1298.

Kohlhagen, J. and Kelly, J. 2008.Vascular Disease and Risk Factors in Chronic Kidney Disease. *Vascular Disease Prevention*, 2(1), pp.321-331.

Koopmans J. R., Slutske W. S., Heath A. C., Michael C., Neale M. C. and Boomsma D. I. 1999. The genetics of smoking initiation and quantity smoked in Dutch adolescent and young adult twins. Behav Genet. 29:383–93.

Kramer H., Luke A., Bidani A., Cao G., Cooper R. and McGee D 2005. Obesity and prevalent and incident CKD: the Hypertension Detection andFollow-Up Program. *Am J Kidney Dis.*46:587–594.

Kumar, S., Bogle, R., Banerjee D. 2014.Why do young people with chronic kidney disease die early? *World J Nephrol:* 6; 3(4): 143-155

Kwuonu C. G., Chukwuonye I I,, Ogah S. O., Abali C., Adejumo O. A., Oviasu E. Awareness level of kidney functions and diseases among adults in a Nigerian population. Indian J Nephrol;25:158-63

Leal-Soto F. 2008. Les croyances épistemologiques des enseignants: étude exploratoire dans le contexte chilien. [Epistemological beliefs of teachers: preliminary study in Chilean context] In Baillat G, Hasni A, editors. La profession enseignante face aux disciplines scolaires: le cas de l'école primaire. Canada: Éditions du CRP, Université de Sherbrook;. p. 123–149.

Leinsalu M., Tekkel M. and Kunst A. E. 2007. Social determinants of ever initiating smoking differ from those of quitting: a cross-sectional study in Estonia. *Eur J Pub Health.* 17:572–8

Lenntech N. D. Heavy Metals. Retrieved from: https://www.lenntech.com/processes/heavy/heavy-metals/heavy-metals.html

Leone A., Landini L. and Leone A. 2010. What is tobacco smoke? Sociocultural dimensions of the association with cardiovascular risk. *Curr Pharm Des*. 16:2510–7.

Leventhal, T. and Liu, K. 2015. What a Nephrologist Needs to Know About Acute Liver Failure. *Advances in Chronic Kidney Disease*, 22(5), pp.376-381.

Levey A. S., Atkins R., Coresh J, *et al*. 2007.Chronic kidney disease as a global public health problem: approaches and initiatives – a position statement from Kidney Disease Improving Global Outcomes. *Kidney Int*. 72(3):247–259.

Levey A. S., de Jong PE, Coresh J, *et al*. 2011. The definition, classification, and prognosis of chronic kidneydisease: a KDIGO Controversies Conference report. Kidney Int. 80:17-28

Levin, A. 2008. Guidelines for the management of chronic kidney disease. CMAJ, Vol. 179, No.11, (November, 2008), pp.1154-1162

Li W., Hsia J. and Yang G. H. 2011. Prevalence of smoking in China in 2010. *N Engl J Med*. 364:2469–70.

Lim H. K., Ghazali S. M., Kee C. C., Lim K. K., Chan Y. Y., Teh H. C., *et al*. 2013. Epidemiology of smoking among Malaysian adult males: prevalence and associated factors. BMC Public Health. 13:8.

Luyckx V. A. and Naicker S. 2008. Acute kidney injury associated with the use of traditional medicines. Nat. Clin. Pract. *Nephrol.; 4: 664–71*.

Madore F., White C. T., Foley R. N., Barrett B. J., Moist L. M., Klarenbach S. W., *et al*. Clinical Practice Guidelines for assessment and management of iron deficiency. *Kidney International - Supplement* 2008, (S110):S7-S11. [MEDLINE: 18668119]

Mahdavi-Mazdeh M. 2010. Why do we need chronic kidney disease screening and which way to go? *Iran J Kidney Dis*.; 4:275–81.

Marley T, and Metzger M. 2015. A Longitudinal Study of Structural Risk Factors for Obesity and Diabetes Among American Indian Young Adults, 1994–2008. Preventing Chronic Disease, 12.

Mathers C. D. and Loncar D. 2006. Projections of global mortality and burden of disease from 2002-2030.http://dx.doi.org/10.1371/journal.pmed.0030442.

Matthew T James, Brenda R Hemmelgarn, and Marcello Tonelli. 2010. Early recognition and prevention of chronic kidney disease. https://doi.org/10.1016/S0140-6736(09)62004-3

Maura Ravera, Michela Re, Luca Deferrari, Simone Vettoretti, and Giacomo Deferrari. 2006. Importance of Blood Pressure Control in Chronic Kidney Disease. *J Am Soc Nephrol* 17: S98–S103, 2006. doi: 10.1681/ASN.2005121319

Mayer O., Simon J., Heidrich J., Cokkinos D. and De Bacquer D. 2004. Educational level and risk profile of cardiac patients in the EUROASPIRE II substudy. J Epidemiol Community Health. 2004;58:47–52

McClellan W. M., Newsome B. B., McClure L. A., Howard G., Volkova N., Audhya P., Warnock DG: 2010. Poverty and racial disparities in kidney disease: the REGARDS study. Am J Nephrol., 32 (1): 38-46.

McCormick-Brown K., Jones and Barlett 1999. Publishing, editor. Health Belief Model. Retrieved from: http://www.jblearning.com/samples/0763743836/ chapter 4.pdf

McMahon, L. 2008. The Clinical Epidemiology of Cardiovascular Diseases in Chronic Kidney Disease: Hemodynamic Cardiovascular Risk Factors in Chronic Kidney Disease: What are the Effects of Intervention?. *Seminars in Dialysis*, 16(2), pp.128-139.

Meguid E. L., Nahas A., Bello A. K. 2005. Chronic kidney disease: the global challenge. Lancet 365: 331–340.

Meguid El and Nahas. 2005. The global challenge of chronic kidney disease. *Kidney International,* Vol. 68. pp. 2918–2929

Mehrotra, R. 2006. Vascular calcification in chronic kidney disease: Evolving pathogenesis with progressive chronic kidney disease? *Kidney International*. 69(1), p.195.

Menke, A., Muntner, P., Batuman, V. *et al*. 2006. Blood lead levels below 0.48 µmol/l (10 µg/dl) and mortality among US adults**.** *Circulation*. 114: 1388–1394

Menon V.**,** Gul A.andSarnak M. J. 2005. Cardiovascular risk factors in chronic kidney disease. *Kidney Int*.68(4):1413–8.

Mercado C. and Jaimes E. A. 2007. Cigarette smoking as a risk factor for atherosclerosis and renal disease: novel pathogenic insights. *Curr Hypertens Rep.* 9(1): 66-72

Michel D. 2010. Crude Oil Health Hazards. Retrieved from: http://www.sciencecorps.org. Model. *Communication Monographs.* 59*,* 329-349.

Moshki M. and Dehnoalian A. 2016. Effect of Precede–Proceed Model on Preventive Behaviors for Type 2 Diabetes Mellitus in High---Risk Individuals.*ClinicalNursingRes.:*1---13. doi:10.1177/1054773815621026.

Muhammad, S. and Sen, B. 2014.The Importance of Raising Chronic Kidney Disease (CKD) Awareness for Young People and Parents. *International Journal of User-Driven Healthcare.*4(4), pp.56-70.

Mukherjea A., Morgan P. A., Snowden L. R., Ling P. M. and Ivey S. L. 2012. Social and cultural influences on tobacco-related health disparities among south Asians in the United States. Tob Control. 21:422–8.

Muntner P. L., He J., Vupputuri S., Coresh J. and Batuman V. 2003. Blood lead and chronic kidney disease in the general United States population: results from NHANES III. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/12631086

Muntner, P., Menke, A., Batuman, V. Rabito F. A., He .J. and Todd A. C. 2007. Association of tibia lead and blood lead with end-stage renal disease: a pilot study of African Americans. *Environ Res*. 2007; 104: 396–401

National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. 2012. Preventing tobacco use among youth and young adults: a report of the surgeon general. Atlanta (GA): Centers for Disease Control and Prevention (US).

Nawrot, T. S. and Staessen, J. A. 2006. Low-level environmental exposure to lead unmasked as silent killer. *Circulation*. 114: 1347–1349

Nawrot, T. S., Thjis, L., Den Hond, E. M. *et al*. 2002. An epidemiologic re-appraisal of the association between blood pressure and blood lead: a meta-analysis**.** *J Hum Hypertens*. 2002; 16: 123–131

Neugarten, J. and Golestaneh, L. 2013.Gender and the Prevalence and Progression of Renal Disease. *Advances in Chronic Kidney Disease*.20(5), pp.390-395

Ngendahayo, Flavien, Mukamana, Donatilla Ndateba, Innocent Nkurunziza, Aimable Adejumo and Oluyinka Chironda, Geldine. 2019. Chronic Kidney Disease (CKD): knowledge of risk factors and preventive practices of CKD among students at a University in Rwanda. Rwanda Journal of Medicine and Health Sciences. 2. 185. 10.4314/rjmhs.v2i2.15.

Nortier J. L. and Vanherweghem J. L. 2007. For patients taking herbal therapy lessons from aristolochic acid nephropathy. *Nephrol. Dial. Transplant. 22: 1512-17*

Nuyts, G.D., Van Vlem, E., Thys, J. *et al*. 1995. New occupational risk factors for chronic renal failure**.** Lancet. 346: 7–11 o_crisis_2008.pdf

Obrador G. T., Garcia-Garcia G., Villa A. R., Rubilar X., Olvera N., Ferreira E., *et al*. 2010. Prevalence of chronic kidney disease in the Kidney Early Evaluation Program (KEEP) Mexico and comparison with KEEP US. *Kidney Int Suppl*. 116:S2-8.

Odubanjo M. O., Oluwasola A. O. and Kadiri S. 2011. The epidemiology of the end-stage renal disease in Nigeria: the way forward. *IntUrolNephrol*. 43:785-92.

Okaka E. I. and Unuigbe E. I., 2014. Eight-year review of hemodialysis: treated patients in a tertiary center in Southern Nigeria. *Ann Afr Med*. 13:221-5.

Okoye C. A., Oviasu E. and Ojogwu L. 2011. Prevalence of chronic kidney disease and its risk factors among adults in a rural population in Edo state, Nigeria. *J US-China Med Sci.* 8:471-81

Okwuonu C. G., Chukwuonye I. I., Ogah S. O., Abali C., Adejumo O A. and Oviasu E. 2015. Awareness level of kidney functions and diseases among adults in a Nigerian population.*Indian J Nephrol.*25:158-63

Olokor A., B, Ojogwu I., L, Ugbodaga P. F.2016. Hyperhomocysteinemia in chronic kidney disease patients in a teaching hospital in Nigeria. *Br J Med Med Res*. 18(9):1–7.

Oluseyi A., Adejumo**,** Ayodeji A., Akinbodewa**,** Enajite I., Okaka**,** Oladimeji E., Alli**,** Ifedayo F and Ibukun**.** 2016.Chronic kidney disease in Nigeria: Late presentation is still the norm. *Nigerian Med J*. 57(3): 185-189

Oluwagbemi B. F. 2007. Basic Occupational Health and Safety. 2nd. Ibadan, Nigeria: Vertex Media Limited

Oluyombo R., Ayodele O. E., Akinwusi P. O., Okunola O. O., Gbadegesin B. A., Soje M. O. and Akinsola A. 2016. Awareness, knowledge, and perception of chronic kidney disease in a rural community of South-West Nigeria.*Niger J ClinPract*. 19:161-9

Orth S. R. 1997. The renal risks of smoking. *Kidney International* .51: 1669-1677.

Orth S. R. 2000. Smoking – a renal risk factor. *Nephron.* 86(1): 12-26.

Orth S. R. 2003. Cigarette smoking: an important renal risk factor – far beyond carcinogenesis. Tobacco Induced Diseases, Vol. 1, No.2, (June, 2003), pp. 137-155

Orth S. R. 2004. Effects of smoking on systemic and intrarenal hemodynamics: influence on renal function. *J Am Soc Nephrol*. 15: S58-S63

Orth S. R., Ogata H. and Ritz E. 2000. Smoking and the kidney. *NDT.* 15: 1509-11.

Owonaro, Peter A. and Eniojukan, Joshua F. 2015. Who are the Smokers and what Factors Influence Smoking among Amassoma Community in South-South Nigeria? IOSR Journal of Pharmacy. Volume 5, Issue 9, PP. 24-31

Pan C. S., Ju T. R., Lee C. C., Chen Y. P., Hsu C. Y. and Hung DZ, 2018. Alcohol use disorder tied to development of chronic kidney disease: A nationwide database analysis. PLoS One.;13(9):e0203410.

Patel, N., Ferris., M. and Rak, E. 2016. Health and Nutrition Literacy and Adherence to Treatment in Children, Adolescents, and Young Adults with Chronic Kidney Disease and Hypertension, North Carolina, 2015. *Preventing Chronic Disease*, 13.

Phaniendra, A., Jestadi, D. B., and Periyasamy, L. 2015. Free radicals: properties, sources, targets, and their implication in various diseases. *Indian journal of clinical biochemistry: IJCB*, *30*(1), 11–26. doi:10.1007/s12291-014-0446-0

Phillips S. C., Petrone R. L. and Hemstreet G. P. 1988. A review of the non-neoplastic kidney effects of hydrocarbon exposure in humans. *Occup Med* . 3:495-509

Pinto-Sietsma S. J, Navis G., Janssen W. M., deZeeuw D., Gans R O. and de Jong PE. 2003. A central body fat distribution is related to renal function impairment, even in lean subjects. .41:733–741

Pinto-Sietsma S. J., Mulder J., Janssen W. M., Hillege H. L., de Z. D. and de Jong P. E. 2000. Smoking is related to albuminuria and abnormal renal function in nondiabetic persons. *Ann Intern Med*. 133(0003-4819; 8):585-591.

Plantinga, L., Tuot, D. and Powe, N. 2010. Awareness of Chronic Kidney Disease AmongPatients and Providers. *Advances in Chronic Kidney Disease*.17(3), pp.225-236.

Praga M., Hernandez E., Herrero JC *et al.* 2000. Influence of obesity on the appearance of proteinuria and renal insufficiency afterunilateral nephrectomy. *Kidney Int.* 58, 2111–2118

Praga, M. 2006. Weight loss and proteinuria. In: Obesity and the Kidney, G. Wolf (Ed.), pp. 221-229, ISBN 10:3-8055-1164-5

Pscheidt C., Nagel G., Zitt E., *et al*. 2015. Sex- and time-dependent patterns in risk factors of end-stagerenal disease: a large Austrian cohort with up to 20 years of follow-up. *PLoS One*. 10:e0135052

Radican L., Wartenberg D., Rhoads G. G., Schneider D,, Wedeen R., Stewart P. and Blair A. 2006. A retrospective occupational cohort study of end-stage renal disease in aircraft workers exposed to trichloroethylene and other hydrocarbons. *J Occup Environ Med*. 48:1–12.

Ramirez, S.P., McClellan, W., Port, F.K., and Hsu, S.I. 2002. Risk factors for proteinuria in a large, multiracial, southeast Asian population. J Am SocNephrol. 13: 1907–1917

Rao M. V., Qiu Y., Wang C. and Bakris G. 2008. Hypertension and CKD: Kidney Early Evaluation Program (KEEP) and National Health and Nutrition Examination Survey (NHANES), 1999-2004. *Am J Kidney Dis*.51(suppl 2):S30-S37.

Renosky, R. J., Hunt, B., and Hill-Briggs, F. 2008. Counseling People Living With Diabetes. Journal of Rehabilitation. Vol. 74, No.4, 31-40.

Richard halmai. 2013. Role of cigarette smoke in chronic kidney diseases**.** University of Pécs, Faculty of Medicine, 2nd Department of InternalMedicine, Pécs, Hungary

Roomizadeh, P., Taheri, D., Abedini, A., Mortazavi, M., Larry, M., Mehdikhani, B., Mousavi, S. M., Hosseini, F. A., Parnia, A. and Nakhjavani, M. 2014. Limited knowledge of chronic kidney disease and its main risk factors among Iranian community: an appeal for promoting national public health education programs. *International journal of health policy and management*, *2*(4), 161–166. https://doi.org/10.15171/ijhpm.2014.37

Rose, G., Khaw, K. and Marmot, M. (2008) Rose's strategy of preventative medicine.Oxford: Oxford University Press.

Russell M., Cooper M.L., Frone M.R., and Welte, J.W. 1991 Alcohol drinking patterns and blood pressure. Am J Public Health 81(4):452–457.

Sacks, F. M. 2001. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. N Engl J Med, Vol. 344, No.1, pp. 3-10

Sarafidis P. A, Li S., Chen S. C., Collins A. J., Brown W. W., Klag M. J. and Bakris G. L. 2008. Hypertension awareness, treatment, and control in chronic kidney disease. *American Journal of Medicine.*vol. 121, no. 4, pp. 332–340

Schaeffner E. S., Kurth T., de Jong P. E., Glynn R. J., Buring J. E. and Gaziano J. M. 2005. Alcohol consumption and the risk of renal dysfunction in apparently health men. *Arch Intern Med*. 165:1048–53

Schaeffner E. S., Kurth T., Jong P. E., Glynn R. J., Buring J. E. and Gaziano J. M. 2005. Alcohol consumption and the risk of renal dysfunction in apparently health men. Arch Intern Med. ;165:1048–1053. doi: 10.1001/archinte.165.9.1048.

Schober, S.E., Mirel, L.B., Graubard, B.I. *et al*. 2006. Blood lead levels and death from all causes, cardiovascular disease, and cancer: results from the III NHANES mortality study. *Environ Health Perspect*. 114: 1538–1541

Sen U. and Basu A. .2000. Factors influencing smoking behaviour among adolescents. *Asian Pacific Journal of Cancer Prevention; 1 (4):305-309*

Shankar A., Klein R. and Klein B. E. 2006. The association among smoking heavy drinking, and chronic kidney disease. *Am J Epidemiol*. 164:263–71

Shield K. D., Parry C. and Rehm J. 2013, Chronic diseases and conditions related to alcohol use. Alcohol Res.; 35(2):155–73

Shlipak M. G., Fried L. F., Cushman M., Manolio T. A., Peterson D., Stehman-Breen C, *et al*. 2005. Cardiovascular mortality risk in chronic kidney disease: comparison of traditional and novel risk factors. JAMA. 293:1737–45

Shomar, R. T., Lubbad, K. I. and Ansari, W. E. (2014). smoking, awareness of smoking-associated health risks, and knowledge of national tobacco legislation in Gaza, Palestine.Central European *journal of public health; 22(2): 80-89*

Shorecki K, Green J and Brenner B. M 2005. Chronic renal failure. (16thedn). Harrison's Principles of Internal Medicine. McGraw Hill Companies Inc.USA.

Sinclair, P. M., Day, J., Levett Jones, T. and Kable, A. 2017. Barriers and facilitators to opportunistic chronic kidney disease screening by general practice nurses.*Nephrology*. 22: 776-782. doi:10.1111/nep.12856

Slawta J. N. and DeNeui D., 2009. Be a Fit Kid: Nutrition and Physical Activity for the Fourth Grade. *HealthPromotionPractice*.doi:10.1177/1524839908328992.

Snyder J. J. and Collins A. J. 2009. KDOQI hypertension, dyslipidemia, and diabetes care guidelines and current care patterns in the united states CKD population: National health and nutrition examination survey 1999-2004. *American Journal of Nephrology*. vol. 30, no. 1, pp. 44–54.

Spry, L. 2008.Building the Chronic Kidney Disease Management Team. *Advances in Chronic Kidney Disease*, 15(1), pp.29-36.

Stabouli S., Papakatsika S. and Kotsis V. 2011. The role of obesity, salt and exercise on blood pressure in children and adolescents Vol. 9, No. 6, 753-761

Stanifer, J. W., Muiru, A., Jafar, T. H., and Patel, U. D.2016. Chronic kidney disease in low- and middle-income countries. Nephrology, dialysis, transplantation: official publication of the European Dialysis and Transplant Association - European Renal Association, 31(6), 868–874. doi:10.1093/ndt/gfv466

Staplin, N., Haynes, R., Herrington, W. G., Reith, C., Cass, A. and Fellström, B. .2016. Smoking and Adverse Outcomes in Patients With CKD: The Study of Heart and Renal Protection (SHARP). *American journal of kidney diseases : the official journal of the National Kidney Foundation*.68(3), 371–380. doi:10.1053/j.ajkd.2016.02.052

Stewart-Dixon T. 2017.Opinion on Primary and Secondary Prevention of Chronic Kidney Disease.J HealthcCommun. 2:68. doi: 10.4172/2472-1654.100109

Sundell L., 2010. Alcohol consumption and binge drinking as risk factors for cardiovascular diseases and depression. Available: http://www.thl.fi/thl-client/pdfs/c3a42431-a4f8-4eac-8d75-8daa06d5a3a3. Accessed 5 July 2011.

Tan A. U., Hoffman B. and Rosas S. E. 2010. Patient perception of risk factors associated with chronic kidney disease morbidity and mortality. *Ethn Dis.* 20:106-10.

Taylor L. Plant Based Drugs and Medicines. Retrieved from: http:// www.raintree.com/ plantdrugs.htm.

Tonelli M., Wiebe N., Culleton B., House A., Rabbat C., Fok M., McAlister F. and Garg A. X. 2006. Chronic kidney disease and mortality risk: a systematic review. J Am Soc Nephrol.;17(7):2034-47. doi: 10.1681/ASN.2005101085. Epub 2006 May 31. PMID: 16738019.

Tozawa M., Iseki K., Iseki C., Kinjo K., Ikemiya Y. and Takishita S. 2003. Blood pressure predicts risk of developing end-stage renal disease in men and women. *Hypertension* 41: 1341–1345

Tramm R. and McCarthy A. 2012. Using the Precede–Proceed Model of Health Program Planning in breast cancer nursing research. *JAdvNurs.*68(8):1870.

Tuot, D. and Boulware, L. 2017. Telehealth Applications to Enhance CKD Knowledge and Awareness Among Patients and Providers. *Advances in Chronic Kidney Disease*.24(1), pp.39-45.

U S Renal Data System (USRDS). 2010. Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. Bethesda, Md, USA

Ulasi I. I. and Ijioma C. K. 2010. The enormity of chronic kidney disease in Nigeria: The situation in a teaching hospital in South-East Nigetia.*J Trop Med.* 501957

Usman A. Khan, Amit X. Garg, Chirag R. Parikh and Steven G. Coca. 2013. Prevention of Chronic Kidney Disease and Subsequent Effect on Mortality: A Systematic Review and Meta-Analysis Published

Vassalotti J. A., Li S., McCullough P. A. and Bakris G. L. 2010. Kidney early evaluation program:A community-based screening approach to address disparities in chronic kidney disease. Semin Nephrol;30:66-73

Vivante A., Golan E., Tzur D., *et al*. 2012. Body mass index in 1.2 million adolescents and risk for endstage renal disease. Arch Intern Med. 172:1644–1650

Vivekanand Jha. Herbal medicines and chronic kidney disease. *Nephrology . 2010; 15: 10-17.*

Wang Y., Chen X., Song Y., *et al*. 2008. Association between obesity and kidney disease: a systematicreview and meta-analysis. *Kidney Int*. 73:19–33.

Watnick, S. 2007. Pregnancy and Contraceptive Counseling of Women with Chronic Kidney Disease and Kidney Transplants. *Advances in Chronic Kidney Disease*.14(2), pp.126-131.

Wedeen R.P. 2008. Lead nephropathy. In: De Broe M.E., Porter G.A., Bennett W.M., Deray G. (eds) Clinical Nephrotoxins. Springer, Boston, MA. https://doi.org/10.1007/978-0-387-84843-3_34

Wedeen, R. 2008. Lead nephropathy in: M.E. De Broe, G.A. Porter (Eds.) Clinical Nephrotoxins . 3rd edn. Springer Publishing Company, New York.773–784

Wedeen, R., Malik, D., and Batuman, V. 1979. Detection and treatment of occupational lead exposure. *Arch Intern Med*. 139: 52–57

West P., Sweeting H., and Young R. 2007. Smoking in Scottish youths: personal income, parental social class and the cost of smoking. Tob Control. 2007;16:329–35

White S. L., Polkinghorne K. R., Atkins R. C. and Chadban S. J. 2010. Comparison of the prevalence and mortality risk of CKD in Australia using the CKD Epidemiology Collaboration (CKD-EPI) and Modification of Diet in Renal Disease (MDRD) Study GFR estimating equations: the AusDiab (Australian Diabetes, Obesity and Lifestyle) Study. *Am J Kidney Dis*. 55: 660-670.

White S. L., Polkinghorne K. R., Cass A., Shaw J., Atkins R. and Chadban S. 2008. Limited knowledge of kidney disease in a survey of AusDiab study participants. *Med J Aust*. 188: 204-208.

WHO 2003. Gender, health and tobacco. Geneva Switzerland.

WHO 2007. Gender and Tobacco control: Apolicy brief 2007. Retrieved from http://www. Who.int/tobacco/resources/publications/general/ policy brief.pdf.

WHO 2008. WHO report on the global tobacco epidemic. The global tobacco crisis Tobacco global agent of death. http://www.who.int/tobacco/mpower/mpower_report_tobacc

WHO 2008. WHO Report on the global tobacco epidemic. The MPOWER package 2008. Retrieved from: http//www. who.int/ tobacco, mpower/mpower _report_full_2008.pdf.

WHO 2011. WHO report about Global Tobacco Epidemic. Warning about dangers of tobacco. World Health Organization, Geneva, Switzerland

Wilkinson A. V., Vasudevan V, Honn S. E., Spitz M. R. and Chamberlain R. M. 2009. Socio demographic characteristics, health beliefs, and the accuracy of cancer knowledge. *J Cancer Educ.* 24:58–64.

William McClellan, Rebecca Speckman, Leslie McClure, Virginia Howard, Ruth C. Campbell, Mary Cushman, Paul Audhya, George Howard, David G. Warnock. 2007. Prevalence and Characteristics of a Family History of End-Stage Renal Disease among Adults in the United States Population: Reasons for Geographic and Racial Differences in Stroke (REGARDS) Renal Cohort Study. *JASN*. 18 (4) 1344-1352; DOI: 10.1681/ASN. 2006090952

Wilson L. M., Tang E. A., Chander G, Hutton H. E., Odelola O. A. and Elf J. L. 2012. Impact of tobacco control interventions on smoking initiation, cessation, and prevalence: a systematic review. *J Environ Public Health*.e961724

Witte, K. 1992. Putting the fear back into fear appeals: The Extended Parallel Process

Wittmann I, Laczy B. and Mikolás E. 2007. Smoking induces insulin resistance and increases the risk of type 2 diabetes and metabolic syndrome, as well. *Diabetologia Hungarica.* XV/4: 305-311.

World Health Organisation. 1980. Report of WHO Study Group. 647. Geneva, Switzerland: WHO; 1980. Recommended health-based limits in occupational exposures to health metals

World Health Organization. 2018. Global status report on alcohol and health 2018 [Online]. Available from: URL: https://www.who.int/substance_abuse/publications/global_alcohol_report/en/

World Kidney Day. 2015. Chronic Kidney Disease. Available from: http://www.worldkidneyday.org/faqs/chronic-kidney-disease/. Accessed December 10, 2017.

World Kidney Day. 2019. Chronic Kidney Disease. Retrieved from: http://www.worldkidneyday.org/ faqs/chronic-kidney-disease/.

Wright-Nunes J. A., Luther J. M. and Ikizler T. A. Cavanaugh KL. Patient knowledge of blood pressure target is associated with improved blood pressure control in chronic kidney disease. Patient Educ Couns. 2012;88(2):184-188.

Wyld, M. L., Lee, C. M., Zhuo, X., White, S., Shaw, J. E., Morton, R. L., Colagiuri, S., and

Yamagata K., Ishida K., Sairenchi T., Takahashi H., Ohba S., Shiigai T, *et al*., 2007. Risk factors for chronic kidney disease in a community based population: a 10-year follow-up study. *Kidney Int*. 71:159–66.

Yamagata, K. 2007. Response to 'Risk factors affecting the incidence of chronic kidney disease'. *Kidney International*, 71(10), p.1076.

Yamamoto, T. 2010. Proteomics Database in Chronic Kidney Disease. *Advances in Chronic Kidney Disease*.17(6), pp.487-492.

Yayoi Funakoshi, Hisamitsu Omori, Ayumi Onoue, Shuichi Mihara,Yasuhiro Ogata, Takahiko Katoh. 2012. Association between frequency of drinking alcohol and chronic kidney disease in men. *Environ Health Prev Med*. 17:199–204

Yidana A., Boakye-Yiadom A. and Osei M. 2016.Tobacco use and its socio-cultural dimension among male adults in northern Ghana. Public Health Res. 6:64–8.

Yusoff Dariah Mohd, Yusof Junaiti and Kueh Yee Cheng 2016. "Knowledge, Attitude And Practices Of The Risk For Chronic Kidney Disease Among Patients In A Tertiary Teaching Hospital", *The Malaysian Journal of Nursing (MJN)*, 8(2), pp. 3-11. Available at: https://ejournal.lucp.net/index.php/mjn/article/view/509 (Accessed: 8February2021).

APPENDICE

APPENDIX I

QUESTIONNAIRE

KNOWLEDGE AND PERCEIVED SUSCEPTIBILITY TO CHRONIC KIDNEY DISEASES AMONG AUTO-MECHANICS AND PROFESSIONALS IN BODIJA COMMUNITY OF IBADAN NORTH LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

Dear Respondent,

I am a Master's student at the Department of Public Health, University of Ibadan College Hospital, Ibadan. I am currently conducting this study titled "Knowledge and Perceived Susceptibility to Chronic Kidney Diseases among Auto-Mechanics and Professionals in Bodija Community of Ibadan North Local Government Area, Oyo State, Nigeria".

This research is part of the requirement for the award of a Master's Degree in Public Health. The information gained through this research will be used to address gaps and limitations in current approaches to preventing Chronic Kidney Diseases in Bodija Community of Ibadan-North, Oyo State, Nigeria.

Please note that you are not supposed to write your name, address and telephone number on the questionnaire. Kindly feel free to express your view and be rest assured that your responses will be kept confidential. I will appreciate your honest and sincere response to the following questions.

Thank you for your co-operation.

Can we start now?

Yes ☐

Consent obtained **Date:** _____

No ☐ *If no, please end this interview now* ***Serial No****: ……..*

Section A: Socio-Demographic Factors

1. Age _____ (in years)
2. Gender: (i) Male [] (ii) Female [ ]

3. Ethnic group: (i) Yoruba [ ] (ii) Hausa [ ] (iii) Igbo [ ]
   (iv) Others (Please Specify) _____
4. Religion: (i) Christianity [ ] (ii) Islam [ ] (iii) Traditional [ ]
   (iv) Others (Please Specify) _____
5. Occupation: _____
6. Level of education: (i) Primary [ ] (ii) Secondary [ ] (iii) Tertiary [ ]
   (iv) No education [ ]
7. Marital Status: (i) Single [ ] (ii) Married [ ] (iii) Divorced [ ] (iv) Widowed [ ]
   (v) Separated [ ]
8. Marital Union: (i) Monogamous [ ] (ii) Polygynous [ ]

Previous Cases of Chronic Kidney Disease

9. How many people from this workshop have died in the last 5 years? _____
10. What did you think killed them? _____
11. Are you aware of any worker who died of CKD in the last 5 years? (i) Yes [ ] (ii) No [ ]
12. Are there opportunities for you to monitor health of your kidney?
    (i) Yes [ ] (ii) No [ ]
13. Have you ever gone for CKD screening before? (i) Yes [ ] (ii) No [ ]
14. Will you be willing to undergo screening for CKD if the opportunity is available?
    (i) Yes [ ] (ii) No [ ]

Section B: Knowledge of Chronic Kidney Disease

15. What is CKD? _____
    What causes CKD?

	Causes	**Yes**	No
16	High blood pressure		
17	Diabetes		

18. Mention 2 Symptoms of CKD?
    i _____
    ii_____

CKD can be prevented by?

	Variable	Yes	No
19	Keeping blood sugar levels under control		
20	Keeping blood pressure under control		
21	Keeping weight under control		
22	Proper washing of hands		
23	Mouth sucking of petrol		
24	Regular cutting of nails		

CKD can be managed by?

		Yes	No
25	Taking prescribed medications		
26	Control blood pressure		
27	Control blood glucose level		

28. Can herbal supplements be effective in treating chronic kidney disease?

(i) Yes [ ] (ii) No [ ]

29. Can drugs help to slowdown the worsening of chronic kidney disease?

(i) Yes [ ] (ii) No [ ]

30. Total Score obtained:

31. Code:

Section C: Perceived susceptibility to Chronic Kidney Disease

Kindly consider the following statements in this section carefully and answer by inserting the mark [X]. Use the key: **A**= Agreed; **D**= Disagree.

S/N	Perceived Susceptibility Of Chronic Kidney Disease	A	D
32.	Consumption of Local herbs cannot predispose me to CKD		
33.	Long term exposure to car batteries, gasoline cannot make me have CKD		
34.	Consumption of alcohol makes me active		
35.	Chronic disease is caused by witches		

36.	Only very rich people are at risk of having CKD		
37.	Hand washing has no relationship with CKD		
38.	Drinking alcohol cannot predispose me to CKD		

39. Total Score obtained:

40. Code:

Section D: Predisposing factors to CKD

41. Do you consume alcohol? (i) Yes [ ] (ii) No [ ]

42. Do you smoke cigarette? (i) Yes [ ] (ii) No [ ]

43. Do you take pain killers? (i) Yes [ ] (ii) No [ ]

44. Do you take herbal concoction? (i) Yes [ ] (ii) No [ ]

45. Do you wear gloves and a nose mask while using lead-containing materials/substances? Yes [ ] (ii) No [ ]

46. Do you have a family member with CKD? (i) Yes [ ] (ii) No [ ]

Do you have these following conditions?

	Variables	**Yes**	**No**
47.	Diabetes Mellitus		
48.	Hypertension		

Section E: Practice of preventive measures against Chronic Kidney Disease

49. Check body weight regularly? (i) Yes [ ] (ii) No [ ]

50. Exercise regularly? (i) Yes [ ] (ii) No [ ]

51. Reduces stress levels in everyday life? (i) Yes [ ] (ii) No [ ]

52. Check blood pressure level regularly? (i) Yes [ ] (ii) No [ ]

53. Check blood sugar levels regularly? (i) Yes [ ] (ii) No [ ]

54. Wash hands with soap under running water before eating (i) Yes [ ] (ii) No [ ]

55. Wash hands with soap under running water only after eating? (i) Yes [ ] (ii) No [ ]

56. Drinks herbal concoction every day? (i) Yes [ ] (ii) No [ ]

57. Stop smoking? (i) Yes [ ] (ii) No [ ]

58. Never smoked cigarettes? (i) Yes [ ] (ii) No [ ]

59. Stop alcohol consumption? (i) Yes [ ] (ii) No [ ]

60. Never consume alcohol? (i) Yes [ ] (ii) No [ ]

61. Wears gloves and nose mask while using lead-containing materials/substances?
(i) Yes [ ] (ii) No [ ]

62. Total Score obtained:

63. Code:

APPENDIX II

ETHICAL APPROVAL LETTER

TELEGRAMS..... TELEPHONE.....

OYO STATE: THE PACESETTER

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/479/1513

30th October, 2019

The Principal Investigator,
Department of Health Promotion and Education,
Faculty of Public Health,
College of Medicine,
University of Ibadan,
Ibadan.

Attention: Ige Opeyemi

ETHICS APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "Knowledge and Perceived Susceptibility to Chronic Kidney Disease among Auto-Mechanic and Allied Professionals in Bodija Community of Ibadan North Local Government Area, Oyo State." has been reviewed by the Oyo State Ethics Review Committee.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

4. Wishing you all the best.

OYO STATE RESEARCH ETHICS REVIEW COMMITTEE
Signature & Date
MINISTRY OF HEALTH

Dr. Abbas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethics Review Committee