



Daffodil
International
University

Project Report

**A cross sectional survey on CKD in two different
hospitals in Dhaka, Bangladesh**

[In the partial fulfilment of the requirements
for the degree of Bachelor of pharmacy]

Submitted To

The Department of Pharmacy,
Faculty of Allied Health Sciences,
Daffodil International University

Submitted By

Student ID: 191-29-236

Batch: 21st DSC-B

Department of Pharmacy,
Faculty of Allied Health Sciences,
Daffodil International University

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APPROVAL

The Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has approved the project paper entitled "A cross sectional survey on CKD in different hospitals in Dhaka, Bangladesh" as satisfactory for partial fulfillment of the requirements for the degree of Bachelor of Pharmacy. The style and contents of the paper have also been approved.

BOARD OF EXAMINERS

.....

Dr. Muniruddin Ahmed
Professor and Head,
Department of Pharmacy,
Faculty of Allied Health Sciences,
Daffodil International University

.....

Internal Examiner 1

.....

Internal Examiner 2

.....

External Examiner

DECLARATION

I hereby declare that I have completed the project report entitled "A cross sectional survey on CKD in different hospitals in Dhaka, Bangladesh" under the guidance of Farhana Israt Jahan, Assistant Professor, Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University. This project represents my own original work, and I assert that neither this report nor any of its parts have been submitted elsewhere for the award of a Bachelor's degree or any other degree.

Supervised By,



Farhana Israt Jahan
Associate Professor,
Department of Pharmacy,
Faculty of Allied Health Sciences,
Daffodil International University

Submitted By,



Ahasan Habib
ID: 191-29-236
Department of Pharmacy,
Faculty of Allied Health Sciences,
Daffodil International University

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Author

AHASAN HABIB

Dedication

I dedicate a special feeling of gratitude to my loving parents and teachers, whose words of encouragement and push for tenacity ring in my ears. My brother has never left my side, and he is very special.

ABSTRACT

Chronic kidney disease (CKD) is a growing public health problem in Bangladesh. This study aims to evaluate the prevalence of CKD and associated risk factors among patients attending the National Institute of Kidney Diseases and Urology (NIKDU) and Kidney Foundation Hospital & Research Institute (KFHRI) in Dhaka, Bangladesh. The study was carried out from January to April, both indoors and outdoors of the NIKDU & KFHRI facility, located in Shera-e-Bangla Nagar, Dhaka-1207 & Mirpur-1, Dhaka-1216, Bangladesh. A total of 100 patients were enrolled in the study, and their medical histories and demographic information were collected through interviews and medical records. The results of the study showed that the prevalence of CKD was 52% among the patients attending NIKDU & 48% among the patients attending KFHRI. The majority of the patients were male (59%), and the mean age was 48.8 years. A total of 33% of patients had problems with protein in their urine; 16% of patients had problems with physical damage; 68% of patients had high blood pressure; 13% of patients had problems with bone disease; 78% of patients had problems feeling weak and tired; 40% of patients had problems with swelling in their hands and feet; 13% of patients had problems with heart attacks; and 66% of patients had problems with pain in their lower backs before their visit to NIKDU & KFHRI. In conclusion, feeling weak and tired and high blood pressure are the most common risk factors for CKD.

Keywords: CKD, NIKDU, KFHRI, prevalence of CKD, diabetes, hypertension, awareness, screening.

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Chapter - ONE

Introduction

1.1. Introduction

Chronic kidney disease (CKD) is a condition that occurs when the kidneys become damaged or unable to properly filter waste products and excess fluid from the blood.[1] The condition is chronic, meaning it is long-lasting and often progressive, which means that it can worsen over time. CKD is a common health problem, affecting millions of people worldwide. In fact, according to the National Kidney Foundation, Chronic kidney disease (CKD) affects 10% of people globally, and millions more are at risk of developing the condition.[2] The kidneys are important organs that play a vital role in maintaining overall health. They filter waste products and excess fluids from the blood, regulate blood pressure, and help to maintain the balance of electrolytes in the body. When the kidneys become damaged or are unable to function properly, waste products can build up in the blood, leading to a range of health problems.[3] CKD is often a result of other health conditions such as high blood pressure, diabetes, and heart disease. These conditions can cause damage to the kidneys over time, leading to a gradual decline in kidney function. However, in some cases, CKD can also be caused by infections, inflammation, and other factors. One of the challenges with CKD is that it often has no symptoms in its early stages. In fact, many people with early-stage CKD may not even be aware that they have the condition. As the condition progresses, however, symptoms may begin to appear, including fatigue, weakness, loss of appetite, nausea, and swelling in the hands and feet.

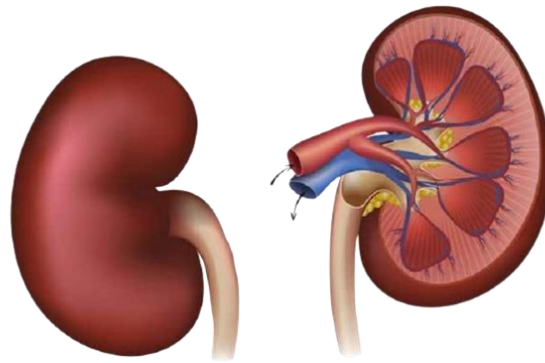


Fig 1.1: Chronic kidney disease

The severity of CKD is often classified into five stages based on the estimated glomerular filtration rate (eGFR), which is a measure of how well the kidneys are filtering waste products from the blood. Stage 1 CKD is the mildest form of the condition, with an eGFR of 90 or above, while stage 5 CKD is the most severe, with an eGFR of less than 15.[4] Treatment for CKD depends on the stage of the condition and the underlying cause. In the early stages, treatment may involve lifestyle changes such as maintaining a healthy diet, quitting smoking, and managing blood pressure and blood sugar levels. As the condition progresses, however, more aggressive treatments such as medication, dialysis, and kidney transplant may be necessary. In addition to medical treatment, there are also several steps that people with CKD can take to help manage their condition and improve their overall health.

In addition to medical treatment, there are also several steps that people with CKD can take to help manage their condition and improve their overall health. These include:

Following a healthy diet: Eating a balanced diet that is low in salt, fat, and protein can help to reduce the workload on the kidneys and slow the progression of the disease.[5]

Getting regular exercise: Regular exercise can help to improve cardiovascular health and maintain a healthy weight, which can help to reduce the risk of complications from CKD.[5]

Managing blood pressure and blood sugar levels: High blood pressure and diabetes are two of the leading causes of CKD, so managing these conditions is essential for preventing further kidney damage.[5]

Quitting smoking: Smoking can damage the blood vessels and increase the risk of cardiovascular disease, which can further damage the kidneys.[5]

Taking medications as prescribed: Certain medications can help to control blood pressure and other health conditions that can contribute to CKD.[5]

1.2. Understanding the progression of chronic kidney disease:

The severity of chronic kidney disease (CKD) is often classified into five stages based on the estimated glomerular filtration rate (eGFR), which is a measure of how well the kidneys are filtering waste products from the blood. The five stages of CKD are:

Stage 1 CKD: In this stage, the eGFR is normal or only slightly reduced, and there may be evidence of kidney damage or other risk factors for CKD. The eGFR in stage 1 is greater than or equal to 90. [6]

Stage 2 CKD: In this stage, the eGFR is mildly to moderately reduced, indicating some loss of kidney function. The eGFR in stage 2 is between 60 and 89.[6]

Stage 3 CKD: In this stage, the eGFR is moderately to severely reduced, indicating significant loss of kidney function. There may be symptoms of CKD, such as fatigue and swelling, at this stage. Stage 3 is further divided into two sub-stages:

Stage 3a: eGFR is between 45 and 59.[6]

Stage 3b: eGFR is between 30 and 44.[6]

Stage 4 CKD: In this stage, the eGFR is severely reduced, and there may be more significant symptoms of CKD, such as anemia, bone disease, and nerve damage. Stage 4 is further divided into two sub-stages:

Stage 4a: eGFR is between 15 and 29.[6]

Stage 4b: eGFR is less than 15.[6]

Stage 5 CKD: This is the most severe stage of CKD, also known as end-stage renal disease (ESRD), in which the kidneys have lost nearly all of their function. At this stage, dialysis or kidney transplant may be necessary to replace the lost kidney function. The eGFR in stage 5 is less than 15.[6]

It is important to note that the progression of CKD can vary from person to person, and not all people with CKD will progress to end-stage renal disease. Early diagnosis and appropriate treatment can help to slow the progression of the disease and improve outcomes for people with CKD.

1.3. What is the cause of CKD?

CKD (Chronic Kidney Disease) is a growing health problem in Bangladesh. According to a study conducted by the Bangladesh Renal Association, the prevalence of CKD in Bangladesh is estimated to be around 12%, and the leading causes of CKD in Bangladesh are diabetes and hypertension.[7]

Diabetes: The incidence of diabetes in Bangladesh has increased dramatically in recent years, and it is estimated that around 6 million people in Bangladesh are living with diabetes. Diabetes is a major risk factor for CKD, and studies have shown that around 30-40% of patients with diabetes will develop CKD. According to a study published in the Bangladesh Journal of Medicine, diabetes is the leading cause of CKD in Bangladesh, accounting for around 45% of cases.[8]

Hypertension: Hypertension is another major risk factor for CKD, and it is estimated that around 20-25% of patients with hypertension will develop CKD. In Bangladesh, the prevalence of hypertension is also increasing, and it is estimated that around 20% of the adult population in Bangladesh has hypertension. According to a study published in the Journal of Health, Population, and Nutrition, hypertension is the second leading cause of CKD in Bangladesh, accounting for around 30% of cases.[8]

Other factors that can contribute to the development of CKD in Bangladesh include poor nutrition, exposure to environmental toxins, and infections such as hepatitis B and C.[8]

Overall, the increasing prevalence of diabetes and hypertension in Bangladesh is a major contributor to the high rates of CKD in the country. Strategies to prevent and manage these conditions, including improving access to healthcare, promoting healthy lifestyles, and early detection and management of CKD, are crucial to reducing the burden of CKD in Bangladesh.

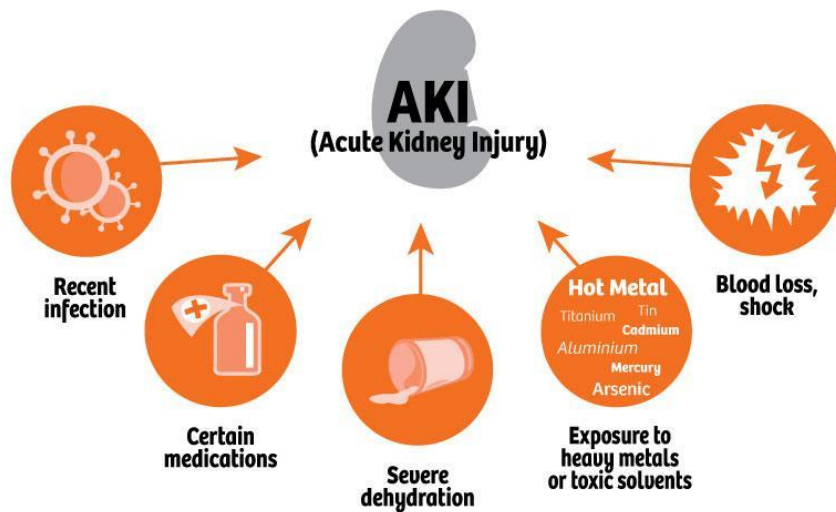


Fig 1.2: Causes of kidney disease

In addition to diabetes and hypertension, there are several other causes of CKD in Bangladesh, including:

Glomerulonephritis: Glomerulonephritis is a group of diseases that affect the glomeruli, which are the tiny blood vessels in the kidneys that filter waste and excess fluid from the blood. In Bangladesh, glomerulonephritis is a significant cause of CKD, accounting for around 10-15% of cases.[1]

Obstructive uropathy: Obstructive uropathy is a blockage of the urinary tract that prevents the normal flow of urine from the kidneys to the bladder. This can lead to damage to the kidneys over time, and in Bangladesh, obstructive uropathy is a significant cause of CKD, accounting for around 5-10% of cases.[1]

Polycystic kidney disease: Polycystic kidney disease is an inherited condition in which cysts (fluid-filled sacs) form in the kidneys, leading to kidney damage over time. While the prevalence of polycystic kidney disease in Bangladesh is not well established, it is estimated to be a relatively uncommon cause of CKD.[1]

Other causes: Other less common causes of CKD in Bangladesh include lupus nephritis, HIV-associated nephropathy, and interstitial nephritis.[1]

1.4. What are the symptoms of CKD?

The symptoms of CKD (Chronic Kidney Disease) in Bangladesh may vary depending on the stage and severity of the disease. In the early stages, CKD may not cause any noticeable symptoms, and many people with CKD in Bangladesh may not be aware that they have the disease until it has progressed to more advanced stages.

However, as CKD progresses, the following symptoms may develop:

Fatigue and weakness: Fatigue and weakness are common symptoms of CKD, as the kidneys play an essential role in producing red blood cells that carry oxygen to the body's tissues.[9]

Swelling: Swelling (edema) can occur in the legs, feet, and ankles due to the accumulation of fluid in the body.[10]

Shortness of breath: Shortness of breath can occur as a result of fluid buildup in the lungs or anemia (a shortage of red blood cells).[9]

Loss of appetite and nausea: The buildup of waste products in the blood can cause nausea and a loss of appetite.[9]

Difficulty sleeping: CKD can disrupt sleep patterns, leading to insomnia or frequent waking up at night.[10]

Itching and dry skin: CKD can cause dry, itchy skin due to the buildup of waste products in the blood.[10]

High blood pressure: High blood pressure is a common symptom of CKD in Bangladesh, as it can damage the kidneys and lead to further kidney damage.[9]

Changes in urine: Changes in urine, such as blood in the urine or foamy urine, can be a sign of kidney damage.[10]

It is essential to note that not all people with CKD will experience these symptoms, and some people may not experience any symptoms at all. If you are at risk for CKD or are experiencing any of these symptoms, it is important to consult a healthcare professional in Bangladesh for a proper diagnosis and treatment

1.5. How to diagnose CKD?

The diagnosis of Chronic Kidney Disease (CKD) involves several steps, which may include:

1.5.1. Medical history and physical exam:

Your healthcare provider will ask about your symptoms, medical history, and family history of kidney disease. They will also perform a physical exam to check for signs of kidney damage, such as swelling and high blood pressure.

1.5.2. Urine and blood tests:

Urine tests can help measure the amount of protein and other waste products in your urine, which can indicate kidney damage. Blood tests can help measure your kidney function by checking your creatinine and blood urea nitrogen (BUN) levels.

Urine Test

The urine test is a common diagnostic test used to detect kidney problems such as Chronic Kidney Disease (CKD).^[11] Here is a general overview of the urine test procedure:

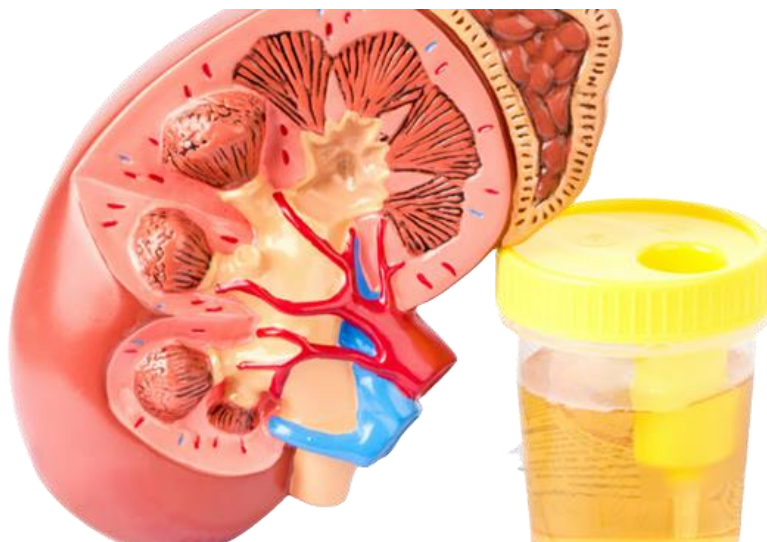


Fig 1.3: Urine test sample

Sample collection: A urine sample is collected from the patient. This can be done in several ways, including:

Midstream urine collection: This involves collecting a urine sample in the middle of urination after the first few drops have been passed.

24-hour urine collection: This involves collecting all urine produced during a 24-hour period in a special container.

Catheterization: This involves inserting a catheter through the urethra into the bladder to collect a urine sample.

Preparation: Before collecting the urine sample, the patient should follow any instructions given by their healthcare provider. This may include avoiding certain foods or medications that can affect the results of the test.

Testing: The urine sample is sent to a laboratory for analysis. The laboratory technician will test the urine for various substances, including:

Protein: High levels of protein in the urine can be a sign of kidney damage.

Glucose: High levels of glucose in the urine can be a sign of diabetes or kidney damage.

Creatinine: Creatinine levels in the urine can help determine how well the kidneys are functioning.

Other substances: The urine may also be tested for other substances, such as blood cells, bacteria, and drugs.

Results: The results of the urine test are usually available within a few days. The healthcare provider will review the results and discuss any abnormalities or concerns with the patient. Further testing may be needed to confirm a diagnosis of CKD or other kidney problems.

It is important to follow any instructions given by the healthcare provider for urine sample collection and preparation to ensure accurate results.

Test strip field	Measuring principle	Detection limit and range	Reference interval
Protein	Indicator error	approx. 300 mg/L albumin	negative
Albumin	Indicator error, immunoreactive	approx. 20 - 80 mg/L albumin	negative (< 20 mg/L)
Blood, hemoglobin, myoglobin	peroxidase like activity	approx. 1.5 - 6 mg Hb/L	negative (< 8 x 10 ⁶ /L)
Leukocytes	Indoxylesterase activity	approx. 5 - 10 x 10 ⁶ granulocytes/L	negative (< 5 - 8 x 10 ⁶ /L)
Glucose	Glucose oxidase method	approx. 1000 mg/L (5.2 mmol/L)	negative (< 2 mmol/L)
Nitrite	Griess' test	0.6 - 1 mg/L nitrit	negative
pH	Color-indicators	pH 5 - 9	pH 5 - 7.5
Concentration, „specific weight“	Polyelectrolyte detection of cations	Corresponding to 1000 - 1030	1010 - 1042 (corresponding to 300 - 1400 mosmol/L)

Fig 1.4: Urine test report

Blood Test

The blood test is a common diagnostic test used to detect kidney problems such as Chronic Kidney Disease (CKD). [11] Here is a general overview of the blood test procedure:

Sample collection: A blood sample is collected from the patient. This is usually done by inserting a needle into a vein in the arm.

Preparation: Before collecting the blood sample, the patient should follow any instructions given by their healthcare provider. This may include avoiding food or drinks for a certain period of time before the test.

Testing: The blood sample is sent to a laboratory for analysis. The laboratory technician will test the blood for various substances, including:

Creatinine: Creatinine is a waste product that is produced by muscles and removed by the kidneys. High levels of creatinine in the blood can be a sign of kidney damage.[11]

Blood Urea Nitrogen (BUN): BUN is a waste product that is produced by the liver and removed by the kidneys. High levels of BUN in the blood can be a sign of kidney damage.[11]

Glomerular Filtration Rate (GFR): GFR is a calculation based on the blood creatinine level, age, sex, and other factors. The GFR estimates how well the kidneys are filtering waste from the blood.[11]

Results: The results of the blood test are usually available within a few days. The healthcare provider will review the results and discuss any abnormalities or concerns with the patient. Further testing may be needed to confirm a diagnosis of CKD or other kidney problems.

It is important to follow any instructions given by the healthcare provider for blood sample collection and preparation to ensure accurate results.

Kidney function test items		Reference	Units
Blood urea nitrogen	BUN	5–25	mg/dL
Creatinine	CRE	0.3–1.4	mg/dL
Uric acid	UA	2.5–7.0	mg/dL
Albumin-globulin in ratio	A/G ratio	1.0–1.8	
Creatinine clearance/24 hrs urine	CC	M: 71–135 F: 78–116	mL/min
Renin	Penin	0.15–3.95	pg/mL/hr
Creatinine urine	Creatinine urine	60–250	mg/dL
Sodium	Na	135–145	meq/L
Potassium	K	3.4–4.5	meq/L
Calcium	Ca	8.4–10.6	mg/dL
Phosphorus	IP	2.1–4.7	mg/dL
Alkaline phosphatase	ALP	27–110	U/L

Fig 1.5: Blood test report

1.5.3. Imaging tests:

Imaging tests such as ultrasound, CT scan or MRI can help visualize the kidneys and detect any abnormalities.[\[11\]](#)

1.5.4. Kidney biopsy:

In some cases, a kidney biopsy may be needed to confirm the diagnosis and determine the underlying cause of kidney damage.[\[11\]](#)

1.5.5. GFR calculation:

Your estimated glomerular filtration rate (eGFR) will be calculated based on your blood test results to determine the stage of CKD. The GFR calculation result will be reported as a number in milliliters per minute per 1.73 square meters (mL/min/1.73m²). A GFR of 60 or higher is considered normal, while a GFR below 60 may be a sign of kidney damage or CKD. Further testing may be needed to confirm a diagnosis of CKD.[\[11\]](#)

Based on the results of these tests, your healthcare provider can diagnose CKD and determine the stage and underlying cause of the disease. Early detection and management of CKD can help slow down its progression and prevent complications.

Chapter - TWO

Literature Review

2.1. Title: Drug Utilization Pattern in Chronic Kidney Disease Patients at a Tertiary Care Public Teaching Hospital

Author: Rajiv Ahlawat, Sanjay D'cruz and Pramil Tiwari

This cross-sectional study investigates the drug utilization pattern in chronic kidney disease (CKD) patients at a tertiary care public teaching hospital. The study aims to identify the most commonly used drugs and to evaluate the appropriateness of drug prescribing in CKD patients.

The article begins by providing background information on CKD and its impact on drug metabolism and excretion. The authors note that CKD patients are at increased risk of adverse drug reactions and drug-drug interactions, making appropriate drug prescribing and monitoring critical in this population.

The study involved the analysis of medical records of 250 CKD patients, and the authors used the World Health Organization (WHO) core drug prescribing indicators to evaluate the appropriateness of drug prescribing in the study population. The authors also identified the most commonly prescribed drugs in CKD patients.

The study found that over 80% of CKD patients were prescribed at least one medication, and the most commonly prescribed drugs were angiotensin-converting enzyme inhibitors (ACEIs), diuretics, and calcium channel blockers. The authors note that these drugs are commonly used in CKD patients to manage hypertension and other comorbidities.

The study also found that the majority of prescriptions met the WHO core drug prescribing indicators, suggesting that drug prescribing in CKD patients at the study hospital is generally appropriate. However, the authors note that there is room for improvement in areas such as dosing adjustments based on renal function and monitoring for drug-drug interactions.

The article concludes by discussing the implications of the study for clinical practice, emphasizing the importance of appropriate drug prescribing and monitoring in CKD patients. The authors note that the study highlights the need for ongoing education and training for healthcare professionals to improve drug prescribing practices in CKD patients.

2.2. Title: Chronic Kidney Disease Diagnosis and Management

Author: Teresa K. Chen, MD, MHS, Daphne H. Knicely, MD, Morgan E. Grams, MD, PhD

This review article by Teresa K. Chen, Daphne H. Knicely, and Morgan E. Grams provides an overview of the diagnosis and management of chronic kidney disease (CKD). The authors begin by defining CKD and describing the epidemiology of the disease, noting that CKD is a common condition that affects millions of people worldwide and is associated with increased morbidity and mortality.

The article then discusses the diagnostic criteria for CKD, including measurement of glomerular filtration rate (GFR) and the presence of albuminuria. The authors emphasize the importance of early detection of CKD, as early intervention can prevent or delay the progression of the disease.

The article also discusses the management of CKD, including lifestyle modifications such as diet and exercise, as well as pharmacological interventions. The authors note that blood pressure control is a key aspect of CKD management, as hypertension is a common comorbidity in CKD patients and can contribute to disease progression.

The article highlights the importance of patient education and self-management in CKD, noting that CKD patients should be empowered to take an active role in their care. The authors also discuss the role of multidisciplinary care teams in CKD management, emphasizing the importance of collaboration between primary care providers, nephrologists, and other healthcare professionals.

The article concludes by discussing the future of CKD management, noting the potential of new technologies such as telemedicine and personalized medicine to improve outcomes for CKD patients. The authors also call for increased awareness and funding for CKD research, noting that advances in understanding the pathophysiology of the disease will be critical in developing more effective treatments.

2.3. Title: Data Mining Analysis of Chronic Kidney Disease (CKD) Level

Author: Muhammad Hafizam Afiq Bin Mohd Harizi

This research article by Muhammad Hafizam Afiq Bin Mohd Harizi aims to develop a predictive model for the early detection of chronic kidney disease (CKD) using data mining techniques. The article describes the methodology used to analyze a dataset of CKD patients and highlights the key findings of the study.

The article begins by providing background information on CKD, a progressive condition that can lead to kidney failure if not detected and managed early. The author notes that early detection of CKD is important in order to prevent or delay the progression of the disease.

The article then describes the dataset used in the study, which consisted of 400 CKD patients. The author used data mining techniques, specifically classification algorithms, to develop a predictive model for CKD based on patient data such as age, gender, blood pressure, and other clinical and laboratory measurements.

The article highlights the key findings of the study, including the identification of the most important factors associated with CKD, which were age, serum creatinine level, blood urea nitrogen level, and diabetes mellitus. The author notes that the predictive model developed in the study had a high accuracy rate of 98.5%, suggesting that data mining techniques can be effective in early detection of CKD.

The article concludes by discussing the potential implications of the study for clinical practice and public health. The author notes that the predictive model developed in the study can be used to identify high-risk individuals and to initiate early interventions to prevent or delay the onset of CKD. The author also suggests that data mining techniques can be used to analyze large datasets of CKD patients to identify new risk factors and potential treatment targets for the disease.

Overall, this research article highlights the potential of data mining techniques in early detection and management of chronic kidney disease. The study provides insights into the key factors associated with CKD and demonstrates the potential of predictive models to improve clinical outcomes for CKD patients.

2.4. Title: Risk Factors For Chronic Kidney Disease

Author: Rumezsa Kazanciog̃lu1

This review article provides an update on the risk factors for chronic kidney disease (CKD), a common and serious health condition that can lead to kidney failure and other complications. The article summarizes recent research on the topic and highlights key risk factors for CKD, including diabetes, hypertension, obesity, smoking, and aging.

The article notes that diabetes and hypertension are the two leading causes of CKD worldwide, and that the prevalence of CKD is increasing due in part to the rising rates of these two conditions. The article also discusses the role of obesity in CKD, with evidence suggesting that excess body weight and central obesity are independent risk factors for CKD.

Other risk factors discussed in the article include smoking, which has been shown to increase the risk of CKD and its progression, as well as aging, which is associated with declining kidney function and an increased risk of CKD. The article also notes that certain medications and environmental toxins can contribute to the development of CKD.

The article concludes by highlighting the importance of early detection and management of CKD risk factors in order to prevent the development and progression of the disease. The author notes that a comprehensive approach is needed to address CKD risk factors, including lifestyle modifications, pharmacological interventions, and public health initiatives.

2.5. Title: Prevalence and Risk Factors for Chronic Kidney Disease in Belize: A Population-based Survey

Author: Jian-Jhang Lin, MSA,§, Francis Morey, MD, MPHb,§, Hon-Yen Wu, MD, PhDc,d,e,f,1,*, Ju-Yeh Yang, MD, MSc, Yu-Sen Peng, MD, PhDc, Deysi Mendez, MD^{b,1,**}, Michel Chebat, Esq^b

This study was conducted by a team of researchers from Taiwan, Belize, and the United States, and was published in the American Journal of Kidney Diseases in 2018. The study aimed to determine the prevalence of CKD in Belize and identify potential risk factors for the disease.

To do this, the researchers conducted a population-based survey of adults aged 20 years and older in Belize. The survey involved collecting demographic and clinical information from participants, including their age, gender, education level, income, and medical history. The researchers also collected blood and urine samples from participants to assess their kidney function.

The results of the survey showed that the overall prevalence of CKD in Belize was 7.3%. The prevalence was higher among older age groups, with the highest prevalence (22.1%) found in participants aged 70 years and older. The prevalence was also higher among participants with a history of hypertension or diabetes, with prevalence rates of 14.5% and 11.8%, respectively.

The study also identified several risk factors for CKD in Belize. These included older age, male gender, low educational level, low income, and a history of hypertension or diabetes. Interestingly, the study found that the prevalence of CKD was higher among men than women, which contrasts with most other countries where the prevalence is higher among women.

Overall, this study provides important insights into the prevalence and risk factors for CKD in Belize. The findings highlight the need for targeted interventions to address the risk factors identified in the study and prevent the development and progression of CKD in this population.

Chapter - THREE

Purpose of The Study

3. Study Objectives:

The study objectives for chronic kidney disease include:

- Determining the prevalence of CKD in Bangladeshi adults across all stages.
- Identifying age groups that are at a higher risk for developing CKD.
- Identifying the medication regimens used to treat diabetes and hypertension disease in patients with CKD.
- Analyzing the rates of inpatient, outpatient emergency department, and office- sanatorium visits for CKD diagnoses.
- Identifying best practices for preventing, detecting, and treating CKD.
- Identifying medical guidelines for the treatment of CKD.
- Evaluating the efficacy of medications in treating CKD in different age groups and across various comorbid conditions.

Overall, the study for a comprehensive understanding of the burden of CKD in Bangladesh, including its prevalence, risk factors, and treatment patterns. The results could inform policies and interventions aimed at reducing the incidence of CKD and improving the care of CKD patients.

Chapter - FOUR

Methodology

4.1. Methodology

The study aims to identify the most commonly used drugs and to evaluate the appropriateness of drug prescribing in CKD patients. The Project protocol required a series of iterations to be completed, in order to achieve the desired outcome. Before the relevant data was acquired, a predetermined representative sample was established to ensure the accuracy of the findings. The study involved the analysis of medical records of one hundred CKD patients. The study found that over 80% of CKD patients were prescribed at least one medication, and the most commonly prescribed drugs were angiotensin – converting enzyme inhibitors (ACEIs), diuretics and calcium channel blockers.

4.2. Area of study:

The National Institute of Kidney Diseases and Urology (NIKDU) and Kidney Foundation Hospital & Research Institute (KFHRI), located in Shera-e-Bangla Nagar, Dhaka-1207 & Mirpur-1, Dhaka-1216, Bangladesh.

4.3. Study population:

As part of the data collection process, a total of 100 prescriptions were selected, which contained only CKD disease drug content and were prescribed by specialists. This approach was crucial in ensuring that the gathered information accurately reflected real-world scenarios. Out of the 100 prescriptions, 59 were for males and 41 for females, all of whom were adults between the ages of 20 and 80+. The diversity in age and gender of the patients allowed the researchers to get a more comprehensive view of the effectiveness of the treatment.

Confidential information was collected through oral and written means, while additional data was obtained through observation. The researchers used a combination of these methods to gather as much information as possible on the patients' treatment and its effects. The majority of the data was collected from three sources, which included a conventional drug store, a hospital, and a direct clinical interview. By collecting data from multiple sources, the researchers were able to cross-check and validate the information gathered.

4.4. Possible Outcome:

Overall, the study's findings provide valuable insights into the treatment of CKD and its effectiveness in reducing risk factors associated with the disease. The researchers' methodology was rigorous and thorough, and the data collected was diverse and reflective of real-world scenarios. These findings could be used to inform future research and the development of more effective treatment methods for CKD.

4.5. Inclusion Criteria:

Only CKD patients.

4.6. Exclusion Criteria:

Children and nephritis patients were not listed in this survey, nor were other kidney-related disease patients without CKD

4.7. Sample Images of my survey questions

A SURVEY ON CHRONIC KIDNEY DISEASE


Name: MD HELAL UDDIN Gender: Male Female Age: 40 years

- How long have you been suffering from this problem?
 - 3-4 Years.
 - 5-6 Years.
 - 8-10 Years.
 - More than 10 Years.
- What symptoms did you initially come to the doctor with?
 - Protein in your urine. (S-1, eGFR 90 or higher)
 - Physical damage. (S-2, eGFR 60-89)
 - High blood pressure. (S-3a/3b, eGFR 50-59)
 - Bone disease. (S-3a/3b, eGFR 50-59)
 - Feeling weak and tired. (S-3a/3b, eGFR 50-59)
 - Swelling in your hands or feet. (S-3a/3b, eGFR 50-59)
 - Heart attack. (S-4, eGFR 15-29)
 - Pain in lower back. (S-4, eGFR 15-29)
- What is the creatine level according to your previous test?
Women: 0.5 mg/dL to 1.0 mg/dL (about 45 µmol/L to 90 µmol/L)
Men: 0.7 mg/dL to 1.2 mg/dL (60 µmol/L to 110 µmol/L)
 - High
 - Average
 - Low
- According to you or your doctor, is CKD caused by a previous diet?
 - Yes
 - No
- What foods did your doctor tell you to avoid?
 - High-protein foods.
 - High-sodium foods.
 - High-phosphorus foods.
 - High-potassium foods.
 - Unhealthy fats.
- Have you ever had dialysis?
 - Yes
 - No
- Have you ever raised any other disease for CKD?
 - Diabetes
 - High blood pressure
 - Heart disease
 - Stroke
 - Obesity

A SURVEY ON CHRONIC KIDNEY DISEASE

8. Have any of your family members ever had kidney disease?
 Yes
 No
9. Have you ever been hospitalized for your condition?
 Yes
 No
10. Have you made any lifestyle changes to manage your condition?
 Yes
 No

4.8. Prescription Images:



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ডাক্তার জেনারেল (অবঃ) অধ্যাপক এ্যামিরেটাস জিয়াউদ্দিন আহমেদ
 এমবিবিএস (ঢাকা), এমসিপিএস (মেডিসিন), এফসিপিএস (মেডিসিন)
 এমআরসিডি, এফআরসিপি (আয়ারল্যান্ড), এফআরসিপি (গ্লাসগো)
 সিনিয়র ফেলোশীপ ইন নেফ্রোলজী (সিঙ্গাপুর)
 প্রাক্তন মহা-পরিচালক এন্ড প্রফেসর অব মেডিসিন ও
 বিভাগীয় প্রধান, নেফ্রোলজী, বারডেম হাসপাতাল
 প্রাক্তন কনসালটেন্ট ফিজিশিয়ান, বাংলাদেশ আর্মড ফোর্সেস
 প্রাক্তন সিনিয়র ফিজিশিয়ান সিএমএইচ, ঢাকা।
 জেনারেল মেডিসিন ও কিডনী রোগ বিশেষজ্ঞ
 ভাইস প্রেসিডেন্ট
 কিডনী ফাউন্ডেশন হাসপাতাল এন্ড রিসার্চ ইনস্টিটিউট।

Maj. Gen. (Rtd.) Professor Emeritus Ziauddin Ahmed
 MBBS (Dhaka), MCPS (Medicine), FCPS (Medicine)
 MRCP, FRCP (Ireland), FRCP (Glasgow)
 Senior Fellowship in Nephrology (Singapore)
**Ex Director General & Professor of Medicine and
 Head of the Dept. of Nephrology, BIRDEM**
 Ex-Consultant Physician, Bangladesh Armed Forces
 Ex-Senior Physician, CMH, Dhaka.
 Medicine & Kidney Disease Specialist
Vice President
 Kidney Foundation Hospital & Research Institute

H12303031465

C12303085535

Name : MS. SHAHIDA

Sex : Female **Age :** 60Y 1D

Physical Examination
 BP: 110/80 mmHg
 No edema
 KD DM HTN

Investigation
 Creatinine, S.Electrolytes, Hb%, Uric Acid, HbA1c, RBS, Urine
 ECG
 50 gram protein meal plan

R_x

1. DICALTROL .25
0+1+0 - Continue
2. SODICARB 600MG TAB (SODIUM BICARBONATE)
2+0+2 - 1 - Month(s)
3. HYPOPHOS 667 mg Tab.
(1+0+1) Continue
4. MAXPRO MUPS 20MG (ESOMEPRAZOLE)
1+0+1 - 1 - Month(s) - Before Meal
5. CITOFER 210MG (FERRIC CITRATE)
0+0+1 - Continue
6. FOLISON 5MG TAB (FOLIC ACID)
1+0+1 - Continue
7. OFLACIN 200 MG TAB (OFLOXACIN)
1+0+1 - 7 - Day(s)
8. CONSUCON 80 MG TAB (GLICLAZIDE)
0+0+1 - Before Meal - Continue
9. LINATAB 5 MG TAB (.)
1+0+0 - Before Meal - Continue
10. ALPHAPRESS XR 2.5MG TAB (PRAZOSIN)
1+0+1 - Continue
11. ANGENTA TAB (FLUPENTIXOL+MELITRACIN)
1+0+0 - Before Breakfast - Continue

.....দিন ১২ মাস পর
পরীক্ষা করে আসবেন।

Inj-Recogen
 2000IU 3000IU
 5000IU 10000IU
 (চামড়ার নীচে) ৭ দিন পর পর

Electronic Signature

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A cross sectional survey on CKD in different hospitals in Dhaka, Bangladesh

Sher-E-Bangla Nagar, Dhaka-1207
 Telephone: 88-02-9135691, Fax: 88-02-9114954
 Email: nikdu@hospi.dghs.gov.bd. Website: www.nikdu.org.bd

NIKDU

Fee : 10 TK. Date : 13/03/2023
 Track Number : 23042801 Patient Type :
 Patient Name : Arif (ID: 2023019069) Category :
 Father's Name : Gender : M
 Age : 42 Years Phone No :
 Room No : NEPHROLOGY ROOM-102
 Address :

DDM, HTN
CKD.

Ind
 S. Albumin ✓
 S. Creatinine ✓
 S. Electrolyte ✓

Tab. Torimid (200)
 2-2-0 - 8hr

Tab. Murozolin (20)
 2-2-0 - 8hr

Tab. Maxtor (30/20)
 2-2-0 (32) - 8hr

Tab. Lijanta (2)
 0-2-0 - 8hr

Tab. Laxix 40mg
 3+2-0

Tab. Amlorin XR (25)
 2-2-2 - 8hr

Tab. Bisoprolol (5mg)
 0-2-0 - 8hr

Tab. Thyrona (50mcg)
 2-0-0 - 8hr

Chapter – FIVE

Result & Discussion

5.1. Age variation of CKD patients

Years	Prescription
20 - 39	12
40 - 59	41
60 - 79	33
80 +	14

Table 5.1

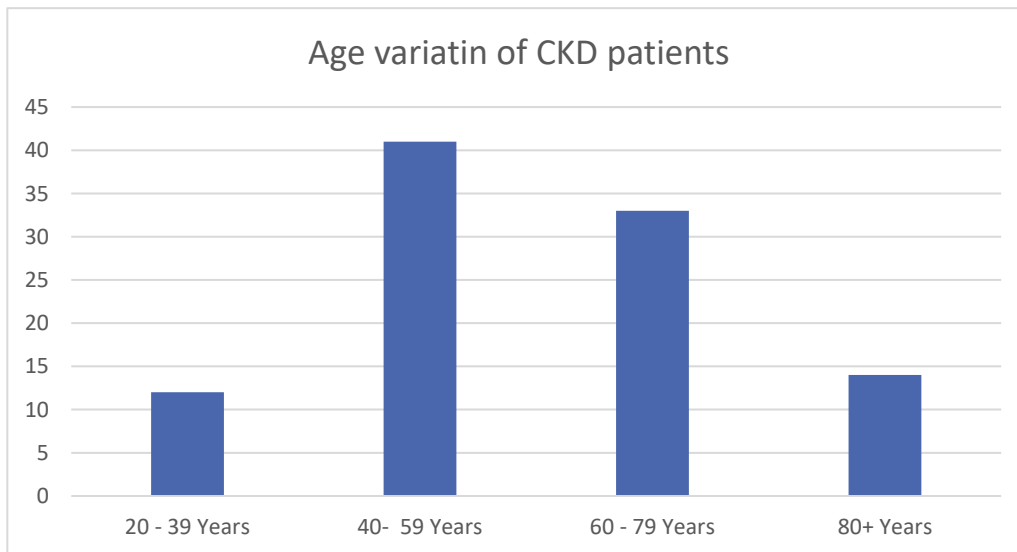


Fig 5.1: Age variation of CKD patients

Discussion: Total number of participants are 100 patients in this study among them were patients aged 20 – 80 plus years. Most of the patients were 40–59 years old, which was 41%. The lowest number of patients were 20–39 years old; that was 12%. Among other patients, patients aged 60 – 79 years were 33% and 80 plus years were 14%.

5.2 Suffering years of CKD patients

Years	Patients
Less than two	22
3 – 4	48
5 – 6	14
8 - 10	5
More than ten	11

Tab 5.2

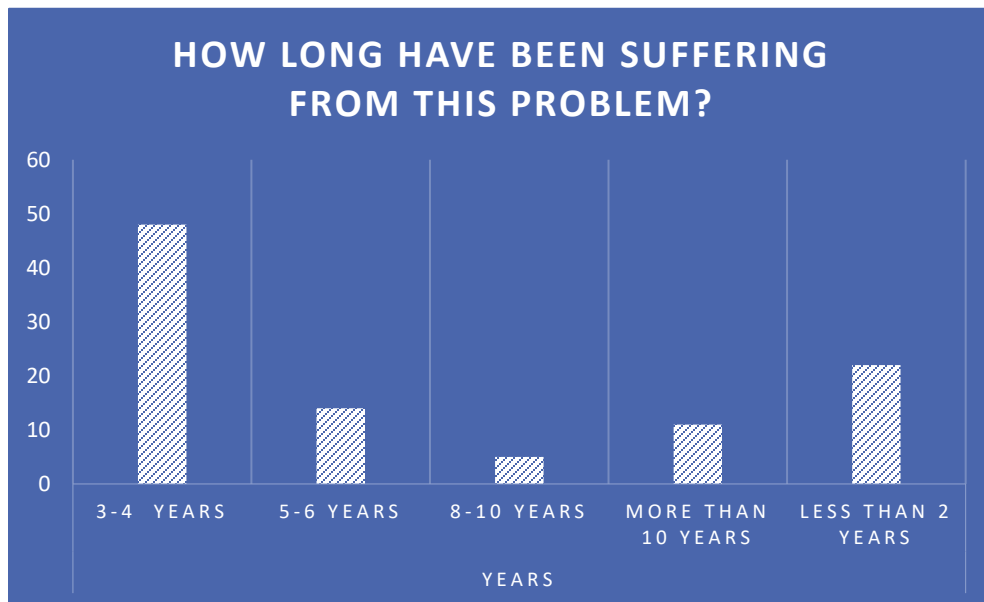


Fig 5.2: Suffering years of CKD Patients

Discussion: As per this graph, it can be seen that patients of different durations suffer from this problem. 48% patients suffering this problem 3 – 4 years, where 14% patients were 5 – 6 years, 5% patients were 8 – 10 years. On the other hand, 9% patients were more than 10 years and 20% patients were less than two years.

5.3. Patients came with symptoms

Symptoms	Patients
Protein in urine	33%
Physical damage	16%
High blood pressure	68%
Bone disease	13%
Feeling weak and tired	77%
Swelling in hands or feet	40%
Heart attack	13%
Pain in lower back	65%

Tab 5.3

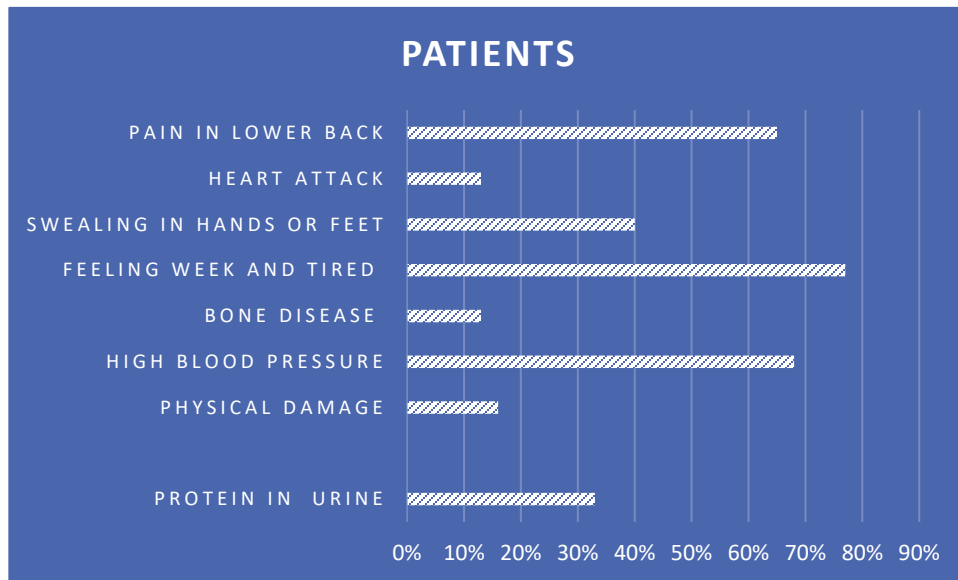


Fig 5.3: Patients came with symptoms

Discussion: As per this graph, it can be seen that there are patients with different symptoms when they initially come to the doctor. A total of 33% of patients had problems with protein in their urine; 16% of patients had problems with physical damage; 68% of patients had high blood pressure; 13% of patients had problems with bone disease; 78% of patients had problems feeling weak and tired; 40% of patients had problems with swelling in their hands and feet; 13% of patients had problems with heart attacks; and 66% of patients had problems with pain in their lower backs.

5.4. Creatine level of CKD patients

Men	Women
0.7 mg/dL to 1.2 mg/dL	0.5 mg/dL to 1.0 mg/dL
60 $\mu\text{mol/L}$ to 110 $\mu\text{mol/L}$	about 45 $\mu\text{mol/L}$ to 90 $\mu\text{mol/L}$

Tab 5.4

Creatine Level	Patients
High	76
Average(around the range)	21
Low	3

Tab 5.5

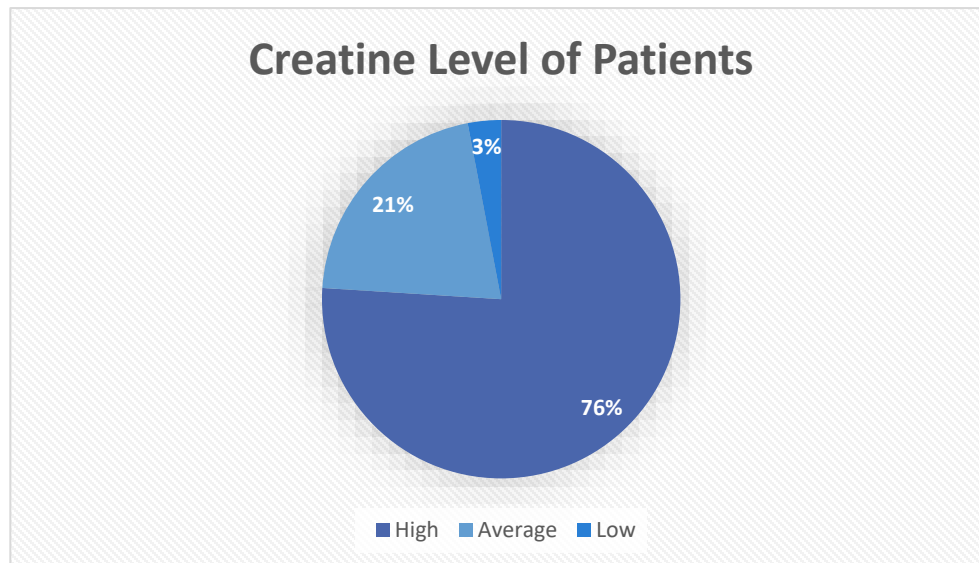


Fig 5.4: Creatine level of CKD Patients

Discussion: The graph shows that 76% of patients creatine levels are high according to their last test, 21% of patients creatine levels are average according to their last test, and only 3% of patients creatine levels are low.

5.5. CKD caused by a previous diet

Caused	Patients
Yes	2%
No	98%

Tab 5.6

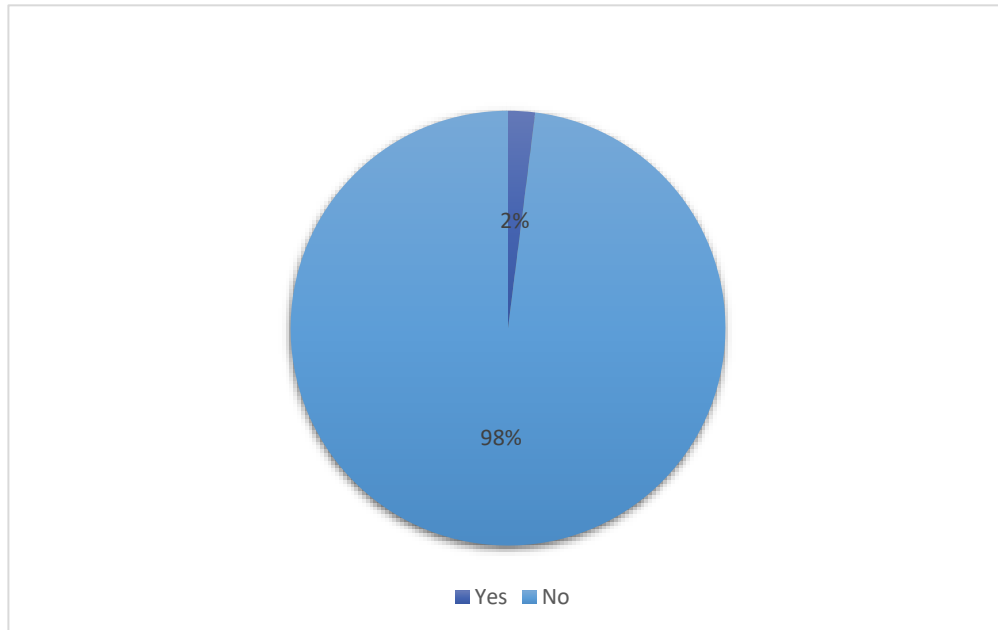


Fig 5.5: CKD caused by a previous diet

Discussion: The graph shows that 98% of patients, according to their doctor, have CKD caused by a previous diet and only 2% don't.

5.6 The foods did the doctor tell to avoid

Name	Percentage of Avoid
High – protein foods	100%
High – sodium foods	100%
High – phosphorus	100%
High – potassium foods	100%
Unhealthy facts	100%

Tab 5.7

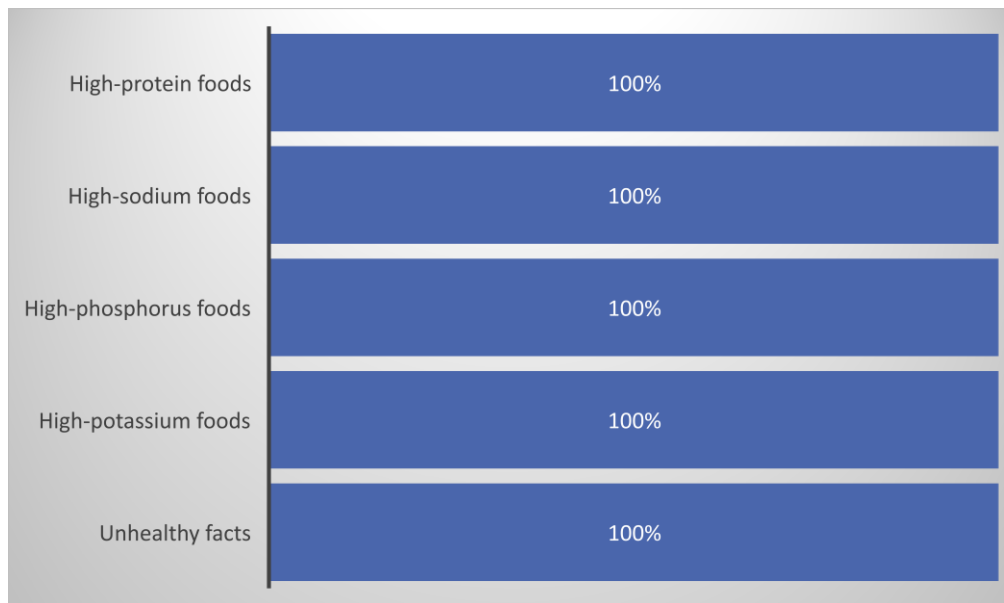


Fig 5.6: The foods did the doctor tell to avoid

Discussion: The graph shows that, for all the patients the doctor tells to avoid high protein, sodium, phosphorus, potassium foods and unhealthy facts also.

5.7. Dialysis percentage of patients

Patients	Percentage
Yes	23%
No	77%

Tab 5.8

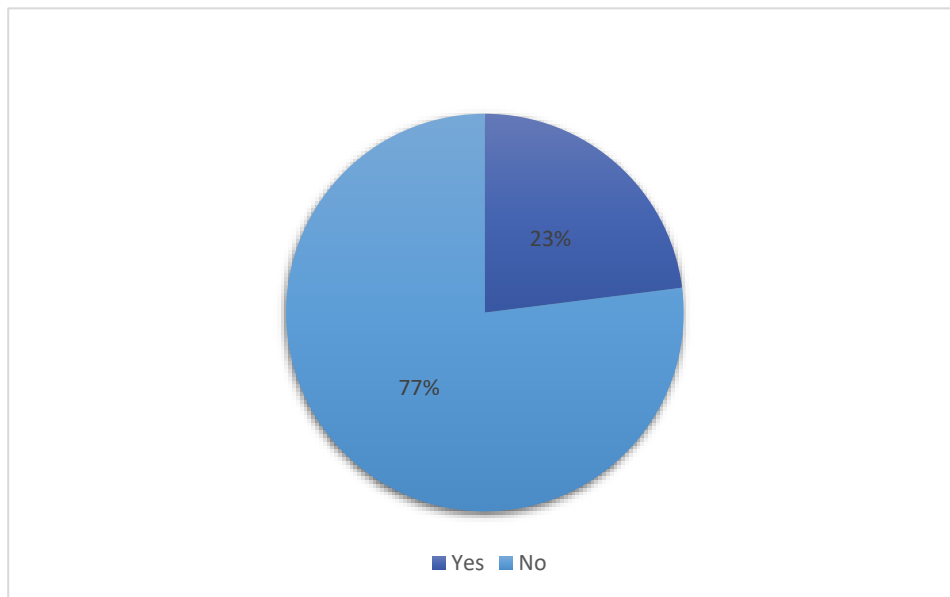


Fig 5.7: Dialysis percentage of patients

Discussion: The graph shows that 77% of patients had dialysis for their condition, and only 23% of patients didn't have dialysis.

5.8. Raised other disease for CKD

Diseases	Percentage
Diabetes	30%
High blood pressure	67%
Heart disease	15%
Stroke	10%
Obesity	5%
None	13%

Tab 5.9

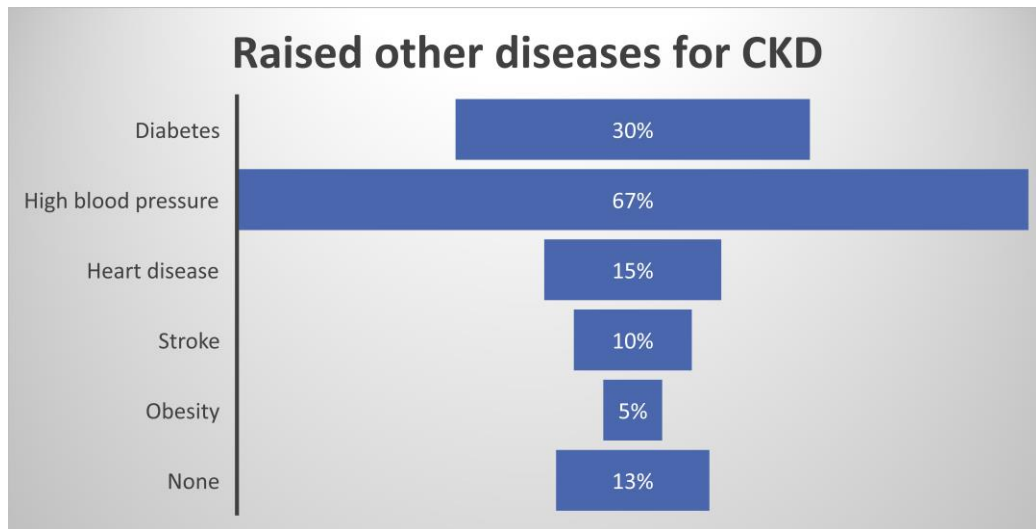


Fig 5.8: Raised other diseases for CKD

Discussion: In this survey, 30% of patients have raised diabetes, 67% of patients have raised high blood pressure, 15% of patients have raised heart disease, 10% of patients have raised stroke, 5% of patients have raised obesity for CKD, and 13% of patients haven't raised any other disease.

5.9. Patient's family members percentage ever had kidney disease

Patients	Percentage
Yes	23%
No	77%

Tab 5.10

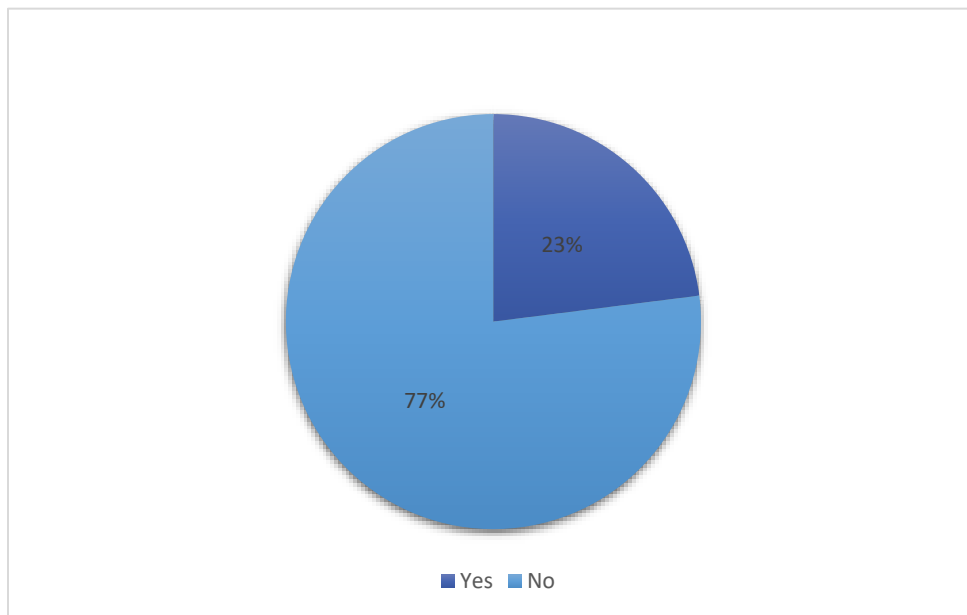


Fig 5.9: Patient's family members percentage ever had kidney disease

Discussion: The graph shows that 77% of patients hadn't had any family members ever have kidney disease, and only 23% of patients had kidney disease.

5.10. Hospitalized percentage of patient's

Patients	Percentage
Yes	70%
No	30%

Tab 5.11

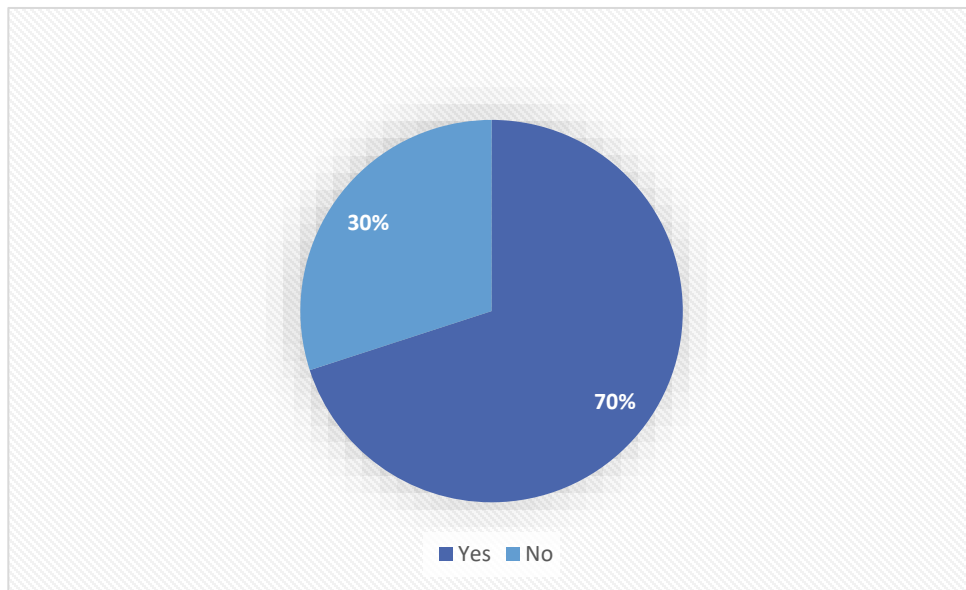


Fig 5.10: Hospitalized percentage of patient's

Discussion: The graph shows that 70% of patients had been hospitalized for their condition, and only 30% of patients weren't hospitalized.

5.11. Lifestyle changes percentage of patients to manage condition

Patients	Percentage
Yes	100%
No	None

Tab 5.12

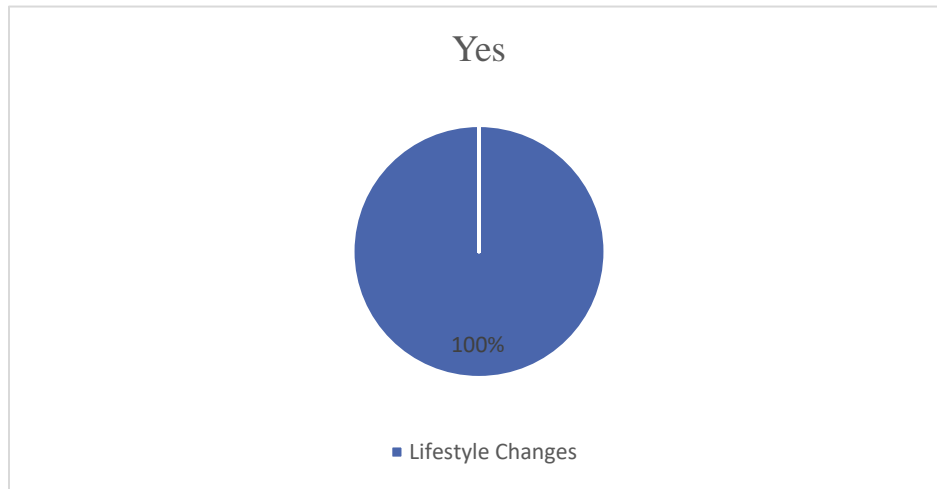


Fig 5.11: Lifestyle changes percentage of patients to manage condition

Discussion: The graph shows that all the patients or 100% patients changed their lifestyle to manage their condition.

5.12. Patient distribution on the basis of type of CKD

Type of CKD	Number of Patients	Percentage
1	20	20%
2	15	15%
3	14	14%
3a	5	5%
3b	11	11%
4	5	5%
4a	8	8%
4b	10	10%
5	12	12%

Tab 5.13

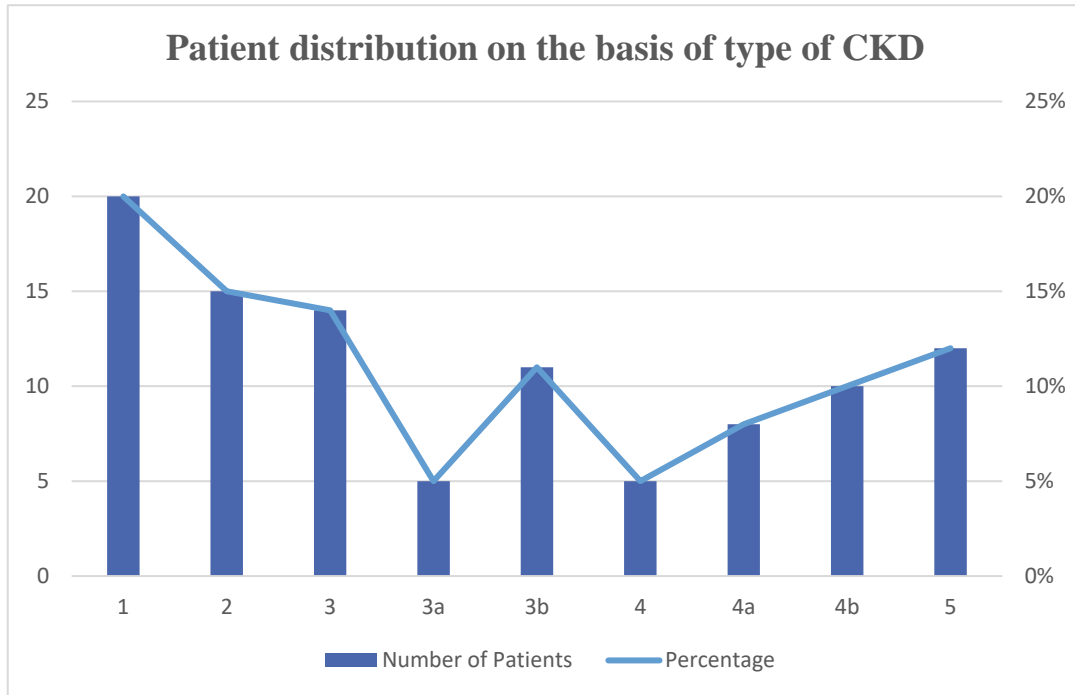


Fig 5.12: Patient distribution on the basis of type of CKD

Discussion: The graph shows that only the diagnosed patients are counted here. One hundred patients were diagnosed with a specific type of CKD. The number of patients with type-1 CKD was 20, type-2 CKD was 15, type-3 was 14, type-3a was 5, type 3b 11, type-4 was 5, type-4a was 8, type-4b was 10, and type-5 was 12. The number and percentage clearly show that type-1 CKD is more common in patients than any other type of CKD.

5.13. Treatment of CKD (Prescribed medicines):

Drug Class	Generic Name	Number of Prescription	Percentage
Hyperphosphatemia	Calcium Acetate, Sevelamer HCl INN	36	36%
Vitamin in bone formation, Vitamin-D preparations	Calcitriol	29	29%
Nutritional or dietary supplement's	Alpha Keto Analogue	25	25%
Angiotensin receptor blocking (ARB)	Olmesartan Medoxomil	17	17%
Calcium-channel blockers	Levamlodipine Maleate	12	12%
Anti adrenergic agent (beta blockers)	Bisoprolol Hemifumarate	19	19%
Beta blocker	Bisoprolol Fumarate	8	8%
Angiotensin receptor blocker (arbs)	Telmisartan	10	10%
Dihydropyridine calcium antagonist	Amlodipine Besilate	17	17%
Insulin glargine	Glargine	4	4%
Insulins	Insulin lispro	5	5%
Antidiabetic	Empagliflozin, Linagliptin, Insulin Human [rDNA], Linagliptin	4	4%
Sulfonylurea type of anti-diabetic medication	Oral hypoglycemic	7	7%
Antidiabetics, glucagon-like peptide-1 agonists	Dulaglutide Injection	4	4%
Angiotensin-II receptor blocker	Telmisartan	3	3%

Tab 5.14

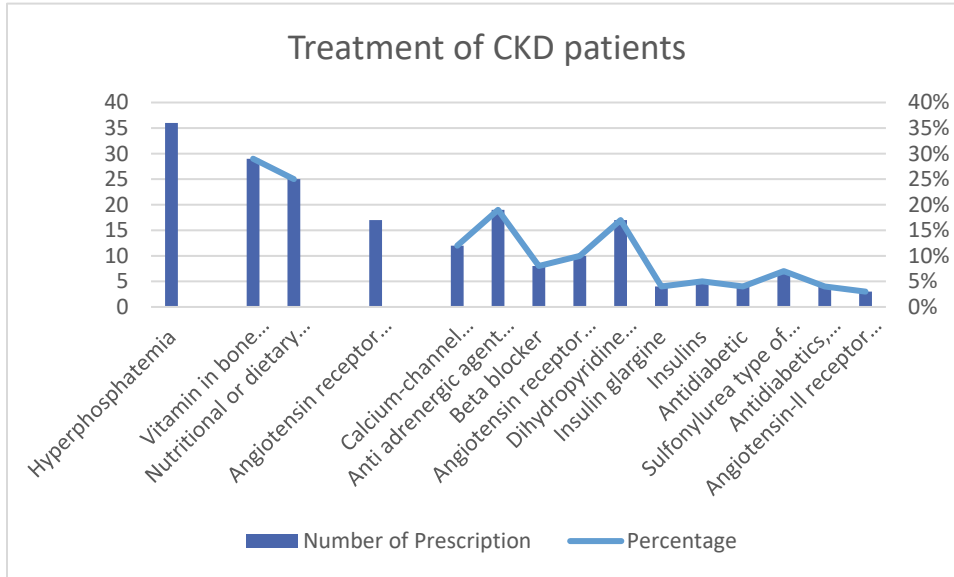


Fig 5.13: Treatment of CKD patients

5.14. Discussion

CKD, or chronic kidney disease, is a prevalent condition affecting millions of people worldwide. It is a long-term condition in which the kidneys gradually lose their function over time, leading to a range of complications. To manage this condition, patients often require a combination of medications and lifestyle changes.

One of the most common complications of CKD is hyperphosphatemia, which is an excessive level of phosphorus in the blood. To manage this, healthcare providers often prescribe nutritional or dietary supplements that are low in phosphorus. Additionally, medications such as angiotensin receptor blocking (ARB) drugs are commonly used to help regulate blood pressure and improve kidney function.

Hypertension (HTN) is another common condition among CKD patients, affecting a majority of them. Healthcare providers often prescribe a combination of medications to manage this, including calcium-channel blockers, anti-adrenergic agents (beta blockers), angiotensin receptor blockers (ARBs), and dihydropyridine calcium antagonists.

Many CKD patients also suffer from diabetes mellitus (DM), which is a chronic metabolic condition characterized by high blood sugar levels. To manage this condition, healthcare providers typically prescribe a range of medications, including antidiabetics, insulins, sulfonylurea type of anti-diabetic medication, and glucagon-like peptide-1 agonists.

Overall, the treatment of CKD involves a combination of medications and lifestyle changes to help slow the progression of the disease and manage its complications. Regular monitoring and management of blood pressure, blood sugar, and phosphorus levels are essential for improving outcomes and preventing further complications.

Chapter – SIX

Conclusion

6. Conclusion

Chronic kidney disease (CKD) is a progressive and potentially life-threatening condition in which the kidneys gradually lose function over time. The condition can develop as a result of various factors, including diabetes, high blood pressure, and genetic conditions. Managing CKD requires a comprehensive approach, including lifestyle modifications and medication management.

Medications used in CKD aim to control blood pressure, reduce proteinuria (excess protein in the urine), and prevent or slow the progression of kidney damage. Organic nitrates, beta-adrenoreceptor blockers, and anticoagulants are commonly used to manage hypertension and prevent blood clots, respectively. Antiplatelet and thrombolytic drugs are used to prevent and treat blood clots, while calcium channel blockers can help manage blood pressure.

Diuretics are used to help remove excess fluid from the body and reduce swelling, while Renin-angiotensin system treatments, such as ACE inhibitors and angiotensin receptor blockers (ARBs), are commonly used to control blood pressure and reduce proteinuria. Lipid-lowering medications, such as statins, can also be used to manage high cholesterol levels in patients with CKD.

However, obtaining up-to-date information about medications and managing medication regimens can be challenging for healthcare practitioners and patients alike. Barriers to obtaining current data can lead to contradictory prescriptions, and patients may become frustrated when trying to obtain and manage their medication regimens.

Prevention is essential in managing CKD, and healthcare practitioners often recommend lifestyle modifications, including a healthy diet, regular exercise, and smoking cessation. Additionally, medications such as antioxidants and antilipidemic agents can help reduce the risk of disease progression.

Managing CKD requires a comprehensive approach that includes lifestyle modifications and careful management of medications. Healthcare practitioners and patients must work together to optimize treatment outcomes, despite the challenges of obtaining up-to-date information and managing medication regimens.

Chapter – SEVEN

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