A survey on prevalence, awareness and management of chronic kidney disease in Bangladesh

A Dissertation submitted to the Department of Pharmacy, East West University, in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy.

Submitted By

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In the name of

Almighty Allah,

The most Gracious

&

The most Merciful

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation, entitled **"A survey on prevalence, awareness and management of Chronic kidney disease in Bangladesh"** is an authentic and genuine research work carried out by me "Chowdhury Rabby Mahmood" under the guidance of **Nishat Nasrin,** Senior lecturer, Department of Pharmacy, East West University, Dhaka.

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"A survey on prevalence, awareness and management of Chronic kidney disease in Bangladesh" is an authentic research work done by **Chowdhury Rabby Mahmood**, ID: 2011-3-70-017 under the guidance of **Nishat Nasrin**, Senior Lecturer, Department of Pharmacy, East West University, Dhaka.

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ACKNOWLEDGEMENT

First, all praise and glory are to the Almighty Allah for His mercy and blessings.

I would like to express my deepest gratitude to my respected teacher and supervisor **Nishat Nasrin**, Senior Lecturer, Department of Pharmacy, East West University, for her day to day mastermind direction, constant supervision and support, constructive suggestions, optimistic counselling, valuable criticism, keen interest and active encouragement to carry out this research work.

It gives me immense pleasure to express sincere appreciation and gratefulness to **Dr. Shamsun Nahar Khan**, Chairperson and Associate Professor, Department of Pharmacy, East West University for providing all possible help during the course of this research work.

It is also great pleasure for me to offer my deepest indebtedness to all of my respected teachers of the Department of Pharmacy, East West University for extending their helping hands whenever needed.

I would like to convey deepest love and obedience to my caring and beloved **parents, my sister and Homaira Parvin Samira.**

Cordial thanks to my friends who gave me support for my research work and for their cooperation. Special thanks to **Mir Nakir Hossain, Iftehajul Haque Akib, Raju khan** and thanks to all of my well-wishers for their support and appreciation throughout my work.

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TABLE OF CONTENTS

LIST OF FIGURES:

LIST OF TABLE

ABSTRACT

Kidney is an important organ in our body. There are various types of kidney diseases occurring in the world. The aim of this study was to find out the prevalence of chronic kidney disease; level of self care practices among the kidney patients. This study was done in National Kidney Institute, College gate, Mirpur road and only outdoor patients were included in the study. A total of 152 eligible cases of kidney patients were considered for this study and a structured questionnaire were used to collect the data. From this study we can observe that male were affected more (59%) than the female (41%) by chronic kidney disease. The study also shows the age distribution among the patients where majority were in between 46 years to 55 years aged people. Stress on the work such as physical, mental and social was also displayed in the study. It was found from the study that most of the kidney patients were non smoker (56%). It was also estimated that most of the CKD patients had not diabetes mellitus (27%). In this study, there were a few patients who were prescribed to take insulin (13%). Only 5% of the CKD patients had undergone nephro surgery. Around 35% of the CKD patients had hypertension. Glomerular Filtration Rate of maximum patients was 60ml/min/1.73m^2-89ml/min/1.73m^2. The result of this study is expected to improve the awareness and consciousness to the people, which ultimately will help to progress the consciousness and awareness among the people.

Key words: Glomerular Filtration Rate, Diabetes Mellitus, Insulin, Nephro surgery, Hypertension.

Chapter 1

Introduction

1.1 Overview

Kidneys are remarkable organs that are located near the middle of the back, just below the rib cage, one on each side of the spine. The kidneys are sophisticated reprocessing machines. Every day, a person's kidneys process about 200 quarts of blood to filter out about 2 quarts of waste products and extra water. The wastes and extra water become urine, which flows to the bladder through tubes called ureters. The bladder stores urine until releasing it through urination. Wastes in the blood come from the normal breakdown of active tissues, such as muscles, and from food. The body uses food for energy and self-repairs. After the body has taken what it needs from food, wastes are sent to the blood. If the kidneys did not remove them, these wastes would build up in the blood and damage the body (Stenley, 2007).

Kidneys are unique as each has two capillary beds arranged in series, the glomerular capillaries which are under high pressure for filtering, and the peritubular capillaries which are situated around the tubule and are at low pressure. This permits large volumes of fluid to be filtered and reabsorbed. Renal blood supply is normally about 20% of the cardiac output. Approximately 99% of the blood flow goes to the cortex and 1% to the medulla. The cortex is the outer part of the kidney containing most of the nephrons. The medulla is the inner part of the kidney and contains the specialized nephrons in the juxta-medullary region, immediately next to the medulla (Stewart, 1998).

Kidney damage is defined as structural or functional abnormalities of the kidney or a large urinary tract infection causing a decrease in circulating blood to the kidney (Smeltzer *et al.*, 2010). Markers of damage include abnormalities in the composition of the blood, abnormalities in the composition of the urine, and abnormalities in imaging studies. The GFR measures the flow rate of filtered fluid through the kidney. Normal GFR rates are 90-120 mL/min (Smeltzer *et al.,* 2010). Causes of decreased GFR may be attributed to age related changes, unilateral nephrectomy, extracellular volume depletion, and system illnesses resulting in a decline in kidney perfusion (Counts *et al.*, 2008). Extracellular volume depletion can decrease GFR due to fluid loss throughout the body leading to a decreased perfusion to the kidneys and decreased circulating volume (Smeltzer *et al.*, 2010).
Systemic illnesses such as septic shock (massive inflammation causes by bacterial infection in the bloodstream) can affect all parts of the body and lead to multiple organ dysfunction

syndrome that also has harmful affect the kidneys. A unilateral nephrectomy (removal of one kidney) could cause a decrease in perfusion to the remaining kidney and a subsequent decrease in GFR (Counts *et al.*, 2008). Two waste products in the blood usually are measured; 1) blood urea nitrogen (BUN), and 2) creatinine (Cr) (Miller, 2015).

1.2 Pathophysiology

Pathophysiologic changes within the kidney depend on the etiology of CKD. When an individual has a diagnosis of CKD there is nephron dysfunction that persists three months or longer resulting in irreversible kidney damage. These dysfunctional changes to the kidney impair glomerular function and predispose the remaining viable nephron to sclerosis (pathological hardening of the tissue).

Azotemia (retention of nitrogenous waste products) occurs as CKD develops. Other pathophysiological changes include uremia, fluid retention, and excessive weight gain. Uremia consist of an accumulation of products that affect protein metabolism, and loss of kidney function that results in fluid and electrolyte imbalances. Common symptoms of uremia include nausea, vomiting, fatigue, anorexia, weight loss, muscle cramps, and change in mental status (Counts *et al.*, 2008). Uremia often leads to major disturbances in the function of all other body systems such as a decline in endocrine abnormalities due to high level of toxicity, cardiovascular abnormalities from left ventricular hypertrophy, and gastrointestinal disturbances from malnutrition (Miller, 2015).

1.3 Types of Kidney Disease

There are five different types of kidney failure:

a. Acute Prerenal Kidney Failure: This is caused by insufficient blood flow to the kidneys. Without enough blood flow, the kidneys cannot filter toxins from the blood. This type is usually curable by resolving the cause of inadequate blood flow.
b. Acute Intrinsic Kidney Failure: This can be caused by direct trauma to the kidneys, such as physical impact, accidents, toxin overload, or ischemia (a lack of oxygen to the kidneys). Severe bleeding, shock, renal blood vessel obstruction, or glomerulonephritis (inflammation of the tiny filters in your kidneys) can all cause ischemia.
c. Chronic Pre-Renal Kidney Failure: When low blood flow to the kidneys is not treated and the condition remains for an extended period of time, chronic pre-renal kidney failure can occur. The kidneys begin to shrink and lose the ability to function.
d. Chronic Intrinsic Kidney Failure: Damage to the kidneys over an extended period due to intrinsic kidney disease can develop into chronic intrinsic kidney failure.
e. Chronic Post-Renal Kidney Failure: This happens when a long-term blockage of the urinary tract prevents urinary waste elimination, which causes pressure and eventual kidney damage (Smeltzer *et al.*, 2010).

1.4 Age Related Physiological Changes in Kidney Function & Structure

Age-associated loss of kidney function has been recognized for decades. With aging, many subjects exhibit progressive decreases in glomerular filtration rate and renal blood flow, with wide variability among individuals. The fall in glomerular filtration rate is because of reductions in the glomerular capillary plasma flow rate and the glomerular capillary ultrafiltration coefficient. In addition, a primary reduction in afferent arteriolar resistance is associated with an increase in glomerular capillary hydraulic pressure. These hemodynamic changes occur in concert with structural changes, including loss of renal mass; hyalinization of afferent arterioles and in some cases, development of aglomerular arterioles; an increase in the percentage of sclerotic glomeruli; and tubule-interstitial fibrosis. Aging is associated with altered activity and responsiveness to vasoactive stimuli, such that responses to vasoconstrictor stimuli are enhanced, whereas vasodilatory responses are impaired. Changes in the activity of the renin-angiotensin and nitric oxide systems appear to be particularly

important, as is the modulating effect of gender. These changes may predispose the older kidney to acute kidney injury, including normotensive ischemic nephropathy, as well as progressive chronic kidney disease (David *et al.*, 2015).

The kidneys also have other functions throughout the body. Most of the fluid in the body is absorbed and filtered via the kidney. Blood is the most important component of the body that is filtered through the kidneys. Inadequate function of the kidney causes an increase in the number of toxins that remain in the body. This influx of toxins causes a build-up of lactic acid leading to metabolic acidosis. As the older adult ages, the decline in physiologic functions can escalate their risk of multiple organ failure and the development of co-morbid conditions such as DM, hypertension, hyper-lipidemia, that increases the risk for CKD (Elliott, 2012).

1.5 Chronic Kidney Failure Stages

The National Kidney Foundation set 5 chronic kidney failure stages to determine the severity of the disease. The chronic kidney failure stages are based on the GFR level (glomerular filtration rate), which is a measurement of how quickly your kidneys are able to clean your blood.

If kidneys are healthy and functioning normally, GFR level will be 90 mL/min or greater.

Stages Normal = Healthy Kidneys with a GFR level of 90 mL/min or greater

Stage 1 = Kidney damage but normal or high GFR of 90 mL/min or greater

Stage 2 = mildly decreased GFR of 60 to 89 mL/min

Stage 3 = moderately decreased GFR of 30 to 59 mL/min

Stage 4 = severely decreased GFR of 15 to 29 mL/min

Stage 5 = Kidney failure or dialysis. GFR of Less than 15 mL/min (Perneger, 1994).

1.5.1 Stage 1 & Stage 2

In stages 1 and 2, there may be no noticeable symptoms. In these chronic kidney failure stages, the disease is usually diagnosed through lab tests that detect associated conditions such as high blood pressure, higher than normal levels of creatinine or urea in the blood, blood or protein in the urine, or evidence of kidney damage (i.e. MRI, CT scan, Ultrasound, contrast X-ray) (Perneger, 1994).

1.5.2 Stage 3

A person with stage 3 chronic kidney disease (CKD) has moderate kidney damage. This stage is broken up into two: a decrease in glomerular filtration rate (GFR) for Stage 3A is 45-59 mL/min and a decrease in GFR for Stage 3B is 30-44 mL/min. As kidney function declines waste products can build up in the blood causing a condition known as “uraemia.” In stage 3 a person is more likely to develop complications of kidney disease such as high blood pressure, anaemia (a shortage of red blood cells) and/ or early bone disease (Perneger, 1994).

1.5.3 Stage 4

In stage 4, kidneys are losing the ability to properly remove waste products and excess water from body and need to prepare for dialysis treatments or a kidney transplant (Perneger, 1994).

1.5.4 Stage 5

Stage 5, is also called end stage kidney disease, or end stage renal disease (ESRD). In this stage there is a complete or near complete loss of kidney function. Body accumulates wastes, water, and toxic substances because the kidneys are unable to clear them from the body. In this stage, need dialysis or a kidney transplant to survive. Acute kidney problems can be caused by infection, injury, certain medical conditions, and certain medications (Perneger, 1994).

1.6 Causes

Chronic kidney disease can be caused by:

- Medical conditions such as high blood pressure, diabetes, or heart disease that cause damage to the small blood vessels within the kidneys.
- Hereditary kidney disease such as polycystic kidney disease or AL port’s syndrome glomerulonephritis (inflammation and damage of the filtering components of the kidney) that is inherited or caused by other medical problems (e.g., lupus, diabetes, amyloidosis).
- Reflux nephropathy, a condition where urine flows from the bladder back to the kidneys, causing damage to the kidneys.
- Blockage of the urinary tract as a result of birth defects, prostate problems, kidney stones, or tumours.

- Medications that can cause permanent damage to the kidneys (e.g., acetylsalicylic acid [ASA], ibuprofen, naproxen, diclofenac, cisplatin, lithium).

In many cases, the exact cause of kidney disease can't be determined. Some people are at an increased risk of developing kidney disease. The risk factors for kidney disease include: high blood pressure, diabetes, having a family member with inherited forms of kidney disease (e.g., polycystic kidney disease) (Stenley, 2007).

1.6.1 Prerenal Causes

Prerenal causes are due to decreased blood supply to the kidney. Examples of prerenal causes of kidney failure are:

1. Hypovolemia (low blood volume) due to blood loss.
2. Dehydration from loss of body fluid (for example, vomiting, diarrhoea, sweating, fever).
3. Poor intake of fluids.
4. Medication, for example, diuretics ("water pills") may cause excessive water loss.
5. Abnormal blood flow to and from the kidney due to obstruction of the renal artery or vein.
6. Renal causes of kidney failure (damage directly to the kidney itself) include: Sepsis: The body's immune system is overwhelmed from infection and causes inflammation and shutdown of the kidneys. This usually does not occur with simple urinary tract infection (Stenley, 2007).

1.6.2 Post Renal Causes

Post renal causes of kidney failure are due to factors that affect outflow of the urine:

1. Obstruction of the bladder or the ureters can cause back pressure because the kidneys continue to produce urine, but the obstruction acts like a dam, and urine backs up into the kidneys. When the pressure increases high enough, the kidneys are damaged and shut down.
2. Prostatic hypertrophy or prostate cancer may block the urethra and prevents the bladder from emptying.
3. Tumours in the abdomen that surround and obstruct the ureters.
4. Kidney stones: Usually, kidney stones affect only one kidney and do not cause kidney failure. However, if there is only one kidney present, a kidney stone may cause the remaining kidney to fail.

5. Chronic renal failure develops over months and years. The most common causes of chronic renal failure are related to:
    - ✓ poorly controlled diabetes ,
    - ✓ poorly controlled high blood pressure , and
    - ✓ Chronic glomerulonephritis (Agarwal & Srivastava, 2009).

Less common causes of chronic renal failure include:

- Polycystic kidney disease.
- Reflux nephropathy (damage caused by urine backflow from the bladder into the ureters and kidney).
- Nephrotic syndrome.
- Alport's disease.
- Interstitial nephritis.
- Kidney stones.

Prostate disease (Stenley, 2007).

1.6.3 Medications Causing Kidney Disease

Some medications are toxic to the kidney including:

1. Nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen (Advil, Motrin, and others), and naproxen (Aleve, Naprosyn).
2. Antibiotics like aminoglycosides gentamicin (Garamycin), tobramycin lithium (Eskalith, Lithobid).
3. Iodine-containing medications such as those injected for radiology dye studies Rhabdomyolysis: This is a situation in which there is significant muscle breakdown in the body, and the damaged muscle fibres clog the filtering system of the kidneys. Massive muscle injury may occur because of trauma, crush injuries, and burns. Some medications used to treat high cholesterol may cause rhabdomyolysis.
4. Multiple myeloma:It is the acute glomerulonephritis or inflammation of the glomeruli, the filtering system of the kidneys. Many diseases can cause this inflammation including:
    - ✓ Systemic lupus erythematosus.
    - ✓ Wegener's granulomatosis.
    - ✓ Good pasture syndrome.

5. Hemolytic uremic syndrome: This condition results from abnormal destruction of red blood cells. It most often occurs in children after certain infections, but also may be caused by medications, pregnancy, or can occur for unknown reasons (Naughton, 2013).

Table 1.1: Drugs Associated with Nephrotoxicity

Drug class/drug(s)	Pathophysiologic mechanism of renal injury
Analgesics	
Acetaminophen, aspirin	Chronic interstitial nephritis
Nonsteroidal anti-inflammatory drugs	Acute interstitial nephritis, altered intraglomerularhemodynamics, chronic interstitial nephritis, glomerulonephritis
Antidepressants/mood stabilizers	
Amitriptyline (Elavil*), doxepin (Zonalon), fluoxetine (Prozac)	Rhabdomyolysis
Lithium	Chronic interstitial nephritis, glomerulonephritis, rhabdomyolysis
Antihistamines	
Diphenhydramine (Benadryl), doxylamine (Unisom)	Rhabdomyolysis
Antimicrobials	
Acyclovir (Zovirax)	Acute interstitial nephritis, crystal nephropathy
Aminoglycosides	Tubular cell toxicity
Amphotericin B (Fungizone*; deoxycholic acid formulation more so than the lipid formulation)	Tubular cell toxicity
Beta lactams (penicillins, cephalosporins)	Acute interstitial nephritis, glomerulonephritis (ampicillin, penicillin)
Foscarnet (Foscavir)	Crystal nephropathy, tubular cell toxicity
Ganciclovir (Cytovene)	Crystal nephropathy
Pentamidine (Pentam)	Tubular cell toxicity
Quinolones	Acute interstitial nephritis, crystal nephropathy (ciprofloxacin [Cipro])

Rifampin (Rifadin)	Acute interstitial nephritis
Sulfonamides	Acute interstitial nephritis, crystal nephropathy
Vancomycin (Vancocin)	Acute interstitial nephritis
Antiretrovirals	
Adefovir (Hepsera), cidofovir (Vistide), tenofovir (Viread)	Tubular cell toxicity
Indinavir (Crixivan)	Acute interstitial nephritis, crystal nephropathy
Benzodiazepines	Rhabdomyolysis
Calcineurin inhibitors	
Cyclosporine (Neoral)	Altered intraglomerularhemodynamics, chronic interstitial nephritis, thrombotic microangiopathy
Tacrolimus (Prograf)	Altered intraglomerularhemodynamics
Cardiovascular agents	
Angiotensin-converting enzyme inhibitors, angiotensin receptor blockers	Altered intraglomerularhemodynamics
Clopidogrel (Plavix), ticlopidine (Ticlid)	Thrombotic microangiopathy
Statins	Rhabdomyolysis
Chemotherapeutics	
Carmustine (Gliadel), semustine (investigational)	Chronic interstitial nephritis
Cisplatin (Platinol)	Chronic interstitial nephritis, tubular cell toxicity
Interferon-alfa (Intron A)	Glomerulonephritis
Methotrexate	Crystal nephropathy
Mitomycin-C (Mutamycin)	Thrombotic microangiopathy
Contrast dye	Tubular cell toxicity
Diuretics	
Loops, thiazides	Acute interstitial nephritis
Triamterene (Dyrenium)	Crystal nephropathy
Drugs of abuse	
Cocaine, heroin, ketamine (Ketalar),	Rhabdomyolysis

methadone, methamphetamine	
Herbals	
Chinese herbals with aristocholic acid	Chronic interstitial nephritis
Proton pump inhibitors	
Lansoprazole (Prevacid), omeprazole (Prilosec), pantoprazole (Protonix)	Acute interstitial nephritis
Others	
Allopurinol (Zyloprim)	Acute interstitial nephritis
Gold therapy	Glomerulonephritis
Haloperidol (Haldol)	Rhabdomyolysis
Pamidronate (Aredia)	Glomerulonephritis
Phenytoin (Dilantin)	Acute interstitial nephritis
Quinine (Qualaquin)	Thrombotic microangiopathy
Ranitidine (Zantac)	Acute interstitial nephritis
Zoledronate (Zometa)	Tubular cell toxicity

(Naughton, 2013).

Top ten drugs that cause kidney damage:

1. Antibiotics, including ciprofloxacin, methicillin, vancomycin, sulfonamides.
2. Analgesics, including acetominophen and non-steroidal anti-inflammatory drugs (NSAID): aspirin, ibuprofen, naproxen, and others available only by prescription.
3. COX-2 inhibitors, including celecoxib (brand name Celebrex). Two drugs in this class have been withdrawn from the market because of cardiovascular toxicity: rofecoxib (brand name Vioxx), and valdecoxib (brand name Bextra). These drugs are a special class of NSAID that were developed to be safer for the stomach, but have the same risk as other NSAIDs for kidney damage.
4. Heartburn drugs of the proton pump inhibitor class, including omeprazole (brand name Prilosec), lansoprazole (brand name Prevacid), pantoprazole (brand name Protonix), rabeprazol (brand names Rabecid, Aciphex), esomeprazole (brand names Nexium, Esotrex).

5. Antiviral drugs, including acyclovir (brand name Zovirax) used to treat herpes infection, and indinavir and tenofovir, both used to treat HIV.
6. High blood pressure drugs, including captopril (brand name Capoten).
7. Rheumatoid arthritis drugs, including infliximab (brand name Remicade); chloroquine and hydroxychloroquine, which are used to treat malaria and systemic lupus erythematosus as well as rheumatoid arthritis.
8. Lithium, used to treat bipolar disorder.
9. Anticonvulsants, including phenytoin (brand name Dilantin) and trimethadione (brand name Tridione), used to treat seizures and other conditions.
10. Chemotherapy drugs, including interferons, pamidronate, cisplatin, carboplatin, cyclosporine, tacrolimus, quinine, mitomycin C, bevacizumab; and anti-thyroid drugs, including propylthiouracil, used to treat overactive thyroid.

1.7 Signs and symptoms of Chronic Kidney Disease

Initially, kidney failure may be not produce any symptoms (asymptomatic). As kidney function decreases, the symptoms are related to the inability to regulate water and electrolyte balances, clear waste products from the body, and promote red blood cell production.

If unrecognized or untreated, the following symptoms of kidney failure may develop into life-threatening circumstances.

- Lethargy.
- Weakness.
- Shortness of breath.
- Generalized swelling (edema).
- Generalized weakness due to anaemia.
- Loss of appetite.
- Fatigue.
- Congestive heart failure.
- Metabolic acidosis.
- High blood potassium (hyperkalaemia).
- Fatal heart rhythm disturbances (arrhythmias) including ventricular tachycardia and ventricular fibrillation.

- Rising urea levels in the blood (uraemia) may lead to brain encephalopathy, pericarditis (inflammation of the heart lining), or low calcium blood levels (hypocalcaemia) (Brown *et al.*, 2003).

1.8 Causes of pain in Chronic Kidney Disease

Kidney failure in itself does not cause pain. However, the consequences of kidney failure may cause pain and discomfort in different parts of the body.

1.8.1 Amyloid proteins

Normal functioning kidneys filter amyloid (a protein) from the blood stream. In kidney failure amyloid proteins in the blood rise, and can separate and clump together forming amyloid deposits into a variety of tissue and organs, including joints and tendons.

This can result in symptoms of:

- ✓ joint stiffness,
- ✓ pain, and
- ✓ Swelling (Davison, 2005).

1.8.2 Procedure related pain

Patients who are on dialysis may have discomfort when on the dialysis machine (Davison, 2005).

1.8.3 Underlying chronic disease pain

Pain is often a consequence of the underlying chronic disease that led to kidney failure.

For example: People with poorly controlled diabetes may develop diabetic neuropathy pain.

People who have peripheral vascular disease also may have pain in their extremities, and may develop claudication (leg pain that occurs with walking) (Davison, 2005).

1.9 Diagnosis

Often, a patient is seen for another medical condition and the diagnosis of kidney failure is a consequence of the patient's disease or injury. In patients with chronic kidney disease due to diabetes, high blood pressure, or another related medical condition; the patient's medical care team most likely monitors kidney function as part of the patient's routine long-term medical care plan.

1.9.1 Blood Tests

A. Serum Creatinine — Creatinine (kree-AT-uh-nin) is a waste product that comes from the normal wear and tear on muscles of the body. Creatinine levels in the blood can vary depending on age, race and body size. A creatinine level of greater than 1.2 for women and greater than 1.4 for men may be an early sign that the kidneys are not working properly. The level of creatinine in the blood rises, if kidney disease progresses.

B. Glomerular Filtration Rate(GFR) — This test is a measure of how well the kidneys are removing wastes and excess fluid from the blood. It may be calculated from the serum creatinine level using your age, weight, gender and body size. Normal GFR can vary according to age (as you get older it can decrease). The normal value for GFR is 90 or above. A GFR below 60 is a sign that the kidneys are not working properly. A GFR below 15 indicates that a treatment for kidney failure, such as dialysis or a kidney transplant, will be needed.

C. Blood Urea Nitrogen (BUN) — Urea nitrogen (yoo-REE-uh NY-truh-jen) comes from the breakdown of protein in the foods you eat. A normal BUN level is between 7 and 20. As kidney function decreases, the BUN level rises.

1.9.2 Imaging Tests

A. Ultrasound — This test uses sound waves to get a picture of the kidney. It may be used to look for abnormalities in size or position of the kidneys or for obstructions such as stones or tumors.

B. CT Scan — This imaging technique uses contrast dye to picture the kidneys. It may also be used to look for structural abnormalities and the presence of obstructions.

1.9.3 Kidney Biopsy

A biopsy may be done occasionally for one of the following reasons:

a) to identify a specific disease process and determine whether it will respond to treatment.
b) to evaluate the amount of damage that has occurred in the kidney.
c) to find out why a kidney transplant may not be doing well.

A kidney biopsy is performed by using a thin needle with a sharp cutting edge to slice small pieces of kidney tissue for examination under a microscope.

1.9.4 Urine Tests

Some urine tests require only a couple of tablespoonful of urine. But some tests require collection of all urine produced for a full 24 hours. A 24-hour urine test shows how much urine your kidneys produce in one day. The test also can give an accurate measurement of how much protein leaks from the kidney into the urine in one day.

A. Urinalysis	Includes microscopic examination of a urine sample as well as a dipstick test. The dipstick is a chemically treated strip, which is dipped into a urine sample. The strip changes colour in the presence of abnormalities such as an excess amount of protein, blood, pus, bacteria and sugar. A urinalysis can help to detect a variety of kidney and urinary tract disorders, including chronic kidney disease, diabetes, bladder infections and kidney stones.
B. Urine Protein	This may be done as part of a urinalysis or by a separate dipstick test. An excess amount of protein in the urine, called proteinuria (pro-TEEN-yu-ree-uh). A positive dipstick test (1+ or greater) should be confirmed using a more specific dipstick test (an albumin specific dipstick) or by a quantitative measurement, such as albumin-to-creatinine ratio.
C. Microalbuminuria	This is a more sensitive dipstick test, which can detect a tiny amount of protein called albumin in the urine. People who have an increased risk of developing kidney disease, such as those with diabetes or high blood pressure, should have this

test if their standard dipstick test for proteinuria is negative.

D. Creatinine Clearance — A creatinine clearance test compares the creatinine in a 24-hour sample of urine to the creatinine level in your blood to show how much blood the kidneys are filtering out each minute (Brown W, 2003).

1.10 Co-Morbid Health Conditions Associated with CKD

According to Hoyert & Xu (2012), heart disease was ranked first and DM Type II ranked seventh out of the top ten leading causes of death. Additional research showed four preventable risk factors (smoking, blood pressure, blood glucose, and adiposity), decrease in mortality from cardiovascular diseases (Danaei *et al.,* 2010). A reduction in these risk factors could increase the probability of adding more years to life expectancy. Therefore, a reduction in cardiovascular diseases can result in decreasing the incidence of CKD among older adults and increasing life expectancy.

DM Type II has also been a growing concern in the older adult as it relates to CKD. When evaluating the number of older adults with CKD, almost 50% of this population was diagnosed with DM Type II (Touhy & Jett, 2012). According to them, older adults should be screened for DM every three years and more frequently if risk factors are present. This will help detect any other abnormalities and other co-morbid conditions that could lead to CKD. Hyperlipidemia is an elevation of cholesterol and triglycerides that usually occur as a result from the improper intake of nutrients. Hyperlipidemia, along with DM Type II has been linked to the development of CKD in the older adult population. Uncontrolled glucose levels Hypertension is one of the most common and prevalent cardiovascular conditions among the older adult (Ostchega *et al.,* 2007). Although some older adults are not diagnosed with hypertension, monitoring and screening could help reduce their risk of acquiring CKD. The higher an individual's blood pressure, the greater the risks are for developing a myocardial infarction, heart failure, cerebral vascular accident, and/or kidney disease (Ostchega *et al.*, 2007).

In an analysis of CKD and the risks of death, cardiovascular events, and hospitalization, older adults with lower glomerular filtration rates were more at risk for developing serious cardiovascular conditions such as a myocardial infarction, angina, coronary artery disease, strokes, and chronic heart failure (Go *et al.*, 2004).

1.11 Treatment or Prevention

Prevention is always the goal with kidney failure. Chronic diseases such as hypertension (high blood pressure) and diabetes are devastating because of the damage that they can do to kidneys and other organs. Lifelong diligence is important in keeping blood sugar and blood pressure within normal limits. Specific treatments depend upon the underlying diseases.

Once kidney failure is present, the goal is to prevent further deterioration of renal function. If ignored, the kidneys will progress to complete failure, but if underlying illnesses are addressed and treated aggressively, kidney function can be preserved, though not always improved.

1.11.1 Diet

Diet is an important consideration for those with impaired kidney function. Consultation with a dietician may be helpful to understand what foods may or may not be appropriate. In this state of impaired kidney function, the kidneys cannot easily remove excess water, salt, or potassium from the blood, so foods high in potassium salt substitutes may need to be consumed in limited quantities. Examples of potassium rich foods include:

- ✓ Bananas
- ✓ Apricots
- ✓ Cantaloupe
- ✓ Sweet potatoes
- ✓ Yogurt
- ✓ Spinach
- ✓ Avocados

Phosphorus is a forgotten chemical that is associated with calcium metabolism and may be elevated in the body in kidney failure. Too much phosphorus can leech calcium from the bones and cause osteoporosis and fractures. Examples of foods and beverages high in phosphorus include:

- ✓ Milk
- ✓ Cheese
- ✓ Nuts
- ✓ Dark cola drinks Canned iced teas
- ✓ Yogurt
- ✓ Organ meets
- ✓ Sardines
- ✓ Oysters
- ✓ Baked beans
- ✓ Black beans
- ✓ Lentils
- ✓ Kidney beans Soy beans
- ✓ Bran cereals
- ✓ Caramels

- ✓ Whole grain products

(Winearls, 2009).

Typical Dietary Recommendations for Chronic Kidney Disease Patients

- ➢ Protein: 0.6-0.8 g/kg/day
- ➢ Sodium: <2 g/day (<6 g/day of salt)
- ➢ Potassium: 40-70 mg/day
- ➢ Phosphate: 600-800 mg/day
- ➢ Calcium: 1400-1600 mg/day (not to exceed 2000 mg/day)
- ➢ Free water (in excess of urine output): 1-1.5 L/day

(Winearls, 2009).

1.11.2 Dialysis

Dialysis cleanses the body of waste products in the body by use of filter systems.

There are two types of dialysis;

1) Haemodialysis, and

2) Peritoneal dialysis (Charles *et al.*, 2001).

1.11.2.1Haemodialysis

Haemodialysis uses a machine filter called a dialyzer or artificial kidney to remove excess water and salt, to balance the other electrolytes in the body, and to remove waste products of metabolism. Blood is removed from the body and flows through tubing into the machine, where it passes next to a filter membrane. A specialized chemical solution (dialysate) flows on the other side of the membrane. The dialysate is formulated to draw impurities from the blood through the filter membrane. Blood and dialysate never touch in the artificial kidney machine.

For this type of dialysis, access to the blood vessels needs to be surgically created so that large amounts of blood can flow into the machine and back to the body. Surgeons can build a fistula, a connection between a large artery and vein in the body, usually in the arm, that allows a large amount of blood flow into the vein. This makes the vein swell or dilate, and its walls become thicker so that it can tolerate repeated needle sticks to attach tubing from the body to the machine. Since it takes many weeks or months for a fistula to mature enough to be used, significant planning is required if haemodialysis is to be considered as an option.

If the kidney failure happens acutely and there is no time to build a fistula, special catheters may be inserted into the larger blood vessels of the arm, leg, or chest. These catheters may be

left in place for weeks. In some diseases, the need for dialysis will be temporary, but if the expectation is that dialysis will continue for a prolonged period of time, these catheters act as a bridge until a fistula can be planned, placed, and matured.

Dialysis treatments normally occur three times a week and last a few hours at a time. Most commonly, patients travel to an outpatient centre to have dialysis, but home dialysis therapy is becoming an option for some. Outpatient dialysis is available on some cruise ships. They are equipped with dialysis machines with trained health care professionals ready to care for those with kidney failure while travelling (Charles *et al*., 2001).

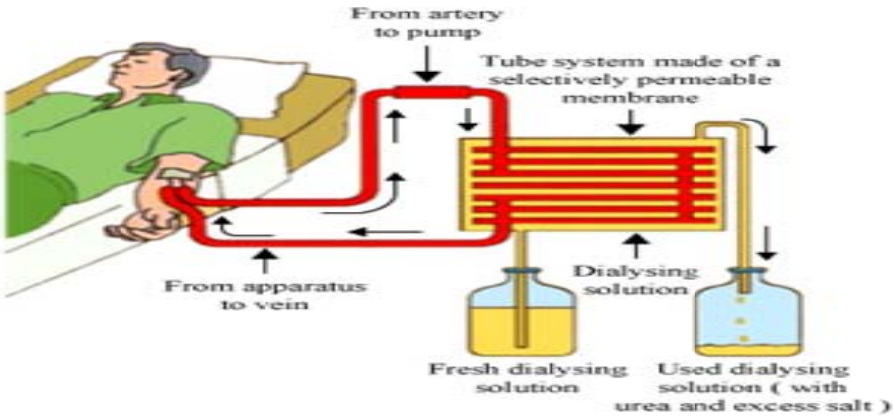

Figure 1.1: Haemodialysis.

1.11.2.2 Peritoneal dialysis

Peritoneal dialysis uses the lining of the abdominal cavity as the dialysis filter to rid the body of waste and to balance electrolyte levels. A catheter is placed in the abdominal cavity through the abdominal wall by a surgeon, and it is expected to remain in place for the long-term. The dialysis solution is then dripped in through the catheter and left in the abdominal cavity for a few hours and then is drained out. In that time, waste products leech from the blood flowing through the lining of the abdomen (peritoneum), and attach themselves to the fluid that has been instilled by the catheters. Often, patients instil the dialysate fluid before bedtime, and drain it in the morning.

There are benefits and complications for each type of dialysis. Not every patient can choose which type he or she would prefer. The treatment decision depends on the patient's illness and their past medical history along with other issues. Usually, the nephrologist (kidney specialist) will have a long discussion with the patient and family to decide what will be the best option available.

Dialysis is life-saving. Without it, patients whose kidneys no longer function would die relatively quickly due to electrolyte abnormalities and the build-up of toxins in the blood stream. Patients may live many years with dialysis but other underlying and associated illnesses often are the cause of death (Charles *et al*., 2001).

Figure1.2: Peritoneal dialysis.

1.11.3 Kidney transplantation

If kidney failure occurs and is non-reversible, kidney transplantation is an alternative option to dialysis. If the patient is an appropriate candidate, the healthcare professional and nephrologist will contact an organ transplant centre to arrange evaluation to see whether the patient is suitable for this treatment. If so, the search for a donor begins. Sometimes, family members have compatible tissue types and, if they are willing, may donate a kidney. Otherwise, the patient will be placed on the organ transplant list that is maintained by the United Network of Organ Sharing.

Not all hospitals are capable of performing kidney transplants. The patient may have to travel to undergo their operation. The most successful programs are those that do many transplants every year.

While kidney transplants have become more routine, they still carry some risk. The patient will need to take anti-rejection medications that reduce the ability of the immune system to fight infection. The body can try to reject the kidney or the transplanted kidney may fail to work. As with any operation, there is a risk of bleeding and infection.

Kidney transplants may provide better quality of life than dialysis. After one year, 95% of transplanted kidneys are still functioning and after five years the number is 80%. It seems that the longer a patient is on dialysis, the shorter the life of the transplanted kidney. If the

transplanted kidney fails, the alternative is another kidney transplant or a return to dialysis (Charles *et al.*, 2001).

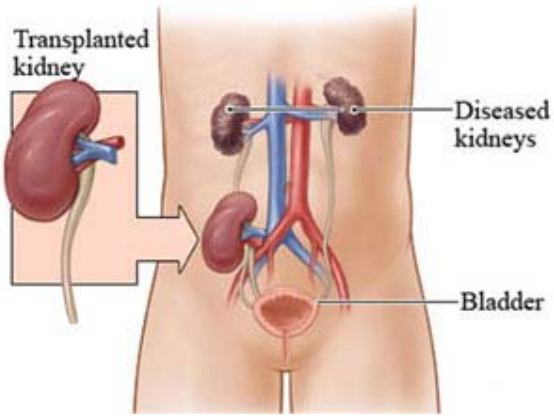

Figure1.3: Kidney Transplantation.

1.11.4 Awareness of General Population

Research by McCollough, and Bakris (2008) showed how awareness and detection of CKD is low in the U.S. The results led to establishing the Kidney Early Evaluation Program (KEEP). This program has helped in determining why individuals were not aware of CKD, its prevalence, and how to prevention. KEEP is the first national health-screening program to target adult populations at high risk for CKD and promote awareness. According to this population-based survey most patients with CKD had not effectively been informed of this condition by medical professionals. To ensure adequate teaching and screening, strategies can be implemented to provide community-based education for adults on ways to detect CKD (McCollough and Bakris, 2008).

There have been a wide variety of programs to determine the awareness of CKD within the U.S. Programs such as KEEP and Pair-Up are used to encourage and promote awareness of kidney disease. Pair-Up is a program used to help raise awareness in women about kidney disease that is sponsored by the American Kidney Fund. According to the American Kidney Fund the Pair-Up program educates women on risk factors of kidney disease, and positive ways to live healthy. This program also give ways to get involved by becoming an activist in preventing kidney disease, sharing personal stories, giving healthy tips, and donating to help those individuals suffering from kidney disease (McCollough and Bakris, 2008).

1.11.5 Awareness of the Older Adult Population

Plantinga and others (Plantinga *et al.,* 2010) noted that understanding risk factors associated with CKD does not differ by gender. However, males with CKD were more likely than

females in the U.S. to be aware of their disease status. This research aided in the understanding that individuals, depending on age and ethnicity, may be more aware with a greater awareness being in males. They further explained that ethnic minorities (particularly African Americans) were more aware of CKD and risk factors due to a higher likelihood of having family members or friends that suffer from CKD.

As research on CKD unfolds, the importance of raising awareness is evident because CKD can often go undetected and untreated in the older adult population. According to Rothberg and others (Rothberg *et al.*, 2008) awareness in the older adult is important to help slow the progression of the disease. They stated CKD is a growing problem among the older adult population. Early detection is considered essential to ensure proper treatment to slow down the damage of nephrons and help maintain kidney perfusion. Other reasons for lack of awareness in the older adult population can occur from the physician's lack of awareness.

Chapter 2

Literature review

2.1 Chronic Kidney Disease and the Risks of Death, Cardiovascular Events, and Hospitalization

More than 400,000 Americans have end-stage renal disease, and over 300,000 of these patients require maintenance dialysis. The mortality rates remain above 20 percent per year with the use of dialysis, with more than half of the deaths related to cardiovascular disease. Alan and his co-researchers found that the annual direct medical costs for end-stage renal disease are nearly $23 billion. Although an estimated 8 million adults in the United States had chronic kidney disease of at least stage 3 (as defined by an estimated glomerular filtration rate [GFR] of less than 60 ml per minute per 1.73 m^2 of body-surface area), less is known about the rates of death, cardiovascular disease, and resource used among persons with a reduced estimated GFR who were not yet receiving maintenance dialysis (Alan *et al.*, 2004).

2.2 National Kidney Foundation Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification, and Stratification

Levey and others described that chronic kidney disease is a worldwide public health problem. In the United States, the incidence and prevalence of kidney failure are rising, the outcomes are poor, and the costs are high. The number of persons with kidney failure who were treated with dialysis and transplantation was projected to increase from 340 000 in 1999 to 651 000 in 2010. The major outcomes of chronic kidney disease, regardless of cause, included progression to kidney failure, complications of decreased kidney function, and cardiovascular disease (CVD). Increasing evidence indicated that some of these adverse outcomes can be prevented or delayed by early detection and treatment. Unfortunately, chronic kidney disease was under diagnosed and undertreated, resulting in lost opportunities for prevention, in part because of a lack of agreement on a definition and classification of stages in the progression of chronic kidney disease and a lack of uniform application of simple tests for detection and evaluation (Levey *et al.*, 2003).

2.3 Prevalence of Chronic Kidney Disease in the United States

The prevalence and incidence of kidney failure treated by dialysis and transplantation in the United States had increased from 1988 to 2004. Whether there had been changes in the prevalence of earlier stages of chronic kidney disease (CKD) during this period was uncertain.

The FREE considered the chronic kidney disease prevalence was determined based on persistent albuminuria and decreased estimated glomerular filtration rate (GFR). Persistence of microalbuminuria (>30 mg/g) was estimated from repeat visit data in NHANES 1988-1994. They also estimated the GFR using the abbreviated Modification of Diet in Renal Disease Study equation re expressed to standard serum creatinine.

The prevalence of CKD in the United States in 1999-2004 is higher than it was in 1988-1994. This increase was partly explained by the increasing prevalence of diabetes and hypertension and raises concerns about future increased incidence of kidney failure and other complications of CKD (Coresh *et al.*, 2007).

2.4 Clinical Practice Guidelines for Chronic Kidney Disease in Adults

"The Kidney Disease Outcome Quality Initiative of the National Kidney Foundation" published clinical practice guidelines on chronic kidney disease in February 2002. Of the 15 guidelines, the first six were of greatest relevance to family physicians. Part II of this two-part review covered guidelines 4, 5, and 6. Glomerular filtration rate was the best overall indicator of kidney function. It was superior to the serum creatinine level, which varied with age, sex, and race and often did not reflect kidney function accurately. The glomerular filtration rate could be estimated using prediction equations that took into account the serum creatinine level and some or all of specific variables (age, sex, race, body size). In many patients, estimated of the glomerular filtration rate could replace 24-hour urine collections for creatinine clearance measurements. Urine dipsticks generally were acceptable for detecting proteinuria. To quantify proteinuria, the ratio of protein or albumin to creatinine in an untimed (spot) urine sample was an accurate alternative to measurement of protein excretion in a 24-hour urine collection. Patients with persistent proteinuria had chronic kidney disease. Other techniques for evaluating patients with chronic kidney disease included examination of urinary sediment, urine dipstick testing for red and white blood cells, and imaging studies of the kidneys (Johnson *et al.*, 2004).

2.5 Burden and management of chronic kidney disease in Japan

Travers and his co-researchers found the risk factors for disease progression differed depending on CKD stage, with proteinuria; smoking, hypertension, and low levels of high-density lipoprotein commonly associated with progression in patients with stage 1 and 2

disease. Serum albumin levels and haemoglobin were the most sensitive variables to progression in patients with stage 3 and 5 disease, respectively (Travers *et al.*, 2013).

2.6 Systemic Consequences of Poor Oral Health in Chronic Kidney Disease Patients

Akar, Carrero and others found the changes in the oral cavity, such as periodontitis and other manifestations of poor oral health, are common in patients with chronic kidney disease (CKD) and may contribute to increased morbidity and mortality because of systemic consequences such as inflammation, infections, protein- energy wasting, and atherosclerotic complications.They had declared that both gingivitis and periodontitis were seen more frequently in ESRD patients (Akar *et al.*, 2011).

Significance of the study

Kidney disease is a serious disease around the world. Life saving dialysis was not available in most of the developing world. There are 112 countries that did not have resources for dialysis and kidney transplant, which directly resulted in the death of over one million people a year from kidney failure. Currently over 1.4 million people worldwide are on dialysis, and this number increases by 8% every year. However, this most likely represented less than 10% of all people who required dialysis to survive. The prevalence of CKD in the United States in 1999-2004 was higher than in 1988-1994. This increase is partly explained by the increasing prevalence of diabetes and hypertension and raises concerns about future increased incidence of kidney failure and other complications of CKD. Chronic kidney disease (CKD) is a substantial concern in the elderly population, with both an increasing incidence of treated kidney failure with dialysis as well as a high prevalence of earlier stages of CKD (Lesley *et al.*, 2010).

Chronic kidney disease (CKD) progresses to end-stage renal disease (ESRD) and is a silent epidemic throughout the world. In Bangladesh, one in every seven people has been suffering from kidney diseases and 40000 die of long-term kidney failures annually. Two crore people are now suffering from kidney ailments which was about one crore 10 years ago. The rate of chronic kidney disease has now increased to 18% from 9% during the period. If the present rate of the disease continues, it will rise to 28-30% in next 10 years turning the situation alarming (Das *et al.*, 2010).

Prevention of this disease can be done by quitting smoking; alcohol, losing weight if overweighed, following a healthy diet, understanding food label, exercising regularly.

Now-a-days kidney disease is a treatable disease with proper planning of prevention, it can be eradicated. This study can provide information related to the awareness of the kidney patients about the condition and prevention of disease progression.

Aims and objectives of the study

The aims and objectives of the study were -

- To determine the prevalence of CKD.
- To find out the consciousness for kidney disease among the people.
- Presence of associated co-morbid conditions.
- To assess self-care practices among the patients.

Chapter 3

Materials and Methods

3.1 Type of the study

It was a prospective study

3.2 Place of the study

This study was done in “National Kidney Institute”, College gate, Mirpur road. Outdoor patients were included in the study.

3.3 Study Population

In this study, 152 patients having kidney disease were taken.

3.4 Inclusion Criteria

Here, male and female both patients were included. And only outdoor patients were included.

3.5 Exclusion Criteria

Indoor patients were not included in this study.

3.6 Study Period

Study period was from June, 2014 from July, 2015.

3.7 Data collection paper

A data collection paper was made and compiled all the information and data of the patient in an organized manner.

3.8 Data analysis

All the data were collected properly and then checked. After that the collected data were entered into Microsoft Excel and then the result was shown in pie chart and calculated the percentage of the parameter of kidney disease.

Chapter 4

Result

4.1 Gender distribution

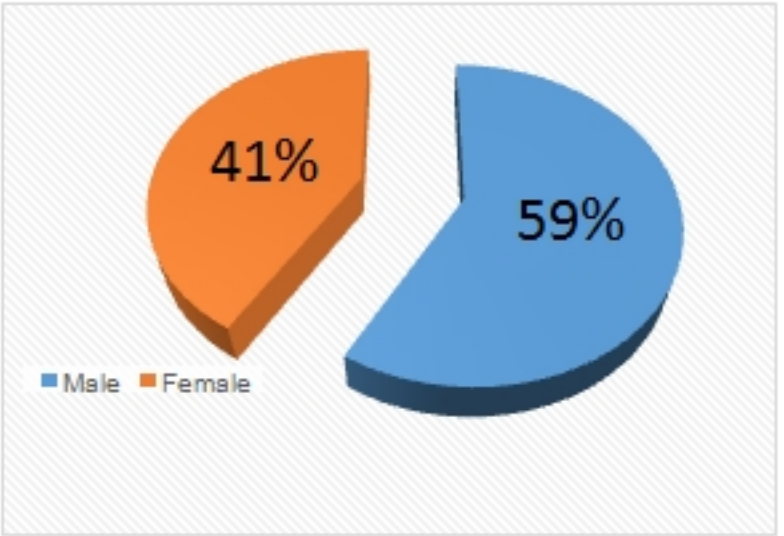

Figure 4.1Gender Distribution

Above diagram show that percent distribution of kidney patients according to the gender, 59% male and 41% female were affected.

4.2 Age distribution

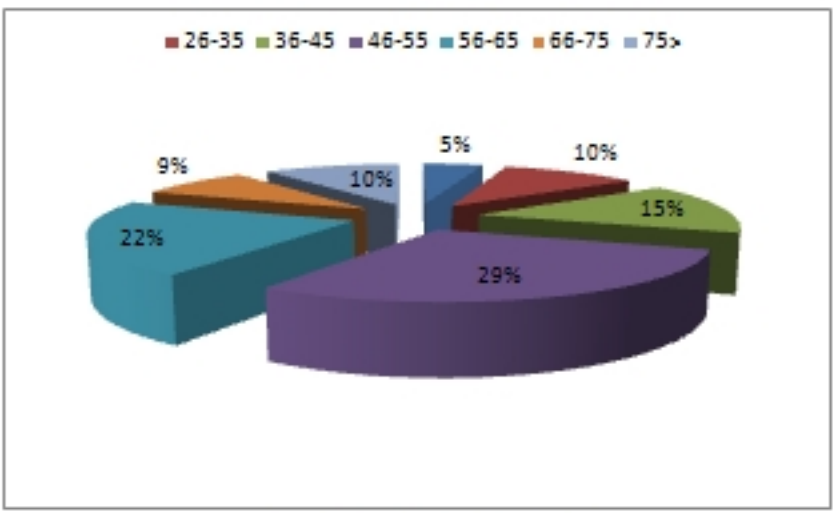

Figure 4.2 Age distribution

In this figure, it is clear that kidney disease occurs mostly in patients with 46-55 years (29%).

4.3 Education Level

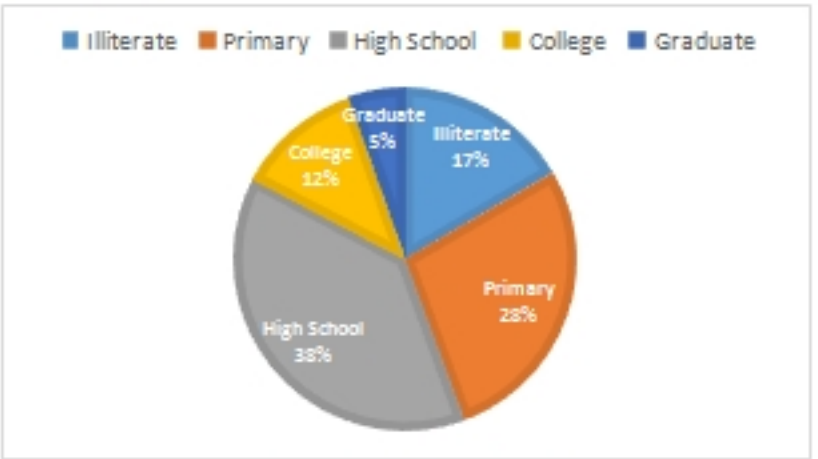

Figure 4.3 Education Level

Above diagram illustrates the percentage of educational level of kidney patients where majority of the patients were high school pass (38%) and only 5% of the patients were graduate.

4.4 Occupational level

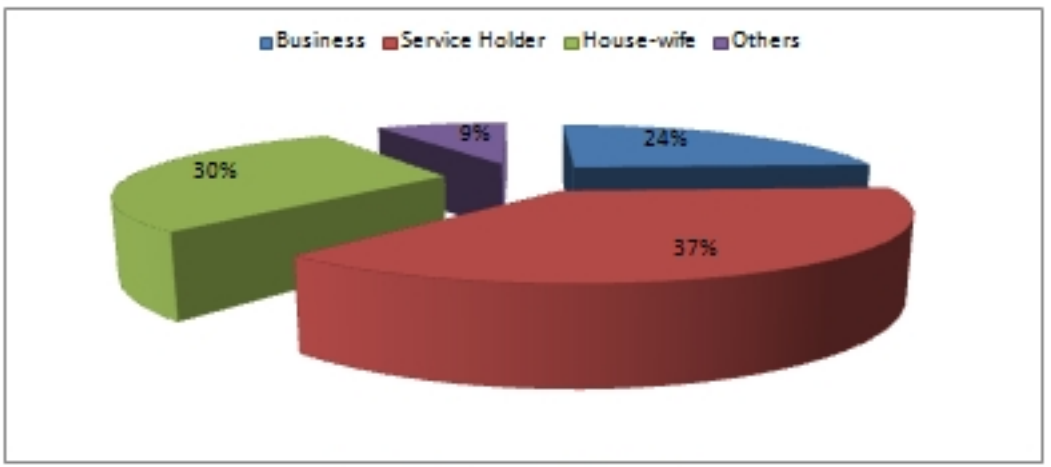

Figure 4.4 Occupational Level

The following figure explains the occupational level of kidney patients. It was found that most of the patients were service holder (37%) & housewife (30%).

4.5 Social class

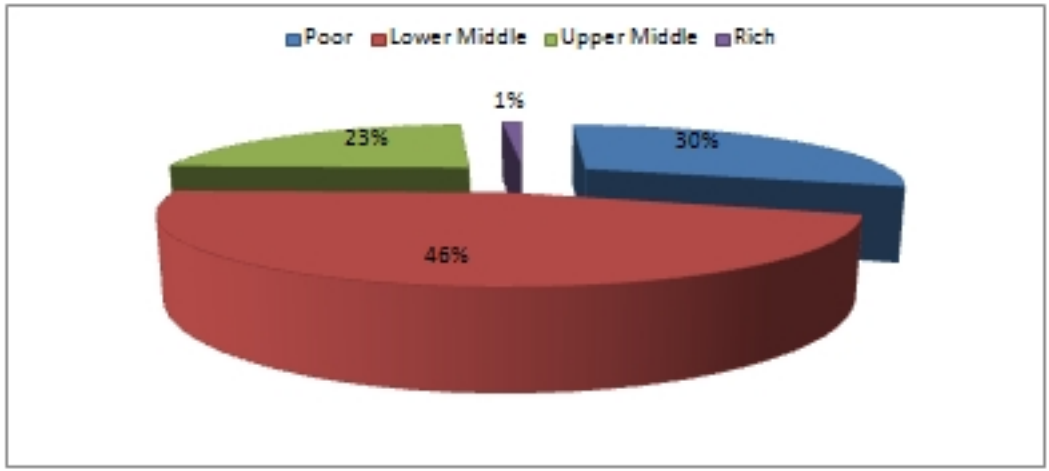

Figure 4.5 Social Class

This diagram display the social class of kidney patients where most of the patients were lower middle (46%) and poor patients were 30%, upper middle were 23% and rich were 1%.

4.6 Stress on work

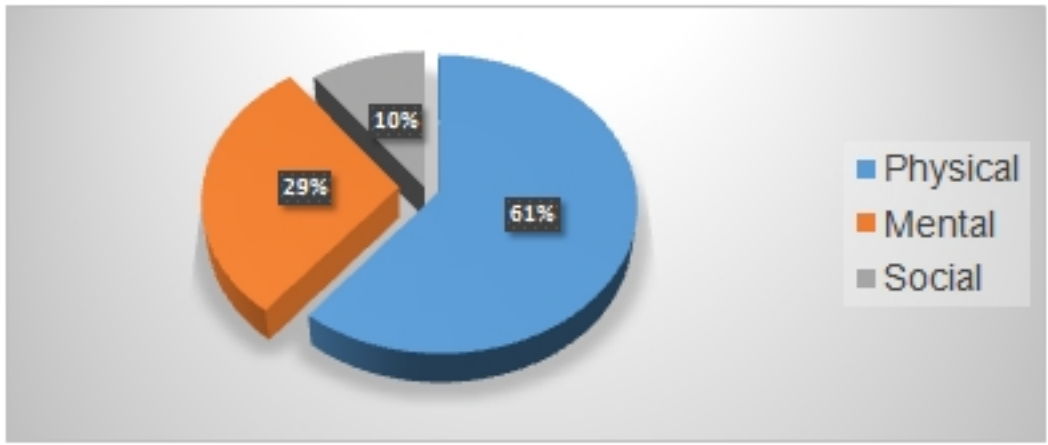

Figure 4.6 Stress on Work

From the above it is evident that mostly of the CKD patients were physically stressed (61%). After that mental stressed were 29% and social stressed were 10%.

4.7 Smoking habit

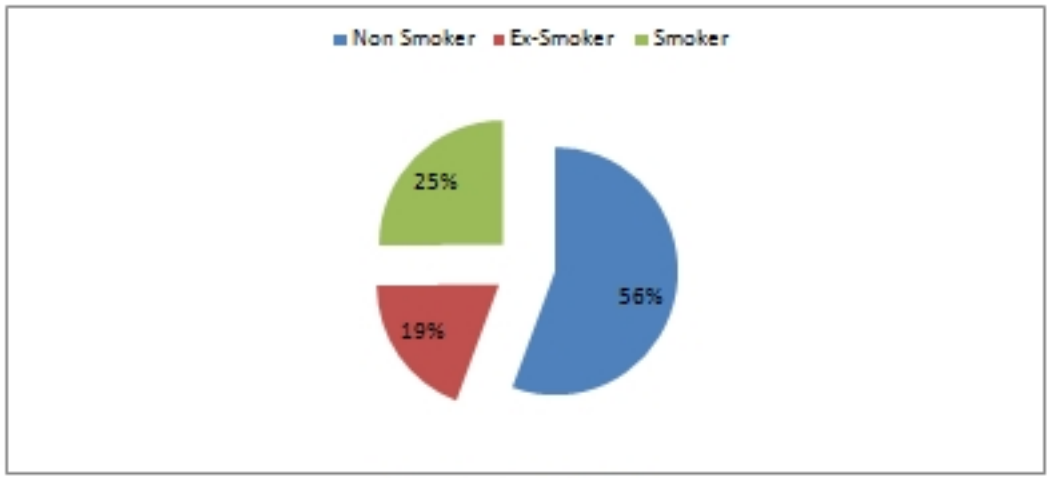

Figure 4.7 Smoking habit

Following figure shows the percentage of non smoker, ex smoker which were 56% and 19% respectively. About 25% of the patients had smoking habit during the study period.

4.8 Other addictions

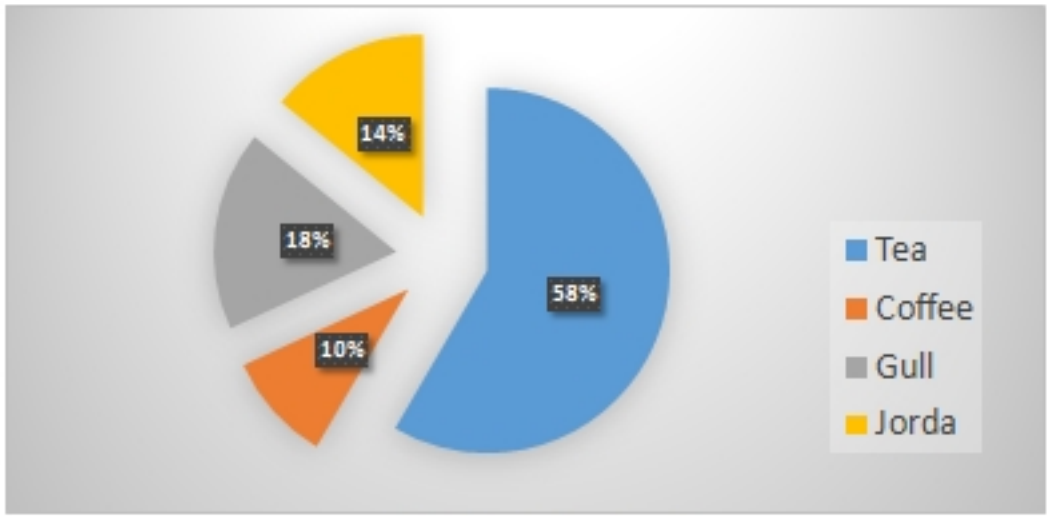

Figure 4.8 Other Addictions

This diagram shows the other addiction of kidney patients which were tea (58%), gull (18%), jorda (14%), and coffee (10%).

4.9 Type of sleeping

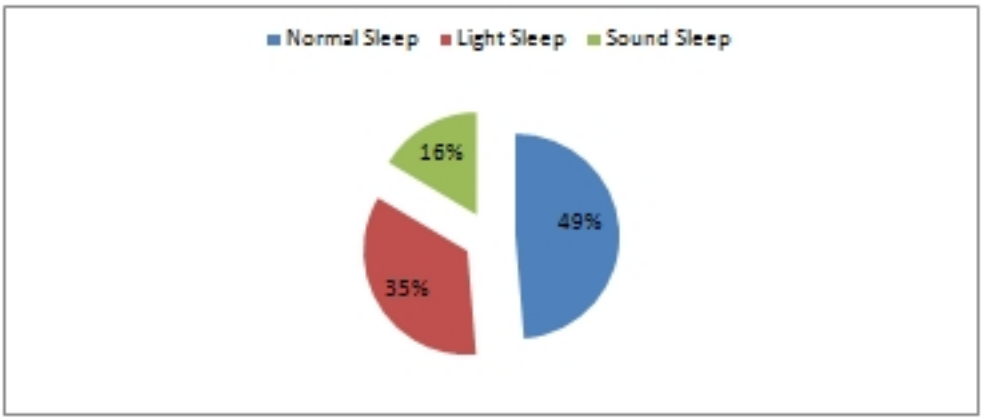

Figure 4.9 Type of Sleeping

The following figure explain the type of sleeping of kidney patients where normal sleep were 49% (that is maximum), light sleep were 35% and sound sleep were 16% (that is minimum).

4.10 Awareness of kidney patients

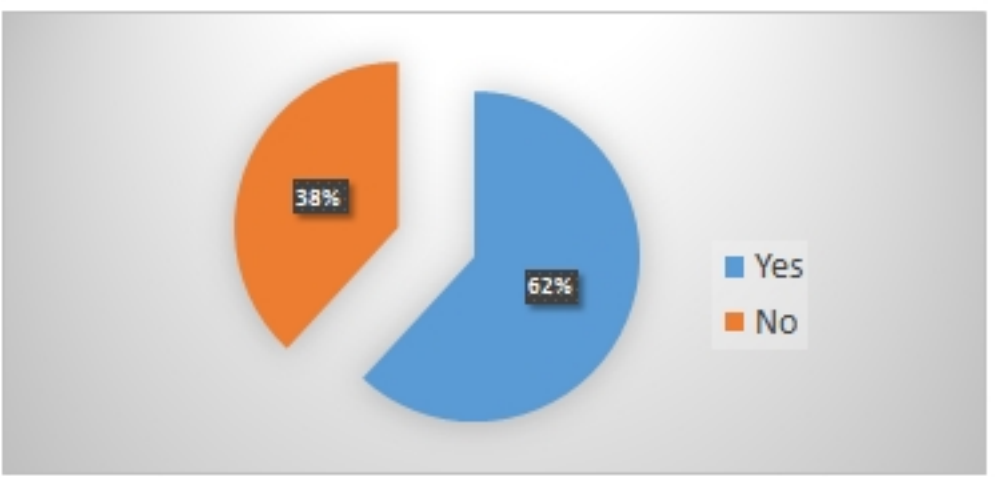

Figure 4.10 Awareness of Kidney Disease

From this figure it is clear that most of the kidney patients were aware about their disease (62%) and the rest of the kidney patients were not aware about their disease (38%).

4.11 Performing health check up

Figure 4.11 Performing Health Check-up

From the diagram most of the patients did not performing their health check up regularly (59%) and 41% patients were performing their health check-up.

4.12 Cholesterol level check up

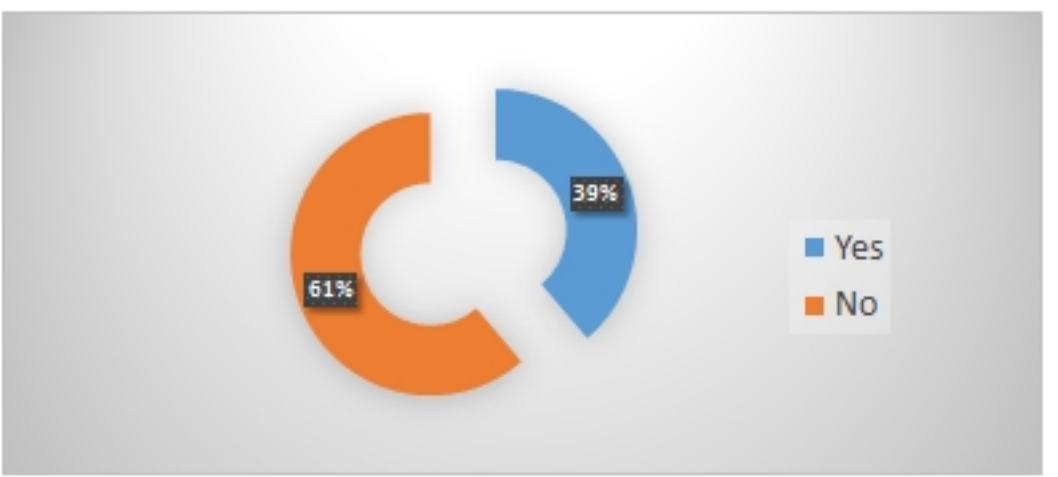

Figure 4.12 Cholesterol Level Check-up

From this figure it is clear that most (61%) kidney patients did not check their cholesterol level and 39% patients of kidney disease checked their cholesterol level.

4.13 Past Family history

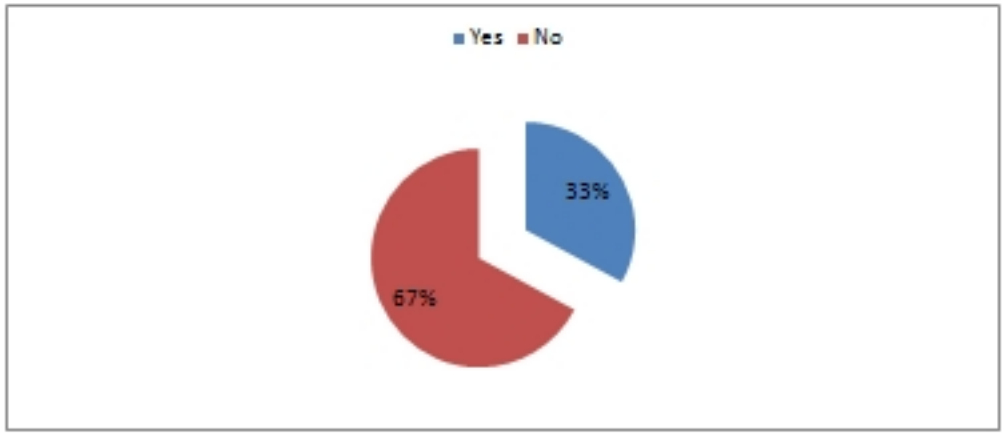

Figure 4.13 Past Family History

From the above figure it can be said that most of the kidney patients did not have any past family history of this disease (67%) and 33% patients had the past family history of kidney disease.

4.14 Glomerular filtration rate

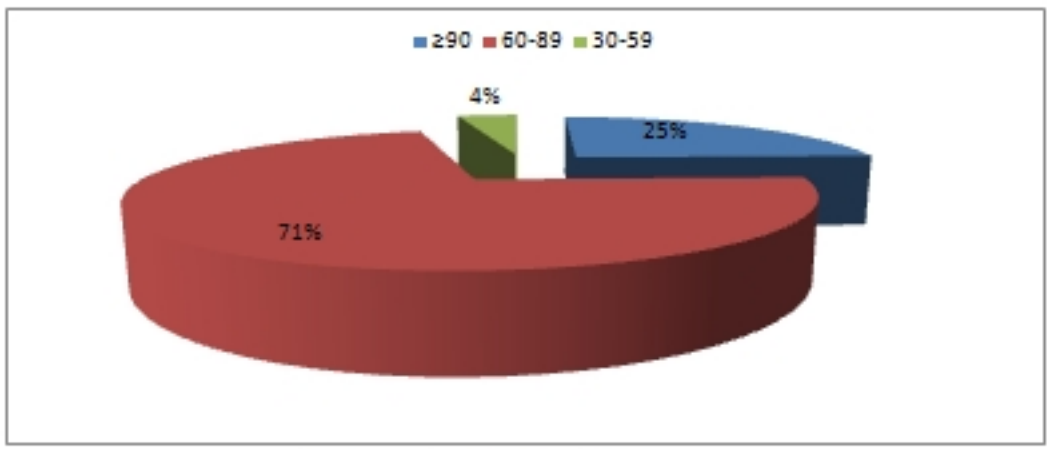

Figure 4.14 Glomerular Filtration Rate

From this figure it is estimated that the GFR of most kidney patients were between 60ml/min/1.73m2 -89ml/min/1.73m2 (71%). About 25% kidney patients had the GFR in the range of ≥90ml/min/1.73m2 and 4% were 30 ml/min/1.73m2 – 59 ml/min/1.73m2.

4.15 Creatinine level

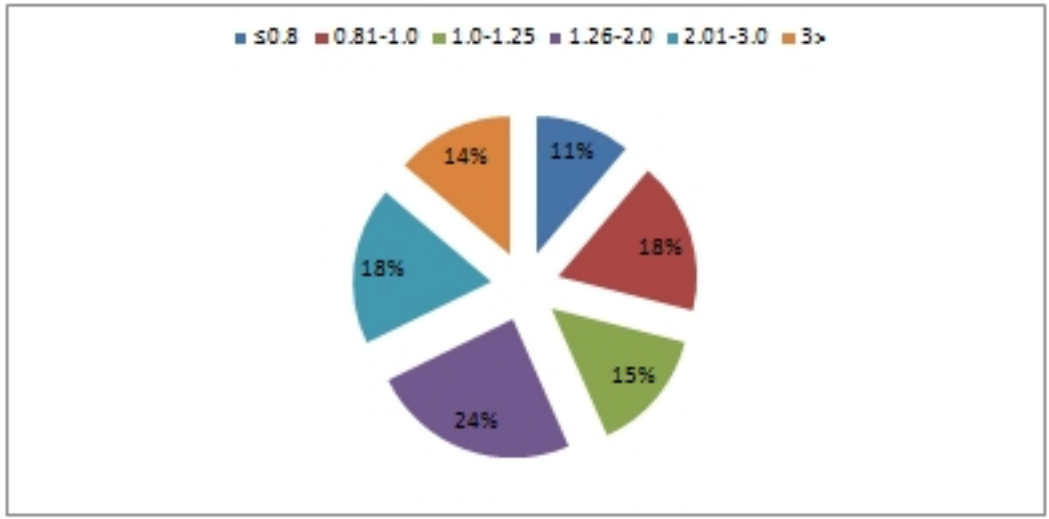

Figure 4.15 Creatinine level

From this figure it is clear that the creatinine level of most kidney patients were between 1.26mg/dl-2.0mg/dl (24%). Creatinine level of in between 0.81mg/dl-1.0mg/dl and 2.01mg/dl-3.0mg/dl were 18%.

4.16 Haemoglobin level

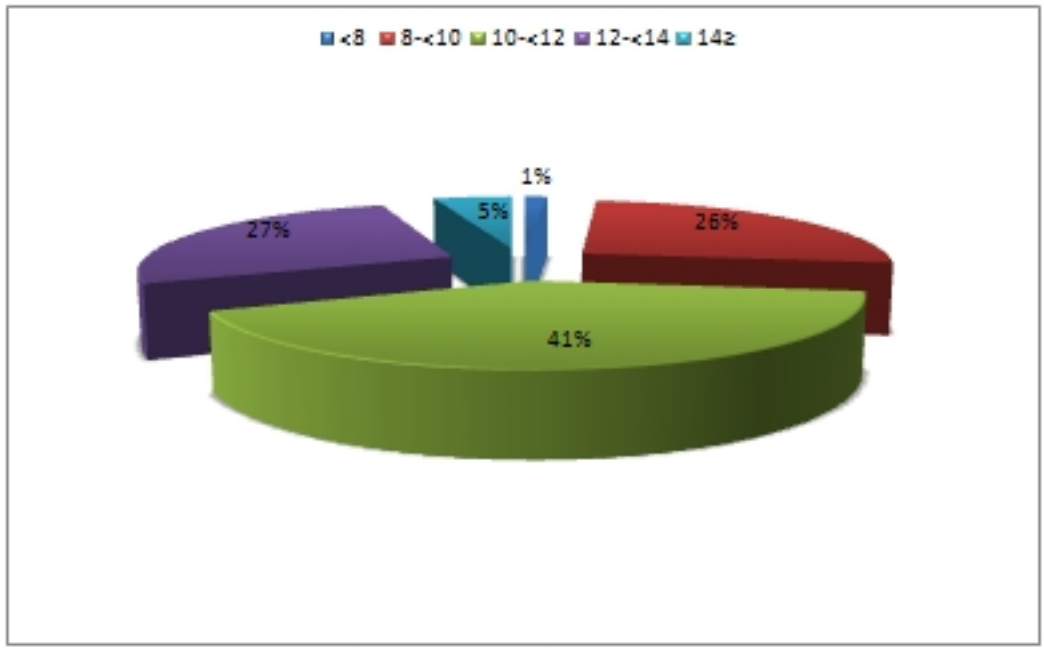

Figure 4.16 Haemoglobin Level

From the above diagram it is observed that the haemoglobin level of most kidney patients were in between 10gm/dl-<12gm/dl (41%). 27% patients who had the haemoglobin level in the range of 12-<14gm/dl.

4.17 White Blood Cell

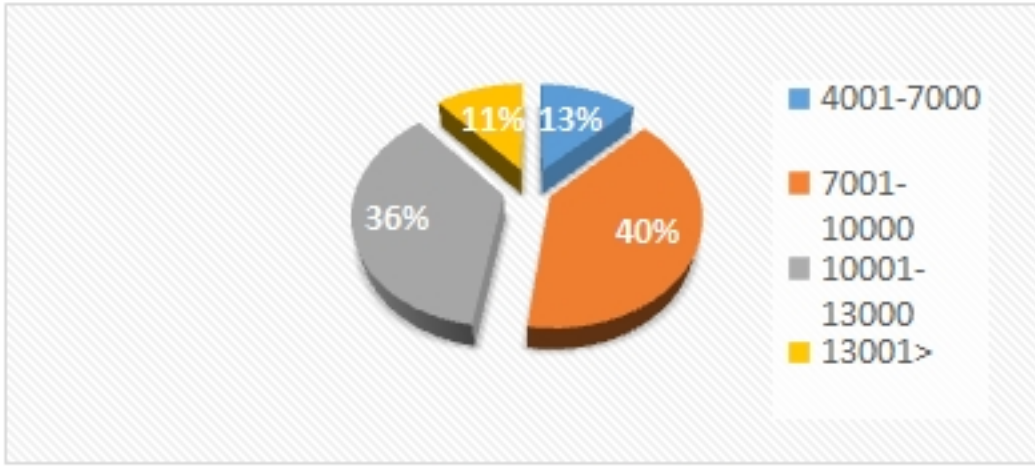

Figure 4.17 White Blood Cell count

In this figure it is estimated that maximum kidney patients had the range of WBC count in between 7001/cumm-10000/cumm (40%). It was also observed that 36% of kidney patients at the range of WBC count in between 10001 -13000/cumm.

4.18 Self care practises

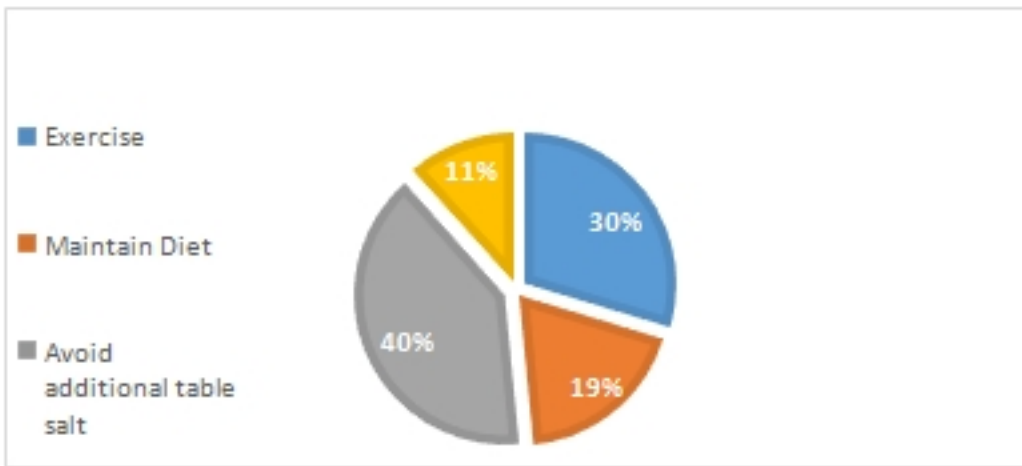

Figure 4.18 Self Care Practices

The above figure explain that self-care practices of CKD patients in which avoid additional table salt, maintaining diet, regular health check-up and exercises were 40%, 19%, 11% and 30% approximately.

4.19 Symptoms

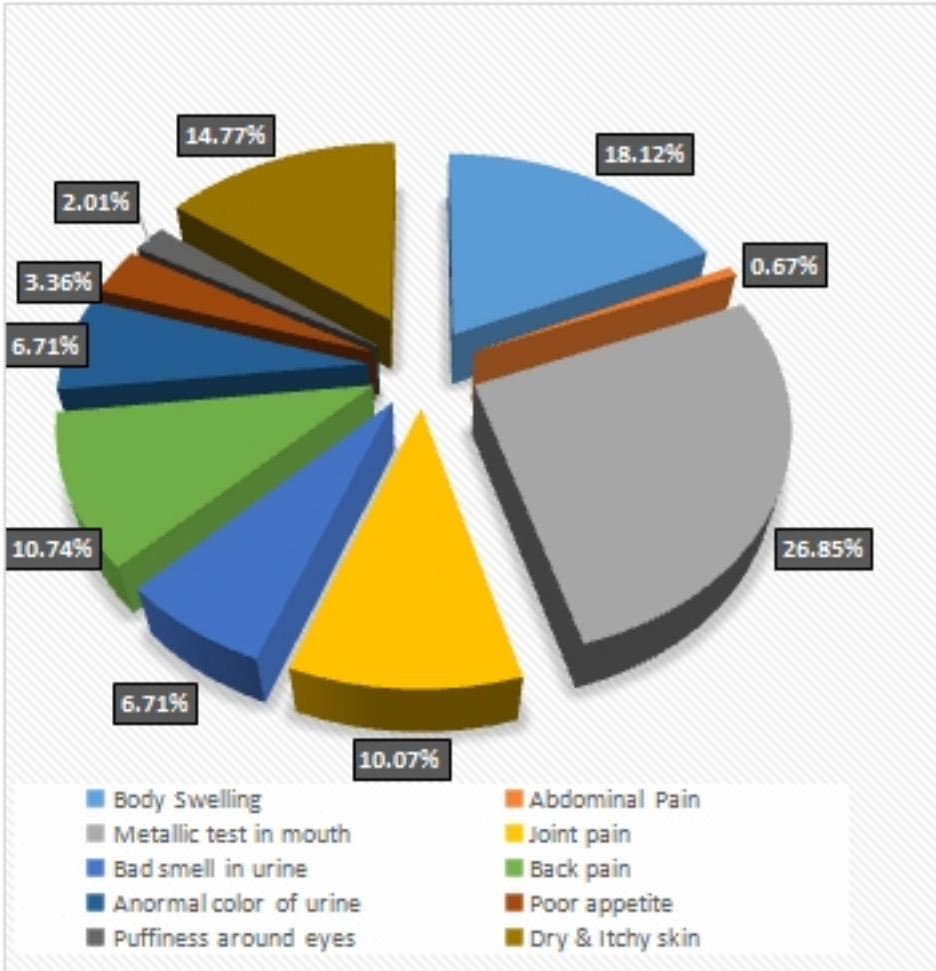

Figure 4.19 Symptoms

From this figure, the symptoms of kidney patients has observed. Here metallic test in mouth (26.85%) was the most common symptoms of kidney patients. About 18.12% had body swelling, 14.77% had dry and itchy skin.

4.20 History of drug abuse

Figure 4.20 History of drug abuse

The above figure estimated the history of drug abuse in kidney patients where 93% did not have the history of drug abuse and only 7% had the history of drug abuse.

4.21 Diabetes Mellitus

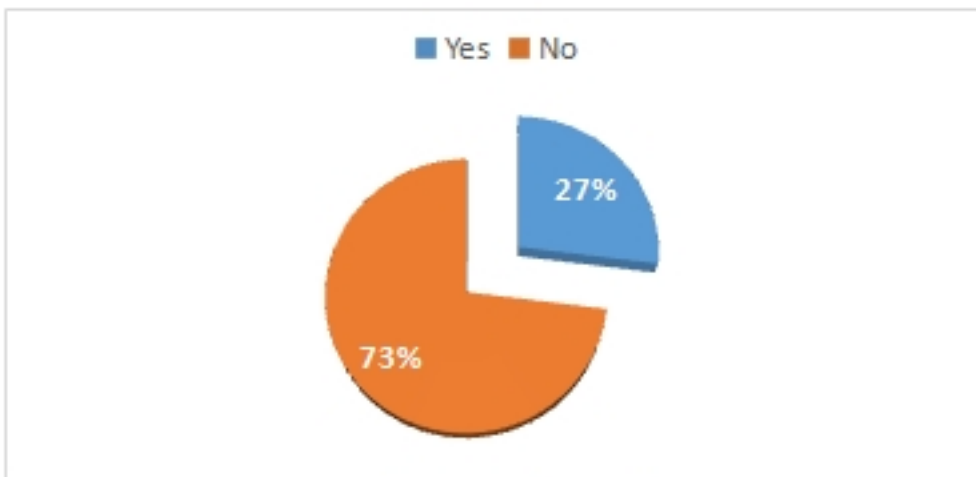

Figure 4.21 Diabetes mellitus

The following figure estimated the diabetes mellitus of kidney patients. About 73% of the CKD patients had not diabetes mellitus and 27% had diabetes mellitus.

4.22 Insulin

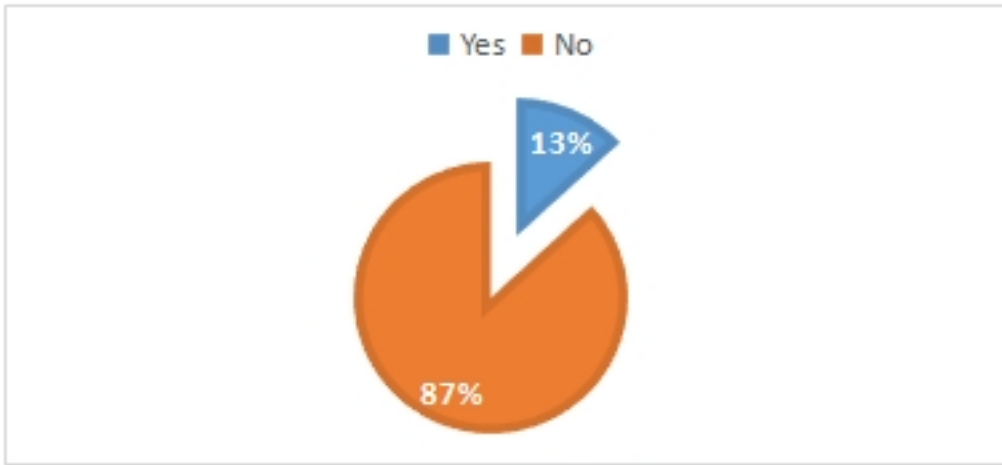

Figure 4.22 Insulin

From this figure, 87% of the CKD patients did not take insulin and 13% of the CKD patients were prescribed to take insulin.

4.23 History of Nephro surgery

Figure 4.23 history of Nephro surgery

From this figure it is clear that only 5% of CKD patients had undergone nephro surgery.

4.24 Hypertension

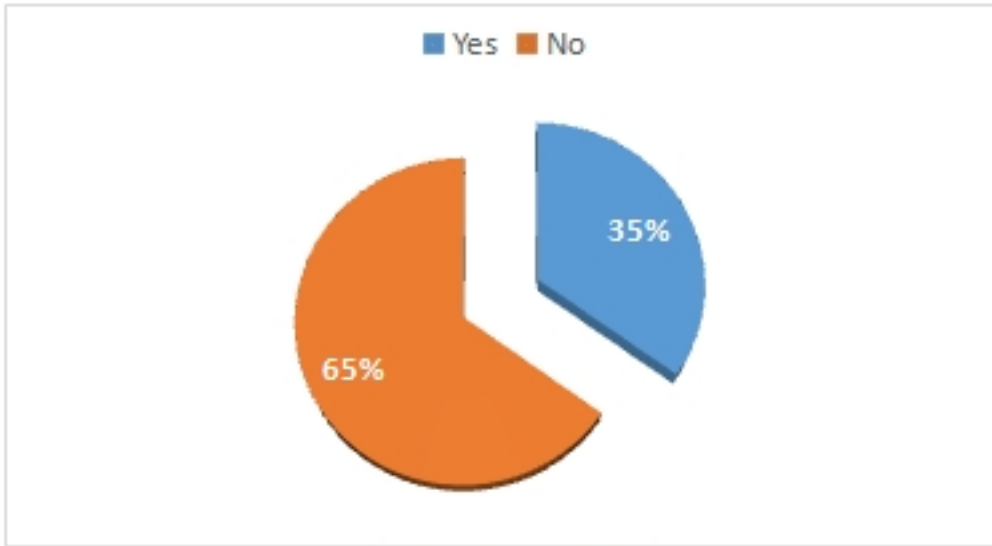

Figure 4.24 Hypertension

From this figure it is observed that 65% of kidney patients did not have hypertension and 35% of kidney patients had hypertension.

Chapter 5

Discussion & Conclusion

5.1 Discussion

CKD is a common disease among adults in the US. There are 10% of adults in the US - more than 20 million. The prevalence of chronic kidney disease was 11% among US adults surveyed in 1988 to 1994 (Travers *et al.*, 2013). In this study, the majority of CKD were between 46-55 years aged people.

The awareness of the CKD patients in the U.S population is low in contrast to the dramatic increase in treated chronic kidney disease (Travers *et al.*, 2013). But in the present study, the awareness of the people was relatively high. About 62% of the patients were aware about their disease which is a good impact.

Chronic kidney disease has become a major cause of global morbidity and mortality even in developing countries. About 800 per million populations were suffering from CKD approximately. ESRD is a significant problem in India which causes death (Agarwal and Srivastava, 2009). In the study, the rate of ESRD was at a lower rate.

In UK, 4.7% people had chronic kidney disease. It was also estimated that the glomerular filtration rate was below 60 ml/min/1.73m2. Diabetes mellitus, hypertension was occurring most in the people who are 55 years old or above 55 years. The end stage renal disease was relatively low (Hallan *et al.*, 2006).

The normal range of GFR is 90 ml/min/1.73m2 - 120 ml/min/1.73m2. In the study, most of the kidney patients had the GFR in between 60 ml/min/1.73m2 - 89 ml/min/1.73m2 which is mildly decreased GFR and it was a moderate result. About 68% of CKD patients had the haemoglobin level below 12 gm/dl that means the majority of the CKD patients had anaemia. Only 5% had undergone nephro surgery. About 65% of the patients had hypertension.

5.2 Conclusion

Now-a-days, kidney disease is one of the most common diseases. There are many of the drugs to treat kidney disease. Besides, dialysis and kidney transplant is occurring also in our country which is more effective to cure a kidney patient properly. It is a silent killer and so every people should be more conscious about their health as well as kidney. In this case, regular health check-up is a most important factor. And the specialist or doctor should have the capability to recognize the kidney disease otherwise severe problem will be create to that particular patient. To recognise this disease here many of the test are done. Physicians should prescribe the accurate drug or should prescribe the accurate way to treat the kidney disease. Here consulting with doctor is also an important factor. Patient should feel free with doctor that can help the doctor to recognise the problem. Awareness is another important factor. People should be aware about their health as well as kidney. People should not be careless. Most of the medicines of this disease is highly cost. And as we all know that Bangladesh is a developing country so many of the people cannot afford it. Here, campaign is a useful way to bring consciousness to the people and free service should be done by the Government. Government should take necessary steps to overcome from the disease and so our young generation as well as adult people will not be affected by kidney disease.

Chapter 6

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