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Prevalence of Kidney Failure

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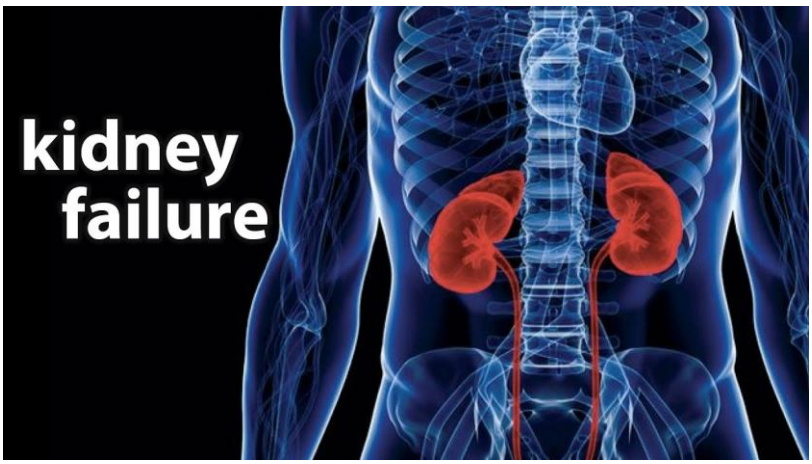
I. Introduction

The kidneys are a pair of bean-shaped organs on either side of your spine, below your ribs and behind your belly. Each kidney is about 4 or 5 inches long, roughly the size of a large fist.

The kidneys' job is to filter your blood. They remove wastes, control the body's fluid balance, and keep the right levels of electrolytes. All of the blood in your body passes through them about 40 times a day. Acute kidney failure occurs when your kidneys suddenly become unable to filter waste products from your blood. When your kidneys lose their filtering ability, dangerous levels of wastes may accumulate, and your blood's chemical makeup may get out of balance.

Acute kidney failure — also called acute renal failure or acute kidney injury — develops rapidly, usually in less than a few days. Acute kidney failure is most common in people who are already hospitalized, particularly in critically ill people who need intensive care.

Acute kidney failure can be fatal and requires intensive treatment. However, acute kidney failure may be reversible. If you're otherwise in good health, you may recover normal or nearly normal kidney function.



PARTS OF KIDNEY

The Kidneys Are Composed of Three Main Sections

Each kidney consists of an outer renal cortex, an inner renal medulla, and a renal pelvis. Blood is filtered in the renal cortex. The renal medulla contains the renal pyramids, where urine formation takes place. Urine passes from the renal pyramids into the renal pelvis.

Kidney failure is the inability of the kidneys to adequately filter metabolic waste products from the blood.

Kidney failure has many possible causes. Some lead to a rapid decline in kidney function (acute kidney injury, also called acute renal failure). Others lead to a gradual decline in kidney function (chronic kidney disease, also called chronic renal failure).

In addition to the kidneys being unable to filter metabolic waste products (such as creatinine and urea nitrogen) from the blood, the kidneys are less able to control the amount and distribution of water in the body (fluid balance) and the levels of electrolytes (sodium, potassium, calcium, phosphate) and acid in the blood.

When kidney failure has lasted for some time, blood pressure often rises. The kidneys lose their ability to produce sufficient amounts of a hormone (erythropoietin) that stimulates the formation of new red blood cells, resulting in a low red blood cell count (anemia).

The kidneys also lose their ability to produce sufficient calcitriol (the active form of vitamin D), which is vital to bone health. In children, kidney failure affects the growth of bones. In both children and adults, kidney failure can lead to weaker, abnormal bones.

Although kidney function can decline in people of all ages, both acute kidney injury and chronic kidney disease are more common in older than in younger people. Many disorders that cause a decline in kidney function can be treated, and kidney function may recover. The availability of dialysis and kidney transplantation has transformed kidney failure from a fatal disease to one that is manageable

PATHOPHYSIOLOGY

Chronic renal failure is caused by a progressive decline in all kidney functions, ending with terminal kidney damage. During this time, there is modulation and adaptation in the still-functional glomeruli, which keeps the kidneys functioning normally for as long as possible. The remaining glomeruli, therefore, experience a rise in pressure through hyperfiltration.

The release of various cytokines and growth factors leads to hypertrophy and hyperplasia. At the same time, the function of the glomeruli suffers due to the excessive demands on them, leading to increased permeability and proteinuria. Increased protein concentrations in the proximal tube system are direct nephrotoxins and can further impair kidney function.

There are 4 phases of chronic renal failure

Reduction in Excretory Function

Breakdown of excretory function is the consequence of an accumulation of endogenous and extraneous substances. This leads to changes in pharmacokinetics and an increase in the concentration of various medications.

Breakdown occurs when the remaining glomeruli are confronted by a surplus of waste products, leading to osmotic diuresis. There is a reduction in the maximal concentrating capacity of the kidney.

In order to filter the physiological quantity of dissolved substances, the nephrons produce between 3 and 4 times as much urine during renal failure, resulting in an accumulation of waste substances.

Reduction in Excretory Renal Function

Because the kidney plays a part in the regulation of many important hormonal cycles, chronic renal failure also has endocrinal consequences. Through a shortage of erythropoietin, there is a reduction in erythrocyte synthesis, which leads to renal anemia; uremia then leads to a reduction of functional erythrocytes due to hemolysis or hemorrhages.

Vitamin D production is also impaired, and phosphate excretion is reduced. Secondary hyperparathyroidism and the associated renal osteopathy ("high-turnover" osteopathy) develop as a result of hyperphosphatemia.

Parallel to this, other pathomechanisms lead to a disruption in bone metabolism: osteomalacia occurs due to a disruption of mineralization, and adynamic bone disease occurs due to a reduction in bone cell activity (particularly in dialysis patients).

Over-Hydration and the Disruption of Electrolyte Balance

As long as the glomeruli can manage to compensate, diuresis and fractional sodium excretion rise. If the glomerular filtration rate noticeably drops, then the ability to compensate is exhausted, leading to increased retention of water and electrolytes.

Hypertension, pulmonary edema, and peripheral edema result from overhydration. Water and salt excretion are thereby inextricably linked. Diuretics can aid in water and salt excretion where critical glomerular damage is present.

Early loss of salts as a result of the disturbance in the resorption process can actually be made worse by the use of diuretics.

Thus, as the glomeruli adapt to compensate, the tubular transport mechanisms also adapt in order to prevent hyperkalemia through increased potassium secretion. Hyperkalemia only develops as a result of hyperstimulation of the resorption capacity.

As many patients are treated with calcium-sparing diuretics due to previous conditions, it is vital to refer to a patient's medication history and adapt the treatment plan accordingly.

Acidosis also rises alongside hyperkalemia. The kidneys can no longer sufficiently eliminate accumulating protons due to a strongly reduced glomerular filtration rate. This metabolic acidosis leads to increased bone calcium release and strengthening renal osteopathy, an increase in gastrointestinal problems, and the impairment of protein metabolism.

Toxic Organ Damage as a Result of Retention of Urinary Excreted Metabolites

Toxic organ damage can be explained under the umbrella term "uremic syndrome." The rise in urinary excreted metabolites in the blood is called azotemia. These metabolites include urea, creatinine, beta-2 microglobulin, and parathyroid hormone, among others.

Uremic syndrome (uremia) principally describes a systemic disruption of all organ functions, especially the circulatory system, central nervous system, blood, and membranes.

Clinically, many symptoms of chronic renal failure can be detected via the skin. Patients often have macules are conspicuously pale, and have a gray, dirty-looking complexion. They often complain of pruritus. Internal membranes are also affected, leading to pericarditis, peritonitis, and pleurisy.

Uremia can also lead to hemolysis with anemia. Simultaneously, thrombocyte and leukocyte dysfunctions or deficiencies can arise.

People with chronic renal failure have a generally increased risk of atherosclerosis with an elevated cardiovascular risk. This leads to media calcification caused by calcium phosphate and to intima calcification through inflammatory factors and cholesterol plaques. Hypertension is common, along with edemas and pulmonary congestion.

Impairments of the central nervous system are indicated by a reduction in vigilance, from general drowsiness to uremic coma. Seizures can occur. Uremia also causes polyneuropathy with paresthesia

Symptoms

Chronic renal failure often begins with generalized symptoms such as tiredness, loss of appetite, and headaches. Further early indicators are polyuria, newly emerging or worsening hypertension, or peripheral edemas. Depending on the etiology, there can also be flank pain or fever.
As the disease progresses, increased tiredness, paleness, headaches, visual disturbances, and a severe loss of renal capacity become noticeable. Uremic gastroenteropathy leads to a loss of appetite and nausea. Pruritus occurs and muscle fibrillations become apparent.
In the final stages, renal failure leads to oliguria or anuria, dyspnea, vomiting, uremic encephalopathy with a severe reduction in vigilance, and increased susceptibility to bleeding.

Causes of kidney failure
Kidney failure can be the result of several conditions or causes. According to the National Kidney Foundation, the two most common causes are high blood pressure and diabetes.
People who are most at risk usually have one or more of the following.
Loss of blood flow to the kidneys
A sudden loss of blood flow to your kidneys can prompt kidney failure. Some conditions that cause loss of blood flow to the kidneys include:
- ✓ heart attack
- ✓ heart disease
- ✓ scarring of the liver or liver failure
- ✓ dehydration
- ✓ severe burns
- ✓ allergic reactions
- ✓ severe infection, such as sepsis

High blood pressure and anti-inflammatory medications can also limit blood flow.
Urine elimination problems
When your body can't eliminate urine, toxins build up and overload the kidneys. Some cancers can block the urine passageways, such as:
prostate, which the American Cancer SocietyTrusted Source says is the most common type in men
- ✓ colon
- ✓ cervical
- ✓ bladder

Other conditions can interfere with urination and possibly lead to kidney failure, including:
- ❖ kidney stones
- ❖ enlarged prostate
- ❖ blood clots within your urinary tract
- ❖ damage to the nerves that control your bladder

DIAGNOSIS
There are a variety of causes of renal failure, and the suspected or most likely cause determines which test is needed and best suited to prove the cause. In order to diagnose kidney failure, your doctor may order:
Renal ultrasound: This imaging exam uses high-frequency sound waves to view the kidneys in real time, and is often the first test obtained to examine the kidneys.
For information about ultrasound procedures performed on children, visit the Pediatric Abdominal Ultrasound page.
Body CT: Computed tomography (CT) combines special x-ray equipment with sophisticated computers to produce multiple images or pictures of the inside of the body. This imaging exam is often used to get a broad overview for multiple causes of kidney failure.
For information on CT scans performed on children, visit the Pediatric CT page.
MR or CT urography: This procedure is used to evaluate patients with blood in the urine, to identify issues in patients with frequent urinary tract infections and follow patients with a history of urinary collecting system cancers.
Body magnetic resonance imaging (MRI): This imaging test uses a magnetic field and radio frequency pulses to produce detailed pictures of the kidneys.
Renal scintigraphy: During this nuclear medicine examination, the kidneys are evaluated using a radiotracer and a gamma camera. This test can provide information about both the function of the kidneys by allowing the radiologist or nuclear medicine physician to see how the kidney functions and excretes urine.
Biopsy: This procedure involves image-guided removal of a small kidney tissue sample in order to test it for disease. Ultimately this may be required to provide a diagnosis, but there are many non-invasive imaging tests that are usually obtained first.

TREATMENT

Several treatment options are available for kidney failure. The type of treatment you need will depend on the cause of your kidney failure as well as the stage.

Dialysis

Dialysis filters and purifies the blood using a machine. The machine performs the function of the kidneys. Depending on the type of dialysis, you may be connected to a large machine or a portable catheter bag.

Along with dialysis, you may need to follow a low potassium, low salt diet.

Dialysis doesn't cure kidney failure, but it can extend your life if you go to regularly scheduled treatments.

Kidney transplant

Another treatment option is a kidney transplant. A transplanted kidney can work fully, so you no longer need dialysis.

There's usually a long wait to receive a donor kidney that's compatible with your body. If you have a living donor, the process may go more quickly.

Transplant surgery might not be the right treatment option for everyone. It's also possible for the surgery to be unsuccessful.

You must take immunosuppressant drugs after the surgery to prevent your body from rejecting the new kidney. These drugs have their own side effects, some of which can be serious.

Lifestyle modifications

Minimizing your intake of alcohol and making certain dietary changes may help prevent your kidney failure from progressing to a more severe disease.

Lowering alcohol intake

If you have kidney failure and drink alcohol, your kidneys will be forced to work harder than they already do. Alcohol doesn't metabolize out of your system, so you'll feel its effects until you receive dialysis to filter it out of your blood.

Beer, ale, and wine also contain large amounts of phosphorous. Severe heart issues and even death are possible if your kidneys are unable to filter it out. However, most hard liquor doesn't carry the same risk.

RISK FACTORS

Having a family member with kidney disease

If you are related to someone who has kidney disease, you are at greater risk, because there are certain genes that can increase your chances of getting kidney disease. Diabetes and high blood pressure also run in families, and can increase your risk of getting kidney disease.

Being African-American, Hispanic, Native American, or Asian

Due to genetics, people of these races/ethnicities are at higher risk for having high blood pressure and diabetes. This also puts them at greater risk for kidney disease.

Being over 60 years old

Over time, the kidneys lose some function naturally. People who are older than 60 are also more likely to have diabetes and high blood pressure, the two leading causes of kidney failure.

Having heart disease

Heart disease is when your heart isn't working as well as it should. This makes it harder for the kidneys do to their job. If your kidneys are working too hard, they may become damaged.

Being obese

Being obese puts you at greater risk for the two biggest causes of kidney disease: diabetes and high blood pressure. This means that being obese puts you at greater risk for kidney disease too.

Smoking

Smoking can cause high blood pressure, which is the second biggest cause of kidney disease. Smoking also causes blockages in your body's blood vessels. When a blood vessel is blocked, your kidneys cannot get the blood flow they need, and this can cause damage, which can lead to chronic kidney disease.

Having a history of acute kidney injury (AKI)

Acute kidney injury is when your kidneys stop working suddenly, over a short period of time.People who have had acute kidney injury before are more at risk for chronic kidney disease than people who have never had acute kidney injury.

RESEARCH OBJECTIVES

The research objective emphasizes on what to derive from the study a and based on how to dealt with such kind of situation. Therefore this study is to find out

- Which age group are mostly affected with the kidney failure?
- At which period do people experience the symptoms of kidney failure?
- Which drug first come in mind when people suffering from kidney failure?
- Do people feel reluctant to seek medical attention when infected with the kidney failure?

II. LITERATURE REVIEW

On this study there were several theories and literatures which was delve into to find out in this study.

Chronic Renal Failure (CRF) is a global public health crisis that tends to take dimensions of epidemic and has severe impact on quality of patient's life [1]. It is a progressive, irreversible deterioration in renal function in which the body's ability to sustain metabolic and fluid and electrolyte balance fails, resulting in uremia or azotemia (retention of urea and other nitrogenous wastes in the blood) [2]. The kidneys regulate the composition and volume of blood, remove metabolic wastes in the urine, and help control the acid/ base balance in the body. It is typically a progressive disease and is defined as; reduction of kidney functiondefined as an estimated glomerular filtration rate (eGFR) < 60 mL/min/1.73 m2 and/ or evidence of kidney damage, including persistent albuminuria-defined as > 30 mg of urine albumin per gram of urine creatinine. It is virtually always asymptomatic in its early stages [3,4]. It is not a single disease and defined based on the presence or absence of kidney damage and level of kidney function - irrespective of the type of kidney disease. It is categorized by the level of kidney function, based on GFR, into stages 1 to 5, with each increasing number indicating a more advanced stage of the disease, as defined by a declining GFR (Table 1). This classification system from the National Kidney Foundation's Kidney Dialysis Outcomes and Quality Initiative (K/DOQI) also accounts for structural evidence of kidney injure [5]. There is a mixture of causes and the damage is usually irreversible and can lead to ill health. The main risk factors, which lead to chronic renal failure, are diabetes, hypertension, anemia, osteodystrophy, glomerulonephritis, malnutrition and polycystic kidney disease [1,6]. Decisions regarding risk factor modification should be taken on an individual basis. In some cases, dialysis or transplantation may become necessary. Owing to recent advances in cardiovascular management, chronic renal failure has become a much less frequent complication than in the past; renal failure itself is no longer life-threatening because hemodialysis is available [7]. Hemodialysis and transplant are the most frequent treatment methods for CRF. However, it has been argued that several restrictions and modifications accompany this treatment, which have a detrimental impact on the quality of patient's life and affect individuals' physical and psychological well-being [6]. Thus, the enormous costs of chronic renal failure to the society at large make management of CRF a critical public health priority. CKD has a complicated interrelationship with other diseases [8]. It is a major risk factor for increased cardiovascular disease and death. Recent studies have reported that CKD is an independent risk factor for cardiovascular disease (CVD) [9]. Therefore, kidney dysfunction should be an additional target for intervention and prevention of CVD [10,11]. Due to the asymptomatic nature of this disease, CKD is not frequently detected until its later progress, resulting in lost opportunities for prevention. Progress to kidney failure or other adverse outcomes could be prevented or delayed through early detection and treatment of CKD [12]. Serum creatinine concentration is the most commonly used biomarker to predict the level of kidney function, but it can be affected by various factors such as age, gender, ethnicity, muscle mass, dietary Pica is an individual entity in the patient with chronic kidney disease (CKD), which phenomenon has not been widely studied despite the high reported prevalence. Moreover, pica complications (anemia, altered electrolytes, poor absorption of micro and macronutrients and malnutrition) could be exacerbated in CKD and limit the quality of renal replacement therapy. The intake of non-caloric and non-nutritional substances could be harmful and cause effects on satiety and metabolic / electrolyte imbalance and modify the biocompatibility of micronutrients, toxins and pathogens worsening health status. In daily practice, pica could be under-reported because patient's shame to recognize it, or fear that such behavior influences their treatment. Additionally, clinicians who not investigate the presence of pica or its complications contribute to the lack of information about the magnitude and relevance of this problem in CKD.

III. METHODOLOGY

Study design

This is a cross sectional study, conducted at GURUNAK hospital Amritsar.

Study area

GURUNAK hospital in Amritsar city, Punjab state.

Study population

Patients with Kidney failure attended to GURUNAK Hospital in the period of study was 20.

Inclusion criteria

All patients with KIDNEY FAILURE of both sexes attending to the hospitals were included in this study.

Exclusion criteria

Patients use Hydroxyurea or any treatment which affect the result, and in cooperation patients were excluded from the study.

Data collection

Questionnaires were used to collect the information about demographic data, family history, and symptoms.

Data analysis

Data obtained was analyzed using Statistical Package for Social Sciences (SPSS) software package version 13. (By use T tests)

RESEARCH QUESTION

The research objective emphasizes on what to derive from the study a and based on how to dealt with such kind of situation. Therefore this study is to find out

- Which age group are mostly affected with the kidney failure?
- At which period do people experience the symptoms of kidney failure?
- Which drug first come in mind when people suffering from kidney failure?

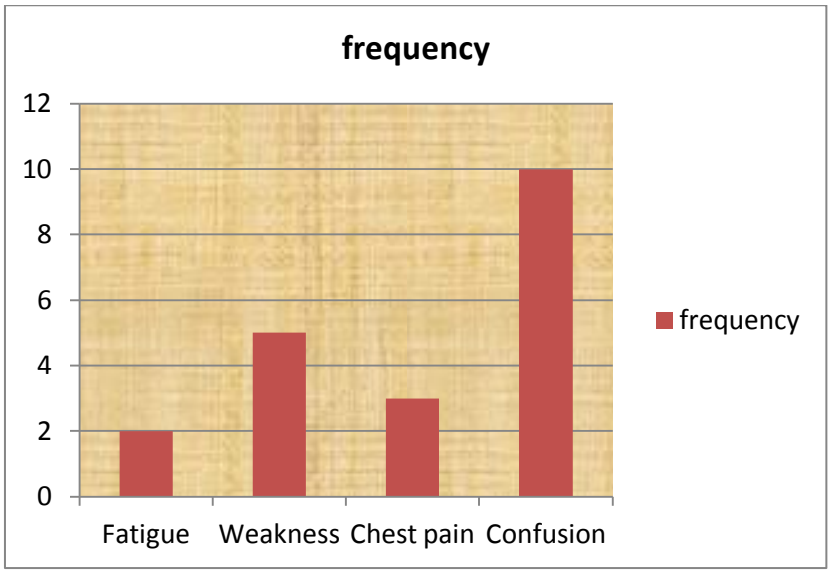
IV. DATA ANALYSIS AND INTREPRETATION

Demographic Data

The age range between 8 months and 15-year, with a high frequency 65/100 (65%) seen in the age group of patients ranged between 1- 5years

Clinical features of the study patients

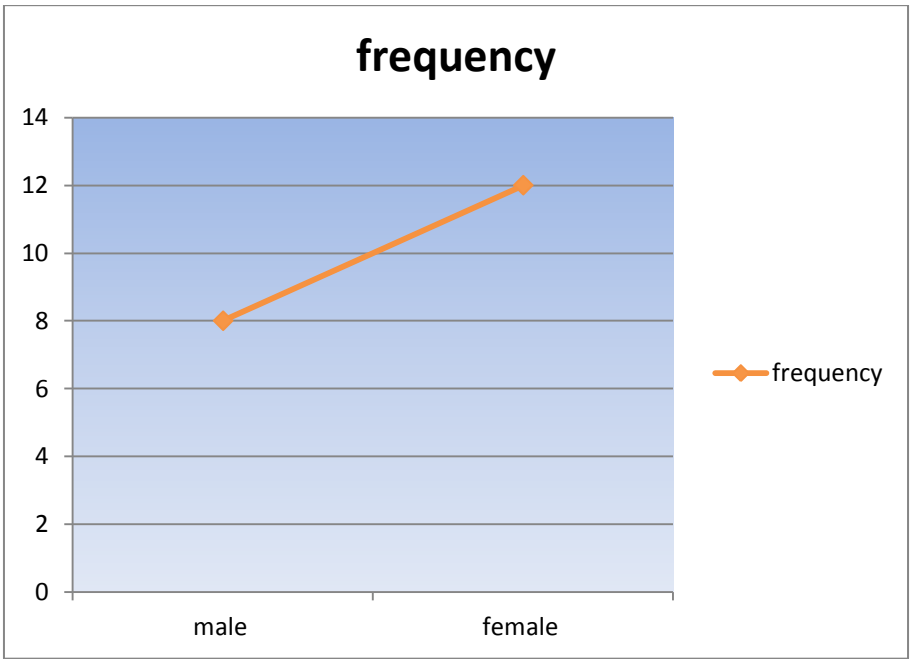
Clinical features	Frequency	Percentage
Fatigue	2	10%
Weakness	5	25%
Chest pain	3	15%
confusion	10	50%



Interpretation: On the above graph it show 10% represent patient with a fatigue,25% indicate patient with weakness,15% represent chest pain and 50% represent patient with confusion.

Which genders mostly have kidney failure?

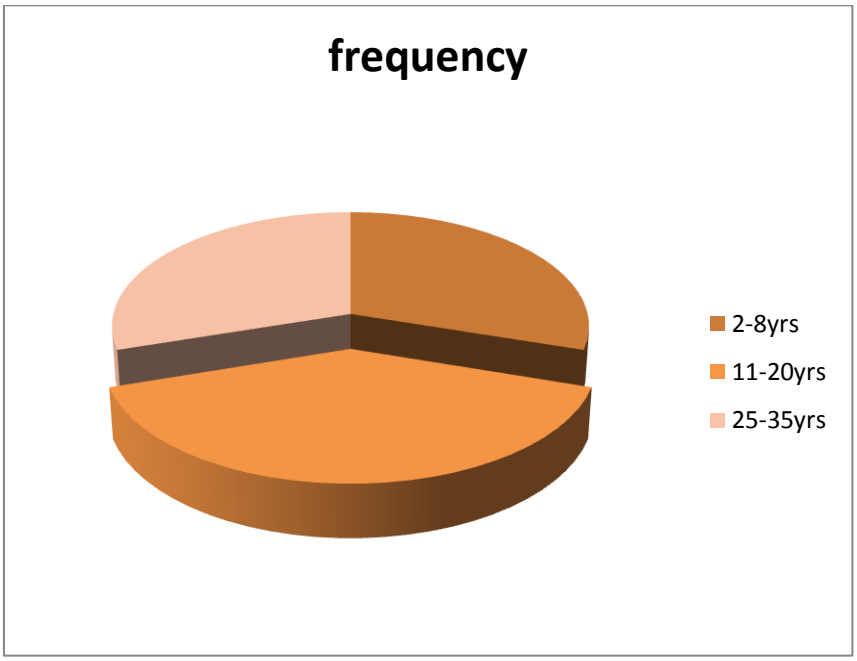
Gender	**frequency**	**percentage**
Male	**8**	**40%**
Female	**12**	**60%**



On the graph above it shows that the gender that mostly have kidney failure is female which represent 60% and male represent 40%.

Age group that mostly affected with sickle cell anemia

Age group	frequency	percentage
2-8yrs	6	30%
11-20yrs	8	40%
25-35yrs	6	30%



From the bar chart it shows that 30% represent the of 2-8years, 40% represent 11-20years and 30% represent 25-35years.

V. DISCUSSION, RECOMMENDATION AND CONCLUSION

DISCUSSION

Chronic renal failure is caused by a progressive decline in all kidney functions, ending with terminal kidney damage. During this time, there is modulation and adaptation in the still-functional glomeruli, which keeps the kidneys functioning normally for as long as possible. The remaining glomeruli, therefore, experience a rise in pressure through hyperfiltration.

The release of various cytokines and growth factors leads to hypertrophy and hyperplasia. At the same time, the function of the glomeruli suffers due to the excessive demands on them, leading to increased permeability and proteinuria. Increased protein concentrations in the proximal tube system are direct nephrotoxins and can further impair kidney function.

Because the kidney plays a part in the regulation of many important hormonal cycles, chronic renal failure also has endocrinal consequences. Through a shortage of erythropoietin, there is a reduction in erythrocyte synthesis, which leads to renal anemia; uremia then leads to a reduction of functional erythrocytes due to hemolysis or hemorrhages.

Vitamin D production is also impaired, and phosphate excretion is reduced. Secondary hyperparathyroidism and the associated renal osteopathy ("high-turnover" osteopathy) develop as a result of hyperphosphatemia.

Parallel to this, other pathomechanisms lead to a disruption in bone metabolism: osteomalacia occurs due to a disruption of mineralization, and adynamic bone disease occurs due to a reduction in bone cell activity (particularly in dialysis patients).

As long as the glomeruli can manage to compensate, diuresis and fractional sodium excretion rise. If the glomerular filtration rate noticeably drops, then the ability to compensate is exhausted, leading to increased retention of water and electrolytes.

Hypertension, pulmonary edema, and peripheral edema result from overhydration. Water and salt excretion are thereby inextricably linked. Diuretics can aid in water and salt excretion where critical glomerular damage is present.

Early loss of salts as a result of the disturbance in the resorption process can actually be made worse by the use of diuretics.

Thus, as the glomeruli adapt to compensate, the tubular transport mechanisms also adapt in order to prevent hyperkalemia through increased potassium secretion. Hyperkalemia only develops as a result of hyperstimulation of the resorption capacity.

As many patients are treated with calcium-sparing diuretics due to previous conditions, it is vital to refer to a patient's medication history and adapt the treatment plan accordingly.

Acidosis also rises alongside hyperkalemia. The kidneys can no longer sufficiently eliminate accumulating protons due to a strongly reduced glomerular filtration rate. This metabolic acidosis leads to increased bone calcium release and strengthening renal osteopathy, an increase in gastrointestinal problems, and the impairment of protein metabolism.

RECOMMENDATION

1.Routine test measurement should be done for all patients as follow up visits.

2. Adequately controlled studies using more inflammatory markers are warranted to define the role of chronic inflammatory state with vaso-occlusive crises and specific complications of the disease.

3. Active community medical education about the kidney through medical personnel and public societies

CONCLUSION

- ✓ According to the sex, the results showed increased female patients more than male patients. Most of the patients had family history of kidney failure
- ✓ Clinical feature in the study patients were chest pain , confusion, fatique and weakness
- ✓ It was also ascertained that age 11-20years with kidney failure was higher than the other age discussed.

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