Introduction

The kidneys play an important role in a child's growth. In addition to removing wastes and extra fluid from the blood, the kidneys produce hormones that promote red blood cell production. It helps regulate the amounts and interactions of nutrients from food, including minerals like calcium, phosphorus, and vitamin D, which are necessary for growth **(Chironda, Manwere, Nyamakura, Tirivanhu and Bhengu, 2014).**

In the general population, slightly more than 30 people in every 100,000 develop kidney failure each year. In the pediatric population age 19 and under the annual rate are 1 or 2 new cases in every 100,000 children. In other words, adults are about 20 times more likely to develop kidney failure than children are the risk increases steadily with age **(Alnazly, Ahmad, Musil and Nabolsi, 2013).**

Renal failure is defined as inability of the kidney to do its function as excrete wastes concentrate urine and conserve electrolytes this progress may be acute or chronic that leading to end stage renal disease. Renal failure is the most common problem all over the world which apparent increase in the number of patients with chronic renal failure

(Haspeslagh, De Bondt, Kuypers, Naesens, Breunig and Dobbels, 2013).

Kidney failure can lead directly to more health problems, like swelling of the body, bone deformities, and growth failure. A successful kidney transplant can give a child with chronic kidney failure the best chance to grow normally and lead a full, active life. Dialysis can help a child to survive an acute episode of kidney failure or to stay healthy until a donated kidney becomes available **(Shailendranath, Prashant and Kedlaya, 2014).**

Hemodialysis is the most common method used to treat advanced and permanent kidney failure. Dialysis does not treat renal failure, but instead keeps a person alive by performing the crucial functions of the kidneys. Hemodialysis (HD) is a medical procedure to remove fluid and waste products from the blood and to correct electrolyte imbalances. This is accomplished using a machine and a dialyzer, also referred to as an "artificial renal" **(Stevens, and Levin, 2013).**

Hemodialysis can be a life-altering condition for the affected children. It affects lifestyle and daily living Daily activities are important components of healthy lifestyle and

activities including nutrition, sleep, personal hygiene, physical exercises and recreational activities; social relations in addition to scholastic achievement week **(Peng et al., 2011).**

Caregivers of children underging hemodialysis should promote the child's independence in self-care activities such as feeding, toilet, dressing and hygiene. Normalizing experiences such as eating, playing, and socializing with other children should be encouraged. The caregiver must assess the child's ability to perform activities of daily living as eating, eliminating, ambulating, bathing, depressing and so forth. This allows the caregivers to plan and implement directly or indirectly, an individualized treatment plan is designed to enforce or promote the child's independence in performing Activities of daily living **(Shailendranath et al., 2014)**.

Nurses have major and several roles in preventing malnutrition for children undergoing haemodailysis therapy that causing loss of lean body mass, through educating these children about healthy diet and follow up care, controlling symptoms, preventing complication, good observation of the physical state of these children, explain renal failure in terms

that the children can understand, stressing the fact that it is a chronic disease and that adherence to treatment plan is necessary in order to delay or prevent complications and encourage children to participate in prescribed care **(Zamanzadeh, Valizade, Aghdam and Gholifam, 2012)**.

"Higher" forms of awareness including self-awareness require cortical contributions, but "primary consciousness" or "basic awareness" as an ability to integrate sensations from the environment with one's immediate goals and feelings in order to guide behavior, springs from the brain stem which human beings share with most of the vertebrates. Psychologist Carroll Izard emphasizes that this form of primary consciousness consists of the capacity to generate emotions and awareness of one's surroundings, but not an ability to talk about what one has experienced. In the same way, people can become conscious of a feeling that they can't label or describe, a phenomenon that's especially common in pre-verbal infants **(Sylvester, Shulman, Jack and Corbetta, 2007).**

Significance of the Study

Seems important to investigate how children with chronic renal failure who treated by permanent hemodylsis and their problems and needs related to hemodylsis. Data generated from this study may be helpful to implement and evaluate program to increase child's resiliency in the face of the hemodylsis problems and enhance effective way of fulfilling their needs to promote sense of wellbeing among this group of children **(Abreu, Kourrouski, Santos, Bullinger, Nascimento and Lima, 2016)**. Hemodylsis treatment results in many problems and restrictions. Children receiving hemodylsis use various strategies to avoid the problems related to their disease and the treatment procedures. The kind of coping strategies they use depends on their personal experience, social support system, individual beliefs, and availability of resources **(Abdel Aziz, Joma and Younis, 2017).** So that, from the investigator point of view it is important to conduct this study to assess the caregiver awareness regarding children undergoing hemodialysis.

Aim of the Study

This study aimed to assess the caregiver awareness regarding children undergoing hemodialysis through:

- Assessing needs and problems among children undergoing hemodialysis
- Assessing caregiver knowledge regarding renal failure and hemodialysis
- Assessing caregiver practices related to care of their children undergoing hemodialysis.

Research Question:-

- Is there a relation between caregiver's knowledge and health status of their children?
- Is there a relation between caregiver's practices and health status of their children?

Review of Literature

Part I. Renal Failure among Children

Renal failure, also known as insufficiency, is a medical condition of impaired renal function in which the renal fail to adequately filter metabolic wastes from the blood. The two main forms are acute renal injury, which is often reversible with adequate treatment, and chronic renal disease, which is often not reversible **(Birdee, Phillips and Brown, 2013)**.

Renal failure is mainly determined by a decrease in glomerular filtration rate, which is the rate at which blood is filtered in the glomeruli of the renal. The condition is detected by a decrease in or absence of urine production or determination of waste products (creatinine or urea) in the blood. Depending on the cause, hematuria (blood loss in the urine) and proteinuria (protein loss in the urine) may be noted **(John and Thomas, 2013)**.

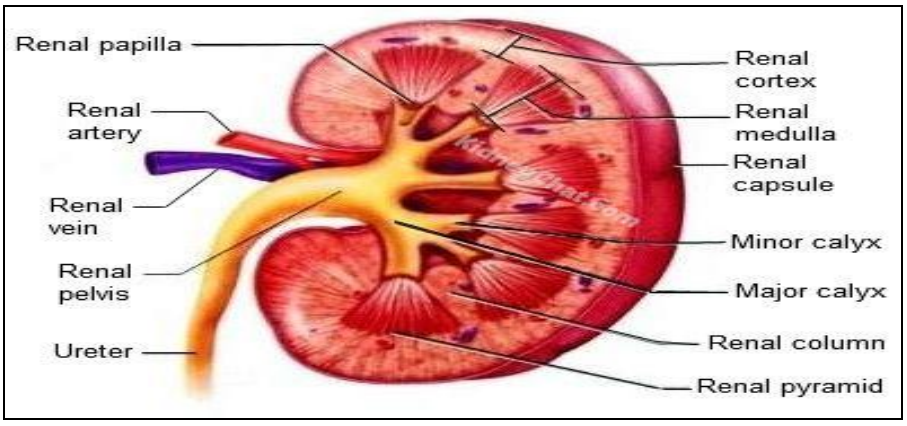
In renal failure, there may be problems with increased fluid in the body (leading to swelling), increased acid levels, raised levels of potassium, decreased levels of calcium, increased levels of phosphate, and in later stages anemia. Bone health may also be affected. Long-term

renal problems are associated with an increased risk of cardiovascular disease **(Kugler Maeding and Russell, 2011)**.

Anatomy and Physiology of the Renal System

The renal are paired organs weighing approximately 150gm and lying retroperitoneal on either side of the vertebral column. The renal major functions include urine formation, excretion of waste products, regulation of electrolyte and acid-base balance, erythropoietin production, synthesis of vitamin D, and auto regulation of blood pressure **(Aiken, Cimiotti, Sloane, Smith, Flynn, and Neff, 2011 & Haspeslagh et al., 2013).**

Figure (1): Anatomy of Renal System



Haspeslagh A. De Bondt K. Kuypers D. Naesens M. Breunig C. Dobbels F. (2013) Completeness and satisfaction with the education and information received by patients immediately after kidney transplant: a mixed-models study, Progress hi Transplantation, Vol 23, No. 1, March

A fluid that resembles plasma is filtered through the glomerular capillaries into the renal tubules called glomerular filtration. As this glomerular filtrate passes down the tubules, its volume and composition is altered by the process of tubular reabsorption and secretion to form the urine that is expelled to the exterior by the process of urination **(Stevens and Levin, 2012)**.

Glomerular Filtration Rate

The Glomerular Filtration Rate (GFR) is the volume of filtrate produced by both renal per minute. It varies with age and sex as it ranges in men between 90-140 ml/min and in women between 80-125 ml/min **(Almeras and Argiles, 2009)**.

GFR remains remarkably constant owing to intrarenal regulatory mechanisms. In disease (with a reduction in intrarenal blood flow), damage to or loss of glomeruli or obstruction to the free flow of ultrafiltrate along the tubule, the GFR will fall and the ability to eliminate waste material and regulate the volume and composition of body fluid will decline resulting in renal failure or Chronic renal failure (CRF), in this respect laboratory investigation would be manifested as a rise in the blood level of urea and plasma

level of creatinine and a reduction in measured of GFR. **(Shailendranath et al., 2014).**

Functions of Kidney (Renal System)

Normally functioning renal control this balance of fluids and chemical substances, this homeostasis is regulated through the renal excretion or conservation of fluid and removal of metabolic waste as needed. The renal also serve endocrine functions including the production of renin and angiotensin, which affect sodium, fluid volume, and blood pressure; as well as the production of erythropoietin, controlling red cell production in the bone marrow; and prostaglandins **(Gordon et al., 2011)**.

The renal have an important role in maintaining health. When healthy, the renal maintain the body's internal equilibrium of water and minerals (sodium, potassium, chloride, calcium, phosphorus, magnesium, and sulfate). The acidic metabolism end-products that the body cannot get rid of via respiration are also excreted through the renal **(Tayyebi et al., 2012)**.

The renal also function as a part of the endocrine system, producing erythropoietin, calcitriol and renin. Erythropoietin is involved in the production of red blood

cells and calcitriol plays a role in bone formation **(Harambat et al., 2012)**.

Types of Renal Failure in Children

Renal failure can be divided into two categories: acute renal injury or chronic renal disease. The type of renal failure is differentiated by the trend in the serum creatinine; other factors that may help differentiate acute renal injury from chronic renal disease include anemia and the renal size on sonography as chronic renal disease generally leads to anemia and small renal size **(Soltannezhad, Farsi, & Moroei, 2013)**.

1. Acute Renal Failure in Children

Acute renal failure, previously called acute renal failure (ARF), is a rapidly progressive loss of renal function, generally characterized by oliguria (decreased urine production, quantified as less than 400 mL per day in children, less than 0.5 mL/kg/h in children or less than 1 mL/kg/h in infants); and fluid and electrolyte imbalance. ARF can result from a variety of causes, generally classified as prerenal, intrinsic, and postrenal. The underlying cause must be identified and treated to arrest the progress, and dialysis may be necessary to bridge the time gap required

for treating these fundamental causes **(Nalado, Abdu, Muhammad, Abdu, Sakajiki and Adamu, 2012)**.

Causes of Acute Renal Failure in Children

Acute renal injury usually occurs when the blood supply to the renal is suddenly interrupted or when the renal become overloaded with toxins. Causes of acute renal injury include accidents, injuries, or complications from surgeries in which the renal are deprived of normal blood flow for extended periods **(Elsayed et al., 2012)**.

Drug overdoses, accidental or from chemical overloads of drugs such as antibiotics or chemotherapy, may also cause the onset of acute renal injury **(Ghadami et al., 2012)**. Unlike chronic renal disease, however, the renal can often recover from acute renal injury, allowing the patient to resume a normal life. People suffering from acute renal injury require supportive treatment until their renal recovers function, and they often remain at increased risk of developing future renal failure **(Nagy et al., 2015)**.

Among the accidental causes of renal failure is the crush syndrome, when large amounts of toxins are suddenly released in the blood circulation after a long compressed limb is suddenly relieved from the pressure

obstructing the blood flow through its tissues, causing ischemia. The resulting overload can lead to the clogging and the destruction of the renal. It is a reperfusion injury that appears after the release of the crushing pressure **(Watson, 2013)**.

The mechanism is believed to be the release into the bloodstream of muscle breakdown products – notably myoglobin, potassium, and phosphorus – that are the products of rhabdomyolysis (the breakdown of skeletal muscle damaged by ischemic conditions) **(Royani et al., 2013)**. The specific action on the renal is not fully understood, but may be due in part to nephrotoxic metabolites of myoglobin **(Komenda, Copland, Makwana, Djurdjev, Sood, Levin, 2010).**

2. Chronic Renal Failure in Children

Chronic renal failure (CRF) can also develop slowly and, initially, show few symptoms. CRF can be the long-term consequence of irreversible acute disease or part of a disease progression **(Heydari, Hashempur and Zargaran, 2013)**.

Chronic renal failure is measured in five stages, which are calculated using children glomerular filtration rate. **Stage 1** CRF is mildly diminished renal function, with few overt

symptoms. **Stages 2** and **3** need increasing levels of supportive care from their medical caregivers to slow and treat their renal dysfunction. Children in **stages 4** and **5** usually require preparation of the patient towards active treatment in order to survive. Stage 5 CRF is considered a severe illness and requires some form of renal replacement therapy (dialysis) or renal transplant whenever feasible **(Johnson and Sánchez-Lozada, 2013)**.

Causes of Chronic Renal Failure in Children

Chronic renal failure (CRF) in children has numerous causes. The most common causes of CRF are diabetes mellitus and long-term, uncontrolled hypertension. Polycystic renal disease is another well-known cause of CRF. The majority of children afflicted with polycystic renal disease have a family history of the disease. Other genetic illnesses affect renal function, as well **(Ahrari, Moshki and Bahrami, 2014)**.

Overuse of common drugs such as ibuprofen, and acetaminophen (paracetamol) can also cause chronic renal damage. Some infectious disease agents, such as Hantavirus, can attack the renal, causing renal failure **(Gill, 2012).**

The Apolipoprotein L1 is a protein that in humans is encoded by the APOL1 gene (APOL)1 gene has been proposed as a major genetic risk for a spectrum of nondiabetic renal failure in individuals of African origin, these include HIV-associated nephropathy (HIVAN), primary nonmonogenic forms of focal segmental glomerulosclerosis, and hypertension affiliated chronic renal disease not attributed to other etiologies **(Nygardh, 2011)**.

Signs and Symptoms of Renal Failure in Children

The signs and symptoms of CRF may include, swelling which even mild of the hands and feet together with puffiness around the eyes, decreased or increased frequency of urination, long-lasting changes in the color of the urine such as unusually dark or red, and changes in appearance of urine such as extra foam. Moreover, headaches resulting from high blood pressure, also children may complain from nausea, vomiting, weakness, fatigue and loss of appetite. In addition to stunted or poor growth as compared to similar age group peers and difficulty in concentration **(Anthony, 2011).**