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Renal Failure: Implication For Health Education

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Abstract

This paper dealt extensively with renal failure. Renal failure is also known as kidney failure and is a state of total or nearly loss of the kidney's ability to excrete waste products and to maintain fluid and electrolyte balance. It has two types- acute and chronic renal failure. Acute renal failure is a rapidly progressive loss of renal function while chronic renal failure can develop slowly and initially show few symptoms, and is irreversible. There are so many causes of renal failure and many clinical manifestations. Implication for health education indicated that people should be educated on renal failure, its causes, risk factors, prognosis and prevention in order to reduce the menace of this disease condition. Some recommendations were made which included among others, maintenance of healthy lifestyle, organization of seminars for the public concerning diseases like diabetes mellitus, renal failure and high blood pressure by health educators.

The term "renal" is derived from the latin name for kidney. Renal failure is otherwise called kidney failure. The kidneys play key roles in body function, not only

by filtering the blood and getting rid of waste products, but also by balancing electrolytes levels in the body, controlling blood pressure, and stimulating the production of red blood cells (Medicine Net.com,2012). The kidneys have the ability to monitor the amount of blood fluid, the concentrations of electrolytes like sodium and potassium, and the acid-base balance of the body. They filter waste products of body metabolism, like urea from protein metabolism and uric acid from DNA break down. Other body wastes excreted by the kidneys include amino acids, mineral salts, water, keto acids, excess glucose, creatinine, toxins and some drugs. The kidneys also have an important role of the production of renin and erythropoietin, and their release in the blood when needed (Berman, Snyder, Kozier & Erb, 2008: & Medicine Net.com, 2012).

After filtration of blood by the kidneys, the waste products are excreted as urine through the ureter, a thin tube that connects a kidney to the bladder. It is then stored in the bladder awaiting urination, when the bladder sends the urine out of the body through the urethra, a canal extending from the neck of the bladder to the exterior. The kidneys perform these functions using three processes of simple filtration, selective reabsorption, the transport of substances from the interstitial fluid to the tubule and endocrine selection, and finally tubular secretion (Waugh & Grant, 2006). When kidneys fail to perform these functions, renal failure results. However, renal failure describes a medical condition in which the kidneys fail to adequately filter toxins and waste products from the body. It is also described as a decrease in glomerular filtration rate, and biochemically, renal failure is typically detected by an elevated serum creatinine level. Its two forms are acute and chronic renal failure; a number of other health diseases may cause either form of renal failure to occur (Grinsted, 2005). Renal failure is very serious and even deadly if left untreated (Wise GEEK, 2012),

Health education is an educational program directed to the general public that attempts to improve, maintain and safe guard the health care of the community. It is also a public health activities that promote health and provide information and training about hazards in the environment that would decrease exposure, illness, or disease (McGraw-Hill Concise Dictionary of Modern Medicine, 2002). Health education is very vital to curtail the rising increase of renal failure cases in the community. In view of the above, this paper addresses renal failure: Implication for health education under the following subheadings;

- Meaning of renal failure
- Pathophysiology of renal failure
- Types of renal failure
- Causes of renal failure
- Clinical manifestation of renal failure
- Diagnosis of renal failure

- Management of renal failure
- Prognosis
- Implication for health education
- Summary/Conclusion
- Recommendations

Meaning of Renal Failure

Renal failure indicates a state of total or nearly loss of the kidney's ability to excrete waste products and to maintain fluid and electrolyte balance (Smeltzer $ Bare, 2000). Renal failure is a serious medical condition affecting the kidneys. When a person suffers from renal failure, the kidneys are not functioning properly or no longer work at all. Renal failure can be a progressive disease or a temporary one depending on the cause and available treatment options. In renal failure the kidneys undergo cellular death and are unable to filter wastes, produce urine and maintain balances. This dysfunction causes a buildup of toxins in the body which can affect blood, brain and heart, as well as other complications (Wise GEEK, 2012). Renal failure occurs when kidneys suddenly become unable to filter waste products from the blood resulting to accumulation of dangerous levels of wastes and the blood's chemical makeup may get out of balance (Mayo Clinic, 2012).

Pathophysiology of Renal Failure

When the kidneys are unable to excrete metabolic wastes and perform their role in fluid, electrolyte and acid-base balance, renal failure exists. The kidneys cannot maintain the homeostasis of the internal environment any longer. There will be retention of the waste and excess products which are normally excreted in the urine. Renal production of renin, erythropoietin and vitamin D3 is also disturbed. With failure of fluid volume regulation the patient becomes oedematous or dehydrated and the acid-base imbalance leads to metabolic acidosis. Electrolyte imbalances occur and an accumulation of nitrogenous wastes produces elevated blood levels of non-protein nitrogenous substances such as urea, creatinine and uric acid. The disturbance in the secretion of hormones leads to alteration in blood pressure, erythrocyte production and calcium absorption by bone tissue. In chronic renal failure, ureamia develops and adversely affects every system in the body such as respiratory, musculoskeletal, cardiovascular, haematological, dermatological, ocular, metabolic, gastrointestinal, reproductive, endocrine and neurological systems.

Types of Renal Failure

There are two types of renal failure viz; acute renal failure and chronic renal failure.

Acute Renal Failure: Acute renal failure is a rapidly progressive loss of renal failure (Grinsted, 2005). It is a sudden loss of ability of kidneys to remove waste and concentrate urine without losing electrolytes (Pub Med Health, 2011). Acute renal failure also means that kidneys have stopped working, and waste products, fluids, and electrolytes build up in the body. This can cause problem that can be deadly (WebMD, 2011). Acute renal failure occurs suddenly and is usually initiated by underlying causes, for example dehydration, infections, serious injury to the kidney (Wise GEEK, 2012). Acute renal failure develops rapidly over a few hours or a few days. It is most common in people who are already hospitalized, particularly in critically ill people who need intensive care. It can be fatal and require intensive treatment and may be reversible (Mayo Clinic, 2012).

Causes of Acute renal Failure: Acute renal failure results from a variety of causes generally classified as pre renal, intrinsic (renal) and post renal. Pre renal causes are due to decreased blood supply to the kidney and include hypovolemia (low blood volume) due to blood loss; dehydration from loss of fluid (e.gs. vomiting, diarrhea , sweating, fever); poor intake of fluids; medications (e.gs. diuretics); and abnormal blood flow to and from the kidney due to obstruction of the renal artery or vein. Renal (intrinsic) causes are due to damage directly to the kidney itself and include sepsis; medications (e.gs. nonsteroidial anti inflammatory drugs like Ibuprofen, naproxen; antibiotics like gentamicin, tobramycin, lithium; iodine-containing medications); rhabdomyolysis (a situation in which there is significant muscle breakdown in the body, and the damaged muscle fibers clog the filtering system of the kidneys); and multiple myeloma (acute glomerulo nephritis). Post renal causes are due to factors that affect out flow of the urine and include obstruction of the bladder or the ureters; prostatic hypertrophy or prostate cancer; tumours in the abdomen; and kidney stones (Grinsted, 2005 & Medicine Net.com, 2012). According to Pub Med Health (2011) and Medline Plus (2012), acute renal failure can be caused by pregnancy complications (like placenta preavia or placenta abruptio); acute tubular necrosis; autoimmune kidney disease (like acute nephritic syndrome, interstitial nephritis).

Clinical Manifestation of Acute Renal Failure

Acute renal failure is generally characterized by oliguria (decreased urine production, less than 400 ml per day in adults, les than 0.5ml/kg/hr in children or less than 1ml/kg/hr in infants); fluid and electrolyte imbalance; body swelling; confusion; fatigue; lethargy; nausea; vomiting; diarrhea; abdominal pain; metallic taste in the mouth; seizures; and coma may occur in very severe acute renal failure (Grinsted, 2005 & Medicine Net.com, 2012). According to Pub Med Health (2011), the symptoms of acute renal failure include bloody stools; breath odour; bruising easily; changes in mental status or mood; decreased sensation especially in the hands or feet; flank pain (between the ribs and hips); hand tremor; high blood pressure; and feeling confused;

anxious and restless; or sleepy. Mayo Clinic (2012) added that the symptoms of acute renal failure include nose bleeding; persistent hiccups; prolonged bleeding; slow sluggish movements; swelling of the ankle, feet and leg.

Possible Complications of Acute Renal Failure

These include chronic (long - term) kidney failure; damage to the heart or nervous system; end-stage kidney disease; high blood pressure; and loss of blood in the intestines (Mayo Clinic, 2012 & Pub Med Health, 2011).

Chronic Renal Failure

Chronic renal failure can develop slowly and initially show few symptoms. It can be the long term consequence of irreversible acute renal disease or part of a disease progression (Grinsted, 2005). Chronic renal failure is more serious than acute renal failure because symptoms may not appear until the kidneys are extremely damaged (Wise GEEK, 2012). Chronic renal failure results when irreversible damage to the nephrons is so severe that 75% of renal functions is lost and the kidneys cannot function effectively resulting in uremia (Berman, Snyder, Kozier & Erb, 2008). Chronic renal failure develops over months or years (Medicine Net.Com, 2012).

Causes of Chronic Renal Failure

Chronic renal failure can be caused by other long term diseases, such as diabetes mellitus and high blood pressure; polycystic kidney disease; over use of common drugs such as aspirin, ibuprofen and acetaminophen (paracetamol); some infectious diseases, such as hantavirus (Wise GEEK, 2012 & Grinsted, 2005). According to Medicine Net.Com (2012), causes of chronic renal failure include among others, chronic glomerulonephritis, reflux nephropathy, kidney stones, and prostate disease.

Clinical Manifestations of Chronic Renal Failure

These include ureamia which develops after 7 days of anuria; polyuria with fixed low specific gravity (about 1.010); very deep respiration (kussmauls); fluid and electrolyte disturbances leading to volume overload or depletion, hypertension, metabolic acidosis, hypercalcemia and hypocalcemia, cardio vascular and pulmonary disturbances leading to arterial hypertension, heart failure, pericarditis and pulmonary oedema, neurological disturbances leading to anorexia, nausea, vomiting, weight loss, peptic ulcer and gastrointestinal bleeding; haematological disturbances leading to anaemia, bleeding and increased potential for infection; and muscular twitching, weakness, hiccough and renal osteodystrophy (Berman, Snyder, Kozier & Erb, 2008 & Medicine Net.Com, 2012).

Three Stages of Chronic Renal Failure

According to Smeltzer and Bare (2000) and Berman, Snyder, Kozier and Erb (2008), chronic renal failure occurs in three stages:

Stage 1: Involves reduced renal reserve where there is a 40% to 75% loss of nephron function. The patient usually is asymptomatic.

Stage 2: Renal insufficiency occurs when 75% to 90% of nephron function is lost. At this point, the serum creatinine and blood urea nitrogen rise, there is anaemia, polyuria and noctouria .

Stage 3: End-stage renal disease (ESRD). This is the final stage of chronic renal failure in which there is less than 10% nephron function remaining. All of the normal regulatory, excretory, and hormonal functions of the kidneys are severely impaired. There is elevated creatinine and blood urea nitrogen level as well as electrolyte imbalance. All the symptoms of uraemia will appear. Examples accumulation of urea under the skin leading to pruritis (itching); ureamia leads to the irritation of vomit center causing nausea and vomiting; and ureamia also causes irritation of the musculoskeletal system leading to muscle twitching, tremors and hiccough.

Diagnosis of Renal Failure

Tests that may be done include blood urea nitrogen (BUN); creatinine clearance; serum creatinine; serum potassium; urinalysis; a kidney or abdominal ultrasound; abdominal x-ray; abdominal CT scan; kidney biopsy; abdominal MRI; blood tests; arterial blood gas and blood chemistries (Pub Med Health, 2012 & Medicine Net.Com, 2012). Others are diagnostic assessments which are history taking (including voiding patterns, family history of renal disease, medication use, amount of urine excreted in 24 hours); observation (including blood pressure, pulse rate and rhythm); physical examination for fluid status (e.g. peripheral oedema); daily weights; and halitosis as a result of acidosis and/or ammonia secretions (Berman, Snyder, Kozier & Erb, 2008 & Smeltzer & Bare, 2000).

Management of Renal Failure

A. Medical Management: The kidney has a remarkable ability to recover from acute failure, hence the objectives of treatment of acute renal failure are to restore normal chemical balance and to prevent complications until repair of renal tissues and restoration of renal functions can take place. With treatment, a person with renal failure can live a relatively normal life. Depending on the severity of renal failure, renal function may be restored by treating the primary disease that is responsible for the damage, or by treating the kidneys with medication. In severe cases of renal failure, a

person might require dialysis and a kidney transplant when the kidneys fail completely, the patient will need a kidney transplant (Wise GEEK, 2012).
Other treatments include:

Nutrition: Diet is an important consideration for those with impaired kidney function. Since kidneys cannot easily remove excess water, salt, or potassium, these may need to be consumed in limited quantities. Foods high in potassium are bananas, apricots, and salt substitutes. Phosphorous is associated with calcium metabolism and may be elevated in the body in kidney failure. Too much phosphorous can leach calcium from the bones and causes osteoporosis and fractures. Foods with high phosphorous content are milk, cheese, nuts, and cola drinks.

Medications may be used to help control some issues associated with kidney failure.
Phosphorous-Lowering Medications (e.gs. calcium carbonate ie.caltrate; calcitriol ie. Rocaltrol; sevelamer ie. renagel**)** can be given.

Red blood cell production stimulation (e.gs. erythropoietin, darbepoetin ie. Aranesp).
Red blood cell production (e.gs. iron supplements).
Blood pressure medications.

Vitamins

Once the kidneys fail completely, the treatment options are limited to dialysis or kidney replacement by transplantation (Medicine Net.Com, 2012).

B. Nursing Management: The nurse has an important role in caring for a patient with acute renal failure.

1. The nurse monitors the patient for complications and reports to the doctors.
2. She participates in the emergency treatment of fluid and electrolyte imbalances.
3. Assesses the patient's progress and response to treatment.
4. Provides physical and emotional support.
5. She keeps the family members informed about the patient's condition.
6. Assists the family members in understanding the treatments and provides psychological support.
7. The nurse maintains asepsis throughout the care of the patient to minimize the risk of infections.
8. Provides skin care to prevent breakdown as a result of oedema.
9. Administers prescribed medications, checks vital signs and other necessary nursing care (Berman, Snyder, Kozier & Erb, 2008 & Smeltzer & Bare, 2000).

Prognosis (Expectations)

Acute renal failure is potentially life – threatening and may require intensive treatment. However, the kidneys usually start working again within several weeks to months after the underlying cause has been treated. In some cases, chronic renal failure or end-stage disease may develop. Death is most common when kidney failure is caused by surgery, trauma, or severe infection in someone with heart disease, lung disease, or recent stroke. Old age, infection , and loss of blood from intestinal tract, and progression of kidney failure also increase the risk of death (Pub Med Health, 2011).

Implication for Health Education

Health education is any combination of learning experiences designed to help individuals and communities improve their health or influence their attitudes (WHO, 2012). This implies that people should be educated about renal failure - its causes, risk factors, prognosis, and prevention. Medicine Net.Com (2012) stated that prevention is the best option to maintain kidney function. Controlling high blood pressure and diabetes mellitus over a life time can decrease the potential for progressive kidney damage. Pub Med Health (2011) opined that treating disorders such as high blood pressure can help prevent acute renal failure.

The Role of the Health Educator: A health educator is a professionally prepared individual who serves in a variety of roles and is specifically trained to use appropriate educational strategies and methods to facilitate the development of policies, interventions, and systems into place, in order to define the basic roles and responsibilities for the health educator. The seven areas of responsibilities for a health educator include;

1. Assess individual and community needs for health education especially concerning renal disease.
2. Plan health education strategies, interventions and programs.
3. Implement health education strategies, interventions and program.
4. Conduct evaluation and research related to health education.
5. Administer health education strategies, interventions and programs.
6. Serve as a health education resource person, and
7. Communicate and advocate for health and health education (Grinsted, 2005).

The health educator should give people information concerning renal failure through proper community diagnosis and planning. Health education may involve changes in life style including how one eats and plan for some activities in order to maintain healthy living. There is need to promote personal and environmental cleanliness; use of portable water; and early screening for diseases like diabetes, high blood pressure, and acute renal failure.

Summary/ Conclusions

Healthy kidneys clean blood by removing excess fluid, minerals and wastes. They also make hormones that keep bones strong and blood healthy. But if the kidneys are damaged, they cannot work properly. Harmful wastes can build up in the body, blood pressure may rise and body may retain excess fluid and not be able to make enough red blood cells. This is called kidney failure or renal failure. It has many causes which are grouped into pre renal, renal, or post renal causes. Clinical manifestations, diagnosis, management, prognosis and implication for health education were also discussed in this paper.

In conclusion, people should adopt a healthy life style. Those with medical conditions like diabetes mellitus, high blood pressure should control these conditions and maintain regular medical check – ups.

Recommendations

From the discussion of renal failure and conclusion, the following recommendations were made;

1. Maintaining healthy life style should be our watch word.
2. Health educators should organize seminars for the public concerning diseases like renal failure, diabetes mellitus and high blood pressure.
3. Government should provide equipment for early diagnosis of acute renal failure and dialysis machine for chronic renal failure.

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