Nurses' knowledge regarding Care of Patients with Acute Renal Failure in Gezira Hospital for Renal Diseases and Surgery, Gezira State, Sudan (2014)

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April, 2014
Nurses' knowledge On Care of Patients with Acute Renal Failure in Gezira Hospital for Renal Diseases and Surgery, Gezira State, Sudan (2014)

Samia Suliman Alaageb Musa

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Date: April, 2014
Nurses' knowledge On Care of Patients with Acute Renal Failure in Gezira Hospital for Renal Diseases and Surgery, Gezira State, Sudan (2014)

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April, 2014

Date of Examination:
Dedication

To my Father. To my greatest Mother, My
Brother and My Sisters

Who gave all their best and supported me in all
my decisions

To my Husband who supported me and gave all to
make me the Person,

To my loving daughter

Samia
ACKNOWLEDGEMENT

First I wish to thank God for affording me the time and the ability needed to stand face of difficulty.

I am deeply indebted to and grateful for my Main supervisor, Dr. Bothyna Bassyoni Elssyed Etewa and my co-supervisor Dr. Ietimad Ibrahim Abd-Elrhman Kambal for their helpful advices and valuable suggestions to me at the various stages of the research and her ultimate consultation.

I also appreciate their patience and the effort that they expended supplying me with opinion and suggestions, that I was to incorporate into my research.

I would like to thank Faculty of Applied Medical Sciences, Gezira University for giving me this opportunity to continue my postgraduate education. My deepest thanks to the Nurses of Gezira Hospital for Renal Diseases and Surgery who shared in this study.

I express my gratitude to my husband Mustafa Mohammed for his encouragement which gave me moral support and self-confidence.
Nurses' knowledge regarding Care of Patients with Acute Renal Failure in Gezira Hospital for Renal Diseases and Surgery, Gezira State, Sudan (2014)

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Abstract

Acute renal failure means that the kidneys camera have suddenly stopped working. The kidneys remove waste products and help balance water and salt and other minerals in the blood. When the kidneys stop working, waste products, fluids, and electrolytes build up in the body. This can cause problems that can be deadly. A descriptive hospital-based study was conducted aimed at assessing nurses' knowledge regarding care of patients with acute renal failure in Gezira Hospital for renal diseases and surgery, Gezira State, Sudan. The sample size consisted of (61) nurses who constituted all available nurses during the period of the study from January to February (2014). Data was collected by using a questionnaire designed for the study. Data was analyzed by using Statistical Package for Social Sciences (SPSS). The results revealed that 52.5%, 62.3% and 59.0%, of the study sample responded with correct answers regarding definition, general causes and inter-renal causes of acute renal failure. 63.9% and 70.5% of the study sample responded with correct answers regarding post renal cause and the clinical manifestations of acute renal failure respectively. 36.1%, 27.9% and 32.8% of the study sample responded with correct answers regarding nutrition, rest and activity balance and how to prevent injury respectively. The study concluded that nurses’ knowledge regarding care of patient with acute renal failure were inadequate. The study recommendations that periodic training program for nurses about acute renal failure patients’ care must be conducted and continuous supervision for nurses’ performance for quality assurance.
تقييم معرفة الممرضين والممرضات تجاه العناية التمريضية بمرضى الفشل الكلوي الحاد بمستشفى الجزيرة للأمراض وجراحة الكلى، ولاية الجزيرة، السودان (2014)

سامية سليمان العاقب موسى

ملخص الدراسة
الفشل الكلوي الحاد هو توقف الكلى فجأة عن العمل. تقوم الكلى بإزالة الفضلات والماء وتوازن الأملاح والمعادن الأخرى في الدم. عندما تتوقف الكلى عن العمل تتراكم السموم في الدم ويفشل توازن السوائل وبالتالي تسبب مشاكل قد تكون مميتة. أجريت هذه الدراسة الوصفية وهدفت إلى تقييم معرفة الممرضين والممرضات تجاه العناية التمريضية بمرضى الفشل الكلوي الحاد بمستشفى الجزيرة للأمراض وجراحة الكلى، ولاية الجزيرة، السودان (2014). تكونت عينة الدراسة من (61) من الممرضين والممرضات بالمستشفى وهي العينة المتاحة خلال فترة الدراسة من يناير إلى فبراير 2014. تم جمع البيانات باستخدام استمارة استبيان صممت لغرض الدراسة. تم تحليل البيانات باستخدام برنامج الحزمة الإحصائية للعلوم الاجتماعية (SPSS). أظهرت النتائج أن 52.5٪، 62.3٪، 59.0٪ و 70.5٪ من أفراد العينة كانت إجابتهم صحيحة عن تعريف الفشل الكلوي الحاد وأسبابه، والآفات الناتجة عن مرض داخل الكلى، 63.9٪، 36.1٪، 27.9٪، 32.8٪ من أفراد العينة كانت إجابتهم صحيحة عن المحافظة على التغذية، و 36.1٪، 32.8٪، 27.9٪، 32.8٪ من أفراد العينة كانت إجابتهم صحيحة عن المحافظة على التغذية، موازنة الحركة والراحة والوقاية من الإصابات. خلصت الدراسة إلى أن معرفة الممرضين والممرضات تجاه العناية بمرضى الفشل الكلوي الحاد كانت غير...
كافية، أوصت الدراسة بعمل برامج تدريبية دورية للممرضين والممرضات عن العناية بمريض الفشل الكلوي الحاد والإشراف المستمر لأداء الممرضين والممرضات لضبط الجودة.
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1. Introduction

1.1 Background:

Acute renal failure means that the kidneys have suddenly stopped working. The kidneys remove waste products and help balance water and salt and other minerals in the blood. When the kidneys stop working, waste products, fluids, and electrolytes build up in the body. This can cause problems that can be deadly. The causes of acute renal failure: Acute renal failure has three main causes: A sudden, serious drop in blood flow to the kidneys. Heavy blood loss, an injury, or a bad infection called sepsis can reduce blood flow to the kidneys. Not enough fluid in the body (dehydration) also can harm the kidneys. Damage from some medicines, poisons, or infections. Most people don't have any kidney problems from taking medicines. But people who have serious, long-term health problems are more likely than other people to have a kidney problem from medicines. Examples of medicines that can sometimes harm the kidneys include:

- Antibiotics, such as gentamicin and streptomycin.
- Pain medicines, such as aspirin and ibuprofen.
- Some blood pressure medicines, such as ACE inhibitors.
- The dyes used in some X-ray tests.

A sudden blockage that stops urine from flowing out of the kidneys. Kidney stones, a tumor, an injury, or an enlarged prostate gland can cause a blockage. (Albright RC, 2001).

1.2 Problems statement:

In worldwide Nurses primary responsibility is monitoring patient with acute renal failure (ARF) that can help the patient. Also provides the information and support for patient and families according to their needs. More than 26,000 American have chronic renal failure and 50,000 die each year due to failure and 37% American undergo dialysis. The number of American with kidney failure is growing at or of 6% a year with the US leading the world in the number of new
cases per million populations. In 10 in UK, less than 1 in 10 people with chronic renal failure ever require renal replacement therapy (RRT). (WHO. 2008).

In developed countries chronic renal failure is a devastating medical, social, and economic problem for patients and their families. The availability and quality of dialysis programs largely depend on the prevailing economic conditions, the political-social structure, overall health care facilities, and the health care funding strategies of various countries. Large disparities separate the socio-economic structures of various countries, especially the developed and the developing countries. In the developed world, health care is generally available, whereas the vast population of people living in developing countries do not have access to even basic amenities like sanitation and safe drinking water. For ESRD patients in economically advanced countries, the focus now is on improving quality of life and increasing long-term survival. In marked contrast, the developing countries are grappling with short-term patient survival and the enormous costs of therapy that limit continuation of treatment in the majority of patients with ESRD. Most of the developing world has a two-tier health care delivery system. In the government-run non-profit hospitals, patients do not have to pay for medical advice, basic examinations, or treatment, but they must pay for disposables (gowns, gloves, syringes, for example) and drugs. However, in the large number of private hospitals, patients do have to pay for all services. (REPORT, AD: 2006)

Nurses' primary responsibility is monitoring patient with acute renal failure (ARF) that can help the patient. Also provides the information and support for patient and families according to their needs. (WHO. 2008).

In developing countries 121% of patients were recruited with male to female ratio being 2.5:1 (86:35). Mean age of the population was 47.8 years (SD ± 13.7). Common causes of CKD identified in these patients included diabetic nephropathy (37, 30.6%), hypertension (16, 13.2%), glomerulonephritis (12, 9.9%), and obstructive uropathy (10, 8.3%). The cause was unknown in 25.6% of patients with chronic renal disease. Fifty percent of patients were from the Western Province. The leading cause of CKD in patients from the Western Province was diabetic nephropathy (26, 37.7%). The etiology of CKD was
unknown in majority of the patients (14, 27.4%) from other provinces. The difference in incidence of diabetic nephropathy in the Western Province as to other provinces was not statistically significant ($P > 0.05$). (Levey AS, et al, 2003).

In Sudan is a large country in the central zone of Africa with an area of about one million square miles. It lies between latitudes 4 and 22 north and longitudes 22 and 38 east and has a population of about 30 million with a considerable number of refugees from the surrounding countries. Ahronic renal failure (ARF) is a common disease in Sudan, the estimated incidence for new cases is about 70 – 140 million inhabitants year. The majority are young patients below 40 years of age and most die before reaching medical attention (El – Amin H, 2007).

1.3 Justification

Acute renal failure (ARF) is a common disease in Sudan. The estimated incidence for new cases is about 70 – 140 million inhabitants year. The majority are young patients below 40 years of age and most die before reaching medical attention. Most patients with chronic renal failure pass little or no urine side effects caused by fluid imbalance like volume over load (hypertension, shortness of breathing, edema of tissues or organ, nausea, vomiting, headache) and also may be occur. The symptoms can occur pre the treatment or post treatment. Anemia also may be occur. Infection occur due to immune, chest pain, back pain or sudden death (Munter H, 2008).

The health care team can help patients and provides the information and support for patient and family to prevent and mange their complications.
1.4 Objectives:

1.4.1 General Objective:

- To study nurses’ knowledge regarding acute renal failure patients’ care in Gezira hospital for renal diseases and surgery, Gezira State, Sudan during the period from January to February 2014.

1.4.2 Specific Objectives:

- Assess nurses’ knowledge regarding various aspects in acute renal failure patients’ care.

- Determine nurses’ knowledge to perform acute renal failure patients’ care correctly.
2. Literature Review

2.1 Definition of renal failure

Renal failure is severe impairment or total lack of kidney function, in which there is an inability to excrete metabolic waste products and water, as well as functional disturbance of all body systems. Renal failure may be acute in onset (developing in hours to days) or chronic (developing slowly and progressively over a course of several years). Renal failure refers to a significant loss of renal function, when only 10 percent of renal function remains, the person is considered to have end-stage renal disease. (Thadhani R, et al 2006).

2.2 Acute renal failure (AFR)

Acute renal failure is a clinical syndrome characterized by a rapid decline in renal function with progressive azotemia (an accumulation of nitrogenous waste products such as BUN) and increasing levels of serum creatinine. Urine output is generally less than 40ml/hr (Oliguria) but may be normal or even increased. AFR can be further divided into prerenal, intrarenal or intrinsic and postrenal etiologies. (Albright RC, 2001)

2.3 Etiology

2.3.1 Prerenal causes

Prerenal causes consist of outside the kidneys than reduce renal blood flow and lead to decreased glomerular perfusion and filtration. This is caused by intravascular volume depletion, decreased cardiac output, or vascular failure secondary to vascodilation or obstruction.

- Hypovolemia can lead to decreased renal perfusion, which can be due to: hemorrhage, dehydration, vomiting, gastric suction, diabetes insipidus, diabetes mellitus, wound drainage, cirrhosis, inappropriate use of diuretics, diaphoresis, burns and peritonitis.
• Decreased cardiac output: congestive heart failure, myocardial infarction, precardial tamponade, cardiac arrhythmias/dysrhythmias, open heart surgery and cardiogenic shock.

• Systemic vasodilation/decreased peripheral resistance: sepsis (septic shock), acidosis, anaphylaxis and neurologic injury.

• Hypotension/hypoperfusion: cardiac failure and shock.

• Renal vascular obstruction: thrombosis of renal arteries, bilateral renal vein thrombosis and embolism.

• Drugs that may complicate prerenal azotemia include NSAIDS, which block synthesis of vasodilating prostaglandins and angiotensin converting enzyme (ACE) inhibition which blocks synthesis of angiotensin. (Thadhani R, et al 2006).

### 2.3.2 Intrarenal causes

Prerenal disease can lead to intrarenal disease (tubular necrosis) if renal ischemia is prolonged. Intrarenal failure is caused by damage to kidney tissues and structures and include tubular necrosis, nephrotoxicity and alteration in renal blood flow:

• Tubule/Nephron damage: acute tubular necrosis (most common cause), acute glomerulonephritis, acute pyelonephritis, rhabdomyolysis.

• Vascular changes: coagulopathies, malignant hypertension, toxemia of pregnancy, systemic lupus erythematosus, sclerosis and stenosis.

• Nephrotoxin/nephrotic injury: allergic-antibiotic (sulfonamide, rifampin) NSAIDs, ACE inhibitor, antibiotics – gentamycin, tobramycin, amphotericin B, polymixin B, neomycin, kanamycin, vancomycin, chemical, carbon tetrachloride and lead, heavy metals, arsenic, mercury, iodinated radiographic contrast media (IVP dye), drug-induced interstitial nephritis – NSAIDs, tetracycline furosemide, thiazide, phenytoin, penicillin, sulphonamide and cephalosporins. (Venturini CM, et al 2008)
2.3.3 Postrenal causes

Postrenal causes involve mechanical obstruction of urinary outflow, between the kidney and the urethral meatus, which includes ureteral and bladder neck obstruction due to:

- Calculi formation.
- Benign prostatis hyperplasia.
- Prostate cancer.
- Bladder cancer.
- Trauma (to back, pelvis or perineum).
- Strictures.

2.4 Pathophysiology

The kidneys receive approximately one fourth of the cardiac output; therefore, they are very sensitive to alteration in perfusion. Most cases of AFR are caused by ischemic episode. Ischemic causes nephron damage, although maintaining of fluid and electrolyte balance is possible 25% of nephron functioning. A urinary output of at least 400ml/day is necessary for adequate excretion of wastes. The decrease GFR that occurs in ARF is responsible for the increased BUN and serum creatining level. The kidneys respond to hypoperfusion in the release of renin and adaptive response to maintain perfusion to the glomerular bed. ARF develops when these adaptive responses are ineffective in maintaining normal kidney function. (Thadhani R, et al 2006).

The pathophysiology of ARF is not completely understood. Nephrotoxic factors and ischemia produce acute renal failure (ARF). The possible pathologic process involved in ARF include the following:
2.4.1 Renal vasoconstriction

Hypovolemia and decreased renal blood flow stimulate renin release, which activates the angiotensin – aldosterone system and results in constriction of the peripheral arteries and the renal afferent arterioles. With decreased renal blood flow, there are decreased glomerular capillary pressure and glomerular filtration rate (GFR) as well as tubular dysfunction and ultimately oliguria. (Green GB, et al, 2004).

2.4.2 Cellular edema

Ischemia causes an anoxia, which leads to endothelial cell edema. Cellular edema raises tissue pressure above capillary flow pressure, consequently blood flow through the arterioles may still be altered after treatment of the underlying conditions. Inadequate renal blood flow further depresses the GFR.

2.4.3 Decreased glomerular capillary permeability

Ischemia alters glomerular capillary permeability. This in turn reduces the GFR, which significantly reduces blood flow and leads to tubular dysfunction.

2.4.4 Intratubular obstruction

When tubules are damaged, interstitial edema occurs and necrotic epithelia cells accumulate in the tubules. This accumulated debris also lowers the GFR by obstructing the tubules and increasing intratubular pressure. (Green GB, et al, 2004).

2.4.5 Leakage of glomerular filtrate

Glomerular filtrate leaks back into plasma through holes in damage tubular membranes, which decreases intratubular fluid flow.

2.5 Clinical manifestation

Clinical ARF may progress through phases of onset oliguria, diuresis and recovery. In some situations, the patient does not recover from ARF, and chronic renal failure results. (Thadhani R, et al 2006).
2.5.1 The onset is the initial phase of injury to the kidney. Reversal or prevention of kidney dysfunction is possible at this stage by early intervention. In this phase, there is hypotension, ischemia, hypovolemia are seen. Symptoms are subtle, which last for hours to days.

2.5.2 Oliguria phase follows within one day of the onset. Major problems of the phase include inability to excrete fluid loads, regulate electrolysis and excrete metabolic waste products. When urine output is less than 400ml/24 hours, there is inability to excrete metabolic wastes, increased serum urea nitrogen and creatinine. BUN may increase 20mg/dl/day. The symptoms include nausea, vomiting, drowsiness, confusion, coma, gastrointestinal bleeding, asterixis, pericarditis. These last for 1-3 weeks, may extend to several weeks in older patients.

When urine output is less than 30ml/24 hours, there is inability to regulate electrolytes (hyperkalemia, hyponatremia, acidosis, hypocalcemia, hyperphosphatemia); inability to excrete fluid overload, (fluid overload, hypervolema); hematological dysfunction, leukopenia) cases may require dialysis. The symptoms are nausea, vomiting, cardiac dysrhythmias, ECG changes, kussmaul's breathing (rapid, deep respirations) drowsiness, confusion, coma, edema, CCF pulmonary edema, neck vein distention, hypertension, fatigue, bleeding, infection. The duration also is dependent upon type of toxic injury and duration of ischemia. (Thadhani R, et al 2006).

2.5.3 Diuretic phase: The diuretic phase begins gradual increase in daily urine output of 1 to 3 liter per day, but may reach 3 to 5 liters or more per day. There is increased production of urine (deficit in concentrating ability of tubule and osmotic diuretic effect of high BNU), slowly increasing excretion of metabolic wastes, hypovolemia, loss of sodium, loss of potassium, high BUN initially, BUN gradually returns to baseline. Symptoms include, urine output up to 4-5 liters per day, postural hypertension, tachycardia, improving mental alertness and activity, weight loss, thirst, dry mucus membranes and decreased skin turgor. These last for 2-6 weeks after onset of oliguria, but duration may vary accordingly.
2.5.4 Recovery phase: The recovery phase begins when the GFR increases so that BUN and serum creatinine levels are starting to stabilize and then decrease. Kidneys are returning to normal functioning, some residual renal insufficiency. Thirty percent of patients do not attain full recovery of GFR. There is decreased energy levels which last for 3-12 months. The clinical manifestations of acute renal failure according to body system are:

- **Urinary:** decreased urinary output, proteinuria, casts, decreased specific gravity, decreased osmolality, increased urinary sodium.

- **Cardiovascular:** volume overload, congestive heart failure, hypotension (early) hypertension (after development of fluid overload), pericarditis, pericardial effusion and arrhythmias.

- **Respiratory:** pulmonary edema, kussmaul's respiratory and pleural effusion.

- **Gastrointestinal** nausea and vomiting: anorexia, stomatitis, bleeding, diarrhea and constipation.

- **Hematologic anemia** (development within 48 hours) leukocytosis, defect in plaslet functioning.

- **Neurologic:** lethargy, convulsions, asterixis and memory impairment.

- **Others:** increase susceptibility to infection, increased BUN, increased creatinine, increased potassium, decreased pH, decreased bicarbonate, decreased calcium and increased phosphate. (Thadhani R, *et al* 2006).

### 2.6 Management

The most important tool for distinguishing perenal, intrarenal and postrenal causes the history, including a thorough review of recent clinical events and drug therapy. Urinalysis is an important diagnostic test. Urine sediment containing abundant cells, casts or protein suggests intrarenal ATN is associated with abundant urinary casts. Normal urine sediment is possible in both prerenal and postrenal causes. Hematuria, pyuria and crystals may be associated with
postrenal causes. If needed, further tests may be necessary such as CT, MRI, renal ultrasound, retrograde pyelogram and renal scan. (Cantarovich F, et al, 2004).

The use of medications in the treatment of ARF is determined by the underlying cause and the presenting symptoms. Hypovolemia is treated with hypotonic solutions such as OUSI saline. If hypovolemia is due to blood or plasma loss, packed red blood cells and isotonic saline are administered. Volume replacements rates must match volume losses on a 1:1 basis. Loop diuretics are used to manage potassium levels. Doses of up to 320mg/ day of fusomide may be required to produce adequate diuretics. Renal failure from nephrotoxin or ischemia is treated with agents that increase renal blood flow. These include renal-dose dopamine, mannitol and diuretics.

Inflammatory states as in acute glomerulonephritis are treated with glucocorticosteroids. Patients with impaired renal functions may have altered responses to therapeutic doses of many medications. Uremia alters the protein-binding sites, absorption, distribution and metabolism of many drugs. NSAIDs and ACE inhibitors are contraindicated in patients with acute renal failure.

When conservative management is not effective, dialysis is required. Dialysis, the process by which waste products in the blood are filtered through a semi-permeable membrane, is indicated. When the patient with ARF is fluid overloaded and/or has rapidly progressive azotemia, hyperkalemia, and metabolic acidosis are used. Three methods are used. Hemodialysis, peritoneal dialysis and continuous renal replacement therapy. While taking care of the person with acute renal failure following points to be kept in mind which include: (Cantarovich F, et al, 2004).

2.6.1 Maintaining fluid and electrolytic balance

- Maintain fluid restrictions.
- Monitor intravenous fluid carefully.
- Keep accurate records of intake and output.
- Weigh patient daily.
• Monitor vital signs frequently, including postural signs.

• Assess fluid status of patient frequently.

• Administer phosphate binding medications as prescribed.

• During diuretic phase.

• Assess for changes in mental status indicative of low serum levels.

• Assess for presence of irregular apical pulses indicative of hypokalemia.

### 2.6.2 Maintaining nutrition

• Provide fluid in small amounts during oliguric phase; phase, ginerable and other effective – scent soft drinks may be tolerated better than other fluids.

• Provide diet: restricted in protein as prescribed, high in carbohydrates and fat during protein restrictions, low in potassium during hyperkalemia, high in potassium during hyperkalemia and take measures to relieve nausea (antiemetic and comfort measure).(Cantarovich F, et al, 2004).

### 2.6.3 Maintaining rest / activity balance

• Maintain bedrest in the acute phase.

• Assist patient with activities of daily living to conserve energy.

• Promote early ambulation when renal status permits.

• Provide for planned rest periods.

### 2.6.4 Prevent injury

• Assess orientation, reorient confused patient.

• During bedrest, keep side rails, rails raised and use padded rails as necessary.
• When patient is ambulatory, assess motor skills and monitor ambulation and assist patient as necessary.

• Assess patient for signs of bleeding.

• Protect patient from bleeding: instruct patient to use soft tooth brush, perform guaiac test on stool, emesis and nasogastric returns.

### 2.6.5 Preventing infection

• Avoid source of infection: limit visitors to well adults.

• Assess for signs and symptoms of infection.

• Maintain asepsis for indwelling lines or catheters.

• Perform pulmonary hygiene.

• Turn weak or immobile patients every 2 hours and as needed.

• Provide meticulous skin care.

• Bathe patient with superfat soap.


### 2.6.6 Facilitate coping

• Encourage development of nurse-patient relationship to assist patient to express feelings as desired.

• Promote patient independence (autonomy).

• Assist patient to explore alternative way of coping.

In addition, patient and family education to be given to take care of the person with acute renal failure as follows:

• Causes of renal failure and problems with recurrent filatures.

• Identification of preventable environmental or health factors contributing to the illness such as hypertension and nephrotoxic drugs.
• Prescribed medication regimen, including name of medication, dosage, reason for taking, desired and adverse effects.

• Prescribed dietary regimen.

• Explanation of risk of hypokalemia, and reportable symptoms (muscle weakness, anorexia, nausea, vomiting and lethargy).

• Signs and symptoms of returning renal failure (decreased urine output, without decreased fluid intake, signs of fluid retention and increased weight).

• Signs and symptoms of infection, methods to avoid infection.

• Need for ongoing follow-up care.

• Option for the future, explanation of transplantation and dialysis there is a possibility. (Cantarovich F, et al, 2004).

2.7 Nursing care plan for the patient with acute renal failure


1. Acid-base balance, alteration in: metabolic acidaemia (acidosis).

Objectives:

Patient's condition will stabilize as follows:

1. Arterial blood gases will values: pH >7.35, <7.45 PaCO₂ optimal level for patient (normal range 35-45 mmHg).

2. Anions will stabilize as follows:

   • Bicarbonate (HCO₃⁻) 22-26 mEq/liter.
   • Chloride 100-106 mEq/liter.
   • Anion gap 12-15 mEq/liter.

4. Serum potassium level: 3.5-5.5 mEq/liter.

5. Haemodynamic status will stabilize as follows:

Arterial BP within 10 mmHg of base-line.

CVP = mean 0.8 mmHg,

6. Ventilatory effort will maintain blood gas values at optimal level for patient.

Respiratory rate: 12-18/min

Tidal volume: >5-7ml/kg

Nursing intervention:

- Monitor neurologic status: level of consciousness, mental status; cranial nerve function; deep tendon reflexes, seizure activity.

- Monitor arterial blood gasses.

- Monitor serum potassium levels

- Monitor respiratory rate and rhythm.

- For pertinent information related to acid-base abnormalities including definition, pathophysiology, aetiology, clinical presentation, treatment, and nursing diagnoses. (REPORT, AD: 2006)

Rational of nursing intervention:

Alterations in neurologic function are commonly associated with severe metabolic acidosis and may include confusion, headache, seizures, coma, and other manifestations.

Reflect effectiveness of ventilator effort and gas exchange, blood gas levels and pH provide essential data for assessing acid-base and electrolyte balance.

Severe metabolic academia can predispose to hyperkalaemia as excess hydrogen ions are moved into cells in exchange for potassium ions, which enter
intravascular space (circulation); hyperkalemia may predispose to cardiac
dysrhythmias and cardiac arrest.

Hyperventilation (Kussmaul's breathing) deep and rapid breathing the body's compensatory response to severe academia (pH<7.20)

2. Nutrition, alteration in: less than body requirements:

Objectives:

Patient will:

1. Maintain body weight between 2-5 percent of patient's baseline.

2. Maintain serum albumin within physiologic range 3.5-5.0g/100ml.

3. Tolerate oral feedings without nausea, vomiting, diarrhea, or stomatitis.

Nursing intervention:

- Collaborate with nutritionist to perform comprehensive nutritional assessment.

- Weigh daily under same conditions.

- Monitor intake and output (monitor electrolytes closely.

- Implement prescribed dietary regimen: (caloric intake: 2000-3000 calories/24hr, low protein intake: 1g/kg of body weight/24hr (protein sources high in essential amino-acids) and avoid foods high in potassium (offer oral high caloric supplements: vitamin and mineral supplements).

Implement measures to enhance mealtimes:

- Provide frequent oral care.

- Limit fluids with meals; provide more frequent small feedings.

- Encourage family to bring appropriate home-cooked foods, encourage visiting during mealtimes.
Encourage rest periods before and after meals.

Rational of nursing intervention:

- Provides baseline for planning nutrition that will sufficient calories to prevent protein catabolism and sufficient protein intake to meet body needs while avoiding excess production of urea nitrogen.
- Body weight is best indicator of fluid gain or loss.
- Diligent monitoring of fluid state is essential to prevent fluid excess during oliguric phase and fluid deficit during phase.
- Acute renal failure and associated metabolic acidaemia place the patient at risk of developing hyperkalemia.
- Prevents stomatitis; decreases foul taste; improves appetite.
- Smaller volume at mealtimes may facilitate gastric emptying and reduce gastrointestinal upsets.
- Favorite foods may enhance appetite. Helps to provide a mealtime atmosphere conducive to good eating.
- Avoids undue fatigue.


Objectives:

Patient will:

- Verbalize knowledge of prescribed diet, specify dietary restrictions and their significance.

Nursing intervention:

Initiate patient/family education regarding prescribed diet and meal preparation. Stress those food permitted versus those foods restricted.
Implement alternative approach to providing nutrition as dictated by patient's overall condition:

(nasogastric or enteral feedings / total parenteral nutrition)

Rational of nursing intervention:

- Compliance with long-term dietary restriction requires that patient/family understand the relationship among renal disease, diet, and medication regimen.

- Ensures adequate intake of essential amino acids for maintaining and repairing body tissues, sufficient carbohydrate caloric source to reverse gluconeogenesis and catabolic state.

4. Infection, potential for depressed immunologic system:

Objectives:

- Patient's condition will stabilize as follows:

1. Nonfebrile.

2. white blood count within physiologic range.

3. patient will verbalize a general feeling of wellbeing

4. Absence of infection: (Negative cultures – absence of redness swelling and pain).

Nursing intervention:

Assess for signs of infection:

- Vigilant assessment of all invasive lines and wound dressings is critical.

- Observe for redness, pain, swelling at all invasive sites, dressing changes as per unit protocol.
• Monitor body temperature, white blood count; obtain cultures as indicated – sputum, blood, urine wound.

• Pulmonary function: encourage deep breathing and coughing.

• Auscultate lungs for adventitious sounds of pulmonary congestion or increased secretion, encourage frequent position changes.

• Urinary function: monitor use of Foley catheter perform perineal care and cleansing around catheter as per unit protocol, maintain the integrity of the closed drainage system, examine urine for cloudiness or unusual odor.

Rational of nursing intervention:

• Uremic state depresses the body's immunologic defenses and increases patient's susceptibility to infection.

• Infection is the most common cause of death in patients with ARF.

• Patient care activities are directed towards prevention of accumulation of pulmonary secretions and atelectasis.

• Assists in evaluating ventilator effort, patients with ARF are high risk developing pneumonia.

• Use of indwelling Foley catheters in patients with ARF is associated with a high incidence of urinary tract infection (nosocomial infections). If an indwelling catheter is necessary, its insertion and ongoing care require strict aseptic technique.

• Indwelling catheter should be removed as soon as feasible as determined by the patient's overall condition.

5. Injury, potential for uremia induced gastrointestinal disorders:
Objectives: Patient will:

1. Tolerate oral feedings.
2. Verbalize having an appetite.
3. Maintain usual bowel routine.
4. Nasogastric secretions and stool negative for occult blood.

Nursing intervention:

- Monitor gastrointestinal function: assess abdomen for distention, tenderness, bowel sounds in all quadrants.
- Monitor for nausea, vomiting, diarrhea, test vomitus or nasogastric aspirate and stool for occult blood
- Monitor Hct and Hgb.

Rational of nursing intervention:

- Patients with ARF are susceptible to gastrointestinal upsets, due in part to the chemical irritation caused by bacteria that hydrolyze urea to ammonia in the gut.
- Administration of antibiotics or other drugs alters the intestinal flora placing the patient at increased risk of infection.

6. Skin integrity, impairment of potential:

Objectives:

Patient will:

1. Maintain intact skin no breaks, lesions, or infection
2. Exhibit warm, dry skin, with good turgor and absence of interstitial edema
3. Verbalize/demonstrate measures for optimal skin care.
Nursing intervention:

- Maintain skin integrity.
- Inspect skin n each shift, especially reddened areas over bony prominences where skin is thin.
- Institute measures to prevent skin breakdown; frequent position changes, use of sheepskin or egg crate matters (pressure relief device) ; frequent lubrication of skin.
- Teach patient/family the essential of skin care.

Rational of nursing intervention:

- A comprehensive assessment of skin can assist in early detection of alterations in skin.
- Deposition of phosphate crystals in the skin causes troublesome itching, which can lead to excoriation and infection.
- Patient/family can be taught to rub a lanolin-base lotion on the skin to avoid scratching and to stimulate circulation.

7. Oral mucous membrane, alteration in:

Objectives:

Patient will:

1. Verbalize when in pain.
2. Identify appropriate pain relief measures.
3. verbalize comfort.
4. Discuss origin of chest pain and significance in ARF

Nursing intervention:

- Evaluate pain and stress tolerance.
• Assess presence of chest pain: Severity – location, duration, quality (type) of pain, influencing factors,

• Assess presence of: Fever, chills, pericardial friction rub, gallop rhythm.

• Administer analgesic as prescribed and evaluate its effectiveness in relieving pain.

• Instruct patients to lean forward over a pillow or bedside table.

• Perform comfort measures: Repositioning; relaxation techniques

• Manipulate the environment and daily routines to provide rest periods.

• Identify patient at risk and predisposing factors: bacteria/ viral infections associated with invasive lines, respiratory and gastrointestinal dysfunction or wounds poor dietary intake depressed immunologic function.

• Assess for cardiac failure and tamponade

• Discuss underlying cause of pericarditis and its potential impact on patient/family lifestyle.

Rational of nursing intervention:

• Pericarditis is frequently precipitated during the uremic state; fear of heart attack on the part of patient/family may complicate therapy and recovery.

• Use SLIDT tool.

• Chest pain associated with pericarditis can be sudden onset, sharp, and intermittent located substernally with radiation to neck and back.

• This positioning frequently relieves chest pain associated with pericarditis

• Comfort measures may decrease pain by prophylaxis is the best treatment.

• These complications must be anticipated and can create an acute emergency situation. The focus of diligent, ongoing assessment it to avid these complication
8. Activity, alteration in: fatigue and anaemia:

Objectives:

Patient will:

1. Verbalize decrease in fatigue.
2. Exhibit willingness to pace activities.

Maintain HctHgb within realistic range based on renal function.

Nursing intervention:

- Evaluate activity tolerance, impact of anemic state:
- Assess onset, time of day and duration of fatigue and clinical circumstances in which it occurs.
- Monitor laboratory data to determine presence and extent of anemia: Hematocrit and hemoglobin, complete blood count (CBC), (BUN) serum creatinine.
- Assess skin for bruising or petechiae, nasogastric aspirate and stool for occult blood.
- Minimize iatrogenic blood loss. Draw minimal blood samples for laboratory study; handle patient carefully to prevent bleeding, avoid hypodermic injections.
- Use stool softeners to prevent constipation and haemorrhiodal bleeding, use soft small-lumen nasogastric tube to minimize gastric mucosa irritation, monitor vital signs, and watch carefully for signs of anemia whatever source.
- Encourage open discussions regarding renal disease: aetiology, clinical presentation, complications, treatment and prognosis.
- Assist patient/family to relate dietary restrictions and exercise activities to status of renal disease.
• Encourage patients/family to verbalize concerns regarding renal disease and expectations of its outcome.

• Reinforce learning and provide feedback for patient/family progress and achievements.

Rational of nursing intervention:

• Fatigue is major clinical manifestation attributed directly to the uremic state.

• Anemia is often seen early in ARF and is associated with an inadequate synthesis of erythropoietin factor by the kidneys. Uremia may predispose to bleeding tendencies.

• Diligent, ongoing assessment is essential to prevent anemia and/or a major bleeding disorder.

• Efforts to minimize blood loss are essential in the presence of compromised hematologic function associated with uremia.

• Conservation of strength may improve endurance.

• ARF may require weeks to months for recuperation and often becomes chronic.

• An informed patient/family can participate in care and make adjustments in lifestyle as necessitated by the course of the renal disease.

• An environment of mutual respect and trust can enhance the learning process.

• Learning should occur at a rate that is meaningful and tolerable to patient and family.

• Learning is an ongoing process; praise for one's accomplishments stimulates self-motivation, and assists in determining directions for further growth.
9. Coping, ineffective individual family potential:

Objectives:

Patient will:

1. Verbalize feelings regarding renal disease.

2. Identify strengths and coping capabilities.

3. Make decisions regarding matters of importance to the patient/family.

4. Identify resources available in family and community.

Nursing intervention:

Evaluate coping capabilities:

- Assess patient's ability to solve problems and set priorities.

- Establish a trusting and caring rapport patient advocacy accessibility to patient.

- Encourage verbalization of perceptions concerns and feelings.

- Assist patient to identify past coping capabilities. Emphasize strengths, after praise for accomplishment encourage development of new coping mechanisms

- Assist to identify community resources and encourage patient to enlist assistance when necessary.

Rational of nursing intervention:

- Problem-solving capability enables patient to assume control and make decisions regarding own actions and behaviours.

- A definitive, dependable support system assists the patient to assume responsibility for the level of health desired.

- Unexpressed and unresolved fears and concerns may compromise ability to cope effectively.
• Active participation in self-care assists the individual to gain a new sense of dignity and feelings of self-worth.

• Additional resources may assist patient to gain increased awareness of self in the interaction among patient, family and environment. (Venturini CM, et al 2008).

2.9 Pervious Studies

In Worldwide: Fourteen cases of acute renal failure secondary to administration of radiographic contrast media were observed, eight within a 15-month period. No patient had multiple myeloma, and only three were diabetic. Predisposing factors included renal hypoperfusion, preexisting renal insufficiency, hyperuricemia, age of more than 60 years, solitary functioning kidney, and exposure to several contrast studies at closely spaced intervals. Control of blood volume and serum uric acid, appropriate spacing of radiographic studies, and possibly urinary alkalinization and hypouricosuric drugs in high-risk patients are recommended to decrease the incidence and morbidity of contrast-mediated nephropathy. (Frank A, et al, 2002).

Another study done by Ronald M, et al (2009) who state that a modified program of intravenous hyperalimentation therapy was instituted for a 71-year-old patient following the development of renal failure after abdominal aortic aneurysmectomy. A prolonged postoperative ileus precluded adequate oral feedings for a total of three weeks, and a progressive rise in blood urea nitrogen (BUN) and serum creatinine levels suggesting nonoliguric acute tubular necrosis precluded the use of protein hydrolysates intravenously. A solution of eight essential amino acids in their L forms in a mixture of 50% dextrose and vitamins was administered by constant 24-hour superior vena cava infusion by standard techniques. Not only did stabilization of the rate of rise of Bun occur and dialysis was not required, but a significant decrease in serum levels of potassium, magnesium, and phosphate occurred in the absence of increased urinary or fecal losses. These biochemical responses suggested incorporation of these ions and nitrogenous wastes into structural protein. (Ronald M, et al 2009).
In developed countries: Another study done by Shigehiko Uchino et al (2005). Context Although acute renal failure (ARF) is believed to be common in the setting of critical illness and is associated with a high risk of death, little is known about its epidemiology and outcome or how these vary in different regions of the world.

Objectives To determine the period prevalence of ARF in intensive care unit (ICU) patients in multiple countries; to characterize differences in etiology, illness severity, and clinical practice; and to determine the impact of these differences on patient outcomes.

Design, Setting, and Patients Prospective observational study of ICU patients who either were treated with renal replacement therapy (RRT) or fulfilled at least 1 of the predefined criteria for ARF from September 2000 to December 2001 at 54 hospitals in 23 countries.

Main Outcome Measures Occurrence of ARF, factors contributing to etiology, illness severity, treatment, need for renal support after hospital discharge, and hospital mortality.

Results Of 29,269 critically ill patients admitted during the study period, 1738 (5.7%; 95% confidence interval [CI], 5.5%-6.0%) had ARF during their ICU stay, including 1260 who were treated with RRT. The most common contributing factor to ARF was septic shock (47.5%; 95% CI, 45.2%-49.5%). Approximately 30% of patients had preadmission renal dysfunction. Overall hospital mortality was 60.3% (95% CI, 58.0%-62.6%). Dialysis dependence at hospital discharge was 13.8% (95% CI, 11.2%-16.3%) for survivors. Independent risk factors for hospital mortality included use of vasopressors (odds ratio [OR], 1.95; 95% CI, 1.50-2.55; P <.001), mechanical ventilation (OR, 2.11; 95% CI, 1.58-2.82; P <.001), septic shock (OR, 1.36; 95% CI, 1.03-1.79; P = .03), cardiogenic shock (OR, 1.41; 95% CI, 1.05-1.90; P = .02), and hepatorenal syndrome (OR, 1.87; 95% CI, 1.07-3.28; P = .03).
Conclusion In this multinational study, the period prevalence of ARF requiring RRT in the ICU was between 5% and 6% and was associated with a high hospital mortality rate. (Shigehiko Uchino et al 2005)

The epidemiology and outcome of acute renal failure (ARF) in critically ill patients in different regions of the world are not well understood. Although there have been several epidemiological studies of ARF, most are either single center or if multicenter are confined to a single country. The period prevalence and hospital mortality reported in these studies have varied widely (single-center studies: 1%-25%; multicenter studies: 39%-71%) and most studies are not comparable because they used different inclusion criteria. In 1 multinational study that collected data for a general severity scoring system and provided further but limited and indirect information about the epidemiology of ARF, more than 90% of participating centers were in Europe or North America. All studies of ARF have been conducted in Australia, Europe, or North America.

We conducted a multinational, multicenter, prospective, epidemiological survey of ARF in intensive care unit (ICU) patients. The objectives of this study were to determine the period prevalence of ARF in ICU patients in multiple countries; to characterize differences in etiology, illness severity, and clinical practice; and to determine the association of these differences with patient outcomes. (Shigehiko Uchino et al 2005).

In developing countries: Study done by Peter A. et al (2006). PURPOSE: This study set out to define the incidence, predictors, and mortality related to acute renal failure (ARF) and acute renal failure requiring dialysis (ARFD) after coronary intervention. Patients and Methods: Derivation-validation set methods were used in 1,826 consecutive patients undergoing coronary intervention with evaluation of baseline creatinine clearance (CrCl), diabetic status, contrast exposure, postprocedurecreatinine, ARF, ARFD, in-hospital mortality, and long-term survival (derivation set). Multiple logistic regression was used to derive the prior probability of ARFD in a second set of 1,869 consecutive patients (validation set).
RESULTS: The incidence of ARF and ARFD was 144.6/1,000 and 7.7/1,000 cases respectively. The cutoff dose of contrast below which there was no ARFD was 100 mL. No patient with a CrCl > 47 mL/min developed ARFD. These thresholds were confirmed in the validation set. Multivariate analysis found CrCl [odds ratio (OR) = 0.83, 95% confidence interval (CI) 0.77 to 0.89, \(P<0.00001\)], diabetes (OR = 5.47, 95% CI 1.40 to 21.32, \(P = 0.01\)), and contrast dose (OR = 1.008, 95% CI 1.002 to 1.013, \(P = 0.01\)) to be independent predictors of ARFD. Patients in the validation set who underwent dialysis had a predicted prior probability of ARFD of between 0.07 and 0.73. The in-hospital mortality for those who developed ARFD was 35.7% and the 2-year survival was 18.8%.

CONCLUSION: The occurrence of ARFD after coronary intervention is rare (<1%) but is associated with high in-hospital mortality and poor long-term survival. Individual patient risk can be estimated from calculated CrCl, diabetic status, and expected contrast dose prior to a proposed coronary intervention. (Peter A. et al 2006). The safety and effectiveness of “closed” intensive care units (ICUs) are highly controversial. The epidemiology and outcome of acute renal failure (ARF) requiring replacement therapy (severe ARF) within a “closed” ICU system are unknown. Accordingly, we performed a prospective 3-mo multicenter observational study of all Nephrology Units and ICUs in the State of Victoria (all “closed” ICUs), Australia, and focused on the epidemiology, treatment, and outcome of patients with severe ARF. We collected demographic, clinical, and outcome data using standardized case report forms. Nineteen ward patients and 116 adult ICU patients had severe ARF (13.4 cases/100,000 adults/yr). Among the ICU patients with severe ARF, 37 had impaired baseline renal function, 91 needed ventilation, and 95 needed vasoactive drugs. Intensivists controlled patient care in all cases. Continuous renal replacement therapy (CRRT) was used in 111 of the ICU patients. Nephrological opinion was sought in only 30 cases. Predicted mortality was 59.6%. Actual mortality was 49.2%. Only 11 ICU survivors were dialysis dependent at hospital discharge. In the state of Victoria, Australia, intensivists manage severe ARF within a “closed” ICU system. Renal replacement is typically continuous and outcomes compare favorably with those predicted by illness severity scores. Our findings support the safety and efficacy of a “closed” ICU model of care. (Louise Cole, et al. 2006).
3. Materials and Methods

3.1 Study Design:

A descriptive hospital-based study aimed at assessing nurses’ knowledge regarding acute renal failure patients’ care in Gezira Hospital for renal diseases and surgery, Gezira State, Sudan during the period of the study from January to February 2014.

3.2 Study Area:

The study was carried out in Gezira hospital for renal diseases and surgery at Wad Medani the capital of Gezira State, which is a large agricultural area located in the central region of Sudan. The locality is about 186 km south to Khartoum state. It receives the patients from the whole state and neighboring states e.g. Algadarif, Sinnar, there are acute renal failure unit and hemodialysis ward and out patients unit. The hospitals units consisted of hemodialysis unit entailed 21 machines and 21 chairs, peritoneal dialysis unit 4 beds, intensive care unit (ICU) 4 beds, cystoscopy unit, female ward 18 beds and male ward 21 beds, Ultra Sound (US) Extracarobnal Shock Waves Lisotop (ESWL) and X-ray unit. Gezira Hospital for Renal Diseases and Surgery (Sudan) is the one of the well-established hemodialysis centres in Sudan with large catchment's area, where 258 patients are in regular hemodialysis. The capacity of renal diseases and surgery about 79 beds and 27 machines.
Table (3.1): Distribution of manpower in the Gezira Hospital for Renal Diseases and Surgery

<table>
<thead>
<tr>
<th>Number</th>
<th>Position</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>Consultants</td>
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<tr>
<td>9</td>
<td>Registrars</td>
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<tr>
<td>15</td>
<td>Medical officers</td>
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<tr>
<td>2</td>
<td>Assistant Nutritionists</td>
</tr>
<tr>
<td>163</td>
<td>Total</td>
</tr>
</tbody>
</table>

**Source:** Statistical Department of Gezira Hospital for Renal Diseases and Surgery, 2013
Table (3.2): Distribution of wards and beds in Gezira Hospital for Renal Diseases and Surgery during the period of the study

<table>
<thead>
<tr>
<th>Average No of patient staying</th>
<th>Average No of beds</th>
<th>No of beds</th>
<th>No of wards</th>
<th>Wards</th>
</tr>
</thead>
<tbody>
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<td>45</td>
<td>5</td>
<td>General ward</td>
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<td>2</td>
<td>4</td>
<td>1</td>
<td>ICU</td>
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<tr>
<td>Less 1 day</td>
<td>24</td>
<td>24</td>
<td>1</td>
<td>Hemodialysis</td>
</tr>
<tr>
<td>Less 1 day</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>Outpatient room</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>79</td>
<td>10</td>
<td>Total</td>
</tr>
</tbody>
</table>

**Source:** Statistical Department of Gezira Hospital for Renal Diseases and Surgery, 2013

### 3.3 Study Population:

The population of the present study includes (61) registered acute renal failure nurses who working at Gezira hospital for renal disease and surgery in all wards and units from all shifts during the period from January to February 2014.

#### 3.3.1 Inclusion Criteria:

- All nurses who have direct contact with acute renal failure patients in previous setting in Gezira hospital for renal diseases and surgery.
- All nurses with one year experience and more in acute renal failure units.

#### 3.3.2 Exclusion Criteria:

- Were not nurses didn’t contact with acute renal failure patients.
- Nurses have experience less than 1 year in acute renal failure units.

### 3.4 Sampling size:

The sample consist ( 61) of acute renal failure nurses who constituted all available nurses during the period of the study from January to February 2014 at Gezira hospital for renal diseases and surgery.
3.5 Sampling technique:

a. Questionnaire was distributed for each available nurse to fill it within 20 to 30 minutes under the researcher guidance identify the knowledge and attitude about acute renal failure (appendix1).

3.6 Sampling technique:

Official letters for the head manager and matron of Gezira hospital for renal diseases and surgery at Wad Medani for approval to collect the data.

3.7 Data collection tool:

Structured questionnaire was designed by the researcher and utilized for three purposes as follows:

First: To find out the general characteristics of the study sample. It contained the basic data related to their general characteristics such as age, education and years of experience.

Second: To assess nurses' knowledge regarding variables of acute renal failure care. It includes questions about definition of acute renal failure, principles and prescriptions, acute renal failure management, complications, and nursing role.

Third: to assess nurse’s regarding acute renal failure patient care.

3.8 Data analysis:

Data was analyzed and entered to the computer by using statistical package for social sciences (SPSS).
4. Results and Discussion

4.1 Results

A. Personal data:

![Figure (4.1) Distribution of the study samples according to their age group](image)

This table revealed that 42.6% of nurses their age ranged between 26 – 30 years, and 34.4% from 31 to 35 years while only 1.6% were more than 35 years old.
Figure (4.2) Distribution of the study samples according to their gender

This Figure revealed 19.7% of the study sample were male while 80.3% were female.
Table (4.1) Distribution of the study samples according to their Educational level and Years of Experiences

<table>
<thead>
<tr>
<th>%</th>
<th>No</th>
<th>Educational level</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.3</td>
<td>13</td>
<td>Bachelor</td>
</tr>
<tr>
<td>49.2</td>
<td>30</td>
<td>Post Graduate</td>
</tr>
<tr>
<td>29.5</td>
<td>18</td>
<td>Other</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>%</th>
<th>No</th>
<th>Years of Experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.9</td>
<td>25</td>
<td>1 to 5 years</td>
</tr>
<tr>
<td>44.3</td>
<td>27</td>
<td>6 to 10 years</td>
</tr>
<tr>
<td>14.8</td>
<td>9</td>
<td>11 to 15 years</td>
</tr>
<tr>
<td>0.0</td>
<td>0</td>
<td>more than 15 years</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>Total</td>
</tr>
</tbody>
</table>

Table (4.1) shows that the majority of nurses (80.3%) had bachelor degree and (18.1%) were post graduate. 44.3% of nurses for years of experiences concentrated in 6 to 10 years while 40.9% were 11 to 15 years.
Table (4.2) Distribution of the study samples according to their Source of knowledge and Training program

<table>
<thead>
<tr>
<th>Source of knowledge</th>
<th>%</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>From college</td>
<td>60.7</td>
<td>37</td>
</tr>
<tr>
<td>Literature</td>
<td>27.8</td>
<td>17</td>
</tr>
<tr>
<td>Others</td>
<td>11.5</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>61</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training program</th>
<th>%</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>57.4</td>
<td>35</td>
</tr>
<tr>
<td>No</td>
<td>42.6</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>61</td>
</tr>
</tbody>
</table>

This table revealed that 60.7% of nurses their source of knowledge regarding acute renal failure from colleges while 27.8% from literature. 57.4% of nurses were receive training program about acute renal failure patients care. While 42.6% were not.
B. Nurses' knowledge:

Table (4.3) Distribution of the study samples according to their nurses' of knowledge regarding definition of renal failure and definition of acute renal failure

Table (4.4): revealed that 52.5% of nurses their knowledge about definition of acute renal failure were correct complete while 37.7% of nurses their knowledge were correct but incomplete.
Table (4.4) Distribution of the study samples according to their nurses' of knowledge regarding the pre-renal causes, Inter-renal causes and post-renal causes of acute renal failure

<table>
<thead>
<tr>
<th>Total</th>
<th>Wrong</th>
<th>Correct incomplete</th>
<th>Correct complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>3.3</td>
<td>2</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>6.6</td>
<td>4</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>6.6</td>
<td>4</td>
</tr>
</tbody>
</table>

Table (4.4): shows that 62.3% of nurses their knowledge about causes of pre-renal failure were correct complete while 34.4% of nurses their knowledge were correct but incomplete. 59.0% and 63.9 of nurses their knowledge about causes of inter-renal and post-renal causes of failure were correct complete respectively.
Table (4.5) Distribution of the study samples according to their nurses’ knowledge regarding the clinical manifestations of acute renal failure according to body system, General clinical symptoms of acute renal failure and urinary symptoms

<table>
<thead>
<tr>
<th>Total</th>
<th>Wrong</th>
<th>Correct incomplete</th>
<th>Correct complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>3.3</td>
<td>2</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>3.3</td>
<td>2</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>3.3</td>
<td>2</td>
</tr>
</tbody>
</table>

Table (4.5): revealed that the majority of nurses 70.5% of nurses their knowledge about the clinical manifestations of acute renal failure according to body system were correct complete while 26.2% of nurses their knowledge were correct but incomplete. 52.5% and 42.6% of nurses their knowledge regarding general clinical symptoms and urinary symptoms of acute renal failure were correctly complete.
45.9%, 40.9% and 34.4% of nurses their knowledge about respiratory symptoms, gastrointestinal and hematological symptoms of acute renal failure were correct complete respectively.
Table (4.7) Distribution of the study samples according to their nurses’ of knowledge regarding The neurologic symptoms, possible pathologic process involved in ARF and to maintaining fluid and electrolyte parlance

<table>
<thead>
<tr>
<th>No 61</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>100%</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The neurologic symptoms include

The possible pathologic process involved in ARF include

TO maintaining fluid and electrolyte parlance

Table (4.7): Revealed that 40.9%, 31.2% and 54.1% of nurses their knowledge about neurologic symptoms, possible pathologic process and maintaining fluid and electrolyte parlance of acute renal failure were correct complete respectively.
Table (4.8) Distribution of the study samples according to their nurses’ of knowledge regarding maintaining nutrition, maintain rest / activity balance and prevent injury

No 61

<table>
<thead>
<tr>
<th>Total</th>
<th>Wrong</th>
<th>Correct incomplete</th>
<th>Correct complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>1.6</td>
<td>1</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>4.9</td>
<td>3</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>4.9</td>
<td>3</td>
</tr>
</tbody>
</table>

36.1%, 27.9% and 32.8 of nurses their knowledge about maintaining nutrition, maintain rest/activity and prevent injury of acute renal failure were correct complete respectively. While 62.3%, 67.2% and 62.3 were correct but incompletely respectively.
Table (4.9) Distribution of the study samples according to their nurses' of knowledge regarding preventing infection education patient and family to be given to take care of the person with acute renal failure and Nursing intervention of patient with alteration metabolic acidaemia

<table>
<thead>
<tr>
<th>Total</th>
<th>Wrong</th>
<th>Correct incomplete</th>
<th>Correct complete</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>6.6</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>61</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>61</td>
<td>6.6</td>
</tr>
</tbody>
</table>

75.4%, 40.9% and 49.2% of nurses their knowledge about prevention infection and education patient and family and nursing intervention of patient with alteration metabolic of acute renal failure were correct complete respectively.
Table (4.10) Distribution of the study samples according to their nurses’ of knowledge regarding Nursing intervention of patient with nutrition alteration less than body requirements, Nursing intervention of patient with infection potential for depressed immunologic system and Nursing intervention of patient with skin integrity

<table>
<thead>
<tr>
<th>Total %</th>
<th>No 61</th>
<th>Wrong %</th>
<th>No 3</th>
<th>Correct incomplete %</th>
<th>No 30</th>
<th>Correct complete %</th>
<th>No 28</th>
<th>No 45.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>61</td>
<td>4.9</td>
<td>3</td>
<td>49.2</td>
<td>30</td>
<td>45.9</td>
<td>28</td>
<td>Nursing intervention of patient with nutrition alteration less than body requirements</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>3.3</td>
<td>2</td>
<td>45.9</td>
<td>28</td>
<td>50.8</td>
<td>31</td>
<td>Nursing intervention of patient with infection potential for depressed immunologic system</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>3.3</td>
<td>2</td>
<td>44.3</td>
<td>27</td>
<td>52.4</td>
<td>32</td>
<td>Nursing intervention of patient with skin integrity</td>
</tr>
</tbody>
</table>

Table (4.10) revealed that 45.9%, 50.8% and 52.4% of nurses their knowledge regarding nursing intervention of patient with alteration less than body requirements and infection potential for depressed and patient with skin integrity were correct complete respectively.
Table (4.11) Distribution of the study samples according to their nurses' of knowledge regarding Nursing intervention of patient with activity alteration in fatigue and anemia, Nursing intervention of patient with coping ineffective individual family potential and Nursing intervention of patient with pain

No 61

<table>
<thead>
<tr>
<th>Total</th>
<th>Wrong</th>
<th>Correct incomplete</th>
<th>Correct complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>4.9</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Nursing intervention of patient with activity alteration in fatigue and anemia:</strong></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>4.9</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Nursing intervention of patient with coping ineffective individual family potential</strong></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>61</td>
<td>1.6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Nursing intervention of patient with pain</strong></td>
<td></td>
</tr>
</tbody>
</table>

49.2%, 44.3% and 72.1% of nurses their knowledge about nursing intervention of patient with activity alteration in fatigue and anemia, patient with coping ineffective individual family potential and patient with pain were correctly complete.
4.2 Discussion:

Acute renal failure means that the kidneys have suddenly stopped working. The kidneys remove waste products and help balance water and salt and other minerals (electrolytes) in the blood. When the kidneys stop working, waste products, fluids, and electrolytes build up in the body. This can cause problems that can be deadly. The causes of acute renal failure: Acute renal failure has three main causes: A sudden, serious drop in blood flow to the kidneys. Heavy blood loss, an injury, or a bad infection called sepsis can reduce blood flow to the kidneys. Not enough fluid in the body (dehydration) also can harm the kidneys. Damage from some medicines, poisons, or infections. Most people don't have any kidney problems from taking medicines. An interventional hospital-based research aimed at assessing nurses' knowledge regarding acute renal failure patients at Gezira Hospital for renal diseases and surgery, Gezira State, Sudan during the period of the study from January to February 2014. The sample consist (61) of acute renal failure nurses who constituted all available nurses during the period of the study from January to February 2014 at Gezira hospital for renal diseases and surgery. The data was collected by using structured questionnaire designed for the purpose of the study. The data was analyzed and entered to the computer by using Statistical Package for Social Sciences (SPSS). This result revealed that 42.6% of nurses their age ranged between 26–30 years, and 34.4% from 31 to 35 years while only 1.6% were more than 35 years old. Regarding gender 19.7% of the study sample were male while 80.3% were female. The majority of nurses (80.3%) had bachelor degree and (18.1%) were post graduate. 44.3% of nurses for years of experiences concentrated in 6 to 10 years while 40.9% were 11 to 15 years.
The results showed that 60.7% of nurses their source of knowledge regarding acute renal failure from colleges while 27.8% from literature. 57.4% of nurses were receive training program about acute renal failure patients care. While 42.6% were not. 52.5% of nurses their knowledge about definition of acute renal failure were correct complete while 37.7% of nurses their knowledge were correct but incomplete. The results revealed that 62.3% of nurses their knowledge about causes of pre-renal failure were correct complete while 34.4% of nurses their knowledge were correct but incomplete. 59.0% and 63.9 of nurses their knowledge about causes of inter-renal and post-renal causes of failure were correct complete respectively.

The majority of nurses 70.5% of nurses their knowledge about the clinical manifestations of acute renal failure according to body system were correct complete while 26.2% of nurses their knowledge were correct but incomplete. 52.5% and 42.6% of nurses their knowledge regarding general clinical symptoms and urinary symptoms of acute renal failure were correctly complete. 45.9%, 40.9% and 34.4% of nurses their knowledge about respiratory symptoms, gastrointestinal and hematological symptoms of acute renal failure were correct complete respectively. The study showed that 40.9%, 31.2% and 54.1% of nurses their knowledge about neurologic symptoms, possible pathologic process and maintaining fluid and electrolyte parlance of acute renal failure were correct complete respectively. 36.1%, 27.9% and 32.8 of nurses their knowledge about maintaining nutrition, maintain rest/activity and prevent injury of acute renal failure were correct complete respectively. While 62.3%, 67.2% and 62.3 were correct but incompletely respectively.

The majority of the study samples 75.4%, 40.9% and 49.2% of nurses their knowledge about prevention infection and education patient and family and nursing intervention of patient with alteration metabolic of
acute renal failure were correct complete respectively. 45.9%, 50.8% and 52.4% of nurses their knowledge regarding nursing intervention of patient with alteration less than body requirements and infection potential for depressed and patient with skin integrity were correct complete respectively.

The study illustrated that 49.2%, 44.3% and 72.1% of nurses their knowledge about nursing intervention of patient with activity alteration in fatigue and anemia, patient with coping ineffective individual family potential and patient with pain were correctly complete.
5. Conclusion and Recommendations

5.2 Conclusion

- Based on the results of this study, the researcher concluded that most of the knowledge of nurses regarding acute renal failure were inadequate knowledge about acute renal failure and nursing care of the patients.
5.2 Recommendations

Based on results of this study the following recommendations are suggested:

- Learning staff facilities library books regarding acute renal failure patients care must be available for nurses in hospital.

- Training program for all nurses working in the wards at the Hospital and practical in using infections control measures.

- Proper and continuous supervision evaluation to assess the nurses’ performance is essential.

- Training program for all nurses working at the hospital for acute renal failure program.
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