

Introduction

Chronic renal failure (CRF) is a worldwide public health problem with increase prevalence, high cost and poor outcome. Compliance is part of helping relationship between clients and health professional. It is the outcome of nurses' and clients' communication and interaction. There is increase attention to the effect of compliance on the health outcome (*Adam and Osborn, 2005*).

End-stage renal disease (ESRD) is the complete or almost complete failure of the kidneys to work (*While et al., 2013*).

ESRD occurred when the kidneys are no longer able to work at a level needed for day-to-day life. The most common causes of ESRD are diabetes and high blood pressure. ESRD almost always comes after chronic kidney disease. The kidneys may slowly stop working over 10- 20 years before end-stage disease results (*Lewis et al., 2007; Hassoan, 2011*).

According to the *United States Renal Data System (USRDS) 2012*, report, over 65,000 ESRD clients die each year. The unadjusted annual death rate for ESRD clients in recent years has ranged between 20 and 22%. For some 20% of these clients, death comes after a decision to discontinue dialysis. An increasing number of clients who

initiate renal replacement therapy are elderly, with the very highest rates for clients 75-79 and 80-84 years old. Older clients have the most co-morbid conditions and at the greatest risk for developing illnesses during their subsequent course on dialysis.

In Egypt, most of clients with ESRD 99.9% are treated by haemodialysis (HD), while only 0.1% of cases with ESRD, are treated by peritoneal dialysis. The number of cases with ESRD on regular HD increases by 10% every year (***Kattab, 2010***).

Quality of client care had become an important factor in the health care area. For years, quality has been assumed. Now, many different types of customers are requesting evidence of quality. Before one measures quality, one must define it. The definition varies according to the user or consumer. Quality has been defined in many ways. There is no single definition of quality; the core of a definition is the balance of health benefits and harms to client (***Daugridas, 2011***).

Haemodialysis client's satisfaction with the provided nursing care can be influenced by number of factors such as their expectations, emotional state, pain management, cosmetic results, prior experience with nursing care, provision

of information, patient attitude toward health care and ward rules and regulations (*Hudak and Gallo, 2006*).

Clients with ESRD are faced with complicated and demanding treatment regimens that include dietary, fluid restriction and medication schedules. Irrespective of whether treatment is predominantly dialysis centre based or home based, clients need to have sufficient knowledge, skills and ability to carry out their treatment regimen without direct supervision of health care personnel. Therefore, clients' education would seem to be an important component in the management of ESRD (*Lewis et al., 2007; Jablonski, 2007*).

End stage renal disease is not only a clinical concern, but also, a growing economic problem. Recently ESRD has received increased attention as a public health problem, this is due to the out increasing numbers of cases attending ESRD therapy (hemodialysis) (*Abd El-Azeem, 2008; Kattab, 2010*).

Significance of the Study:

End stage renal disease is a treating disease for saving the clients' life. In Egypt, each year, over 117 case per million were on HD, which makes the disease to be a national health problem because of its effects on clients and their families. The disease is not only a clinical issue but a social, economic and psychological problem affecting both the clients and the society, that is why ESRD at this time focused on (*Abd el Azeem, 2008; Khattab, 2010*).

The Academy of Protection Against end stage renal disease (ESRD) reported that there is increase in the number of the renal failure clients to be 15000 cases, this means in Egypt the number reached 200/per million people, more than the number of WHO 100/per million people. The number of cases increased in Aswan, Assyut, and Beni-Suef where it reached 500/per million people. The statistically reported number of cases increased to be 400/per million people. According to the WHO, reported at 2020 Egypt is expected to have the largest number of renal failure (**Ahmed, 2009 and Arnold, 2011**).

Clients undergoing HD, from the day of their admission to HD unit for enhancing complication, so the nurses had important role to prepare clients for HD session. Nurses were essential in care for clients under-going to HD in the dialysis unites , the nurses create the most ideal environment, assists , prevent of complications and help the client and his/her family with rehabilitation and adaptation to his/her new way of life (**Hausnan and Ingataucil, 2010; Lemon, 2012**).

Aim of the Study

This study aimed to improve the quality of nurses' performance to meet haemodialysis clients' satisfaction through:

- Assessing nurses' performance related to quality of haemodialysis management to detect their needs.
- Assessing clients' satisfaction.
- Designing and implementing a training program according to their needs.
- Evaluating the outcome of the training program through improving nurses' performance and clients' satisfaction.

Research Hypothesis:

The haemodialysis training program will improve the quality of nurses' performance to meet the haemodialysis clients' satisfaction.

Part I: The Kidney and Renal Disease

Introduction about the Kidney:

The kidney is one of a pair organ, lying on the posterior abdominal wall; the right kidney is slightly lower than the left. Each kidney measures 11-13 cm long, six cm wide and four cm thick, and weights 135 to 150 gm (*Lewis et al., 2007*).

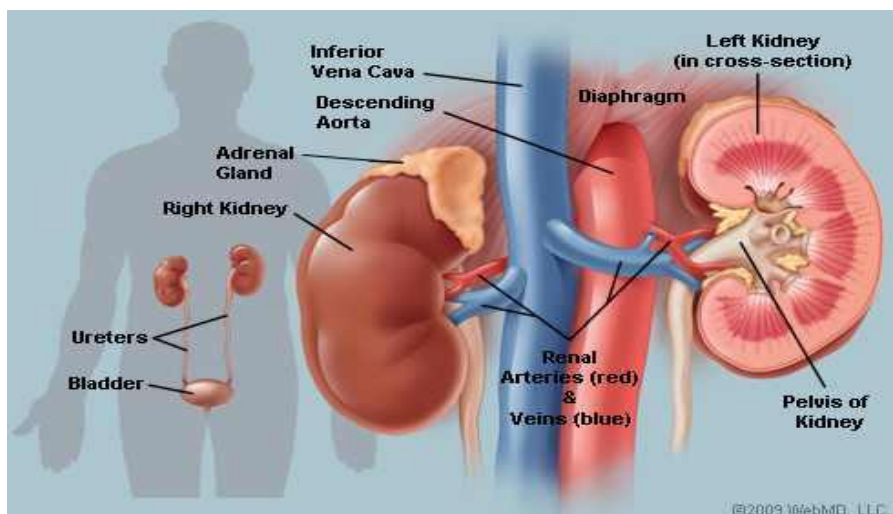
It was reported by *Long et al. (2012)* that, the kidneys are important excretory organs, functioning along with lungs in excreting the wastes products of food metabolism. Carbon dioxide and water are products of carbohydrates and fat metabolism. Protein metabolism produces urea, as well as various acids, which only kidneys can excrete.

The kidney is one of the parenchymatous organs. It consists of cortex and medulla, where the process of wastes excretion takes place. Cortex is the outer layer of the parenchyma consisting of connective tissues, glomeruli and convoluted tubules where filtration takes place. Medulla is the area of kidney where concentration of wastes takes place; it contains henle's loops and pyramids of converging tubules. Calyx (calyces) is the collection area for urine within kidney before it passes to renal pelvis (*Osborn and Waton 2010; NKUDID, 2013*).

Pelvis is the central collecting system of the kidney. Hilum is the area of convergence of the renal collecting system, ureter delivers formed urine to the urethra, renal artery is the blood supply of the kidney and renal vein is the blood drainage. Ultreroptic junction is the point at which the renal pelvis becomes the ureter. Capsule is the dense fibrous tissue covering the kidney (*Osborn and Waton 2010; NKUDID, 2013*).

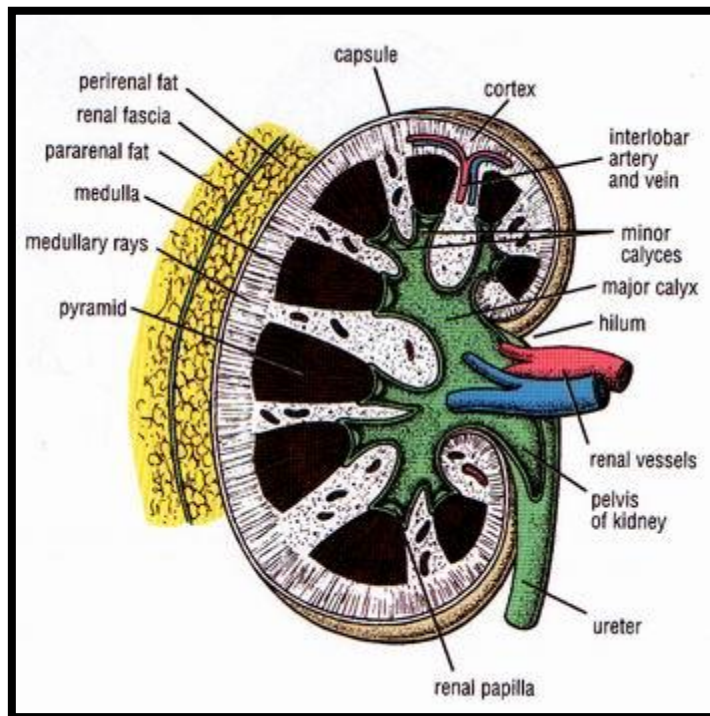
Gerota's fascia is the layer of connective tissue between the kidney and psoas muscle and the lumbar spine. Perinphric fat is the layer of fat surrounding the kidney outside of the capsule. Perihilar fat is the layer of fat in the area of the renal Hilum (Figs.1,2) (*Osborn and Waton 2010; NKUDID, 2013*).

Figure (1): The kidneys



<http://www.webMD.LLC,2009>. available at, 5-2014.

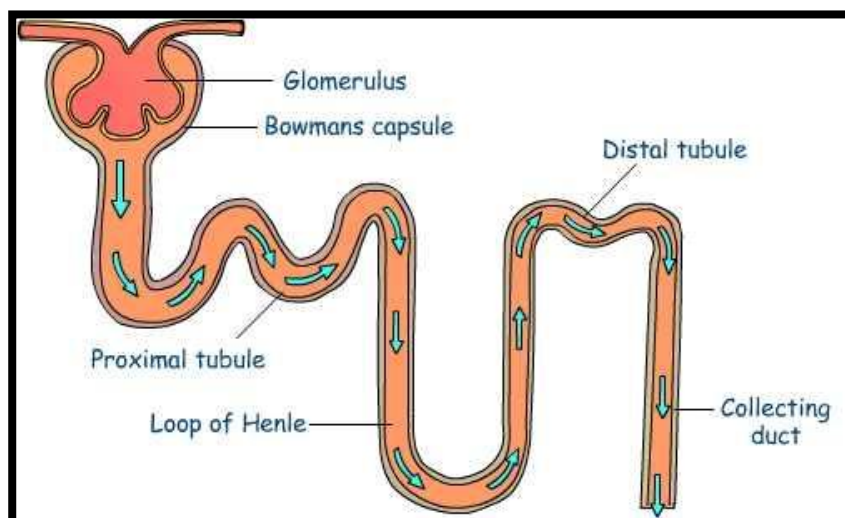
Figure (2): Structure of the kidney



Osborn, K.S and Waton, A.B. (2010): Medical surgical nursing. Person Company, New York; pp. 32-44.

The structure of the kidney is composed of number of nephrons approximately one million nephrons on each kidney. The nephron is described in two parts: the proximal convoluted tubule, the loop of henle. On the other hand, renal blood vessels are divided into afferent and efferent arterioles. The afferent arterioles which give rise to the glomerular capillaries arise from branches of the renal artery rather than the capillaries unit which emerge from the glomeruli to form efferent arterioles, as shown in figure (3) (***Osborn and Waton, 2010***).

Figure (3): Components of the nephron



Mayo-Clinic (2009): Hemodialysis How to Work? Available at: http://www.mayoclinic.com/healthy/Hemodialysis/DA_00084,2009

Function of the Normal Kidney:

The kidneys play a major role in regulating the water and electrolyte content and the acid-base balance of the body; they conserve appropriate amounts of essential substances vital to normal cellular function (e.g. glucose) and excrete the waste products of metabolism, toxic substances and drugs in the urine. In addition, the kidney is the major organ responsible for the production of the most active vitamin D metabolite, its major effect is to stimulate calcium absorption from the gut. The process involved in these functions performed by the kidneys are filtration, selective re-absorption, transport of substances from the interstitial fluid, to the tubule and endocrine secretion (*Kumar and Clark, 2010*).

End-stage renal disease (ESRD):

ESRD is the complete or almost complete failure of the kidneys to work. ESRD is when the kidneys are no longer able to work at a level needed for day-to-day life. The most common causes of ESRD are diabetes and high blood pressure. ESRD almost always comes after chronic kidney disease. The kidneys may slowly stop working over 10 - 20 years before end-stage disease results (*Lewis and Hetkemper, 2007; Lous et al., 2013*).

ESRD represents a significant health problem worldwide, resulting in the death of thousands and financial crisis for clients and their families (*Mohamed, 2013*).

Causes of ESRD:

The incidence of different etiologic agents responsible for ESRD often shows geographical variations being different in different countries. Causes of ESRD are numerous. They include chronic glomerulonephritis, acute renal failure, polycystic kidney disease, repeated pyelonephritis and nephrotoxins systemic diseases such as diabetes mellitus, hypertension, lupus erythematosus, sickle-cell disease and amyloid disease may also lead to renal failure (*Blacke and Matassarini, 2005*).

The highest risk are cases with diabetes and hypertension, representing about 67% of diagnosed cases. Unfortunately, new anti-hypertensive medications,

hypoglycemic agents and insulin combination haven't significantly reduced renal complications and the progressive to ESRD in clients with these chronic diseases (*Hussien, 2011*).

Symptoms of ESRD may include:

Abnormally dark or light skin, nail changes, bone pain, drowsiness and confusion Problems concentrating or thinking, numbness in the hands, feet, or other areas muscle twitching or cramps, breath odor, easy bruising, nosebleeds, or blood in the stool, excessive thirst, frequent hiccups, low level of sexual interest and impotence, menstrual periods stop (amenorrhea), sleep problems, such as insomnia, restless leg syndrome, or obstructive sleep-apnea, swelling of the feet and hands (oedema),vomiting, especially in the morning (*Black and Matassarini, 2010*).

Most clients with ESRD, in the United States, dialysis clients live about one-third as long as non-dialysis clients of the same age and gender. The unadjusted five-year probability of survival for all incident ESRD clients on dialysis is only 39%; and for the 48% of incident ESRD clients who are 65 years of age or older, it is only 18%. Forty-five percent of new ESRD clients have diabetes. Life expectancy is also shortened by co-morbid conditions, including hypertension, congestive heart failure, ischemic heart disease, and peripheral vascular disease (*Welechi, 2012*).

According to the ***United States Renal Data System [USRDS] (2012)*** report, over 65,000 ESRD cases die each year. The unadjusted annual death rate for ESRD clients in recent years has ranged between 20 and 22%. For some 20% of these clients, death comes after a decision to discontinue dialysis. An increasing number of clients who initiate renal replacement therapy are elderly. Based on data from the USRDS for 1993 to 1998, the highest incident treatment rates were for clients 65 years and older, with the very highest rates for clients 75-79 and 80-84 years old. Older clients have the most co-morbid conditions and are at the greatest risk for developing illnesses during their subsequent course on dialysis. Older clients are also the most likely to stop dialysis (***Long et al., 2012***).

It is clear from the foregoing information that the care of ESRD clients requires expertise not only in the medical and technical aspects of maintaining patients clients on dialysis, but also in palliative care - encompassing pain and symptom management, advance care planning, and attention to ethical, psychosocial, and spiritual issues related to starting, continuing, withholding, and stopping dialysis (***USRDS, 2012***).

Part II: Haemodialysis

Haemodialysis (HD) have been around since the mid 1940's. It began to be regularly used in 1960 and is now a standard treatment all around the world. Thousands of clients have been helped by these treatments. It is a life saving procedure (*NKF, 2013*).

Haemodialysis is a method that is used to achieve the extracorporeal removal of waste products such as creatinine and urea and free water from the blood when the kidneys are in a state of renal failure. Haemodialysis is one of three renal replacement therapies (the other two being renal transplant and peritoneal dialysis). An alternative method for extracorporeal separation of blood components such as plasma or cells is aphaeresis (*NKF, 2013*).

So to meet the client's needs and ensure that they receive quality care under nurse's hands. HD clients are uniquely vulnerable to the development of healthcare-associated infections because of multiple factors including exposure to invasive devices, immune-suppression, the lack of physical barriers between clients in the outpatient haemodialysis environment, and frequent contact with healthcare workers during procedures and care. Efforts and actions designed to reduce the risk of infection are

recommended for all settings where HD services are provided (*Adam and Osborne, 2005; Kumar and Clark, 2010*).

Haemodialysis can be an outpatient or inpatient therapy. Routine HD is conducted in a dialysis outpatient facility, either a purpose built room in a hospital or a dedicated, stand alone clinic. Less frequently HD is done at home. Dialysis treatments in a clinic are initiated and managed by specialized staff made up of nurses and technicians; dialysis treatments at home can be self initiated and managed or done jointly with the assistance of a trained helper who is usually a family member (*NIDDK, 2011 and NKF, 2013*).

The principle of HD is the same as other methods of dialysis; it involves diffusion of solutes across a semi-permeable membrane. Haemodialysis utilizes counter current flow, where the dialysate is flowing in the opposite direction to blood flow in the extracorporeal circuit. Counter-current flow maintains the concentration gradient across the membrane at a maximum and increases the efficiency of the dialysis, as shown in figure (4) (*Kumar and Clark, 2010*).

Figure (4): A semi-permeable membrane



Mayo-Clinic (2009): Hemodialysis How to Work? Available at: http://www.mayoclinic.com/healthy/Hemodialysis/DA_00084,2009

Fluid removal (ultra-filtration) is achieved by altering the hydrostatic pressure of the dialysate compartment, causing free water and some dissolved solutes to move across the membrane along a created pressure gradient. Urea and other waste products, potassium, and phosphate diffuse into the dialysis solution. However, concentrations of sodium and chloride are similar to those of normal plasma to prevent loss. Sodium bicarbonate is added in a higher concentration than plasma to correct blood acidity. A small amount of glucose is also commonly used (*Kumar and Clark, 2010 and NKF, 2013*).