Renal nurses Knowledge and performance Regarding Renal transplantation Patient's Care, at east Nile Model Hospital, Khartoum State, Sudan (2012)

By

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Renal Nurses' Knowledge and Performance Regarding Renal Transplantation Patients' Care, at East Nile Model Hospital, Khartoum State, Sudan (2012)
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Abstract

Renal transplantation is the organ transplant of a kidney into a patient with end-stage renal diseases. It is classified as deceased-donor or living-donor transplantation, depending on the source of the donor organ. This descriptive hospital-based study was conducted at East Nile Model Hospital, Khartoum State, Sudan, during the period of (December 2012 to February 2013), aimed at assessing Nurses' Knowledge and Performance regarding Renal Transplantation Patients' Care. The sample size consisted of (50) nurses. Data were collected by using a questionnaire designed for the study, and observation check list was used to observe and monitor nurses' performance regarding care of patients with renal transplantation. Data analysis was performed by statistical package for social sciences (SPSS). Results revealed that (70.0%) of the study sample gave correct answers regarding definition of renal transplantation, the nurses responded with correct answer regarding source of kidney donor, contraindication for kidney transplantation, and nursing role before kidney transplantation surgery (76.0%, 78.0% and 26.0%) respectively. Only (40.0%, 36.0% and 36.0%) of the nurses responded with correct answers regarding signs and symptoms of transplantation rejection, the procedure of renal transplantation and medication needed (immunosuppressive regimens) respectively. (42.0%, 44.0%, and 46.0%) of the study sample correctly evaluated their performance regarding evaluation of general condition, Routine evaluation, and nursing role during surgery of kidney transplantation patient respectively. Only (26.0% and 30.0%) of the study sample performed correctly the Nursing practices and maintaining fluid balance after kidney transplantation surgery respectively. Highly significant positive relationship was observed between educational level and renal assessment for live kidney donor. The study conducted that the knowledge and practices of nurses were inadequate. The study recommended that continuous training program about renal transplant Patients' Care must be done as well as continues monitoring and supervision for nurses' performance as a method of quality assurance.
معرفة واداء ممرضي وممرضات الكلى تجاه العناية التمريضية لمرضى زراعة الكلى بمستشفى شرق النيل النموذجي، ولاية الخرطوم، السودان، (2012).

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كليه العلوم الطبية والتطبيقية
قسم التمريض
جامعة الجريرة

ملخص الدراسة

زراعة الكلى هي عملية نقل كلى من المتبرع إلى مريض القصور الكلوي المزمن بتجانس المتبرع مع المريض إتماماً إلى نوع المتبرع المأخوذ منه الكلية إذا كان المتبرع مريض أو سليم وهي زراعة تجري بين كانتين من الجنس نفسه وعمليات الطعم المغاير. ويمكن إجراء عمليات الطعم المغاير إما من مصدر حي أو من أشخاص متوفين دماغيا. أجريت هذه الدراسة الوصىية بمستشىى شر النيل النوىوذجي ولاية الخرطوم، السودان، وهىدفت هىذه الدراسىة ةلىى 50.0% (50.0) ممرض وممرضة خىلل الىتىرة مىن دبسىمبر 2012 الىى فبرايىر 2013. تىم جمىع البيانىات بخسىتخدام إاسىتمارة إسىتبيان تىم تصميمها للدراسة كما تم إستخدام قاممة الملحظة لمراقبة أداء الممرضين والممرضات أثناء العناية التمريضية بمرضى زراعة الكلى. تم تحليل البيانات بواسطة برامج الحزمة الإحصائية للعلوم الاجتماعية (SPSS). أظهرت النتائج أن (70.0%) من أفراد العينة كانت إجابتهم عن تعريف زراعة الكلى (70.0%) من أفراد العينة كانت إجاباتهم صحيحة عن مصدر المانحين للكلى، موانع عملية زراعة الكلى، ودور التمريض قبل جراحة زرع الكلى على التوالي فقط (70.0%) من أفراد العينة كانت إجاباتهم صحيحة عن علامات وأعراض الرفض بعد عملية جراحة زرع الكلى على التوالي. فقط (70.0%) من أفراد العينة نفذوا بشكل صحيح دور التمريض، والمحافظة على توزن سوائل جسم المريض بعد جراحة زرع الكلى على التوالي. توجد علاقة إيجابية ذات دلالة إحصائية بين المستوى التعليمي وقييم حالة الكلى للمانحين الأحياء. وخلصت الدراسة إلى أن معرفة وممارسات الممرضين
والممرضات كانت غير كافية. أوصت الدراسة بأهمية عمل برامج تدريبية دورية للممرضين والممرضات عن العناية بمرضى زرع الكلى والتاكيد على أهمية الإشراف والمراقبة من أجل ضبط الجودة.
Introduction

1.1 Background

Kidney transplantation has become the treatment of choice for patients with end stage renal disease (ESRD) during the past 40 years, more than 400,000 kidney transplant have been performed worldwide each year and approximately 9000 are performed in the US there are many more patients on the waiting list of kidney transplant then there are origin donors (Donavitch, 2005).

Kidney transplantation or renal transplantation is the organ transplant of a kidney into patient with ESRD. Involves transplanting a kidney from a living donor or deceases donor to a recipient who has ESRD. Recent years have witnessed an explosive growth in the number of patients experiencing end stage renal disease (ESRD), as well as number of centers providing therapeutic modalities such as hemodialysis, peritoneal dialysis and renal transplantation.

Improvement in surgical technique and meticulous attention to both the donor and the recipient operations has led to a significant decrease in surgical complications rate. Surgical complications continue to occur in 10% of transplant recipients, but, fortunately are rarely the cause for allograft loss today. The incidence of graft loss due to acute rejection is now less than 1%, and the incidence of graft loss due to chronic rejection is decreasing.

Therefore, somewhat ironically, surgical complications remain an important cause of graft loss after kidney transplants. (MertE, 2008).

Nurses are in a key position to disseminate knowledge and provide skillful nursing care, so it is mandatory to investigate nurses' knowledge and
practices regarding renal transplantation patients' care.

1-2 Problem statements:

Worldwide: End-stage kidney disease (ESKD) can be defined by the requirement for life-saving dialysis or kidney transplantation. Worldwide, the number receiving renal replacement therapy (RRT) is estimated at more than 1.4 million, with incidence growing by approximately (8%) annually. Driving this increase are population ageing, type 2 diabetes mellitus and hypertension, key risk-factors for chronic kidney disease. However, due to the expensive nature of RRT, treatment for ESKD is largely the domain of high-income countries (HIC). We consider the extent of the ESKD burden in low and middle-income countries (LMIC) and impediments to the delivery of RRT, and propose a range of strategies for improving access to treatment for the world’s poorest ESKD sufferers. (Schieppati A, et al, 2005)

In developed countries: Kidney transplantation has become the treatment of choice for most patients with ESRD. During the past 40 years, worldwide more than 400,000 kidney transplantation have been performed in the US each year and approximately 9000 are performed in the US and there are many more patients on the waiting list of Kidney transplantation then there are origin donors, when Michael Woodruff performed one between identical twins in Edinburgh until the routine use of medications to prevent and treat acute rejection, (Donavitch S, 2005).

In developing countries:

Patients with RF, living in developing countries, face many obstacles e.g. lack of access to transplantation centers due to limited or no facilities, quality and safety issues, restricted choice of organs from living donors, and exploitation associated with transplant tourism. Eco
nomic deprivation in developing countries and the relatively modest expenditure on health care by government contributes to poor transplantation activity, with a rate of 0-10 per million population (pmp) in contrast to the rate in the developed world at around 30-50 pmp. In addition, lack of public awareness, education and motivation for organ donation as well as lack of manpower contribute to an insufficient transplant program. (John L, et al, 2012).

The availability of dialysis and transplantation is variable in Africa, with treatment rates in North Africa between 30 and 186.5 pmp. Services are predominantly urban and therefore generally inaccessible to poorer and less educated rural patients. In poorer nations, for example in sub-Saharan Africa, economic and manpower factors influence a conservative approach to therapy. The majority of those with RF die because of lack of funds as few can afford regular maintenance dialysis or renal transplantation (often not available). (Aviles G, et al, 2006)

**In Sudan:** Health care in Sudan is directly supervised by the government. There are few private hospitals in the capital and some of the big cities. The health workers within the country are decreasing rapidly due to immigration to other countries for economic reasons. About 75% of kidney transplant recipient have at least one episode of infection in the first year after transplantation because of immunosuppressant therapy or poor infection control. Immunosuppressant of the past made the transplant recipient more vulnerable to opportunistic infections comidiasis, cytomegalovirus, pneumocystis pneumonia and infection with other relatively non pathogenic viruses, fungi, and protozoa, which can be a major hazard (El-Amin, et al, 2009).
1.3. Justification:
Chronic renal failure (CRF) is a common disease the estimate might be due to the endemicity of many tropical diseases which are known to affect the kidneys in Sudan. In addition there is a high incidence of renal stones (obstructive renal failure), and a high level of consanguinity making familiar renal diseases quite common. The rejection of transplanted kidneys remains a matter of area concerns to the patient, the family, and the health care team, the fears of kidney rejection and the complications of immunosuppressive therapy (Cushing, syndrome, diabetic, cataracts, acne, nephro toxicity) place tremendous psychological stresses on the patient. Also nursing function care is an important for this patient.
(Correa R, 2005)

1.4. Objectives: -

1.4.1. General objectives:
Assess nurse's knowledge and performance regarding care of patient with Renal Transplantation.

1.4.2. Specific objectives:
   - Assess nurse's knowledge regarding various aspects of kidney transplantation.
   - Identify nurse's performance when care of kidney transplant patients.
2. Literature Review

2.1. Definition:
Renal transplantation is the organ transplant of a kidney into a patient with end-stage renal diseases. It classified as deceased-donor or living-donor transplantation depending on the source of the donor organ (Cecka J, 2008).

2.2-Indications:
The indication for kidney transplantation is end-stage renal disease (ESRD), regardless of the primary cause. This is defined as a glomerular filtration rate < 15ml/min/1.73 sq.m. Common diseases leading to ESRD include infections, diabetes mellitus, and focal segmental glomerulosclerosis, malignant hypertension, and polycystic kidney disease. Genetic causes include a number of inborn errors of metabolism, and autoimmune conditions such as lupus. Diabetes is the most common cause of kidney transplantation, accounting for approximately 25% of those in the US. The majority of renal transplant recipients are on dialysis (peritoneal dialysis or hemofiltration) at the time of transplantation. The majority of renal transplant recipients are on some form of peritoneal dialysis or the similar process of hemofiltration at the time of transplantation. However, individuals with chronic renal failure who have a living donor available may undergo pre-emptive transplantation before dialysis is needed. (David K, et al. 2006).

2.3. Contraindications and requirement:
Contraindications include both cardiac and pulmonary insufficiency, as well as hepatic disease. Concurrent tobacco use and morbid obesity are also among the indicators putting a patient at higher risk for surgical complications. Body Mass Index (BMI) has a very strong association with outcomes after renal transplantation independent of most of the known
risk factors for patient and graft survival. The extremes of very high and very low BMI before renal transplantation are important risk factors for patient and graft survival. It is important to note that elevated BMI was significantly associated with worse graft survival independent of patient survival. Whether prospective weight adjustment before renal transplantation can favorably affect post transplant risk (David P, 2006)

**Transplant requirements:** vary from program and country to country. Many programs place limits on age (e.g. the person must be under a certain age to enter the waiting list) and require that one must be in good health. Significant cardiovascular disease, incurable terminal infectious diseases and cancer often are transplant exclusion criteria. In addition, candidates are typically screened to determine if they will be compliant with their medications, which is essential for survival of the transplant. People with mental illness and/or significant on-going substance abuse issues may be excluded. HIV was at one point considered to be a complete contraindication to transplantation. There was fear that immunosuppressant someone with depleted immune system would result in the progressing of the disease. However, some research seem to suggest that immunosuppressive drugs and anti retrovirirals may work synergistically to help both HIV viral loads/CD4 cell counts and prevent active rejection. (Bedeir A, 2013).

**2.4-Sources of kidneys transplant:**

**2.4.1-Living donors:** (LDKT)

More than one in three donations in the UK is now from live donor and
almost one in three in Israel. The percentage of transplants from living donors is increasing. Potential donors are carefully evaluated on medical and psychological grounds. This ensures that the donor is fit for surgery and has no disease which brings undue risk or likelihood of a poor outcome for either the donor or recipient. In 2006, 47% of donated kidneys were from living donors. This varies by country: for example, only 3% of kidneys transplanted during 2006 in Spain came from living donors. (John L, 2012).

Live donor kidney transplant (LDKT) has several advantages over deceased donor transplantation, including a shorter waiting time with the possibility of transplantation before dialysis (very useful in developing economies where dialysis facilities are rare), a lower rate of delayed graft function, and improved long-term graft survival. In a comprehensive global assessment of LDKT involving countries, Horvath et al, showed that Saudi Arabia had the highest reported living kidney donor transplant rate at 32 per million population (pmp), followed by Jordan (29 pmp), Iceland (26 pmp), Iran (23 pmp), and the US (21 pmp). Rates of LDKT have steadily risen in most regions of the world. New strategies to expand the living donor pool include paired kidney exchange, altruistic donation, desensitization and transplantation across ABO blood group barrier-measures that may not be practicable in developing countries at present. (Ferrari P, et al, 2009).

2.4.1. a. Assessment of potential living donors:
The Amsterdam Forum has established guidelines for ensuring safe selection of donors. All donors should have certain standard tests performed and where indicated, tests for trypanosomiasis, schistosomiasis,
Brucellosis, and typhoid should be included. The purpose of assessment of living kidney donation is to discover medical conditions that could increase donor risk of complications and to determine whether the donor can provide a suitable graft for the recipient. Living kidney donation is justified only if it results in minimal or no harm to the donor (including being left with the better kidney) and a significant benefit to the recipient. Due to the relatively low yield and significant workload involved, staged assessment with the possibility of exclusion of donors at an early stage is particularly appropriate. Exclusions during the first stage assessment, when non-invasive, less expensive tests are performed, avoid unnecessary investigations in the second stage. As CT angiography (defines the vascular anatomy, thereby contributing to the decision on which kidney to remove) exposes potential donors to irradiation and is the most expensive of the tests, it should be conducted last. Donor related morbidity constitutes the reason for exclusion on medical grounds in approximately 23% of potential donors; this may be possibly higher in developing countries due to hidden morbidity in residents. (Delmonico F, 2005)

2.4.1. c. Assess the condition and kidney function of a live kidney donor:
ABO blood typing, HLA-A,-B and-DR tissue typing, Cross match, Initial medical evaluation. History and physical evaluation Psychosocial evaluation Cardiovascular evaluation, chest radiograph, optional pulmonary function test, Electrocardiogram, (including echo cardiograph for donor older than 50 years with history of heavy smoking or mild hypertension, Laboratory investigation, Complete blood count, platelet count Prothrombin time (PT), partial thromboplastin time, blood urea and nitrogen, creatinin, sodium,
potassium, bicarbonate, fasting blood glucose, calcium phosphorus, albumin, total protein, uric acid, liver enzymes, bilirubin, fasting cholesterol, triglycerides (Kerry G, 2012). Urine culture Evaluation of glomerular filtration rate, 24-hour urine for creatinin clearance or direct evaluation in boxes or insulin clearance (renography), 24-hours for total protein, urine for micro albumin urea, ultra sound examination of the kidneys Intra venous pylon gram. Before being selected a living donor, careful information should be provided to the potential donor who should undergo a careful medical and physical evaluation. after complete evaluation of the donor, formal written consent often legal must be obtained from the donor, special care must be taken to ensure that a potential living related donor does not fulfill any of exclusion criteria. (El-Agroudy, et al, 2007)

2.4.1. d. Risks of living kidney donation

Living kidney donors are at risk of developing surgical complications, death, and deterioration of kidney function that may result in need for dialysis and renal transplantation. Major complications of LKD (higher in laparoscopic than in open) are reported in about 2.6-4.2%, but overall complication rate ranges from 8 to 47%, with the annual center volume ≤50 being significantly associated with a risk of major complications. Postoperative mortality following LKD is calculated to be 1:3000 (0.03%). More recent series have reported a lower mortality rate of 0.02%, whereas others reported no deaths. Complications peculiar to laparoscopic LKD include bowel injury during trochar placement and revascularization of the ureter with a conversion to open rate of 5.7-8.3%. The risk of developing progressive renal impairment, hypertension, or significant proteinuria after
kidney donation appears to be low. However, Mjoen, et al showed a significant rise in blood pressure five years after donation. (Mjoen G, et al, 2011) A recent long-term follow-up study of 3,698 donors in the US showed 11 incidents of ERF at a mean of 22.5 years after donation (180 pmp per year), which is lower than the general US population (268 pmp per year). (Fehrman E, et al, 2007) With over 20 year’s follow-up of 400 LKD, a 29% survival advantage over a comparative population cohort was found. This is possibly because of the stringent selection criteria for kidney donors and the regular follow-up. (Hakim and Nadey, 2010)

2.4.2-Organ trade
In the developing world some people sell their organs. Such people are often in grave poverty or are exploited by salespersons. People traveling to make use of such kidneys, sometimes known as “transplant tourism,” are not looked upon favorably by organizations such as the U. S. National Kidney Foundation. These patients may have increased complications owing to poor infection control and lower medical and surgical standard. One surgeon has said that organ trade could be legalized in the UK to prevent such tourism. According to the World Health Organization (WHO), illegal organ trade occurs when organs are removed from the body for the purpose of commercial transactions. The WHO justifies these actions by stating that, “Payment for organs is likely to take unfair advantage of the poorest and most vulnerable groups, undermines altruistic donation and leads to profiteering and human trafficking.” Despite these ordinances, it was estimated that 5% of all organ recipients engaged in commercial organ transplant in 2005. Research indicates that illegal organ trade is on the rise, with a recent report by Global Financial Integrity estimating that the illegal
organ trade generates profits between $600 mill and $1.2 billion per year with a span over many countries, including but not limited to Poverty (Tazeen H, 2008)

2.4.3. Deceases donors:

Deceases donors can divide in two groups:

2.4.3. a. Brain-dead (BD) donors.

2.4.3. b. Donation after Cardiac Death (DCD) donors. (Cadaveric renal transplantation)

Although brain-dead (or “beating heart”) donors are considered dead, the donor’s heart continues to pump and maintain the circulation. This makes it possible for surgeons to start operating while the organs are still being perfused. During the operation, the aorta will be cannulated, after which the donor’s blood will be replaced by an ice-cold storage solution, such as UW (Viaspan), HK, or Perfadex. Depending on which organs are transplanted, more than one solution may be used simultaneously. Due to the temperature of the solution, and since large amounts of cold NaCl-solution are poured over the organs for a rapid cooling, the heart will stop pumping. (Ibrahim H, et al, 2009).

2.4.3. a. Brain-dead (BD) donors

Due to lack of an enabling law and an unclear definition of brain death, initial efforts at deceased donor transplantation were from cardiac death donors. The donation procedure was often performed at the bedside with crude facilities, the dedicated sort of facilities present at many specialist hospitals in developed countries today. At the time (1960s), there was less effective method of kidney preservation and use of immunosuppressive drugs. As a result, outcomes of such transplantation were poor, and it was
not surprising that with the establishment of brain stem legislation, donation after cardiac death (DCD) programs were abandoned. The situation has improved since those early days, and due to a continuing lack of organs, many transplant centers in the developed world have returned to DCD. Where dedicated, sufficiently motivated, and trained teams are available (Talbot D, 2010)

2.4.3. b. “Donation after Cardiac Death”

Donors are patients who do not meet the brain-dead criteria but, due to the small chance of recovery, have elected via a living will or through family to withdraw support. In this procedure, treatment is discontinued (mechanical ventilation is shut off). After a time of death has been pronounced, the patient is rushed to the operating room where the organs are recovered. Storage solution is flushed through the organs. Since the blood is no longer being circulated, coagulation must be prevented with large amounts of anticoagulation agents such as heparin. Several ethical and procedural guidelines must be followed, most importantly; the organs recovery team should not participate in the patient’s care in any manner until after death has been declared. (Talbot D, et al, 2010)

2.5. Kidney preservation and cold ischemia times:

Better outcomes of living donor compared to well-matched deceased donor renal transplants demonstrate the impact of brain death (pre-mortem shock and cytokine release), organ preservation, and ischemia-reperfusion injury. The procedure of flushing and keeping the kidney cool during retrieval and storage either on ice or in a pulsatile perfusion machine, while awaiting implantation, reduces cellular metabolism to the barest minimum and stabilizes cell membrane to keep the internal milieu in the absence of the
Na+/K+ pump. Machine perfusion has been shown to be beneficial for extended criteria donor kidneys, (Moers C, et al, 2009) In a report of kidney preservation involving transplants in 195 centers spread over three continents, showed that graft survival in deceased donor transplants remained stable for up to 18 hours of cold ischemia and worsened further with time, particularly after 36 hours. Other studies have shown the detrimental effects of short increments of cold ischemia time. (Moeller S, 2004)

2.6. Compatibility

If plasma pheresis or IVIG is not performed, the donor and recipient have to be ABO blood group compatible. Also, they should ideally share as many and "minor antigens" as possible. This decreases the risk of transplant HLA rejection and the need for another transplant. The risk of rejection may be further reduced if the recipient is not already sensitized to potential donor HLA antigens, and if immunosuppressant levels are kept in an appropriate range. The level of sensitization to donor HLA antigens is determined by performing a panelreactive antibody test on the potential recipient. In the United States, up to 17% of all deceased donor kidney transplants have no HLA mismatch. However, HLA matching is a relatively minor predictor of transplant outcomes. In fact, living non-related donors are now almost as common as living (genetically)-related donors. In the 1980s, experimental protocols were developed for ABO-incompatible transplants using increased immunosuppressant and plasma pheresis. Through the 1990s these techniques were improved and an important study of long-term outcomes in Japan was published. Now, a number of programs around the world are routinely performing ABO-incompatible transplants. (David P, 2006).

2.7. Procedure of kidney transplantation
In most cases the barely functioning existing kidneys are not removed, as this has been shown to increase the rates of surgical morbidities. Therefore, the kidney is usually placed in a location different from the original kidney, often in the iliac fossa, so it is often necessary to use a different blood supply:

The *renal artery* of the kidney, previously branching from the abdominal aorta in the donor, is often connected to the external iliac artery in the recipient.

The *renal vein* of the new kidney, previously draining to the inferior vena cava in the donor, is often connected to the external iliac vein in the recipient.

There is disagreement in surgical textbooks regarding which side of the recipient’s pelvis to use in receiving the transplant. Campbell's Urology (2002), recommends placing the donor kidney in the recipient’s contralateral side (i.e. a left sided kidney would be transplanted in the recipient's right side) to ensure the renal pelvis and ureter are anterior in the event that future surgeries are required. In an instance where there is doubt over whether there is enough space in the recipient’s pelvis for the donor’s kidney the textbook recommends using the right side because the right side has a wider choice of arteries and veins for reconstruction. Smith urologist (2004) states that either side of the recipient’s pelvis is acceptable, however the right vessels are “more horizontal” with respect to each other therefore
easier to use in the anastomoses (Luciolli E, et al, 2010). The transplant surgery takes about three hours. The donor kidney will be placed in the lower abdomen and its blood vessels connected to arteries and veins in the recipient's body. When this is complete, blood will be allowed to flow through the kidney again. The final step is connecting the ureter from the donor kidney to the bladder. In most cases, the kidney will soon start producing urine. Depending on its quality, the new kidney usually begins functioning immediately. Living donor kidneys normally require 3–5 days to reach normal functioning levels, while cadaveric donations stretch that interval to 7–15 days. Hospital stay is typically for 4–7 days. If complications arise, additional medications (diuretics) may be administered to help the kidney produce urine. (Laftavi M et al, 2005).

2.8. Management
2.8.1. Preoperative management: -
Preoperative management goals include bringing the patient's metabolic state to level as close to normal as possible, making sure that the patient is free of infection, and preparing the patient for surgery and the postoperative course. (Joseph F, et al, 2003).

2.8.1.a. Initial and maintenance immunosuppressive treatment
The use of daily maintenance immunosuppressive it is mandatory in renal transplant in order to reduce the incidence of acute rejection during the
first 6 month after transplant and to improve graft survival in the short (1 year) medium – (5 years) and long term less than 10 years. Maintenance immunosuppressive could lead to over immunosuppressant characterized by an increased incidence of infections complications therefore the choice of the Initial maintenance is should be at balance between efficacy and tolerance of the drugs used in association and targeted to need of recipient (Jordan S, et al, 2004).

2.8.1.b. Medical management: -

A complete physical examination is performed to detect and treat any conditions that could cause complications after transplantation. Tissue typing, blood typing, and antibody screening are performed to determine compatibility of the tissues and cells of the donor and recipient other diagnostic tests must be completed to identify conditions requiring treatment before transplantation. The lower urinary tract is studied to assess bladder neck function and to detect ureteral reflux. (Bruce K, et al, 2003). The patient must be free of infection at the time of renal transplantation because after surgery medications to prevent transplant rejection will be prescribed. These medications suppress, the immune response, leaving the patient immunosuppressed and at risk of infection. Therefore, the patient is evaluated and treated for any infections, including gingival (gum) disease and dental caries. (Mert E, 2008).

A psychosocial evaluation is conducted to assess the patient’s ability to adjust to the transplant, coping styles, social history, social support available, and financial resources. A history of psychiatric illness is important to obtain because psychiatric conditions are often aggravated by the cortication. If a dialysis routine has been established, hemodialysis is often
performed the day before the scheduled transplantation procedure to optimize the patient's physical status. However, it is preferable to avoid initiation of dialysis before transplantation when a donor kidney is available (Hegde S, et al, 2005)

2.8.1.c. Nursing management: Pre operative nursing management

2.8.1. d. Nurse Interventions

A Kidney Transplant is the most commonly performed type of solid organ transplant. Nurse Interventions in this process can be classified as pre- and post-renal transplantation interventions. In the pre transplantation phase, the nephrology nurse plays a vital role in assisting the patient to tackle the challenges associated with Renal Transplantation. Pre-transplant interventions include physical, psychological and educational support to the patient and family members since kidney transplantation is an elective procedure, the entire procedure requires extensive pre-transplant evaluation and the patient is normally maintained on a schedule of pre-transplant dialysis. (Murphy F, 2007). Transplant is delayed with the onset of chest pain, infection, pneumonia, or gastrointestinal bleeding. If the serum potassium exceeds 5.5 mEq/l, the patient is put on dialysis preceding the transplant procedure. Post-transplant nursing care for the patient begins in the post-anesthesia care unit (Cunningham et.al, 2005). Since the transplant is placed in a heterotrophic retroperitoneal location in the lower pelvis, nurse's awareness of the transplant positioning in the operating room is vital for an effective postoperative care (Claudia, 2004). The patient's hemodynamic status and fluid volume need to be monitored to avoid post-transplant complications while maintaining central venous pressure at 10 mmHg and systolic blood pressure above 120 mmHg
Intravenous administration of steroids such as methyl prednisolone and diuretics such as mannitol or furosemide enhances diuresis. Urine output is replaced on an hourly milliliter-for-milliliter basis and recorded hourly. Reduced capillary spasms and normal renal blood flow is achieved by calcium channel blocker administration into the renal artery. It is important to keep the patient euvolemic or mildly hypervolemic by adequate intravenous fluid replacement which is usually 0.45% normal saline closely resembling the sodium content of a newly transplanted diuresing Kidney (Graham J, 2006).

Nurse assessment of hourly urine output includes assessment of anuria where there is no urine output and Oliguria where the output is less than 50 ml per hour. The nursing aspects of preoperative care for the patient undergoing renal transplant are similar to those for patients undergoing other types of elective abdominal surgery. Preoperative teaching can be conducted in a variety of settings, including the outpatient preadmission area, the hospital, or the transplantation clinic during the preliminary work up phase. Patient teaching addresses postoperative pulmonary hygiene, pain management options, and dietary restrictions, IV, and arterial lines, and other tubes (indwelling catheter and possibly a nasogastric tube), and early ambulation. The patient who receives the kidney from a living related donor may be concerned about the donor and how the donor will tolerate the surgical procedure. Most patients have been on dialysis for months or years before transplantation, many have waited months to years for a kidney transplant and are anxious about the surgery, possible rejection, and the need to return to dialysis, helping the patient to deal with these concerns is part of the nurse’s role in preoperative management, as is teaching the patient
about what to expect after surgery. Assess knowledge and feelings about the procedure, answering questions and clarifying information as needed. Listen and address concerns about surgery, the source of the donor organ, and possible complications. Addressing concerns and reducing preoperative anxiety improve postoperative recovery. Continue dialysis as ordered. Continued renal replacement therapy is necessary to manage fluid and electrolyte balance and prevent uremia prior to surgery. Administer immunosuppressive drugs as ordered before surgery. Immunosuppressant is initiated before transplantation to prevent immediate graft rejection (Graham J, 2006).

2.8.1. e. The Challenges facing the Nephrology Nurse

Problems like Premature Graft Loss, failing renal transplant and Obstructive uropathy pose serious challenges for the Nephrology Nurse in the post-transplantation phase (shonibor A, 2010). Renal Graft Rejection is a phenomenon where the transplanted Kidney is recognized as non-self by the immune cells of the patient. Rejection can be Hyper acute, Acute or Chronic (Gabriel M, 2008). Hyper acute rejection occurs within minutes to hours of transplantation leading to Graft Loss. Acute rejection occurs days to weeks after the renal transplant and chronic rejection occurs over months to years. The incidence of rejections within the first three months following transplantation has been reported as being seven to eighteen percent in different risk groups. Hence, surveillance renal allograft biopsies are included into standard care procedures and biopsies are performed at three months and one year after transplantation (Golconda et.al, 2003). Immunosuppressant in such cases can be classified as induction, maintenance, and rejection. Induction immunosuppressive medications are administered per tra
nsplant and maintenance immunosuppressant usually consists of a combination of steroids, a calcineurin inhibitor and a purine inhibitor (Halloran P, et al, 2003).

Since, malignancy is a significant risk in the transplant patient due to immunosuppressant, Non-Hodgkin’s Lymphoma, Cancers of the skin, liver, kidney, vulva, perineum and Post-Transplant Lymphoproliferative Disorder (PTLD) are frequent in transplant patients. (Gabriel M, 2008)

Urinary tract infections in the transplant patient are usually a symptomatic. Obstructive Uropathy has been identified as the cause of renal failure in 16.2% of pediatric patients who undergo Renal Transplantation (Hinds, 2004).

Nurse care for patients with Obstructive Uropathy involves an understanding of the various congenital anomalies that create Obstructive Uropathy and the urological interventions used to treat them. Hypertension is one of the most common complications of Renal Transplantation when the Kidney is UN functional. Increased sodium and fluid retention associated with vasoconstrictive medications and corticosteroids predispose the patient to Hypertension (Murphy F, 2007)). Transplant patients are also prone to Renal Stones, Necrosis of the failed Kidney and Interstitial Nephritis. A vascular Necrosis is a debilitating condition that is frequently observed in the transplant population and the patient experiences pain in major joints such as the hips, shoulders, and knees. Undetected A vascular Necrosis leads to Joint Necrosis Post-Renal Transplant Compliance is an important aspect of the care process (Merrill, 2004)

2.8.1. f. Nurse Models in Renal Care

Development of protocols to aid nurses in the care of patients following a Kidney Transplant has been found useful to detect nursing problems at an earl
y stage for immediate and appropriate action [Henderson and Prendergast, 1999]. A Negotiated Care Model for the nursing role in the chronic health care context of Renal Replacement Therapy has been evaluated recently where the renal setting is conceptualized as a specialized social context with a dominant professional discourse and a contrasting client discourse. The model is based on the fact that the renal nurses develop a relationship with the patient based on responsiveness to their subjective experience reflecting the renal client discourse while performing specific therapeutic activities in accord with the dominant discourse. In this model, care is defined as the quality that nurses actively seek to create in their relationships with clients, through negotiation, in order to help them to live a complete life after a Renal Replacement Therapy. The incorporation of Nursing Theories into the clinical care of patients with end stage kidney disease has been shown to enhance the overall care that is administered and three Nursing Theories of Orem, Neuman and Peplau have been shown to assist renal nurses to articulate their practice (Graham J, 2006).

2.8.2 Postoperative management: -

The goal of care is to maintain homeostasis until the transplanted kidney is functioning well. The patient whose kidney functions immediately has a more favorable prognosis than patient whose kidney does not. (Bedeir A, 2013)

2.8.2.a. Postoperative diet

Kidney transplant recipients are discouraged from consuming grapefruit, pomegranate and green tea products. These food products are known to interact with the transplant medications, specifically tacrolimus, cyclosporin and sirolimus; the blood levels of these drugs may be increased, potentially leading to an overdose. (John L, et al, 2012)
2.8.2.b. Medical management:

Immunosuppressant

Majority of the transplant recipients are maintained on a triple regimen of steroids, calcineurin inhibitor (tacrolimus or cyclosporine) and either azathioprine or mycophenolate mofetil (MMF). The use of MMF instead of azathioprine improved survival. (Meier, et al, 2003). Tacrolimus is superior to cyclosporine in improving graft survival and preventing acute rejection after kidney transplantation, but increases post-transplant diabetes mellitus. American Africa (AA) requires a 37% mean higher dose of tacrolimus than whites to achieve compatible blood concentrations. The excess risk of acute rejection in Blacks may reflect differences in immunoresponsiveness and/or pharmacokinetics of immunosuppressive agents. The profound deleterious effect of acute rejection appears to be largely responsible for the accelerated rate of late graft loss in (AA). (Neylan J, et al, 2008) Though cheap, steroids are associated with severe complications prompting several authors to advocate steroid-free maintenance immunosuppressant. Late steroid withdrawal is associated with an increase in acute rejection or long-term deterioration of renal function, even in the absence of overt acute rejection. However, rapid withdrawal (≤7 day's post-transplantation) is not complicated by increased acute rejection rate. Steroid withdrawal protocols require the use of new and more expensive agents and protocol biopsies these are difficult objectives to meet in developing countries. (Fehrman I, et al, 2007)

Due to a narrow therapeutic index for most immunosuppressive drugs, there is a fine balance between:

- Under dosing (associated with acute rejection) .1
- Overdosing (associated with infections and malignancy and organ- .2
A significant complication of immune suppressant is the development of *de novo* cancer after solid organ transplantation. There is a 2-3 times increase in cancer incidence and the risk is related to the type, degree, and duration of immunosuppressant, and viral co-factors and recipient age. A major obstacle to effective immunosuppressant in developing countries remains the cost of these drugs. (Punnett A, 2010). The survival of a transplanted kidney depends on the ability to block the body’s immunoresponse to the transplanted kidney, to overcome or minimize the body’s defense mechanism, Immunosuppressive agents are administered. The use of corticosteroid agents is limited because of long-term side effects (Laftavi M, et al, 2005). Cyclosporine is available in microemulsion from (Neoral) that delivers the medication reliably, thus producing a steady-state serum concentration. Tacrolimus (Prograf) is similar to cyclosporine and about 100 times more potent. Mycophenolatemofetil (CellCept), sirolimus (Eapamune), and antithymocyte globulin (Thymoglobulin), as well as tacrolimus, are used in various combinations to prevent transplant rejection. Treatment with combinations of these new agents has dramatically improved survival rates. Immunosuppressive therapy after kidney transplantation continues to evolve (Halloran, 2004). Doses of immunosuppressive agents are gradually reduced (tapered) over a period of several weeks, depending on the patient’s immunologic response to the transplant. However, the patient is required to take some form of Immunosuppressive therapy for entire time that he or she has the transplanted kidney the risks associated with these medications
include nephrotoxicity, hypertension, hyperlipidemia, hirsutism, tremor, and several types of cancers sirolimus may have antineoplastic effects compared with cyclosporine (Stallone S, et al., 2005). Mycophenolate may increase the risk for cytomegalovirus disease. (Halloran P, 2004).

2.8.2.c Nursing management:

2.8.2. d. Assessing the patient for transplant rejection

After kidney transplantation, the nurse assesses the patient for signs and symptoms of transplant rejection: oliguria, edema, fever, increasing blood pressure, weight gain, and swelling or tenderness over the transplanted kidney or graft. Patients receiving cyclosporine may not exhibit the usual signs and symptoms of acute rejection. In these patients, the only sign may be an asymptomatic rise in the serum creatinine level (more than 20% rise is considered acute rejection) (Ferrari P, 2007). Preventing infection by the results of blood chemistry tests and platelet counts are monitored closely, because Immunosuppressant depresses the formation of leukocytes and platelets. The patients closely monitored for infection because of susceptibility to impaired healing and infection related to Immunosuppressive therapy and complications of renal failure.

Clinical manifestations of infection include shaking chills, fever, and rapid heartbeat (tachycardia), and respirations (tachypnea), as well as there an increase or a decrease in WBCS (leukocytosis or leukopenia). (Meier-K et al, 2005). Infection may be introduced through the urinary tract, the reparationary tract, the surgical site, or other sources. Urine cultures are performed frequently because of the high incidence of bacteriuria during early and late stage of transplantation. Any type of wound drainage should b
e viewed as potential source of infection because drainage is an excellent
culture medium for bacteria. Catheter and drain tips may be cultured when
removed by cutting off the tip of the catheter or drain (using aseptic techniq
ue) and placing the tip in sterile container to be taken to the laboratory for
culture. (Jordan S, 2004). Renal graft rejection and failure may occur within 24 hour
s (hyperacute), within 3 to 14 days (acute), or after many years (chronic).
It is not uncommon for rejection to occur during the first year after
transplantation. Ultrasonography may be used to detect enlargement of the
kidney; percutaneous renal biopsy (most reliable) and X-ray techniques are
used to evaluate transplanted kidney, the patient needs to return to dialysis.
The rejected kidney may or may not be removed, depending on when the
kidney is left in place. About 75% of kidney transplant recipients have at
least one episode of infection in the first year after transplantation because
of immunosuppressant therapy. Immunosuppressant of the past made the
transplant recipient more vulnerable to opportunistic infections
(candidacies, cytomegalovirus, and pneumonia) and infection with other
relative nonpathogenic viruses, fungi, and protozoa, which can be a major
hazard. Cyclosporine therapy has reduced the incidence of opportunistic
infections. Because it selectively exerts its effect, sparing T cells that
protect the patient from life threatening infections. In addition, combination
immunosuppressant therapy and improved clinical care have produced
1-year patient’s survival rates approaching 100% and graft survival
exceeding 90%. Infections, however, remain a major cause of death at all
points in time for kidney transplant recipients (Gabriel M, 2008)

2.8.2. e. General post operative nursing role:
Maintain urinary catheter patency and a closed system, catheter patency is vital to keep the bladder decompressed and prevent pressure on suture lines. A closed drainage system minimizes the risk for urinary tract infection. Measure urine output every 30 to 60 minutes initially. Careful assessment of urine output helps determine fluid balance and transplant function. Acute tubular necrosis (ATN) is a common early complication, usually due to tissue ischemia during the period between removal of the kidney from the donor and transplantation. Oliguria is an early sign. Monitor vital signs and hemodynamic pressures closely. Diuresis may occur immediately, resulting in hypovolemia, low cardiac output, and impaired perfusion of the transplanted kidney. (Hinds, 2004). Maintain fluid replacement, generally calculated to replace urine output over the previous 30 or 60 minutes, milliliter for milliliter. Fluid replacement is vital to maintain vascular volume and tissue perfusion. Administer diuretics as ordered. Loop and/or osmotic diuretics such as furosemide or mannitol may be used to promote postoperative diuretic. Remove the catheter within 2 to 3 days or as ordered. Encourage to void every 1 to 2 hours and assess frequently for signs of urinary retention following catheter removal. The bladder may have atrophied prior to surgery, reducing its capacity. Urinary retention places stress on suture lines and increases the risk of infection. Monitor serum electrolytes and renal function tests. These tests are used to monitor graft function and fluid and electrolyte status. Electrolyte imbalances may develop as the transplanted kidney begins to function and diuretic occurs. Elevated serum creatinine and BUN levels may be early signs of rejection or graft failure. (Murphy F, 2007). Monitor for possible complications hemorrhage from an arterial or venous anastomosis can be either acute or
Insidious. Indicators include swelling at the operative site, increased abdominal girth, and signs of shock, including changes in vital signs and level of consciousness. Hemorrhage is a surgical emergency, requiring prompt recognition and treatment to preserve the graft. Urethra anastomosis failure causes urine leakage into the peritoneal cavity. It may be marked by decreased urine output with abdominal swelling and tenderness. Failure of the urethral anastomosis requires surgical intervention. Renal artery thrombosis is characterized by an abrupt onset of hypertension and reduced GFR. Renal artery thrombosis can result in transplant failure. (Jordan S, et al, 2004)

Infection due to immunosuppressants is an immediate and continuing risk. The inflammatory response is blunted, and infection may not significantly elevate the temperature. Monitor for signs such as change in level of consciousness, cloudy or malodorous urine or purulent drainage from the incision. Prevention and prompt treatment of infections is particularly important in the immunosuppressed. Pre discharge teaching for the client and family the use and effects of prescribed medications, including antihypertensive medications, immunosuppressive agents, prophylactic antibiotics, and others as ordered. Monitoring vital signs including temperature, and weight. Manifestations of organ rejection, such as swelling and tenderness over the graft site, fever, joint aching, weight gain, and decreased urinary output. Stress the importance of promptly reporting signs and symptoms to the physician ordered or recommended dietary restrictions such as restricted carbohydrate and sodium intake, and increased protein intake. (Neylan, 2006). Measures to prevent infection, such as avoiding crowds and obviously ill individuals the client and family
will manage care after discharge, and therefore need a good understanding of what to expect, how to monitor graft status, and measures to reduce the adverse effects of medications. Provide psychological support, address concerns, and provide information as needed. The client knows that transplant success is not guaranteed. In addition, the client has often been managing a chronic disease independently and is used to having a degree of control. Providing information and allowing the client to retain control and relieves anxiety and improves recovery. (Wolfe R, et al, 2004)

2.9. Outcome of Renal Transplantation (complications)

2.9.1. Transplant rejection (hyper acute, acute or chronic)

Patient and graft survival are best with LRD transplantation, followed by LURD, donation after brain death (DBD) and then DCD transplants. Despite histo-incompatibility, the survival rates of LURD transplantation were reportedly higher than those of DBD kidneys. Though early results of LRD and LURD kidney transplantation are comparable, the degree of mismatch exerts a significant influence on long-term graft survival as demonstrated by 10-year graft survival of 73% for HLA identical grafts and 55% for other allograft. Blacks are reported to have a worse outcome following transplantation than non-Blacks. Whether the transplant experience of Black people living in developed countries can be extrapolated to those living in developing countries is not known. A single UK center reported that all transplant outcomes were significantly worse for Black than non-Black patients, for example, death-censored graft survival (5-year 66% versus 87%) and first-year graft loss (12% versus 3.8%). (Macphee I, 2010)

2.9.2. Infections and sepsis due to the immunosuppressant drugs that are required to decrease risk of rejection
The risk and type of infection varies with time after transplantation. Bacterial infections are common during the first month. Thereafter, viral, particularly cytomegalovirus (CMV), fungal, and opportunistic infections take over. *Mycobacterium tuberculosis* is an important consideration in patients in developing countries, with 15% developing the infection in Pakistan. This has implications for immunosuppressant monitoring due to drug interactions requiring cyclosporine dose adjustments and tuberculosis prophylaxis with isoniazid in transplant recipients in countries with prevalence of tuberculosis. (John G, et al, 2003)

**2.9.3. Post-transplant lymphoprofilerative disorder** (a form of lymphoma due to the immune suppressants) There are many lymphoproliferative disorders that are associated with organ transplantations and immunosuppressant therapies. In most reported cases, these cause B cell lymphoproliferative disorders, however some T cell variations have been described. The T cell variations are usually caused by the prolonged use of T cell suppressant drugs, such as sirolimus, tacrolimus or cyclosporine A (Mert E, 2008)

**2.9.4.** Imbalances in electrolytes including calcium and phosphate which can lead to bone problems amongst other things

**2.9.5.** Hematological complications (anemia).

**2.9.6.** Other side effects of medications including gastrointestinal inflammation and ulceration of the stomach and esophagus, hirsutism (excessive hair growth in a male-pattern distribution), hair loss, obesity, acne, diabetes mellitus type 2, hypercholesterolemia, and others. (Wolfe R, et al, 2004)

**2.10. Prognosis:**
Kidney transplantation is a life extending procedure. The typical patient will live 10- to 15 years longer with a kidney transplant than if kept on dialysis. The increase in longevity is greater for younger patients, but even 75-year-old recipients (the oldest group for which there is data) gain an average four more years of life. People generally have more energy, a less restricted diet, and fewer complications with a kidney transplant than if they stay on conventional dialysis. Some studies seem to suggest that the longer a patient is on dialysis before the transplant, the less time the kidney will last. It is not clear why this occur, but it underscores the need for rapid referral to a transplant program. Ideally, a kidney transplant should be preemptive, i.e. take place before the patient begins dialysis. At least four professional athletes have made a comeback to their sport after receiving a transplant (McDonald S, 2004)

2.11. Previous study

**Worldwide** End-stage kidney disease (ESKD) can be defined by the requirement for life-saving dialysis or kidney transplantation. Worldwide, the number receiving renal replacement therapy (RRT) is estimated at more than 1.4 million, with incidence growing by approximately 8% annually. Driving this increase are population ageing, type 2 diabetes mellitus and hypertension, key risk-factors for chronic kidney disease. However, due to the expensive nature of RRT, treatment for ESKD is largely the domain of high-income countries (HIC). We consider the extent of the ESKD burden in low- and middle-income countries (LMIC) and impediments to the delivery of RRT, and propose a range of strategies for improving access to treatment for the world’s poorest ESKD sufferers. (Moeller S, et al, 2004)
**In developing countries** Patients with RF, living in developing countries, face many obstacles e.g. lack of access to transplantation centers due to limited or no facilities, quality and safety issues, restricted choice of organs from living donors, and exploitation associated with transplant tourism. Economic deprivation in developing countries and the relatively modest expenditure on health care by government contributes to poor transplantation activity, with a rate of 0-10 per million population (pmp) in contrast to the rate in the developed world at around 30-50 pmp. In addition, lack of public awareness, education and motivation for organ donation as well as lack of manpower contribute to an insufficient transplant program. (John L, et al. 2012). Conditions including chronic glomerulonephritis, hypertension and diabetes mellitus that are associated with progression to RF are prevalent in developing countries. Hypertension, a strong independent risk factor for ERF, affects 20% of the adult population in Africa. The population-attributable risk for kidney failure is 42% for diabetes mellitus, which has a major effect on the incidence of RF in young and middle-aged adults and may be responsible for a larger proportion of end stage renal disease than is suggested by the use of clinical diagnoses of underlying renal disease by the nephrologists. It is estimated that about 30% of the 170 million people with diabetes mellitus worldwide have or will develop diabetic nephropathy. (Schieppati A et al. 2005). Human immunodeficiency virus (HIV)-associated nephropathy has become the third leading cause of RF in African Americans (AA). Data on chronic kidney disease (CKD) for many developing countries are either not available or inaccurate, but considering the prevalence of poor socioeconomic factors, the incidence of RF is likely to be similar to or higher than that in high-income countries. It is
thought that CKD is more prevalent and virulent in Africa than that found in the Western countries. CKD, which affects the young and productive members of the population, is a major cause of morbidity and mortality in Nigeria, where the prevalence of RF is estimated to be 300-400 pmp. (Shonibor A, 2010). The availability of dialysis and transplantation is variable in Africa, with treatment rates in North Africa between 30 and 186.5 pmp. Services are predominantly urban and therefore generally inaccessible to poorer and less educated rural patients. In poorer nations, for example in sub-Saharan Africa, economic and manpower factors influence a conservative approach to therapy. The majority of those with RF die because of lack of funds as few can afford regular maintenance dialysis or renal transplantation (often not available). (Aviles G, et al, 2006).

Chronic renal failure (CRF) occurs when the kidney cannot adequately expel waste products and toxins from the body and regulate the body's fluid balance. Kidney transplantation has become the treatment of choice for patients with ESRD, worldwide; Transplant recipients must take immunosuppressive anti-rejection drugs for as long as the transplanted kidney functions. For the routine immunosuppressive Prograf, Collect and Prednisolone, these drugs cost 1,500$US per month, medicare paying for more than three years for these drugs for those patients, unless the patient is otherwise medicare eligible. Transplant programs may not transplant a patient unless the patient has a reasonable plan to pay for medication after the Medicare expires, however, patients are almost never turned down for financial reasons alone. 50% of patients with end-stage renal disease only have Medicare coverage. In March 2009 a bill was introduced in the Senate, 565 and in the House that will extend Medicare coverage for the
drugs for as long as the patient has a functioning transplant. This means that a patient who has lost their jobs and insurance will not also lose their kidney and be forced back on dialysis. Dialysis is currently using up 17 $ billion yearly of Medicare funds and total care of these patients amount to over 10% of the entire Medicare budget. (Francis L, et al, 2003)

In developed countries: Kidney transplantation has become the treatment of choice for most patients with ESRD. During the past 40 years, worldwide more than 400,000 kidney transplantation have been performed in the US each year and approximately 9000 are performed in the US and there are many more patients on the waiting list of Kidney transplantation then there are origin donors, when Michael Woodruff performed one between identical twins in Edinburgh until the routine use of medications to prevent and treat acute rejection, (Gabriel M, 2008).RF is more prevalent in racial and ethnic minorities in the United States, and although organ donation rates are lower in these groups, AA waits twice longer for transplantation than Caucasian Americans. Furthermore, ethnic minorities in the US are more likely not to be offered transplantation as a treatment of choice or to die waiting for a transplant than their counterparts, the reasons for this disparity in the rate of transplantation include: lack of awareness of the need for organ donation, religious myths and misconceptions, mistrust of medical system, concerns about allocation issues, money and insurance barriers, and attitudes of medical practitioners, inequity of access is a major issue in developed countries, and ability to pay may be the most significant factor in developing countries. Improved understanding of the immunosystem and the availability of effective immunosuppressive drugs have made the rejection problem less imposing than earlier. As a result, ther
have been significant developments in transplant services in countries like India, Pakistan, South Africa, and Sudan. However, there is a wide difference among countries with respect to organ donation practices. Transplant tourism is dictated by market laws and is profit driven. It is thought that the lack of provision of transplant services in developing countries has made transplant tourism inevitable. (Mor E, 2006), A comprehensive review of commercial kidney transplantation performed in several developing countries showed patient and graft survival were generally inferior to those obtained in the US and a higher incidence of unconventional and life threatening infections such as malaria, invasive fungal infection, pneumonia, HIV and hepatitis (Hippen B, 2006).

**In Sudan** Despite an early start, the provision of renal replacement therapy (RRT) in Sudan is constrained by economic factors. This report describes the ESRD population and the available renal replacement therapy (RRT) services in Sudan in 2009. In June 2009, there were 2858 patients on hemodialysis (HD) in Sudan, 122 patients on continuous ambulatory peritoneal dialysis (CAPD), and 1168 kidney transplant recipients. The overall prevalence of treated ESRD was 106 patients per million populations. All forms of RRT were funded by the government. The mean age of HD, CAPD and kidney transplant patients was 46±17, 42±22 and 39±13 years respectively. Males constituted 66%, 67.7% and 79.5% and children constituted 3.9%, 25.3% and 6.6% of HD, CAPD and kidney transplant patients respectively. The commonest reported cause of kidney failure was hypertension (26.1%), followed by diabetes mellitus (DM) (10.4%), obstructiveuropathy (7.6%), glomerulonephritis (GN) (5.5%), polycystic kidney disease (2.6%), and pyelonephritis (1.1%). The majority of HD
patients (83.8%) are offered twice-weekly HD, 83.6% had a functioning arterio-venous (AV) fistula, 6.4% were positive for hepatitis B virus (HBV) infection, 6.5% were positive for hepatitis C virus (HCV) infection, and 0.7% were positive for both HBV and HCV. Target blood pressure, hemoglobin and phosphorus levels were achieved by 26.5%, 23.1% and 28.5% of HD patients compared to 41.8%, 20.6% and 63.5% of CAPD patients respectively. Kidney transplant recipients had their transplant operation performed in Sudan (33.1%), Egypt (20.7%), KSA (18.2%), Jordan (14.8%), Pakistan (8.4%) and other countries. The prevalence of RRT in Sudan remains low. Hypertension and diabetes mellitus are the most commonly reported cause of kidney failure. (El-Amin, et al, 2009).

3. Materials and Method

3.1 Study Design:
Descriptive hospital based study to assess nurse’s knowledge and performance regarding renal transplant patient care at East Nile Model
Hospital from December 2012 to February 2013

3.2. Study Area:
The study was carried out in East Nile Model Hospital, Algeraif Sherg district, at Khartoum State, Sudan. East Nile Hospital contains 200 beds of which 10 beds hemodialysis, 10 beds ICU, 10 beds renal wards & average beds in general wards allocated for internal renal department covering all the renal transplant patients (dialysis, waiting list, fallow up & complicated patients & Etc. East Nile Model Hospital has a very busy Emergency Department receiving an average of 100 patients per day. There is also an ICU Department which receives critical medical patients, complicated surgical, obstetrics, orthopedics as well as the renal transplantation cases. It also consists of X-ray, US & Echo Department and a completed laboratory department. This hospital is one of the well established quality control department in Sudan including infection control program, myself is the controller of this program, implemented in its regular system on international bases and Arab Accreditation program as the hospital implementing to get the Accredit certificate from them.

Table (3.1): Distribution of manpower in East Nile model hospital

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultants</td>
<td>16</td>
</tr>
<tr>
<td>Registrars</td>
<td>9</td>
</tr>
<tr>
<td>Occupation</td>
<td>No.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Medical officers</td>
<td>42</td>
</tr>
<tr>
<td>House officers</td>
<td>1</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>112</td>
</tr>
<tr>
<td>Auxiliary nurses</td>
<td>28</td>
</tr>
<tr>
<td>Secondary</td>
<td>41</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>3</td>
</tr>
<tr>
<td>Assistant Pharmacists</td>
<td>1</td>
</tr>
<tr>
<td>Nutritionists</td>
<td>3</td>
</tr>
<tr>
<td>Assistant Nutritionists</td>
<td>2</td>
</tr>
<tr>
<td>Microbiologist</td>
<td>1</td>
</tr>
<tr>
<td>Lab. Technicians</td>
<td>22</td>
</tr>
<tr>
<td>Quality members</td>
<td>4</td>
</tr>
<tr>
<td>X-ray &amp; U.S department</td>
<td>14</td>
</tr>
<tr>
<td>Services Department</td>
<td>75</td>
</tr>
<tr>
<td>Administration department</td>
<td>22</td>
</tr>
<tr>
<td>Renal consultant</td>
<td>4</td>
</tr>
<tr>
<td>Renal nurses</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>......</td>
</tr>
</tbody>
</table>

Source: Statistical Department of East Nile Model Hospital 2013.

**Table: (3.2) Distribution of wards and beds in East Nile Model Hospital during December 2012-february 2013.**

<table>
<thead>
<tr>
<th>Wards</th>
<th>No of Ward</th>
<th>No of beds</th>
<th>Average No of patient stayin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------</td>
<td>------</td>
<td>---------</td>
</tr>
<tr>
<td>General ward</td>
<td>9.0 Wards</td>
<td>200 beds</td>
<td>almost full</td>
</tr>
<tr>
<td>ICU</td>
<td>1 unit</td>
<td>10</td>
<td>Almost full</td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>1.0 ward</td>
<td>10</td>
<td>Full/ 4 shifts</td>
</tr>
<tr>
<td>Out Patient &amp; emergency</td>
<td>2.0</td>
<td>16</td>
<td>Full/almost</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

Source: Statistical Department of East Nile model Hospital 2013.

3.3 Study Population:
The population of the present study includes Renal Unit, Hemodialysis & ICU nurses (50) who working at East Nile Model Hospital and working directly with the renal transplant patients from all shifts during study period.

3.3.1 Inclusion Criteria:
* All (50) nurses of renal transplantation who have direct contact with patients in previous setting in the hospital.
* All the nurses with one a year and more in renal transplantation unit.

3.3.2 Exclusion Criteria:

- Qualified nurses working in the setting rather than the renal patients
- Qualified nurses have experience less than 1 year in the same setting.
- Qualified nurses working in the renal unit and without contact with renal patients.

3.4. Sample Size:
The sample consists of all nurses who have direct contact with renal
transplantation patients in the East Nile Model Hospital who are available during study period.

### 3.5 Data collection tools:

Two tools of data collection were used:

**Tool i: Interview questionnaire:**

Structured questionnaire was designed by the researcher and utilized. Questionnaire was distributed for each available nurses to fill it within 20 to 30 minutes under the researcher guidance identify the knowledge and attitude about renal transplant (appendix) for two 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 nurse's knowledge regarding variables of renal transplantation care. It includes questions about definition of renal transplant, Types of end stage of renal disease management, Source of kidney donor, Contraindication for kidney transplantation, transplant rejection signs and symptoms complications, and nursing role. etc

**Tool ii:** An observation checklist for monitoring nurses' performance in caring of transplantations' patient

### 3.6. Ethical consideration

- Permission from manager and matron of East Nile model Hospital for data collection through official letters.

### 3.7. Data analysis:

The data were conducted, processed and transferred to computer coding,
using descriptive analysis which includes percentage, means frequency distribution tables and figures by using statistical package for social sciences (SPSS)

4. Results and discussion

4.1. Results
Table 1: Distribution of the study sample accordingly to their general characteristics.

(NO: 50)

<table>
<thead>
<tr>
<th>Items</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>23</td>
<td>46.0%</td>
</tr>
<tr>
<td>26-30</td>
<td>26</td>
<td>52.0%</td>
</tr>
<tr>
<td>31-35</td>
<td>1</td>
<td>2.0%</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22</td>
<td>44.0%</td>
</tr>
<tr>
<td>female</td>
<td>28</td>
<td>56.0%</td>
</tr>
<tr>
<td>total</td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Table (1)** this table shows that (52.0%) of the study sample their ages between (26-30) years, followed by (46%) their ages were 25 years And only single nurse (2.0%) her age is (31-35). More than one half (56.0 %) of study sample was female.

**Table(2):** Distribution of the study sample accordingly to their Years of Experiences, Place of work, and attending training program about renal transplantation patients' care before.
(No 50)

<table>
<thead>
<tr>
<th>Items</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years of Experiences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>26</td>
<td>52.0%</td>
</tr>
<tr>
<td>6-10</td>
<td>24</td>
<td>48.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Place of work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ward</td>
<td>15</td>
<td>30.0%</td>
</tr>
<tr>
<td>ICU</td>
<td>22</td>
<td>44.0%</td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>10</td>
<td>20.0%</td>
</tr>
<tr>
<td>Recovery</td>
<td>3</td>
<td>6.0%</td>
</tr>
<tr>
<td><strong>total</strong></td>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Attending training program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>30</td>
<td>60.0%</td>
</tr>
<tr>
<td>No</td>
<td>20</td>
<td>40.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Table (2)**: this table shows that more than one half (52%) of the study sample their years of experience ranged 1-5years. (44%) of the study sample their place of work was ICU. (40.0%) didn’t attend any training program about renal transplantation patients’ care before.

**Table (3)**: Distribution of the study sample accordingly to their knowledge regarding Definition of renal transplant, Source of kidney donor, and
Contraindication for kidney transplantation.

(No 50)

<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Incorrect answer</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Definition of renal transplant</td>
<td>No 35 70.0%</td>
<td>No 15 30.0%</td>
<td>50 100%</td>
</tr>
<tr>
<td>2. Source of kidney donor</td>
<td>No 38 76.0%</td>
<td>No 12 24.0%</td>
<td>50 100%</td>
</tr>
<tr>
<td>3. Contraindication for kidney transplantation</td>
<td>No 39 78.0%</td>
<td>No 11 22.0%</td>
<td>50 100%</td>
</tr>
</tbody>
</table>

Table (3) this table shows that (70.0%) of the study sample responses with correct answers regarding Definitions of renal transplant, and (78.0%) of them know the Contraindication for kidney transplantation.

Table (4): Distribution of the study sample accordingly to their knowledge regarding initial medical Evaluation for patient of renal transplant, Renal assessment for live kidney donor, and laboratory investigation for patient of
renal transplant.

(No 50)

<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Incorrect answer</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: initial medical Evaluation for patient of renal transplant.</td>
<td>No 36 72.0%</td>
<td>No 14 28.0%</td>
<td>No 50 100%</td>
</tr>
<tr>
<td>2. Renal assessment for live kidney donor.</td>
<td>No 49 98.0%</td>
<td>No 1 2.0%</td>
<td>No 50 100%</td>
</tr>
<tr>
<td>3. Laboratory investigation for patient for renal transplant.</td>
<td>No 36 72.0%</td>
<td>No 14 22.0%</td>
<td>No 50 100%</td>
</tr>
</tbody>
</table>

Table (4) this table shows that most of (98.0%) of the study sample responses with correct answers regarding renal assessment for live kidney donor.

Table (5): Distribution of the study sample accordingly to their knowledge regarding Nursing role before surgery kidney transplantation, the procedure of renal transplantation, and Medications needed (immunosuppr
(No 50)

<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Incorrect answer</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nursing role before surgery of kidney transplantation</td>
<td>48 96.0%</td>
<td>2  4.0%</td>
<td>50 100%</td>
</tr>
<tr>
<td>2. The procedure of renal transplantation.</td>
<td>18 36.0%</td>
<td>32 64.0%</td>
<td>50 100%</td>
</tr>
<tr>
<td>3. Medications needed (immunosuppressive regimens).</td>
<td>18 36.0%</td>
<td>32 64.0%</td>
<td>50 100%</td>
</tr>
</tbody>
</table>

Table (5) this table shows that most of (96.0%) of the study sample responses with correct answers regarding renal assessment for live kidney donor.

Table (6): Distribution of the study sample accordingly to their knowledge regarding Side effects of immunosuppressive regimens, Complication of renal transplant and Transplant rejection signs and symptoms
Table (6). This table shows that (40.0%) of the study sample responses with correct answers regarding Transplant rejection signs and symptoms & more than one half of them know the Complications of renal transplant.

<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Incorrect answer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Side effect of immunosuppressive regimens.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No 37, 74.0%</td>
<td>No 13, 26.0%</td>
<td>50</td>
</tr>
<tr>
<td>2. Complications of renal transplant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No 29, 58.0%</td>
<td>No 21, 42.0%</td>
<td>50</td>
</tr>
<tr>
<td>3. Transplant rejection signs and symptoms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No 20, 40.0%</td>
<td>No 30, 60.0%</td>
<td>50</td>
</tr>
</tbody>
</table>

Table (7): Distribution of the study sample accordingly to their knowledge regarding general evaluation of renal transplant patient, and routine evaluation of renal transplant patient nursing role during surgery of kidney transplantation.
<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Incorrect answer</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evaluation of General condition of the patient of renal transplantation</td>
<td>No 25 50.0%</td>
<td>No 25 50.0%</td>
<td>50 100%</td>
</tr>
<tr>
<td>2. Routine evaluation of renal transplant patient</td>
<td>No 40 80.0%</td>
<td>No 10 20.0%</td>
<td>50 100%</td>
</tr>
<tr>
<td>3. Nursing role during surgery of kidney transplantation</td>
<td>No 37 74.0%</td>
<td>No 13 26.0%</td>
<td>50 100%</td>
</tr>
</tbody>
</table>

Table (7). This table shows that one half (50.0%) of the study sample responses with correct answers regarding evaluation of General condition of the patient of renal transplantation.

Table (8): Distribution of the study sample accordingly to their knowledge regarding nursing role after surgery kidney transplantation, nursing intervention after surgery kidney transplantation, and maintaining fluid balance after surgery kidney transplantation.

(No 50)
Table (8) this table shows that (74.0%) of the study sample responses with correct answers regarding Nursing role after surgery kidney transplantation, and Nursing intervention after kidney transplantation surgery.

<table>
<thead>
<tr>
<th></th>
<th>er</th>
<th></th>
<th>wer</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Nursing role after surgery kidney transplantation</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>37</td>
<td>74.0%</td>
<td>13</td>
<td>26.0%</td>
<td>50</td>
</tr>
<tr>
<td>2.Maintaining fluid balance after surgery kidney transplantation</td>
<td>35</td>
<td>70.0%</td>
<td>15</td>
<td>30.0%</td>
<td>50</td>
</tr>
</tbody>
</table>

**Table (9):** Distribution of the study sample accordingly to their knowledge regarding evaluation of the potential live kidney donor and recipient, and preventing infection towards renal transplantation patients.

(No 50)
Table (9). This table shows that (70.0%) of the study sample responses with correct answers regarding preventing infection towards renal transplantation patients.

<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Incorrect answer</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evaluation of the potential live kidney donor and recipient</td>
<td>No 33 66.0%</td>
<td>No 17 34.0%</td>
<td>No 50 100%</td>
</tr>
<tr>
<td>2. Preventing infection towards renal transplantation patients.</td>
<td>No 35 70.0%</td>
<td>No 15 30.0%</td>
<td>No 50 100%</td>
</tr>
</tbody>
</table>

Table (10): Distribution of the study sample accordingly to their performance regarding general and routine evaluation of renal transplant
(No 50)

<table>
<thead>
<tr>
<th>Items</th>
<th>Done Correctly</th>
<th>Done Incorrectly</th>
<th>Not done</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>1. Evaluation of General condition of the patient of renal transplantation</td>
<td>25</td>
<td>50.0%</td>
<td>25</td>
<td>50.0%</td>
</tr>
<tr>
<td>2. Routine evaluation of renal transplant patient</td>
<td>20</td>
<td>40.0%</td>
<td>30</td>
<td>60.0%</td>
</tr>
</tbody>
</table>

Table (10). This table shows that one half (50.0%) of the study sample perform correctly evaluation of General condition of the patient of renal transplantation.

Table (11): Distribution of the study sample accordingly to their performance regarding Nursing role before, during, and after kidney transplantation surgery.
Table (11). This table shows that only (26.0% and 30.0%) of the study sample performed correctly the nursing practices, and maintaining fluid balance after kidney transplantation surgery respectively.
Figure 1: Distribution of the study sample accordingly to their knowledge about end stage of renal disease management

This figure showed that the majority (86.0%) of the study sample at Bachelor degree level.
Figure (2). Distribution of the study sample accordingly to their sources of knowledge.

This figure showed that only (2%) of the study sample their sources of knowledge from Literature – book – internet together.
Table (12). Correlation between the educational level of the study sample and their knowledge regarding the renal assessment.

(No 50)

Table (12): Shows that there is none statistical significant relationship between the educational level of the study group and their knowledge regarding renal assessment since chi square value is 2.165 df 2 and p.value 0.339

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Correct complete</th>
<th>Incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor</td>
<td>36</td>
<td>7</td>
<td>43</td>
</tr>
<tr>
<td>Post graduate</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Diploma</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>9</td>
<td>50</td>
</tr>
</tbody>
</table>

Chi square value 2.165

Table (13): Correlation between the educational level of the study sample and their knowledge regarding history and physical examination – blood
The Nurses knowledge regarding history and physical examination - blood pressure

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Correct complete</th>
<th>incorrect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor</td>
<td>40</td>
<td>3</td>
<td>43</td>
</tr>
<tr>
<td>Post graduate</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Diploma</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>4</td>
<td>50</td>
</tr>
</tbody>
</table>

Chi square value 1.213  Df 2  p. value 0.545

Table (14): Shows that there is statistically none significant relationship between the educational level of the study group and their knowledge regarding history and physical examination since chi square value is 1.213 df 2 and p.value 0.545

4.2. Discussion.

Kidney transplantation or renal transplantation is the organ transplant of
a kidney into a patient with end-stage renal diseases. Kidney transplantation is typically classified as deceased-donor or living-donor transplantation depending on the source of the donor organ. Descriptive hospital-based study was conducted aimed at assessing Nurses' Knowledge and Performance regarding Renal Transplantation Patients' Care at East Nile Model Hospital, Khartoum State, Sudan. The sample size consisted of (50) nurses during the period of (December 2012 to February 2013). The study sample revealed that (52%) of the study sample were of ages (26-30) and (46%) aged (25) and only single nurse aged (31-35). Most of study units were females (56%). and majority of study sample (86%) were Bachelor and followed by (10%&4%) were Diploma and Postgraduate. The study showed that (70%) of nurses responded with correct and complete answers regarding definition of renal transplant, (76%) of nurses responded with correct and complete answers regarding source of the kidney donors. (78%) of nurses gave correct and complete answers regarding contraindication for kidney transplantation. This results are differ from result of (Akoh J, et al, 2009) they stated that nurses have lack knowledge regarding source of the kidney donors, and contraindication for kidney transplantation. Only (40%) of the nurses responded with correct and complete answers regarding transplant rejection signs and symptoms. This result is similar to result of (Alebiosu C, et al, 2006) they stated that nurses have lack knowledge regarding transplant rejection signs and symptoms. Majority (98%) of the nurses responded with correct and complete answers regarding renal assessment for live kidney donor. This result is differ from result of (Bamgboye E, 2006) he stated that nurses have lack knowledge regarding renal assessment for live kidney donor. The half (50%) of the
study sample responded with correct and complete answers regarding evaluation of the general condition of the patient for renal transplantation. Only (36%) of nurses responded with correct and complete answers regarding, the procedure of the renal transplantation. This result was different from (Shonibor A) who stated that the majority of nurses were good knowledge regarding evaluation of the general condition of the patient for renal transplantation and procedure of the renal transplantation (Shonibor A, 2010). Only (26.0% and 30.0%) of the study sample performed correctly the nursing role, and maintaining fluid balance after kidney transplantation surgery respectively. Regarding the correlation between level of education and nurses knowledge about history and physical examination this study showed that nurses who had Post graduate level both had complete correct answer to those with diploma and bachelor. This may be related to the effect of years of experiences for acquisition of knowledge and skill. Also it was observed that the years of experiences had positive effect in the performance of the nurses who had 5 years or more regarding counseling of the patient about their health against whose experience was less than 5 years. Only (26.0% and 30.0%) of the study sample performed correctly the nursing practices, and Maintaining fluid balance after kidney transplantation surgery respectively, this results are similar to result of (Polaschek N) who stated that the majority of nurses were of poor performance regarding nursing practices, and Maintaining fluid balance after kidney transplantation surgery. (Polaschek N, 2003)
5.1. Conclusion:
Based on the result of this study, it is concluded that most of nurses' knowledge regarding renal transplant patient was fair depending on the WHO calculation by taking the mean of the average percentage (76%, 78% and 40%) = 194/3 = 64.4%. Also their practices were lacking especially regarding Nursing role, and maintaining fluid balance after kidney transplantation surgery.
5.2 Recommendations
Based on result of this study the following the recommendations are suggested

- Learning staff facilities library books regarding renal transplant must be available for nurses in hospital.
- Continuous in services Training - focusing on practical issues- for all nurses working in the East Nile Model Hospital for renal disease and surgery is mandatory.
- practical training in using infections control measures is needed
- Proper and continuous evaluation to assess the nurses’ performance is essential.
- Training manual about renal transplantation patients’ care should be designed and available for nurses at the hospital
- Development of protocols to aid nurses in the care of patients with Kidney Transplantation
Reference


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Updated: Dec 5, 2008
S Elamin, W Obeid, H Abu-Aisha 2009, Arab Journal of Nephrology and Transplantation


Francis L. Delmonico, And James J. Wynn: Managing the Enlarging Waiting
Questionnaire for assessment of Renal Nurses' Knowledge and Performance Regarding Renal Transplantation Patients' Care at East Nile Model Hospital, AlgeraifSherig district, Khartoum State, Sudan
Personal Data: 1

Gender: male {} female {}

Age: 25 {} 26-30 {} 31-35 {} more than 35 {}

Educational level: Bachelor {} Post graduate {}

Other mention {}

Years of Experiences: 2

1 to 5 years {} 6 to 10 years
11 to 15 years {}

Sources of knowledge: 3

Form college {} literature {}
Book {} internet {}

Training: 4

Yes {} No {}

Place of work: 5

Ward {} hem dialysis {}
Peritoneal dialysis {}
ICU {}

Types of end stage of renal disease management: 6

: Hemodialysis (a)
: Peritoneal dialysis (b)
: Transplant (c)
Definition of renal transplant .2
: the organ transplant of a kidney into the patient with end stage renal disease
: transplant a kidney from living donor or disease donor to the recipient who had ESRD
: kidney transplant from well matched living donor who related to the patient
: all of above (d)

Source of kidney donor .3
: living donors (a)
: organ trade (b)
: deceased donors (brain dead donor) (c)
: all of above (d)

Contraindication for kidney transplantation include: .4
: Cardiac & pulmonary insufficiency (a)
: Acute cancer (b)
: Sever elderly (c)
: Acute infection disease (d)
: All of above (e)

Evaluation of the potential live kidney donor and recipient. .5
: ABO blood typing – tissue typing & cross match (a)
: Initial medical Evaluation (b)
: Renal assessment (c)
initial medical Evaluation:  .6
:history & physical examination – blood pressure  (a
:psychosocial evaluation  (b
:cardio vascular evaluation  (c
: laboratory investigation  (d
: all of above  (e

Renal assessment for live kidney donor:  .7
:urine collection for 24hurs total protein&creatinine clearance  (a
:ultrasound examination  (b
:renal arteriogram  (c
: laboratory investigation  (d
: all of above  (e

laboratory investigation include:  .8
:CBC  (a
: renal profile  (b
: fasting blood glucose  (c
: liver function test & uric acid  (d
:PTT&PT  (e
: all of above  (f

Nursing role before surgery kidney transplantation  .9
:explants the patient to the procedure and teach him about what  (a
to expect after surgery
:consent is witnessed  (b
:psychological support (c)
:preoperative antibiotics and bowel cleansing (d)
:assess pulmonary status (e)
:all of above (g)

**The procedure of renal transplantation** .10

: the kidney may be removed and renal artery and vein tied off (a)
: the transplanted kidney is placed in the iliac fossa (b)
: the renal artery of the donated kidney is sutured to the iliac artery (c)
: the renal vein is sutured to the iliac vein (d)
: the ureter of the donated kidney is sutured to the bladder (e)
: all of above (f)

**Medications needs (immunosuppressive regimens)** .11

: predniselone (a)
: cyclosporine (b)
: azathioprine (c)
: prograf (d)
: all of above (e)

**Side effect of immunosuppressive regimens** .12

: infection & sepsis (a)
: gastrointestinal ulceration (b)
: hair loss & obesity (c)
: all of above (d)

**Complication of renal transplant include** : .13

: transplant rejection (hyper acute, acute or chronic) (a)
: infections and sepsis due to the immunosuppressant (b)
: post-transplant lymphoproliferative disorder (c)
hematological complication (anemia)  
ed
all of above  

**transplant rejection signs and symptoms**.  
oliguria and edema  
fever  
high blood pressure  
weight gain
Swelling or tenderness 
All of above 

15. Evaluation of General condition of the patient of renal transplantation  
frequently monitor to diagnose complications and deterioration of function immediately after surgery at least one daily during hospital stay 
after discharge should be assessed at least twice–weekly for one month  
weekly for another month  
and regular intervals  
all of above  

**Routine evaluation should be consist of**.  
brief medical history  
vital signs & body weight  
Genera examination (CBC, renal profile, urinalysis)  
blood level of immunosuppressive drugs  
all of above  

**Nursing role during surgery kidney transplantation**:  

Nursing role after surgery kidney transplantation: 17
- monitor vital signs and assess evidence of bleeding or hemorrhage (a)
- monitor bowel sounds & abdominal distention (b)
- monitor pain (c)
- prevent the infection (d)
- maintenance fluid balance (e)
- patient education & health maintenance (f)
- all of above (g)

Nursing intervention include: 18
- relieving pain (a)
- promoting urinary elimination (b)
- preventing infection (c)
- maintaining fluid balance (d)
- all of above (e)

Maintaining fluid balance include: 19
- closely monitor intake and output especially after renal transplant (a)
- expect normal urine output to be 30 to 100 ml/hour (b)
- monitor serum electrolyte and (ECG) (c)
- monitor BP, heart rate, central venous pressure (d)

All of above (e)

Preventing infection include: 20
: monitor for fever, elevated leukocyte count  (a)
: administer antibiotics as prescribed  (b)
: obtain specimen for bacteriologic testing of urine, wounds,  (c)
catheters discontinued, drains and sputum
: provide antimicrobial therapy  (d)
: provide regular skin care and assist with hygiene  (e)
: oral antifungal to prevent mucosal candidiasis  (f)
: all of above  (g)

Observation check list
<table>
<thead>
<tr>
<th>items</th>
<th>pre</th>
<th>post</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nursing role before the kidney transplant:</td>
<td></td>
<td></td>
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<tr>
<td>Prepare I.C.U</td>
<td></td>
<td></td>
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<tr>
<td>check O2 cylinder</td>
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<tr>
<td>Check DC shock &amp; EC G &amp; suction machines if available</td>
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<tr>
<td>Monitor functioning</td>
<td></td>
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<tr>
<td>check immune suppressive drugs</td>
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<tr>
<td>Explain &amp; discuss the procedure with the pt</td>
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<td></td>
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<tr>
<td>-consent signed with witness</td>
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<td></td>
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<tr>
<td>-check investigation related to transplant</td>
<td></td>
<td></td>
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<tr>
<td>-Check BP</td>
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<tr>
<td>-Check PR</td>
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<tr>
<td>-Check temperature</td>
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<tr>
<td>-Check RR</td>
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<tr>
<td>2. Nursing role during the kidney transplant</td>
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<tr>
<td>-Monitor vital signs</td>
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</tbody>
</table>
### Personal Protective Equipment

- Surgery under aseptic technique

### Nursing role post the kidney transplant:

- Personal protective equipment
  - Wear gloves
  - Wear mask
  - Wear eyes glass
  - Wear gown
  - Wear cap
  - Monitor vital signs
  - Routine blood investigation (urea & electrolyte, prograf)
<table>
<thead>
<tr>
<th>Measure output from urinary catheter and drain every hour and fluids replacement according to output</th>
</tr>
</thead>
<tbody>
<tr>
<td>movement for patient</td>
</tr>
<tr>
<td>Assess patient condition</td>
</tr>
<tr>
<td>Assess pain</td>
</tr>
<tr>
<td>Administration drugs (antibiotics- Immune suppression)</td>
</tr>
<tr>
<td>Drain under aseptic technique</td>
</tr>
<tr>
<td>Assess rejection</td>
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<tr>
<td>Instruct report</td>
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</tbody>
</table>
Renal System

The kidneys are essentially regulatory organs which maintain the volume and composition of body fluid by filtration of the blood and selective reabsorption or secretion of filtered solutes, the kidneys are retroperitoneal organs (i.e. located behind the peritoneum) situated on the posterior wall of the abdomen on each side of the vertebral column, at about the level of the twelfth rib. The left kidney is slightly higher in the abdomen than the right, due to the presence of the liver pushing the right kidney down. The kidneys take their blood supply directly from the aorta via the renal arteries; blood is returned to the inferior vena cava via the renal veins. Urine (the filtered product containing waste materials and water) excreted from the kidneys passes down the fibromuscular ureters and collects in the bladder. The bladder muscle (the detrusor muscle) is capable of distending to accept urine without increas
ing the pressure inside; this means that large volumes can be collected (700-1000ml) without high-pressure damage to the renal system occurring.

When urine is passed, the urethral sphincter at the base of the bladder relaxes, the detrusor contracts, and urine is voided via the urethra.

The structure of the kidney

On sectioning, the kidney has a pale outer region - the cortex - and a darker inner region - the medulla. The medulla is divided into 8-18 conical regions, called the renal pyramids; the base of each pyramid starts at the corticomedullary border, and the apex ends in the renal papilla which merges to form the renal pelvis and then on to form the ureter. In humans, the renal pelvis is divided into two or three spaces - the major calyces - which in turn divide into
further minor calyces. The walls of the calyces, pelvis and ureters are lined with smooth muscle that can contract to force urine towards the bladder by peristalsis. The cortex and the medulla are made up of nephrons; these are the functional units of the kidney, and each kidney contains about 1.3 million of them.

The nephron is the unit of the kidney responsible for ultrafiltration of the blood and reabsorption or excretion of products in the subsequent filtrate. Each nephron is made up of:

- A filtering unit— the **glomerulus**. 125ml/min of filtrate is formed by the kidneys as blood is filtered through this sieve-like structure. This filtration is uncontrolled.
- The **proximal convoluted tubule**. Controlled absorption of glucose, sodium, and other solutes goes on in this region.
The **loop of Henle**. This region is responsible for concentration and dilution of urine by utilizing a *counter-current multiplying* mechanism—basically, it is water-impermeable but can pump sodium out, which in turn affects the osmolarity of the surrounding tissues and will affect the subsequent movement of water in or out of the water-permeable collecting duct.

The **distal convoluted tubule**. This region is responsible, along with the collecting duct that it joins, for absorbing water back into the body—simple math will tell you that the kidney doesn't produce 125ml of urine every minute. 99% of the water is normally reabsorbed, leaving highly concentrated urine to flow into the collecting duct and then into the renal pelvis.