



Nursing Performance and Therapeutic Regimen Compliance of Patients Post Renal Transplantation

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Abstract

Background: Kidney Transplantation is a surgical procedure in which a healthy kidney is implanted into a person with End-Stage Renal Disease or chronic kidney failure. **This study aimed** to evaluate nursing performance and therapeutic regimen compliance of patients post renal transplantation. A descriptive design was utilized. **Setting:** This study was conducted in kidney transplant unit at New Surgery Hospital and Nephrology Outpatient Clinics - Zagazig University Hospital, Egypt. **Subjects :** A convenience sample of (50) available nurses working in the above mentioned settings and purposive sample of (32) patients. **Tools:** Three tools were utilized for data collection:- Structured interview questionnaire to assess nurses' knowledge level and attitude regarding kidney transplantation; An observation checklists for nurses' practice regarding care of patients post renal transplantation and Patient's interview questionnaire to assess patients' compliance. **Results:** The current study revealed that 56.7% and 56.0% of the studied nurses had unsatisfactory total knowledge and practice respectively regarding renal transplantation. While, 62% of the studied nurses had positive attitude about renal transplantation. Also, 62.5% of the studied patients had total in compliance related the therapeutic regimen post renal transplantation. **Conclusion:** more than half of nurses had unsatisfactory levels of knowledge and practice regarding renal transplant care, while nearly two-thirds had a positive attitude and nearly two-thirds of patients were non-compliant with the therapeutic regimen. There is a significant relationship between patients' compliance, nurses' knowledge, practice and attitude. **Recommendations:** The need for applying this study on a large sample for generalization, continuous training and educational programs, updated guideline booklets for nurses and patients and regular monitoring systems to evaluate both nursing performance and patient compliance post renal transplantation.

Keywords: Nursing Performance, Renal Transplantation, Therapeutic Regimen ,Compliance



Introduction

Renal transplantation is the gold standard treatment for individuals with kidney failure requiring renal replacement therapy. This procedure offers significant advantages over dialysis, including improved health outcomes, reduced costs and prolonged survival. However, the post-transplantation period presents numerous physical and emotional challenges that compromise patient comfort. Despite a successful transplant and a functioning graft, these individuals continue to manage a chronic condition that requires ongoing care, encompassing interrelated domains such as family relationships, social integration and interactions with healthcare services and professionals (Calazans et al., 2026).

Kidney transplantation is primarily indicated for end-stage renal disease (ESRD), irrespective of the underlying etiology. ESRD is typically defined as a glomerular filtration rate (GFR) $< 15 \text{ mL/min/1.73 m}^2$, at which point patients require renal replacement therapy. The most common causes of ESRD include diabetic kidney disease, hypertensive and renovascular disease, chronic infections, and autoimmune disorders such as chronic glomerulonephritis and systemic lupus erythematosus. Genetic disorders, particularly autosomal dominant polycystic kidney disease (ADPKD) and various inborn errors of metabolism, also contribute significantly. Despite comprehensive diagnostics, a proportion of cases remain idiopathic (Danovitch, 2025).

The survival of the transplanted kidney depends on multiple factors, with adherence to prescribed immunosuppressive medications being the most critical. Patients must take their medications exactly as instructed; skipping doses or improper timing can lead to graft rejection and loss of kidney function (Murray et al., 2025).

Despite improved surgical techniques and transplantation technology, complications do occur and a delay in detection and treatment of any of these complications may lead to loss of renal graft function, morbidity, or even the patient's death (Negret et al., 2025).

Vascular, urologic, and nephrogenic complications can happen; the vascular complication (eg, renal artery and vein stenosis and thrombosis, arteriovenous fistula, and pseudo aneurysms); the urologic complication (eg, urinary obstruction and leak, and per transplantation fluid collections, including hematoma, seroma, lymphocele, and abscess formation)

and nephrogenic complication (including acute tubular necrosis, graft rejection chronic allograft nephropathy, and neoplasm). Early diagnosis and treatment of these complications are Paramount to prevent graft failure and other significant morbidities to the patients (Yamanaka et al., 2025)

Nurses play a central role in post-transplant care, serving as frontline providers for monitoring vital signs, laboratory parameters, and clinical symptoms that may indicate early graft dysfunction or systemic complications. Effective nursing management encompasses comprehensive assessment, patient education, medication adherence support, infection prevention, and psychosocial care, as well as coordination with the multidisciplinary transplant team. Through vigilant surveillance, prompt identification of complications, and evidence-based interventions, nurses contribute significantly to optimizing transplant outcomes and enhancing patient safety in the critical post-operative period for both recipient and donor (Al Bilasi et al., 2024).

Therapeutic regimen compliance is a fundamental determinant of successful outcomes following renal transplantation. Adherence to prescribed immunosuppressive therapy is essential for maintaining graft function and preventing acute and chronic rejection, graft loss, and increased morbidity and mortality. Despite careful patient selection prior to transplantation, non-adherence remains a common and often under-recognized problem among kidney transplant recipients. Evidence indicates that a significant proportion of patients demonstrate partial or intermittent non-compliance, which may still result in clinically relevant adverse outcomes (Mahmood et al., 2025).

Factors influencing patients' compliance with the therapeutic regimen are multifactorial and include social and economic factors, such as family functioning, social support, and medication costs; healthcare system-related factors, including accessibility and continuity of care; condition-related factors, such as disease symptoms and comorbidities, including psychiatric disorders; therapy-related factors, such as treatment side effects, duration, and regimen complexity; and patient-related factors, including health beliefs, self-efficacy, level of knowledge, and perceived barriers to adherence (Zhang et al., 2025).

Nurses play a pivotal role in the care of renal transplant recipients, addressing complex issues such as medication management, infection prevention, chronic



disease control, fluid balance, urine output monitoring, and the psychological challenges associated with transplantation. Owing to their continuous patient contact, nurses are uniquely positioned to identify early signs of non-compliance and recognize risk factors that predispose patients to non-adherent behaviors. Through ongoing assessment, education, and patient-centered interventions, nurses can implement timely strategies to support adherence and promote optimal long-term transplant outcomes (Lee & Kang, 2025)

Significance of the study:

Kidney transplantation is a chief public health care in both developed and developing countries. Worldwide, kidney transplantation is considered the most common type of solid organ transplantation. According to the Global Observatory on Donation and Transplantation (GODT), 173,727 solid organ transplants were performed globally in 2024, representing the highest number ever reported worldwide. Kidney transplantation accounted for approximately 110,000 kidney transplants, representing nearly two-thirds of all solid organ transplantations performed globally (Martin et al., 2026). Also Farag & Elsayed, 2025 confirmed that the annual new cases of KT in Egypt was around 1100, facilitated by 35 licensed centers based on Egyptian regulations, with an age-standardized prevalence of 106 patients with CKD per 1000 population, reflecting a substantial national CKD burden.

Nurses plays a crucial role in maintaining graft function, preventing complications, and improving patients' overall health outcomes. Nurses are responsible for continuous assessment, infection prevention, medication administration, patient education, psychological support, and monitoring for signs of rejection or complications (André et al., 2024).

Compliance to the therapeutic regimen is one of the most important factors affecting the success of renal transplantation. Patient compliance with medications, dietary instructions, follow-up visits, fluid management, and lifestyle modifications is essential to prevent graft rejection and reduce morbidity and mortality rates. Poor compliance may lead to serious complications, graft failure, repeated hospitalization, and increased healthcare costs. (De Beir et al., 2024). Therefore, this study is important to assess nursing performance and patient compliance among post renal transplantation patients and to identify areas that require improvement in nursing care and patient education.

Aim of the study: Assess nurses' knowledge, practice

and attitude regarding care of patients post renal transplantation

Research Question:

1. What is the level of nurses' knowledge regarding care of patients post renal transplantation?
2. What is the level of nurses' practice regarding care of patients post renal transplantation?
3. What is nurses' attitude regarding care of patients post renal transplantation?
4. What is the degree of patients' therapeutic regimen compliance?

Research design: A descriptive research design was carried out in this study.

Setting: This study was conducted in kidney transplant unit at New Surgery Hospital and Nephrology Outpatient Clinics (transplant follow up) - Zagazig University Hospitals Sharkia Governorate, Egypt.

Subjects: A convenience sample of all available nurses (50) who working in the above mentioned settings and provided direct care to patients, work experience at least one year and accept to participate in the study as well as purposive sample of (32) patients according to the following inclusion criteria ; Patients that had kidney transplantation recently < 18 months ,age <60 years old ,both sexes and agree to participate in the study . .

Tools of data collection:

Three tools were used in this study as the Data was collected by the researcher using the following tools:-

Tool I: Self-administered questionnaire for nurses: The researcher developed the questionnaire after reviewing of recent relevant literature from (Hussein & Zatoon, 2019 & Masaad et al, 2020) to assess nurses' knowledge level about caring of patients post kidney transplantation. It was designed in Arabic language to avoid any misunderstanding. It consisted of 96 questions and composed of three parts as the following :

Part 1 : Demographic data of the studied nurses : this part included data about the demographic characteristics of the studied nurses consisting of eight close ended questions as their age, sex, marital status, qualification, years of experience in general & special nursing experience at kidney transplant department ,training courses and availability of booklet or guidelines about nursing care post renal transplantation.

Part 2: Studied nurses' knowledge questions: - divided into the following 5 sections:-

Section (A): Nurses' knowledge regarding anatomy&



physiology of kidney concerned with assessment nurses' knowledge about anatomy & physiology of kidney as function, location, normal size, parts of urinary system, functional unit of kidney, stages of urine formation and normal urine output for healthy adults.

Section (B): Nurses' knowledge about kidney Failure: It included seven MCQ questions about (definition, causes, signs and symptoms, types of kidney failure, investigations and lines of treatment).

Section (C): Nurses' knowledge about kidney transplantation and its complications: as definitions, prerequisites of kidney transplantation, indication, contraindication, preparation, donors criteria, signs of infection, types and signs of rejection, signs of shock and infection control precautions.

Section (D): Nurses' knowledge about immunosuppressive drugs: As types, uses, side effects and precautions.

Section (E): Nursing intervention for patients with kidney transplantation: it covered vital signs, CVP measurement, urinary catheter care, urine output assessment, diet, patient hygiene, wound care, pain management, LOC assessment, transplanted kidney functions, fluid & electrolytes imbalance, lab investigations, oral care, discharge plan, follow up and healthy guidelines.

Part (3): Nurses' attitude regarding kidney transplantation it consisted of 16 items and presented as 3 points likert scale ranges from zero to two. Zero (disagree), one (quite agree), 2 (agree).

Tool II: An observation checklists for nurses' practice: It evaluates nurses' practice regarding care of patients post renal transplantation which includes: Vital signs (assessment of radial pulse, axillary temperature, respiratory rate, blood pressure), care of urinary catheter, wound care, breathing exercises and pain management which are adopted from (Carter & Notter, 2023). In addition, it included Arterial Blood Gases Sample & CVP measurement adopted from (AACN, 2023). As well as, Physical assessment & Maintaining infection control in renal transplant unit: (routine hand washing, surgical hand asepsis, applying surgical mask, goggles & face shield, removing surgical mask, applying sterile gloves and gown "Closed Method", keeping protective isolation room) adopted from (Doyle & McCutcheon, 2021) and urine output assessment adopted from (Potter et al., 2021).

Tool III: Patient's interview Questionnaire: - it was developed by the researcher after reviewing recent relevant literature from (Abdel-Aziz et al; 2019). The

questionnaire covered three parts as the following:

Part 1: Socio-demographic data of the Patient: - This part was concerned with personal data of the studied patients as: - age, gender, marital status, education, type of work, residence, monthly income, received information about kidney transplantation and its source.

Part 2: Patient's health history. questions to assess patient's past history such as (onset of renal failure, causes of renal failure, type of dialysis, period of dialysis, duration since renal transplantation) and family history of renal failure, and present history (donor type and relationship between donor and recipient, diseases after transplantation, prescribed medications post renal transplantation and presence of medication side effects).

Part 3: Patient's compliance assessment: this part was concerned with compliance of the renal transplant recipients to the recommended therapeutic regimen that include medication, nutrition, fluid intake, follow up visits, work, exercise, prevention of infection, social relationships.

Administrative and ethical considerations:

According to letters from dean of the nursing faculty, Zagazig University's explaining the purpose of the study and requesting support, the general director of Zagazig University Hospitals and the head of the new surgical department gave their consent to carry out the research. The faculty ethical committee approved the study before it started. Prior to starting, the researcher gave the participating nurses and an explanation of the study's objectives and purpose. The confidentiality and anonymity of the nurses' data were ensured by the researcher. The nurses participating in the study were informed that they might withdraw from it at any time without providing a reason, and that they could choose not to participate. The researcher promised to keep the data and information collected confidential and use it only for the study.

Pilot study:

Ten percent of the primary study sample, or eight nurses, participated in a pilot trial. In order to detect potential challenges during data collection, the pilot was designed to verify and assess the tools' clarity, application, and feasibility. It was also useful in estimating the amount of time required to complete the data gathering tools. The participants in the pilot study were incorporated into the main study sample because no changes were made to the tool.

Field work:

Fieldwork of the present study was executed over a period



of 24 months, from June 2024 to June 2026, as follows: 2–3 months were allocated for preparing the literature review, 3–4 months for preparing the study tools, 10 months for sample collection, 2 months for statistical analysis, and 5 months for writing the tables, discussion, and recommendations.

Before collecting the sample, the researchers secured all necessary permissions from the director of Zagazig University Hospital, New surgery Hospital, and kidney transplant directors. Meetings were conducted with the head nurses of the units to clarify the objectives of the study. Nurses' time schedules and assignment sheets were obtained to organize the data collection process. In addition, meetings were held with all study nurses, during which the researcher personally explained the purpose of the study and the nurses' role in completing the questionnaires then distributed to the nurses for completion.

Distribution of the questionnaire was conducted daily at the end of the morning shift for nurses working during the morning shift, and before the beginning of work for nurses working during the afternoon (evening) shift. Each nurse completed the questionnaire individually. The time required to complete the questionnaire ranged from 30–45 minutes. While observational checklists were collected by the researcher through observing the nurses during their actual practices with the patients during both morning and afternoon shifts throughout the study period and the average time required for the completion was around 30–45 minutes.

Concerning the studied patients, the researcher recruited the patients from both renal transplant unit and outpatient transplant follow up clinics. The researcher selected patients according to the inclusion criteria. Each patient was interviewed individually for approximately 30–45 minutes.

Content validity & Reliability:

Once the tool was prepared in their preliminary form, the data collection tools were presented to a panel of five experts from nursing field, these include three professors and two assistant professors of medical surgical nursing from faculty of nursing at Zagazig University. The experts reviewed the tools for relevance comprehensiveness, accuracy, clarity, and easy administration. Minor modifications were done according to the experts' judgement. Internal consistency reliability of all items of the tools was assessed using a Chronbach's Alpha test and presented as following: -Knowledge was 0.954, attitude

:0.719, observational checklist: 0.988 and patients' compliance was 0.733.

Statistical analysis:

All data were collected, tabulated and statistically analysed using SPSS 25.0 for windows (SPSS Inc., Chicago, IL, USA 2011). Quantitative data were expressed as the mean $\pm$ SD & (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test when appropriate. Correlation coefficient test was calculated to assess relationship between various study variables, values near to 1 indicate strong correlation & values near 0 indicate weak correlation. All tests were two sided. P-value < 0.05 was considered statistically significant (S), and p-value ≥ 0.05 was considered statistically insignificant (NS).

Results:

Regarding the demographic characteristics of the nurses in the study sample Table 1 shows that, 72.0% of the studied nurses their age was 25–30 years with mean age 27.62 ± 2.24 , 94.0% were female and had bachelor of nursing, 66.0% are unmarried, 32.0% had 3 years of experience in nursing field in general and 44.0% had 1 year of experience in renal transplantation unit. In addition, 58.0% of nurses received training courses about nursing care for renal transplant and 52.0% reported that there isn't guiding booklet in the department regarding renal transplantation

Figure (1) portrays that more than half (56.7%) of the studied nurses had unsatisfactory total knowledge about renal transplantation. While less than half (43.3%) had satisfactory total knowledge about renal transplantation.

Figure 2 illustrates that nearly two-thirds (62.0%) of the studied nurses had positive attitude regarding renal transplantation. While about one-third (38.0%) had negative attitude.

Table 2 confirms that the highest Satisfactory total practices level of studied nurses were regarding central venous pressure measurement, assessing blood pressure, care of urinary catheter (56%-54%-52%) respectively. While the lowest satisfactory total practices level are regarding measuring level of consciousness, intake & output charting, breathing exercises (36%-36%-34%) respectively.

Table (3) clears that 71.9% of the studied patients' age was above 30 years and male, 81.3% are married and live in rural area, and 59.4% had university education.



While, 90.6% are working and had information from doctor, and 78.1% had enough income.

Table (4) summarizes that most of the studied patients had renal failure for one to 5 years ago and maintained on hemodialysis(81.3% , 100.0%) respectively; less than two thirds the main cause of the renal failure was blood pressure and had mothers donor(59.4%,59.4%) respectively and about one third of patients complained from mouth ulcer (32.0%).

Table (5) portrays that more than two-thirds of the studied patient had total incompliance related extent of compliance to the medication regimen and social relations(68.8%, 68.8%) respectively .While half had total compliance related medical follow-up (50.0%).

Figure 3 demonstrates that about two-thirds (62.5%) of the studied patients had total incompliance regarding the therapeutic regimen post renal transplantation. While more than one-third (37.5%) had total compliance regarding the therapeutic regimen post renal transplantation

According to **Table (6)** there was positive statistically significant correlations matrix between the studied nurses total knowledge and total attitude ($P < 0.001$, $R=0.750$), as well as between the studied nurses total knowledge and total practices ($P < 0.05$, $R=0.350$) and between the total compliance of studied patients and total practices of studied nurses ($P < 0.05$, $R=0.839$).

Discussion:

The present study sample was convenience sample of all available nurses (50 nurses)working in kidney transplant unit and transplant follow-up outpatient clinic the results of the present study clarified that the highest percentage of studied nurses' age ranged from 25-30 years ; majority of studied nurses were females and had bachelor of nursing, more than half of the studied nurses were unmarried and nearly one-third of studied nurses had three years of experience in nursing field in general and slightly less than half of them had one year of experience in renal transplantation unit.

This result may be explained by the fact that KT units is a critical and highly specialized care unit requires high qualified nurses so Bachelor-prepared nurses more suitable for working in such complex units. Also, younger nurses with good health can tolerate the nature of working in KT units. Nursing has historically and globally been a female-dominated profession, as admission of male students in nursing schools only dates less than two decades, so that nursing workforce is still more feminine.

According to nurses' total knowledge regarding renal transplantation, The current study portrayed that more than half of the studied nurses had unsatisfactory total knowledge regarding renal transplantation, while less than half of them had satisfactory total knowledge. From the researcher point of view, this may be attributed to lack of motivation, increased workload, insufficient courses, lack of follow up, inadequate access to standardized written protocols, such as guiding booklets or guidelines and absence of library.

This finding is in harmony with **Alkharabsheh,Mostafa& Ibrahim, (2025)** who found in a study titled "Effect of Implementing an Educational Program about Post kidney Transplant Care on Critical Care Nurses' Knowledge" that most of nurses exhibited unsatisfactory knowledge at the preprogram period. Also, **Khalil, (2024)** who found in a study titled "Nurses' Performance Regarding Care of Patients Undergoing Renal Transplantation." that less than half of studied nurses had satisfactory total knowledge regarding care of patients undergoing renal transplantation, while, slightly more than half of them had unsatisfactory total knowledge about renal transplantation . Additionally, it is in agreement with **Ponnu et al., (2021)**, who conducted a study in India by entitled "Knowledge on nursing management regarding renal transplant among the nurses", and stated that more than half of the studied nurses had poor knowledge.

On the other hand, **Aliam et al., (2023)** who stated that assessment of the total knowledge of the studied nurses about kidney transplantations prior educational intervention implementation has shown that more than one third of them had unsatisfactory knowledge. In addition, **Majchrowicz,Tomaszewska&Guzak,(2023)** confirmed in a study titled "Opinion of surveyed nurses on transplantation and reasons for negative public attitudes toward organ donation" that the majority of nurses surveyed are knowledgeable.

Concerning studied nurses' attitude regarding renal transplantation, the current study illustrated that nearly two-thirds of the studied nurses had positive attitude about renal transplantation.In my opinion, this may be due to several factors such as alert conscience, good ethics and feelings, compassionate, kind and empathetic attitude toward patients.

This finding was in agreement with **Soyibo et al.,(2023)** who mentioned in their study titled "Knowledge and Attitudes of Health Care Professionals Towards Kidney Donation and Transplantation " that Healthcare



professionals consisted of more than half of them as nurses had fairly positive attitudes towards kidney donation and transplantation and suggested the need for awareness programmes to increase the HCP's knowledge and improve their attitudes towards kidney donation and transplantation.

Likely, **Majchrowicz, Tomaszewska & Guzak, (2023)** confirmed in a study titled "Opinion of surveyed nurses on transplantation and reasons for negative public attitudes toward organ donation" that the nurses surveyed are knowledgeable about transplantation and have a positive attitude toward organ donation and transplantation.

On the contrary, **Uwingabiye et al., (2021)** stated in a study titled "Assessment of knowledge, attitude and perceptions regarding kidney donation among nursing students at the University of Rwanda" that more than half of the studied nursing students had negative attitudes toward kidney donation and transplantation.

According to the results of current study; more than half of the studied nurses had unsatisfactory total practices level about renal transplantation. While less than half of studied nurses had satisfactory total practices level about renal transplantation. From the researcher point of view, this may be attributed to limited participation in specialized training, lack of continuous professional development, and heavy workload, inconsistent use of standardized protocols and insufficient theoretical knowledge, lack of motivation and decreased years of experience.

This finding supported by the results of **Khalil, (2024)** who showed in their study that less than half of the studied nurses had competent scores of total practices regarding care of patients undergoing renal transplantation and more than half of them had incompetent scores of practices and explained it by more than half of the studied nurses had experience of less than 5 years at kidney transplantation unit in their study. This finding aligned with **Aliam et al., (2023)** whose results declared that less than half of the studied nurses had competent practices post renal transplantation pre educational intervention in all items of nurses practice post kidney transplantation.

Results of present study demonstrated that nearly three-quarters of the studied patients' age was above 30 years and male, the majority of the studied patients were married and live in rural area. From the researcher point of view this may be due to that chronic kidney disease is more common in adults over 30 years due to conditions such as hypertension and diabetes. In addition, males

have a higher risk of kidney disease and are more likely to undergo renal transplantation.

This finding was congruent with **Derejie et al., (2024)** who reported in a study titled "Medication non-adherence and its associated factors among kidney transplant patients in a large teaching hospital in Ethiopia" that nearly three-quarters of kidney transplant patients were male and over 30 with a median age of 37 years. Also, aligns with **Torres-Gutiérrez et al., (2023)** who found in a study titled "Prevalence and modifiable factors for holistic non-adherence in renal transplant patients: a cross-sectional study" that more than half of the studied patients were male and over 30 years. While disagrees with **Asanova et al., (2025)** who mentioned in a study titled "The determinants of psychological Well-Being among kidney transplant recipients in kazakhstan: A Cross-Sectional study" that more than half of the studied patients were females.

Regarding the marital status of the studied patients, the finding of the current study was consonant with **El-Agroudy et al., (2021)** who stated in a study titled "Quality of life among renal transplant recipients in Bahrain: A single-center experience" that the majority of the studied patients were married. In addition, **Im & Jang, (2024)** stated in a study titled "Predictors of self-care in kidney transplant patients according to preoperative dialysis: A comparative study" that the majority of the studied patients were with spouse.

Regarding the residence, the finding of the current study was consistent with **Sarhan, Jarareh & Shraim, (2021)** who found in a study titled "Quality of life for kidney transplant recipients and hemodialysis patients in Palestine: a cross-sectional study" that more than half of the studied patients live in rural area. While, disagrees with **Jabeen et al., (2021)** who indicated in a study titled "Evaluation of quality of life among kidney transplant patients: A cross-sectional study" that more than half of the studied patients live in urban areas.

Regarding educational level of the studied patients, the current study indicated that more than half of the studied patients had university education. This finding is supported with **Leonforte et al., (2025)** who clarified in a study titled "Role of educational level in kidney transplant outcomes" that nearly two-thirds of the studied patients had a high educational level. While contrasted with **Jabeen et al., (2021)** who reported that many participants had basic or secondary education rather than university education.

Furthermore, the current study showed that the majority of the studied patients are working with enough



income and had information from doctor and all received information about renal transplant .This finding is in agreement with **Knobbe et al.,(2022)** who confirmed in a study about “Employment status and work functioning among kidney transplant recipients” that nearly three-quarters of the studied patients were employed and had better income.

Similarly, **Thomas et al., (2026)** reported in a study titled “ Transplantation and employment earnings in kidney transplant recipients” that kidney transplantation was associated with improved employment income among the majority of transplant recipients, reflecting better socioeconomic outcomes after transplantation .While disagrees with **Park et al.,(2023)** who documented in a study titled “Changes in socioeconomic status and patient outcomes in kidney transplantation recipients in South Korea” that employment rates declined within the first 2 years after transplantation .

In the light of the current study regards renal transplant recipients medical health history; the current study illustrated that the majority of the studied patients had renal failure for one to five years ago and maintained on hemodialysis(81.3% , 100.0%) respectively. This finding is consistent with **Caldwell et al.,(2025)** who demonstrated in a study titled “Kidney transplant wait times under waiting list expansion scenarios” waiting times ranging from about 32 to 52 months depending on the waiting list and organ availability.

Regarding family history of renal failure, the current study reported that all the studied patients had no one in the family had renal failure , more than half of the studied patients reported that the main cause of the renal failure was high blood pressure.

This finding is supported by **Cha'on et al., (2025)** who presented in a study about “Prevalence and risk factors of chronic kidney disease of unknown etiology in Northeast Thailand” that the majority of patients with CKD including renal failure was strongly associated with age, hypertension ,diabetes mellitus, and obesity.

The current study showed that all the studied post transplant patients had a close kinship with the donor. This finding is supported by **Daw et al., (2024)** who stated in a study titled “Relationships, race/ethnicity, gender, age, and living kidney donation evaluation willingness” that more than half of the studied sample donors had a close kinship with the transplant recipients and were mostly family members. While contrasts with **Al Ammary ,(2024)** who found in a study titled “Evolution of biologically related living kidney donation in the

United States from 1988 to 2022” that the proportion of biologically related kidney donors has decreased over time and there was sustained decline , with an increasing number of transplants performed using unrelated donors.

Less than half of the studied patients had blood pressure problems after renal transplantation. The relatively high prevalence of post-transplant hypertension can be explained by the effects of immunosuppressive drugs such as Cyclosporine and Tacrolimus, in addition to factors like fluid retention, pre-existing hypertension, and reduced graft function. This finding is in harmony with **Harsányi et al., (2026)** who mentioned in a study titled “Predictive Factors of Post-transplant Hypertension in Kidney Transplant Recipients: A Single-Center Retrospective Study” that slightly less than half of the studied patients suffered from hypertension post renal transplantation.

The majority of post-transplant patients were non-smokers. This finding is supported by **Marczak et al.,(2025)** who confirmed in a study titled “Patterns of cigarette, e-cigarette, heated tobacco, and alcohol use in solid organ transplant recipients, a pre-versus post-transplant comparison: Survey results from a transplantation center in Poland” that the majority of post-transplant patients were non-smokers .

Regarding total studied patients' compliance to the therapeutic regimen; the current study demonstrated that approximately two-thirds of the studied patients had total incompliance related the therapeutic regimen post renal transplantation. This may be attributed to the complexity of lifelong multidrug regimens, medication side effects, financial constraints, low motivation, stress, denial, forgetfulness and poor social support and inadequate follow-up.

This finding is supported by **Heape, Cronin & Hughes , (2025)** who reported in a study titled “Understanding immunosuppression medication adherence in kidney transplant recipients: a cross-sectional exploration of the role of illness perceptions, medication beliefs and perceived behavioral control” that more than half of kidney transplantation recipients had total non-adherence to therapeutic regimen .

Conversely, **Huang et al., (2024)** who confirmed in a study titled “Knowledge, attitude, and practice toward postoperative self-management among kidney transplant recipients” that the majority of kidney transplant recipients had good knowledge, positive attitude and good practice toward postoperative self-management and therapeutic regimen adherence.

The current study demonstrated that there was highly



statistically significant correlations between the studied nurses total knowledge and total attitude ($P < 0.001$), and there was statistically significant correlations between the studied nurses total knowledge and total practices between the total compliance of studied patients and total practices of studied nurses ($P < 0.05$).

From my point of view, the observed correlations concerning positive association between knowledge, attitude, and practice suggests that well-informed nurses are more likely to exhibit positive attitudes and apply appropriate clinical practices. Moreover, the significant relationship between nurses' practices and patient compliance highlights the important role of nursing care in enhancing compliance. These findings align with evidence emphasizing the impact of patient education and continuous nursing support on adherence among renal transplant recipients. However, patient compliance may also be influenced by individual and psychosocial factors beyond nursing care.

This finding is in alignment with **Zhu et al., (2026)** who found in a study titled "A nurse-led program to improve immunosuppressant medication adherence in adult kidney transplant recipients: a randomized clinical trial" that nurses lead the implementation of structured adherence programs within transplant care teams, educating and empowering KTRs to effectively manage their medication behaviors. In addition, significant correlation between improved patient adherence outcomes and nurses active involvement in follow-up programs.

In addition, it is supported by **Lee & Kang, (2025)** who mentioned in a study titled "Self-management interventions for kidney transplant recipients: A systematic review" that nurse-involved education and support significantly improve patient adherence and self-management reflecting strong positive correlation between nurses competencies and patients' compliance to therapeutic regimen. Additionally it aligns with the findings of **Azer et al., (2024)**, who reported that there was a high statistically significant correlation between studied nurses' knowledge and practices.

On the other hand, it partially disagrees with **Zhou et al., (2025)** who found in a study titled "Investigating the pathways of medication adherence in renal transplant recipients based on the COM-B model: the parallel mediating effects of beliefs and emotion regulation efficacy" that patients adherence is strongly correlated and influenced by beliefs, emotional factors, social

support, not only healthcare provider factors. Additionally, this finding is inconsistent with **Khalil, (2024)** in study titled "Nurses' Performance Regarding Care of Patients Undergoing Renal Transplantation" who confirmed that there was insignificant statistically correlation between total knowledge and total practices scores of the studied nurses. Furthermore, it stands against **Aliam et al., (2023)** whose findings showed, that were no statistically significant correlation between nurses' knowledge and practices post renal transplantation.

Conclusion:

According to the results of the present study, it can be concluded that more than half of studied nurses had unsatisfactory knowledge and practice regarding post-renal transplantation care, while nearly two-thirds had a total positive attitude. Additionally, there is a significant relationship between studied nurses' total knowledge, attitude, and practice. Moreover, the current study concluded that nearly two-thirds of studied patients were non-compliant with the therapeutic regimen. Furthermore, there is a significant relationship between studied patients' total compliance, studied nurses' total knowledge, practice and attitude.

Recommendations:

Based on the findings of the current study, the following recommendations are proposed:

1. Implement continuous in-service training programs to improve nurses' knowledge and clinical practices related to renal transplantation.
2. Provide and ensure accessibility of updated guideline booklets in transplant units.
3. Develop tailored educational programs considering patients' educational level and socioeconomic status.
4. Enhance patient counseling regarding the importance of compliance to therapeutic regimens.
5. Establish regular monitoring systems to evaluate both nurses' performance and patient compliance.
6. Integrate continuous evaluation and feedback mechanisms for nurses and patients.
7. Conduct further studies to explore factors affecting both nurses' performance and patient compliance.
8. Apply this study on a large sample for generalization.



Table (1): Frequency and Percentage Distribution to Demographic Characteristics of Studied Nurses (n=50).

Demographic characteristics	No.	%
Age		
>25	4	8.0
25->30	36	72.0
30+	10	20.0
Mean $\pm$ SD	27.62 $\pm$ 2.24	
Sex		
Male	3	6.0
Female	47	94.0
Qualification		
Nursing Technical Institute	3	6.0
Bachelor of nursing	47	94.0
Marital status		
Married	17	34.0
Unmarried	33	66.0
Years of experience in nursing		
1 year	11	22.0
2 years	9	18.0
3 years	16	32.0
4 years	8	16.0
5 years	6	12.0
Years of experience in renal transplantation:		
<1year	9	18.0
1-2 year	22	44.0
>2 years	19	38.0
Training courses regarding renal transplant		
Yes	21	42.0
No	29	58.0
Presence of guiding booklet regarding renal transplantation		
Yes	24	48.0
No	26	52.0

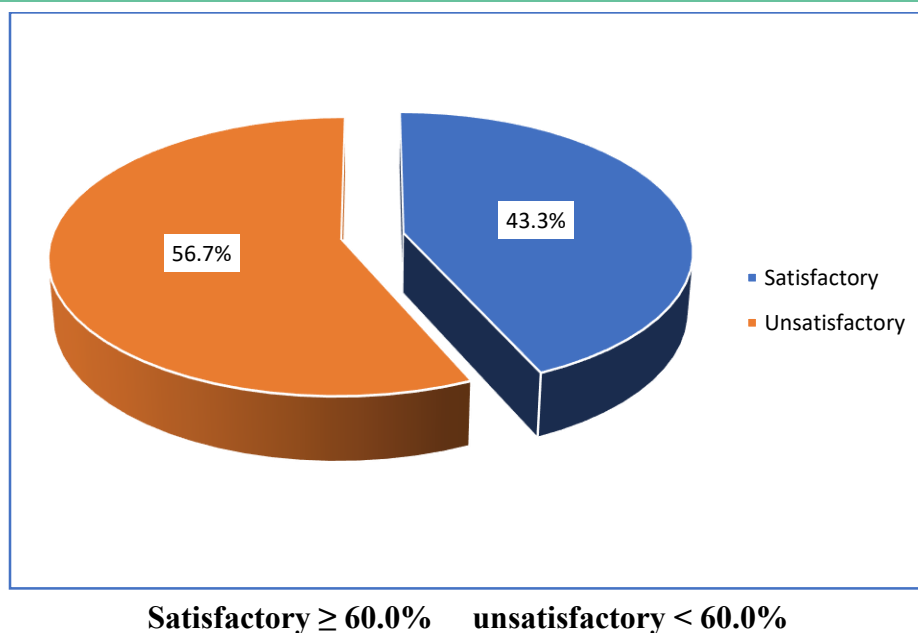


Figure (1): Studied Nurses' Total Knowledge Level regarding Renal Transplantation (n=50).

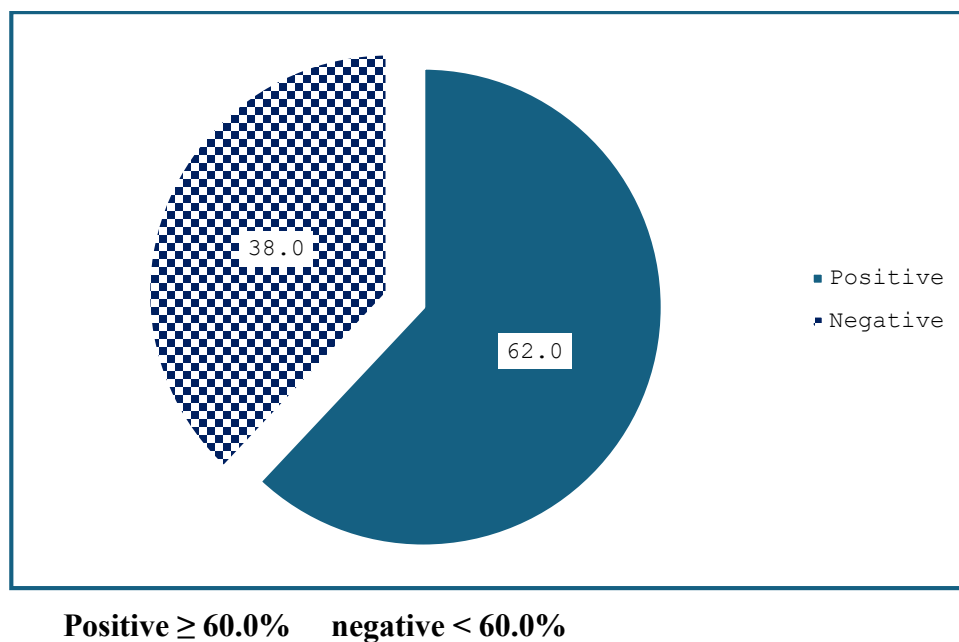


Figure (2): Studied Nurses' Total Attitude Level regarding Renal Transplantation (n=50).

**Table (2): Frequency and Percentage Distribution of Studied Nurses' Total Satisfactory Practices (n=50).**

Items	Satisfactory (≥75.0%)	
	No.	%
Total Physical assessment	21	42.0
Assessment of radial pulse	22	44.0
Assessing axillary temperature	21	42.0
Assessing respiratory rate	20	40.0
Assessing blood pressure	27	54.0
Arterial Blood Sample	23	46.0
CVP measurement	28	56.0
Care of urinary catheter	26	52.0
Wound care	20	40.0
Breathing exercises	17	34.0
Urine output assessment	18	36.0
Measuring LOC	18	36.0
Pain management	22	44.0
Maintaining infection control measures	24	48.0

LOC: Level of Consciousness

CVP: Central Venous Pressure

Table (3): Frequency and Percentage Distribution of Demographic Characteristics of Studied Patients (n=32).

Demographic characteristics	No.	%
Age		
>30	9	28.1
30 +	23	71.9
Min-Max	24-31	
Mean ±SD	27.62±2.24	
Sex		
Male	23	71.9
Female	9	28.1
Marital		
Married	26	81.3
Unmarried	6	18.8
Level of education		
Reads and writes	3	9.4
Intermediate	10	31.3
University	19	59.4
Current job		
Work	29	90.6
Don't work	3	9.4
Residence		
Urban	6	18.8
Rural	26	81.3
Income		
Enough	25	78.1
Not enough	7	21.9
Received information about renal transplantation		
Yes	32	100.0
*In case of yes, what is the source of the information? (n=32)		
Social Media	6	18.8
Doctor	29	90.6

*results not mutually exclusive



Table (4): Frequency and Percentage Distribution of Studied Patients regarding Medical History (n=32).

Medical history	No.	%
You have renal failure from		
Less than one year	3	9.4
1-<5 years	26	81.3
5- >10 years	3	9.4
The cause of renal failure was: -		
Hypertension	19	59.4
Diabetes mellitus	6	18.8
Unknown	7	21.9
Type of dialysis		
Hemodialysis	32	100.0
How long have you been on dialysis?		
<1Year	6	18.8
1-5 years	26	81.3
Renal transplantation has been done since		
Less than 18 months	32	100.0
Are you smoker		
Yes	9	28.1
No	23	71.9
Are you taking drugs without medical prescription?		
Yes	6	18.8
No	26	81.3
Renal transplantation is		
The first trial	32	100.0
Does anyone in your family have renal failure?		
No	32	100.0
The type of donor		
Close Kinship	32	100.0
What is the kinship?		
Father	6	18.8
Mother	19	59.4
Brother	7	21.9
What health problems developed after renal transplantation (n=16)		
Diabetes mellitus	3	9.4
Blood pressure	13	40.6
What medications are you taking now?		
Immune suppressive	13	26.0
Blood pressure	9	18.0
Peptic drugs	4	8.0
Have experienced any of the following complaints		
Mouth ulcer	16	32.0
The appearance of skin pimples (pimples)	3	6.0
Skin color change	3	6.0
Head hair loss	4	8.0
Pain when urinating	3	6.0



Table (5): Frequency and Percentage Distribution of Studied Patients' Total Compliance to the Therapeutic Regimen (n=32).

Items	Compliance		Incompliance	
	No	%	No	%
Compliance related to the medication regimen	10	31.3	22	68.8
Compliance related nutrition	12	37.5	20	62.5
Compliance related control of fluid intake	14	43.8	18	56.3
Compliance related prevention of infection	15	46.9	17	53.1
Compliance related medical follow-up	16	50.0	16	50.0
Compliance related social relations	10	31.3	22	68.8
Compliance related the nature of work PRT	12	37.5	20	62.5
Compliance related exercise & sports	15	46.9	17	53.1
Compliance related marital and intimate relationship (n=26)	10	38.5	16	61.5

PRT: Post Renal Transplant

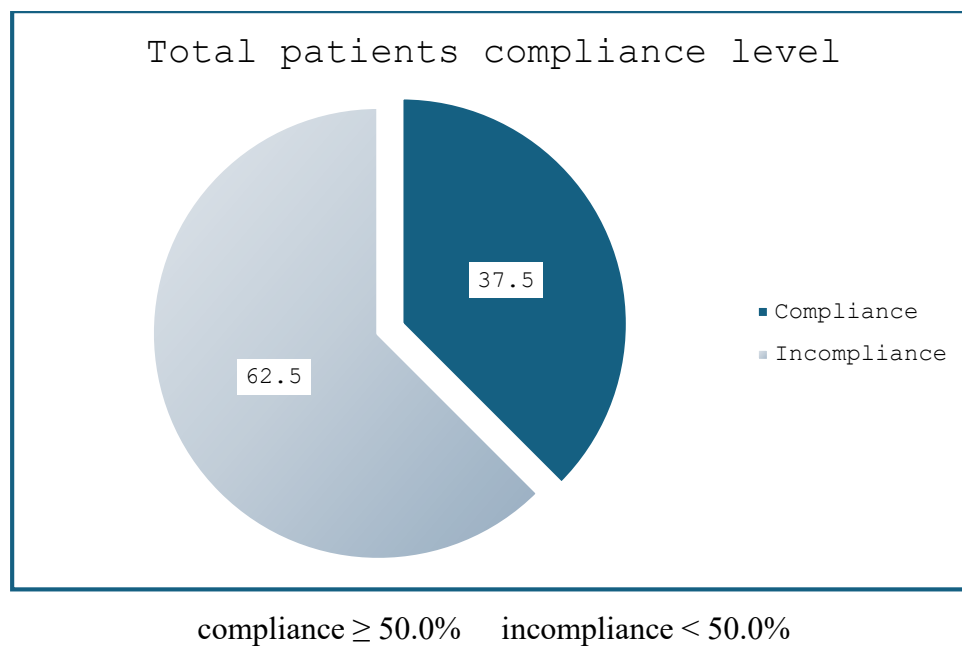


Figure (3): Total studied patients' compliance regarding the therapeutic regimen



Table (6): Correlation between Total Knowledge, Practices and Attitude of Studied Nurses and Total Compliance of Studied Patients.

Study variables		Total nurses knowledge	Total nurses attitude	Total nurses practices	Total patients compliance
Total nurses knowledge	R	1	.750	.350	.189
	P-value		.000**	.013*	.301
	N		50	50	32
Total nurses attitude	R	.750	1	.226	.239
	P-value	.000**		.114	.187
	N	50		50	32
Total nurses practices	R	.350	.226	1	.839
	P-value	.013*	.114		.037*
	N	50	50		32

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