

Research Article

Kidney Transplantation: Our Experience in a Private Tertiary Center in Abuja

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Abstract

Introduction: The success of kidney transplantation depend on the effectiveness in certain key factors including excellent donor compatibility, immunosuppression and good surgical techniques. Exciting prospects in kidney transplantation is envisaged especially with the launching of standards and guidelines for the establishment and coordinating organ/tissue transplantation services by the Federal Government of Nigeria in March, 2025. We have come a long way with our five year experience in kidney transplantation. The use of branded immunosuppressive agents, excellent HLA/DSA typing and compatibility as well as ‘top notch’ surgical and medical team of experts have exponentially achieved a favorable outcome. Challenges are not unusual but we are hopeful that the future is promising and will offer more advancement in ‘tips and tricks’ of successful lifelong kidney transplantation. We report our experience in kidney transplantation over a 5 year period in our center. **Methodology:** This is a retrospective cohort study involving patients who had kidney transplantation in our facility over a 5 year period from January 2020 to December 2024. A proforma was designed to obtain existing records from our data base. Data analysis was conducted using Python with its libraries including Pandas, Numpy and Matplotlib. P value of less than 0.05 was considered statistically significant. **Results:** Descriptive Statistics showed that a total of 104 patients had kidney transplantation surgery over the prescribed period. 66.35% were males while 33.65% were females. The average age of recipients was 46.27 years with a range of 24 to 72 years while the average age donors was 26.12 years with a range of 18 to 50 years. The average length of hospital stay after donor nephrectomy was 4.14 days while the average length of hospital stay for recipients post-surgery was 9.50 days with a range of 7-12 days. The etiology of renal failure were mainly long-term hypertension in 38.46%, diabetic mellitus in 29.81%, combination of both comorbid condition in 28.85%, autoimmune disease in 1.92% and genetic factor in 0.96%. Prognosis six months post-surgery was good in 82.69% and only 17.31% had unfavorable outcome. No donor mortality was observed. **Conclusion:** We have come a long way with our 5 years experience in management of end stage kidney disease in tropical Africa with excellent outcome. Though challenges are inevitable, the future still hold a promising exiting prospects as we envisage progressive experience and welcome new innovations including the use of minimal access techniques to achieve improved results.

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Keywords

Kidney Transplantation, End Stage Kidney Disease, Chronic Kidney Disease, Hypertension, Diabetes Mellitus, Donor, Recipient

1. Introduction

Kidney transplantation (KTP) is a form of renal replacement therapy and a well-recognized treatment of choice for selected patients with end-stage kidney disease (ESKD) [1]. The recipient of the new kidney invariably enjoys better quality of life (QoL) with significant reduction in the morbidity and mortality. Dialysis which is also another form of renal replacement therapy is not without notable complications including renal cysts formation. KTP invariably remains a better and economic alternative where necessary compared with long-term dialysis. [2] Patients considered for KTP must have confirmed chronic kidney disease (CKD) stage 5 (eGFR <15 ml/min/1.73 m²) and fit for major surgical intervention and long-term immunosuppression. Preemptive kidney transplantation may be considered in patients with an eGFR >15 ml/min/1.73 m² if they have indications requiring occasional dialysis. Other challenging areas are with patients with malignancy as no standard consensus exists to guide decision to proceed with KTP in Nigeria.

Increasing demands and paucity of organ supply, lack of standard guidelines as well as legal issues has being a major challenge that disrupts organ transplantation in Nigeria. The Federal Government of Nigeria recently launched standards and guidelines for the establishment and coordinating organ/tissue transplantation services in March, 2025 with the aim of regulating organ donation and supply protocol. [3] Expansion of the kidney donor bank has been achieved through the use of both living and deceased donors. However, the use of deceased or cadaveric donors has not gained acceptance in Nigeria and other sub-sahara Africa perhaps for religious reasons.

The success of kidney transplantation depend on the effectiveness in certain key factors including excellent donor compatibility, immunosuppression and good surgical techniques. [4] Exciting prospects in kidney transplantation is envisaged especially with the launching of standards and guidelines for the establishment and coordinating organ/tissue transplantation services by the Federal Government of Nigeria in March, 2025. [3] The use of branded immunosuppressive agents, excellent HLA/DSA typing and compatibility as well as 'top notch' surgical and medical team of experts have exponentially achieved a favorable outcome. [4] Challenges are not unusual but we are hopeful that the future is promising and will offer more advancement in 'tips and tricks' of successful lifelong kidney transplantation.

Jamilya Saparbay et al reported that donor characteristics such as sex, age, site of donor nephrectomy had no significant

impact on graft survival. They also noted that recipients' sex, underlying risk factor, immunological status and post-transplant events such as acute graft rejection episodes after transplantation were predictors of poor prognosis as per kidney function one year following KTP. [5]

Many factors determining the long-term outcome and prognosis after KTP is generally assessed by mortality rate or kidney dysfunction leading to loss of graft. Christophe Legendre et al noted that graft from living donors yields better result while graft from expanded criteria donors have poor prognosis with deleterious impacts. [6] Several factors such as age of both donor and recipients, ethnic background, duration on dialysis, comorbidities, malignancy, infection, level of renal impairment, HLA typing and cross matching, plasmapheresis, delayed graft function affects graft survival as well as outcome of KTP. [6]

Age invariably affects the outcome of KTP as older patients have higher prevalence of comorbidity and greater risk of postoperative complications compared to younger patients. Nyengaard et al noted that the risks of delayed graft function, acute rejection, and graft failure from donors >65 years are significantly higher compared to younger patients. The number of sclerosed glomeruli per kidney and the mean glomerular volume negatively correlate with age beyond 60 years and may increase to 30-50% after the age of 60 but positively correlate with kidney weight. [7, 8]

The management of ESKD is not economic friendly and associated with morbidity and mortality. Hypertension and diabetes mellitus remain the leading causes of ESKD, accounting for 29% and 47% respectively. [9, 10] Wai H Lim et al reported that 1 in 2 Australians with ESKD has diabetes mellitus with up to 35% of cases directly attributed to diabetes with higher mortality compared with the age-matched general population. A high mortality rate has also been attributed to cardiovascular disease including hypertension, autoimmune diseases, infection, obstructive nephropathy and malignancy. [11] Cardiovascular diseases, diabetes mellitus and chronic kidney disease (CKD) are related and interlinked conditions. Kris Vijay et al reported that 25%-40% of patients with heart failure have DM and 40%-50% of patients with heart failure have CKD. Both DM and CKD are associated with increased risk of hypertension and heart failure. More so, 40% of people with DM develop CKD thus making DM the leading cause of kidney failure globally. [12] They also reported that 16% of patients with heart failure have both DM and CKD with the combination of these 3 comorbidities leading to increased risk

of ESKD with associated morbidity and mortality. The mechanisms that underlie the relationships between cardiac diseases, DM, and CKD are not clear but likely relate to shared cardiovascular and metabolic predisposing factors with downstream effects on inflammation, oxidative stress, and neuro-hormonal pathways. [12]

Wang Y et al noted that graft survival and discontinuance of dialysis are the most important parameters in assessing outcome of kidney transplantation surgery. [13] Monitoring graft function, therapeutic drug concentrations including tacrolimus level, serial twice daily electrolyte, urea and creatinine as well as surgical complications and kidney perfusion via resistive index are the most important aspect of immediate post-operative assessment of recipients. Patient reported outcomes (PROs) and QoL are mainly assessed on long-term basis and are viewed as an invaluable tools in evaluating health related QoL and symptom burden. [13]

The role of immunosuppressive agents cannot not be overemphasized in KTP as it plays a key role in graft survival and outcome. Bartosz Foroniewicz et al in their assessment of long-term outcome of KTP emphasized that the benefit of immunosuppression depends on patient characteristics. [14] Immunosuppressive medications can improve graft survival but unlikely to address the increasing morbidity and mortality from the identifiable cause of ESKD such as hypertension, diabetes mellitus, obstructive nephropathy from bladder outlet obstruction and infections. Treatment ought to be individualized and post-transplant care provided mainly by the transplant nephrologist with in-depth knowledge of all implicating factors to improve long-term outcomes after KTP. [14] Current branded immunosuppression protocol are effective in preventing graft rejection. However the burden of progressive negative impact on inherent etiological factors such as long-term hypertension, diabetes, renal parenchymal disease and nonspecific factors including bladder outlet obstruction, infection and malignancy has attributed significant negative long-term consequences that may be worse in the future due to increasing age of both donors and recipients. [6]

Imran Khan et al in a prospective observational study conducted over a period of 2 years noted that 45 patients had KTP during the prescribed period with male dominance. The most common comorbidity was hypertension and the major native identifiable kidney disease was IgA nephropathy followed by an unknown cause. [15] Imran Khan et al also noted a favorable renal transplant experience among a relatively healthy recipients. Their challenge was related to potential lacunae including the lack of etiology of ESKD, the low rate of pre-emptive transplant, and no deceased donor transplant. [15]

In this study, we report our experience and challenges of KTP performed in Alliance Hospital and Services Limited Abuja with peculiar focus on outcomes amongst recipients at 6 months following KTP.

2. Methodology

This is a retrospective cohort study involving patients who had kidney transplantation surgery in Alliance Hospital and Services Limited Abuja over a 5 year period from January 1, 2020 to December 31, 2024. Alliance Hospital and Services Limited Abuja is a privately owned tertiary center that offers specialist services in virtually all fields of medicine and surgery including organ transplantation. A proforma was designed to obtain existing records from our data base including relevant biodata, etiology of chronic kidney disease/ESKD, site of donor nephrectomy, length of hospital stay for both donors and recipients, post KTP serial urea and creatinine up to 6 months as well as prognosis and QoL after KTP. All donors had compatible HLA typing and crossmatching before KTP. CT angiography was also done for all donor patients to guide the surgeons on the anatomy and site of donor nephrectomy. Ethical clearance was obtained from the hospital management and ethical committee. Data analysis was conducted using Python with its libraries including Pandas, Numpy and Matplotlib. P value of less than 0.05 was considered statistically significant.

3. Results

A total number of one hundred and four patients had KTP during the prescribed period. 66.35% of the recipients were males while 33.65% of recipients were females as shown in Figure 1.

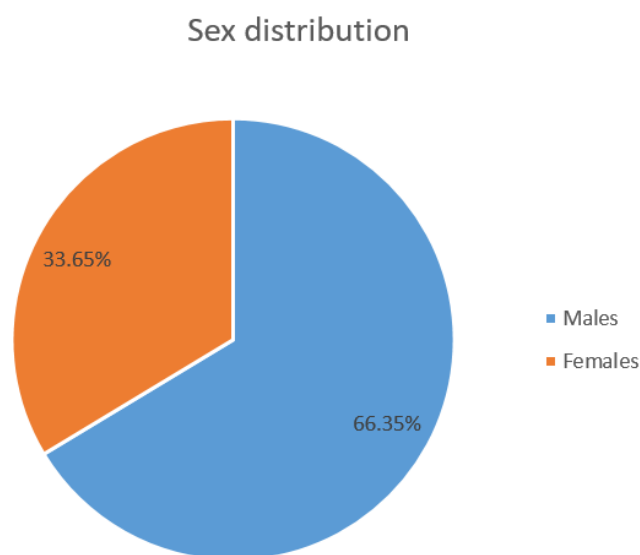


Figure 1. Sex distribution of recipients.

The average age of recipients was 46.27 years with a range of 24 to 72 years while the average age donors was 26.12 years with a range of 18 to 50 years as shown in Figure 2.

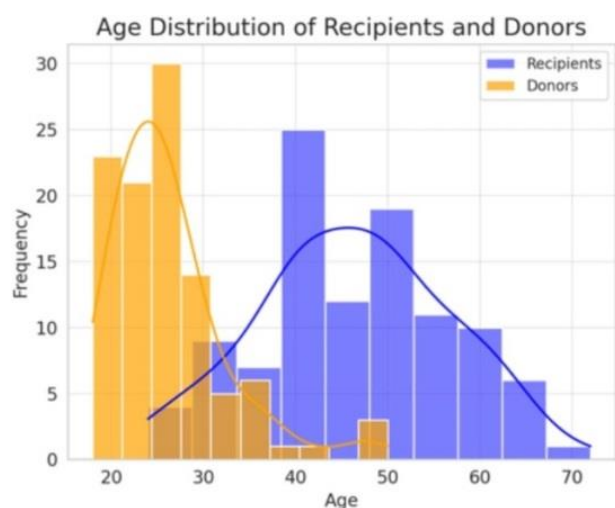


Figure 2. Showings age distribution of both donors and recipients.

Ninety eight donors (94.2%) had left donor nephrectomy while only 6 (5.8%) donors had their right kidney harvested

for KTP as shown in Figure 3.

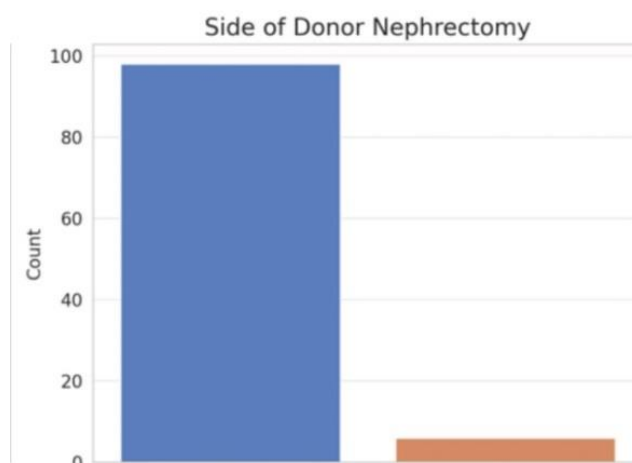


Figure 3. Site of donor nephrectomy.

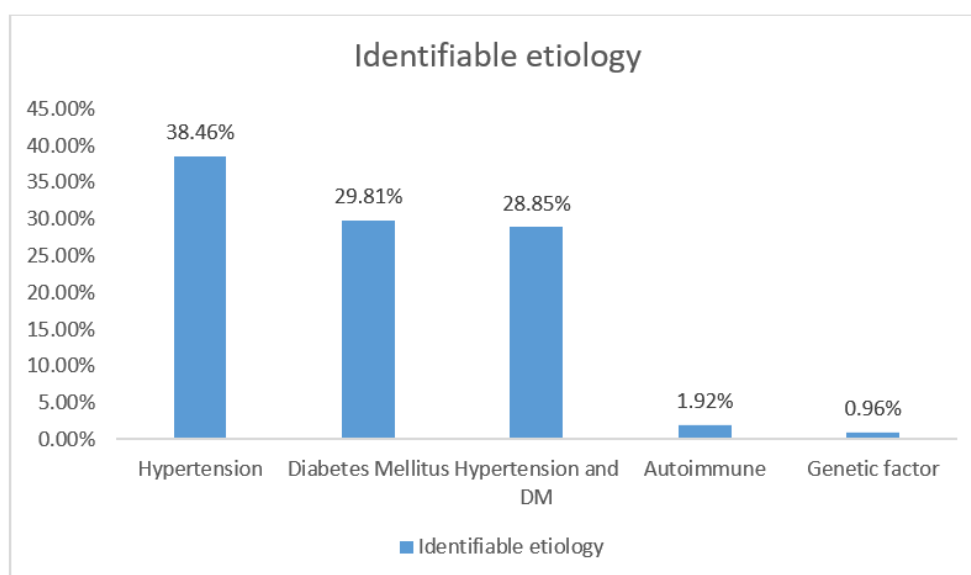


Figure 4. Identifiable etiology of ESKD in our patients.

The identifiable etiology of ESKD were hypertension in 38.46%, diabetes mellitus in 29.81%, combination of both comorbid condition in 28.85%, autoimmune disease in 1.92% and genetic factor in 0.96% as depicted in Figure 4. All donors had open donor nephrectomy. The average length of hospital stay after donor nephrectomy was 4.14 days with a range of 4-12 days, while the average length of hospital stay for recipients was 9.50 days with a range of 7-12 days.

Prognosis outcome analysis showed good outcome in 86 cases (82.7%) and poor outcome in 18 cases (17.3%). The majority of patients had a favorable prognosis six months post-surgery as shown in Figure 5 below.

Prognosis Outcome Distribution (6 Months Post-Surgery)

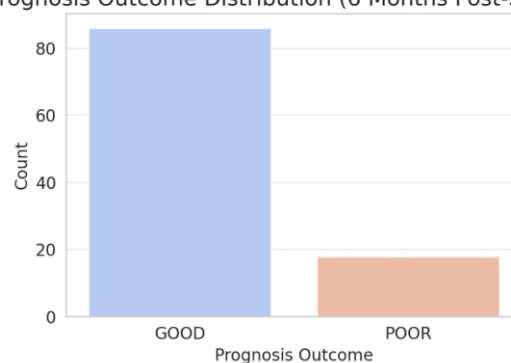


Figure 5. Prognosis outcome after 6 months.

Further sequential breakdown of prognosis by sex showed that similar prognosis across sexes. Six poor outcomes out of 35 cases (17.1%) were noted in females while 12 poor outcomes out of 69 cases (17.4%) were observed amongst male recipients as depicted in Figure 6.

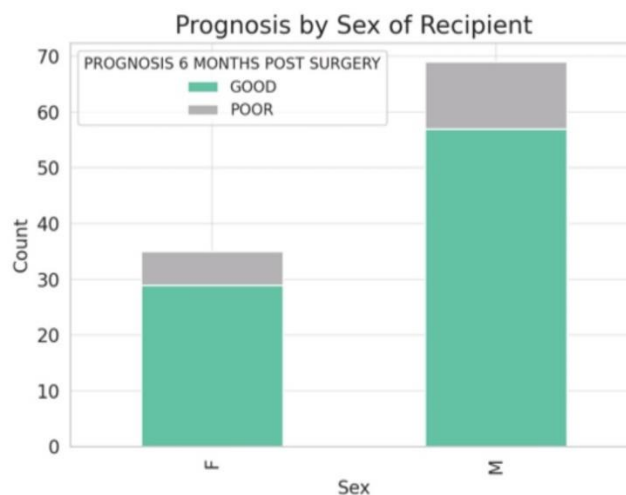


Figure 6. Prognosis by sex.

The prognosis by age showed that patients aged 46-60 had the poorest outcome (9 cases) compared to young patients (<30 years) who had only good outcomes. Patients aged 60 and above had a higher proportion of poor outcomes (4 cases) compared to younger patients (<30 years) as depicted in Figure 7.

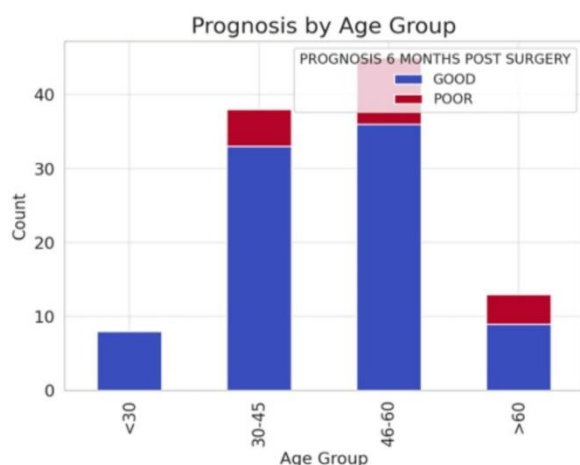


Figure 7. Prognosis by age group.

Prognosis with respect to site of donor nephrectomy showed that amongst the patients who received left kidney, 82.65% had good outcome while 17.35% had poor outcome. For patients who received right kidney, 83.33% had good outcome while 16.67% had poor outcome. Most patients

received left kidney but prognosis were similar compared to patients who received right kidney as shown in Figure 8.

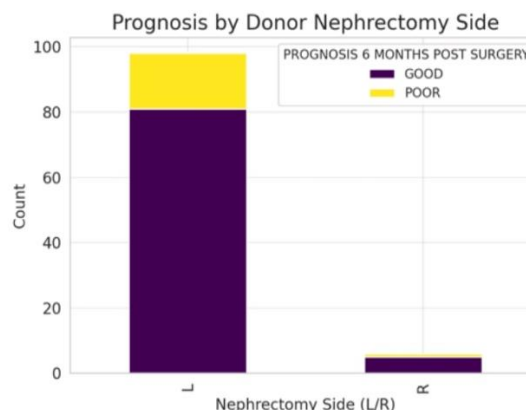


Figure 8. Prognosis based on side of kidney received by recipients.

4. Discussion

Kidney transplantation (KTP) remains the most viable form of renal replacement therapy and a well-recognized treatment option for selected patients with end-stage kidney disease (ESKD). [1] The recipient of the new kidney/graft invariably enjoys better quality of life (QoL) with significant reduction in the morbidity and over 10 year favorable outcome. Dialysis which is also another form of renal replacement therapy is not without notable complications including renal cysts formation especially with long-term dialysis. KTP invariably remains a better and economic alternative where necessary compared with long-term dialysis. [1] We encourage our patients with ESKD to opt for KTP as early as possible compared to long-term dialysis which is associated with significant untoward effects and remains an economic burden. Early KTP following ESKD has a favorable outcome. [1] Our success rate was 82.7% which is encouraging and probably attributed to the fact that we encourage early KTP once we diagnosed ESKD. Aside encouraging early KTP we also adhere strictly to our protocol including excellent donor HLA/DSA typing and compatibility, use of branded immunosuppressive agents as well as 'top notch' surgical and medical team of experts. Wang Y et al reported that graft survival and discontinuance of dialysis are the most important parameters in assessing outcome of kidney transplantation surgery. [13] Our patients stopped dialysis after KTP evidenced by progressive reduction of urea and creatinine to normal value within 3-5 days after KTP with resolution of pre transplant symptoms and discontinuation of hemodialysis as reported by Wang Y et al. [13]

We observed male preponderance amongst patients seeking KTP as 66.35% were males and only 33.65% were females. Our findings are in keeping with that of Carrero JJ et al who reported that while CKD affects more females than males, paradoxically there seems to be a preponderance of males among patients on renal replacement therapy including KTP. They also attributed this to the fact that the protective effects

of estrogen in females as well as the damaging effects of testosterone. The unhealthy lifestyles commonly associated with males like intake of alcohol, smoking, higher risk of injury and occupational hazards might lead to faster decline in kidney function in males compared to females with more males presenting for KTP. [16, 17] More so, females in tropical Africa like Nigeria live in poverty, receive less education and are dependent on others for health care decision making compare to males. [17] Dissimilarities between the sexes are also apparent in the outcomes of CKD with mortality higher in males than females while the difference disappears for patients who had KTP. [16] This is similar to our findings as both males and females post KTP had similar poor outcome of about 17% respectively though we recorded more success in males compared to females.

ESKD is occurs in all age groups but commoner in the in older patients due to other pathologies like prostate enlargement causing obstructive nephropathy, comorbid conditions like hypertension and DM as well as progressive sclerosis with decreased renal function especially in the elderly. Neri F et al noted that reduced graft survival in elderly kidney recipients seems to be related more to the increasing recipient's age than to the donor's characteristics. [18] This is similar to our experience as we noted that the average age of recipients was about 46 years compared to the donors with an average age of 26 years. Our experience is also similar to findings by Minjur Dorji et al which showed that the mean age of patients with CKD coming for KTP was around 47 years. [20]

Majority of the donors had left donor nephrectomy while a selected few had right donor nephrectomy due to the anatomic complexity which may complicate the surgery. We preferred left donor nephrectomy because the renal vessels are longer making implantation into the recipient easier. Occasionally, we opt for right donor nephrectomy only when the anatomy on the left is complex with multiple arteries compared to the right side to avoid anastomosing multiple arteries which will invariably affect graft survival. Ruch B et al also reported similar experience with emphasis that left donor nephrectomy is preferred over right due to anatomical factors and ease of procurement. [19] Right donor nephrectomy is also not associated with higher incidence of complications compared to left donor nephrectomy. Ruch B et al also noted that open implantation of robotically procured right renal allografts was not associated with higher risk of recipient complications. [18] This is similar to our experience as both the success and complication rate were same for both right and left donor nephrectomy. Our choice of left donor nephrectomy was purely on anatomic simplicity except for few cases where we opted for right donor nephrectomy because of rare anatomic complexity on the left with multiple arteries.

Hypertension was the commonest cause of CKD requiring KTP in our facility in 38.46% of patients who had KTP followed by DM and infection. This is in keeping with finding by Minjur Dorji et al which noted hypertension, chronic glomerulonephritis and DM constituting 20.8%, 12.9%, and 8.9%

of the total patients respectively. [20] From the foregoing, the strategy to preventing CKD with consequent ESRD lies on prevention, early diagnosis, timely and appropriate treatment. This may invariably reduce the risk of CKD/ESKD with eventual reduction in patient seeking KTP and associated economic burden. Hashmi FM et al reported diabetes mellitus as the leading cause of ESKD followed by vascular disorders. This is at variance with our experience which showed that majority of our patients with ESKD had hypertension. While the variation may be as a result of their large sample size, however we also observed that a significant number of our patients scheduled for KTP had both hypertension and diabetes mellitus as the identifiable risk for ESKD. This may align with the finding by Hashmi FM et al when we add up the latter category with the patients confirmed with DM alone as the identifiable risk factor. [21]

5. Conclusion

We have come a long way with our 5 years experience in management of end stage kidney disease in tropical Africa with excellent outcome. Though challenges are inevitable, the future still hold a promising exiting prospects as we envisage progressive experience and welcome new innovations including the use of minimal access techniques to achieve improved results obtainable in developed countries.

Limitation

We acknowledge limitations inherent to single-center retrospective studies such as small sample size. We believe a large and multi-center study will further add value to a comprehensive experience, The short follow-up period is also insufficient to properly assess long term prognosis.

Abbreviations

KTP	Kidney Transplantation
ESKD	End Stage Kidney Disease
CKD	Chronic Kidney Disease
eGFR	Estimated Glomerular Filtration Rate
DM	Diabetes Mellitus
PRO	Patient Reported Outcome
QoL	Quality of Life

Ethical Clearance

Ethical clearance was obtained from the hospital ethical committee.

Author Contributions

Obiatuegwu Kenenna: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Methodology, Project administration, Writing – original draft, Writing – review & editing

Otabor Christopher: Funding acquisition, Supervision, Validation, Writing – review & editing

Agrawal Rajesh Kumar: Project administration, Resources, Validation, Writing – review & editing

Magnus Felix: Investigation, Methodology, Software, Visualization

Aremu Abayomi: Data curation, Formal Analysis, Investigation, Project administration

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Data Availability Statement

All data are in the archive of the hospital record department and readily accessible.

Conflicts of Interest

The authors declare no conflicts of interest.

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