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**IMPACT OF KIDNEY TRANSPLANT ON QUALITY OF LIFE(QOL)
WITH CKD PATIENT**

A PROJECT REPORT

BY

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Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment of
B.Sc. in Nutrition and Food Engineering

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APPROVAL

This project, “**Impact of Kidney Transplant on Quality of Life(QoL) With CKD Patient**”, has been turned in by **Shakila Akter** to the Department of Nutrition and Food Engineering at Daffodil International University. It has been accepted as a partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved for its style and content.

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DECLARATION

I hereby declare that this project has been done by me under the supervision of **Tasmia Tasnim, Assistant Professor**, Department of Nutrition and Food Engineering, Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Background: Chronic Kidney Disease (CKD) is a condition in which kidney function declines over time. The primary objective of this study was to assess the impact of kidney transplant on Quality of Life(QoL) with CKD patients.

Methods: A cross-sectional study on 200 patients who had undergone kidney transplantation at “Kidney Foundation Hospital and Research Institute. Data were collected through structured questionnaires, and pre-constructed KDQOL-SF. Data were analyzed using IBM SPSS, version 22 with significance of $p < 0.05$.

Results: The study included 200 patients, with 74.5% aged less than 60 years and a slight male predominance (54.0%). Most patients had secondary education or higher (88.0%) and were from urban areas (56.0%). Clinical assessments showed a mean eGFR of 39.49 ml/min/1.73m² and elevated creatinine levels (224.31 µmol/L). A significant proportion of patients had comorbidities such as diabetes (46.5%) and hypertension (58.0%). Quality of life scores indicated significant impacts based on age group, with patients >60 years old showing worse outcomes in the Burden of Kidney Disease (BKD) domain ($p < 0.05$). Patient satisfaction was high, with 80.0% expressing no regret about the transplant and 89.0% willing to recommend the kidney transplant.

Conclusion: The study revealed that only age group impacted the QoL of the studied kidney transplants patients significantly. Also, high patient satisfaction and willingness to recommend transplantation emphasize the perceived benefits of kidney transplant.

Keywords: CKD, Kidney transplantation, Quality of life, KDQOL-36, MNA.

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CHAPTER 1

INTRODUCTION

1.1 Background

Chronic Kidney Disease (CKD) is a condition in which kidney function declines over time. The kidneys primarily excrete water-soluble waste and regulate water, electrolytes, and acid-base balance in response to changes in blood volume and osmolality (Madhavan et al., 2023). They also produce hormones like renin and erythropoietin. Many adults have CKD, especially those with diabetes, hypertension, or a family history of renal failure. The best indicators of kidney function for CKD staging are proteinuria and glomerular filtration rate (Stevens & Levey, 2005). CKD can lead to cardiovascular illness, anemia, mineral and bone abnormalities, and nervous system diseases. CKD affects about 10–15% of the world's population and is on the rise due to the increase in classic risk factors such as diabetes, hypertension, and obesity (Kovesdy, 2022). Individuals with end-stage renal disease and those with moderately impaired kidney function have a higher risk of cardiovascular complications, mortality, and hospitalization. CKD-related non-traditional risk factors, such as inflammation and ineffective immune responses, can increase the risk of cardiovascular mortality, cancer, and infection (Badro, 2023).

1.1.1 Kidney transplantation

Chronic kidney disease has five stages based on the eGFR test and kidney function in filtering waste and fluid (Zsom et al., 2022). For individuals with end-stage renal disease (ESRD), which is the final stage of chronic kidney disease (CKD), kidney transplantation is crucial. In this procedure, a patient whose kidneys are failing receives a healthy kidney from a living or deceased donor through surgery. Kidney transplantation not only enhances the quality of life, but also provides freedom from dialysis schedules and offers better long-term survival rates compared to dialysis (Jordakieva et al., 2020). It helps in normalizing renal function, thereby improving fluid regulation, waste elimination, and electrolyte balance. However, it also involves lifelong use of immunosuppressive medication to prevent kidney transplant rejection, along with careful monitoring for potential complications (Gandolfi et al., 2022). Overall, kidney transplantation significantly improves the outlook and well-being of ESRD patients, enabling them to lead more active lives (Antoun et al., 2023).

1.2 Objectives of the study

1.2.1 Primary objective

The primary objective of this study was to assess the impact of kidney transplant on Quality of Life (QoL) with CKD patients.

1.2.2 Specific objectives

- To assess the socio-demographic, clinical assessment and transplant characteristics of the patients.
- To determine Quality of Life (QoL) of elderly patients using KDQOL.
- To investigate factors impacting QoL of kidney transplant patients.

CHAPTER 2

LITERATURE REVIEW

The study conducted by Sarhan et al. (2021) compared the health-related quality of life (HRQOL) between kidney transplant recipients (KTRs) and hemodialysis (HD) patients. The research was a cross-sectional analysis carried out in two central kidney units in the West Bank, Palestine, and involved 100 KTRs and 272 HD patients. The assessment of HRQOL was based on the Short Form-36 Health Survey (SF-36), and the study utilized multivariable linear regression to determine the disparities in mean HRQOL scores between the two groups. The research revealed that KTRs exhibited notably higher HRQOL scores when compared to HD patients across various domains of the SF-36 survey (Sarhan et al., 2021). These domains encompassed physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. The enhancements in HRQOL for KTRs varied from a 15.5-point increase in social functioning to a 32.6-point increase in general health, with confidence intervals indicating robust statistical significance. The study emphasized the clinical significance of these findings, indicating that kidney transplantation leads to substantial improvements in both the physical and mental health components of HRQOL in contrast to hemodialysis. The study identified a major gap, which is the absence of longitudinal data. The cross-sectional design restricts the ability to deduce causality and monitor changes in HRQOL over the post-transplantation period. The study advocates for further research comparing HRQOL among KTRs with the general population. This would aid in pinpointing specific factors contributing to lower HRQOL in KTRs that could be addressed through intervention. Another gap is the study's focus on a specific geographic region (West Bank, Palestine), which may limit the applicability of the findings. Comparative studies in diverse cultural and healthcare settings would be advantageous. Additionally, the study predominantly centers on HRQOL scores without delving into other influencing factors such as socio-economic status, comorbid conditions, and access to post-transplant care, which can significantly impact HRQOL.

The study conducted by Cohen et al. (2019) examined the health-related quality of life (HRQOL) of dialysis patients in the United States using the Kidney Disease Quality of Life (KDQOL-36™) survey. This retrospective observational study covered a period of three years (2014-2016) and involved data from 413,951 survey responses from adult dialysis patients in a large dialysis organization, excluding Veterans Affairs beneficiaries. The main objective of the research was to analyze completion rates of the KDQOL-36™ survey and the distribution of scores and item responses in a nationally representative group. The study reported a high overall completion rate of 79.8% for the KDQOL-36™ surveys, with 240,343 unique patients completing 330,412 surveys. The mean domain scores were as follows: 36.6 for the physical component summary (PCS), 49.0 for the mental component summary (MCS), 51.3 for burden of kidney disease (BKD), 78.1 for symptoms and problems of kidney disease (SPKD), and 73.0 for effects of kidney disease (EKD). These scores were similar across different dialysis modalities. The study did not find a significant correlation ($R < 0.05$) between patient perceptions of general health and PCS or SPKD. Additionally, interdialytic weight gain did not correlate with patient-reported shortness of breath, PCS, or SPKD. Significant ceiling effects were observed for the SPKD subscale, with more than 65% of patients reporting being "not at all" or "somewhat bothered" by

symptoms, and for three items, over 85% of patients gave these responses. The observed ceiling effects for the SPKD subscale indicate that the KDQOL-36™ may not fully capture the range and severity of symptoms experienced by dialysis patients. This suggests a potential need to revise the survey to include more detailed response options or additional items that better reflect the patient experience. The lack of correlation between general health perceptions and specific HRQOL domains like PCS and SPKD points to the need for further research to understand these dynamics. More detailed analyses could help uncover underlying factors influencing these perceptions. Although the study compares HRQOL across different dialysis modalities, it does not provide longitudinal data to track changes over time within individual patients. Longitudinal studies could offer more insights into the long-term impact of dialysis modalities on HRQOL. The study highlights the necessity to revise the KDQOL-36™ to address factors that are most relevant to contemporary dialysis patients. Research focused on identifying and integrating these factors could significantly enhance the survey's relevance and effectiveness.

The study by Pawlaczyk et al. (2022) examines the nutritional status and quality of life (QOL) among patients with chronic kidney disease (CKD) compared to those who have undergone kidney transplantation. The research includes a sample of 167 patients divided into three groups: 39 pre-dialysis patients, 65 dialysis patients, and 63 kidney transplant patients. The study utilized the Kidney Disease Quality of Life questionnaire (KDQoL) and the Mini Nutritional Assessment questionnaire (MNA) to evaluate these parameters. The study aimed to assess and compare the nutritional status and QOL across different stages of CKD and post-transplantation. The results showed no statistically significant differences in overall KDQoL scores among the three groups, indicating that QOL does not vary significantly based on disease stage or transplant status alone. Factors affecting QOL included the disease status (pre-dialysis, dialysis, post-transplant), MNA score, patient age, and waist-to-hip ratio (WHR). Nearly one-third of patients in both the dialysis and post-transplant groups were at risk of malnutrition. The study concludes that systematic assessment of nutritional status and regular monitoring of QOL should be integrated into standard CKD management guidelines to improve patient outcomes. Similar to other cross-sectional studies, this research lacks longitudinal data that would provide insights into changes in QOL and nutritional status over time, especially before and after transplantation. The study identifies a risk of malnutrition but does not delve into specific nutritional interventions or their effectiveness in improving QOL in CKD and transplant patients. While the study considers some factors influencing QOL, it does not extensively explore broader psychosocial variables such as social support, mental health, and economic status, which can also impact QOL. The research is context-specific and may not account for cultural and regional differences in diet, healthcare practices, and patient experiences, limiting the generalizability of the findings.

CHAPTER 3

MATERIALS AND METHODS

3.1 Study design

This cross-sectional study was conducted to evaluate the impact of kidney transplant on the quality of life(QoL) of CKD patients.

3.2 Target population

The study included patients who had undergone kidney transplantation at “Kidney Foundation Hospital and Research Institute”, located at Plot No. 5, 2 Road No.-1, Dhaka 1216, Bangladesh. The study was conducted between November 2023 and February 2024. A total of 200 patients participated, providing informed consent prior to their inclusion in the study.

3.3 Sample size determination

$$\begin{aligned}\text{Sample size} &= \frac{z^2 \hat{p}(1 - \hat{p})}{\epsilon^2} \\ &= \frac{(1.96)^2 \times 0.5 \times (1 - 0.5)}{0.0693^2} \\ &= \frac{3.8416 \times 0.25}{0.0048} \\ &= 200\end{aligned}$$

The sample size was determined using a standard formula based on the (ϵ) margin of error: $\pm 6.93\%$; ($\hat{p}$) population proportion: 50.00% ; (z) z-score: 1.96 (Das et al., 2016). A total of 200 participants were interviewed to achieve a representative sample.

3.4 Data Collection

Data were collected through structured questionnaires, and pre-constructed KDQOL-SF. Responses were taken by face-to-face interviews, and from medical records. Socio-demographic information includes respondent's age, gender, educational level, residential status (urban/rural), marital status, income level, occupation.

Clinical characteristics includes Body Mass Index (BMI), estimated Glomerular Filtration Rate (eGFR), Serum creatinine, albumin, potassium, and calcium levels, hemoglobin levels, comorbidities (diabetes, hypertension, cardiovascular disease), family history of kidney disease.

Transplant related information includes duration since transplantation, number of transplants, dialysis history prior to transplant, source of transplant (living vs. deceased donor), and relationship of donor to recipient. Quality of Life measured using the Kidney Disease Quality of Life-36 (KDQOL-36) questionnaire, which includes domains such as the Physical Component Score (PCS), Burden of Kidney Disease (BKD), Symptoms and Problems of Kidney Disease (SPKD), and Effects of Kidney Disease (EKD) (Hays et al., 1994).

3.5 Scoring system

3.5.1 KDQOL

This shortened form of the KDQOL-SF, which assesses patients' quality of life, consists of 36 questions, can save time and money by conducting extensive population surveys in three to five minutes (Elamin et al., 2019). Generic (SF-36) domains are measured on a 100-point scale by 36 items in the : physical function (10 items), role limitations due to physical problems (4 items), role limitations due to emotional problems (3 items), pain (2 items), general health perceptions (5 items), social function (2 items), emotional well-being (5 items), and energy/fatigue (4 items). Kidney disease targeted domains included physical component(12 items), burden of kidney disease (4 items), symptoms/problems and effects of kidney disease (8 items). Each subscale has a score that runs from 0 to 100, where higher numbers correspond to better health. If their score was 60% or lower, they had a low quality of life; if it was 60% or higher, they had a high QOL(Elamin et al., 2019).

3.6 Statistical Analysis

Data were analyzed using IBM SPSS, version 22. Descriptive statistics were used to summarize demographic and clinical characteristics. Independent sample t-tests were performed to compare quality of life scores across different groups (e.g., age, gender, nutritional status). Pearson correlation coefficients were calculated to assess the relationship between nutritional status and quality of life domains. Statistical significance was set at $p \leq 0.05$.

3.7 Ethical Considerations

Informed consent was obtained from all participants. Data confidentiality and patient anonymity were maintained throughout the study.

3.8 Limitations

The study is limited by its cross-sectional design, which precludes causal inferences. The sample size may limit the generalizability of the findings. Longitudinal studies are needed to assess long-term outcomes and the impact of interventions on the quality of life in kidney transplant patients.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Results

The majority of patients (74.5%) age were less than 60 years. The 25.5% of patients aged 60 or more reflects that a significant portion of the elderly also undergoes such treatments as kidney transplant with slight male predominance (54.0%) is consistent. A significant proportion of patients have at least a secondary level of education (88.0% with secondary education or higher). Most of the patients were from urban areas (56.0%) with high percentage of married patients (84.5%). Most patients had moderate income level (51.5%) with majority being service holders (36.0%). Post-transplant, the highest proportion of patients were service holders (33.0%), followed by housewives (24.5%).

Table 1: Socio-demographic characteristics of the renal transplant patients.

Variables	Frequency	Percentages
Age Group		
60 or more	51	25.5%
<60	149	74.5%
Gender		
Male	108	54.0%
Female	92	46.0%
Education		
No education	4	2.0%
Primary	20	10.0%
Secondary	73	36.5%
Higher	64	32.0%
Graduate	37	18.5%
Post graduate	2	1.0%
Residence		
Rural	88	44.0%
Urban	112	56.0%
Marital Status		
Single, divorced or widowed	31	15.5%
Married	169	84.5%
Income Level		
Very Poor (<10,000)	48	24.0%
Poor (10,000–20,000)	49	24.5%
Moderate (20,000–30,000)	103	51.5%
Employment Status		
Unemployed/none	25	12.5%
Service Holder	72	36.0%
Housewife	55	27.5%
Farmer/labor	8	4.0%
Other	40	20.0%
Post Transplant Qualification		
Unemployed/none	32	16.5%
Service Holder	66	33.0%

Housewife	49	24.5%
Farmer/labor	8	4.0%
Other	43	22.0%

The pie chart shows that half of the patients (50.0%) are overweight, with an additional 15.5% being obese and 4.0% extremely obese. This suggests that a significant portion of renal transplant patients have higher BMI.

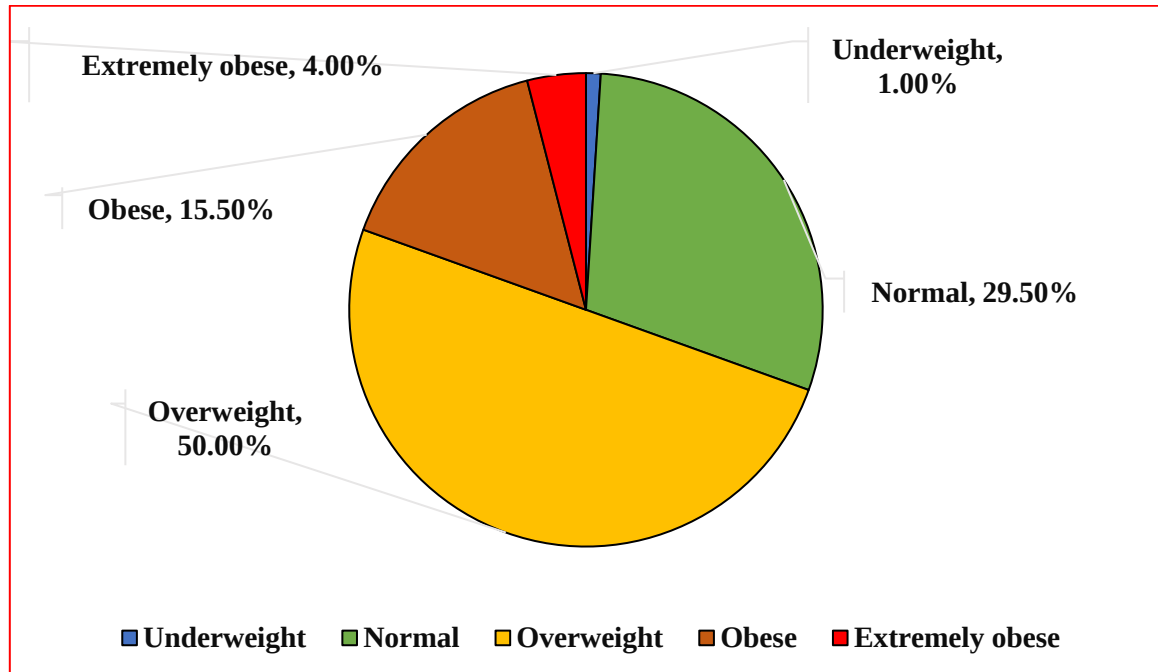


Figure 1: Body mass index of renal transplant patients.

The mean eGFR of 39.49 ml/min/1.73m² indicates an overall moderate reduction in renal function. Elevated creatinine levels (224.31 µmol/L) further support this finding. Albumin and potassium levels are within normal ranges, indicating stable protein and electrolyte balance, while calcium levels are slightly above average. The mean hemoglobin level is slightly low.

Table 2: Biochemical characteristics of renal transplant patients.

Biochemical parameters	mean±SD
eGFR	39.49±24.09 (ml/min/1.73m ²)
Creatinine	224.31±159.06 µmol/L
Albumin	4.27±0.35 g/dL
Potassium	3.89±0.32 mmol/L
Calcium	9.02±1.21 mmol/L
Hemoglobin	10.41±1.93 g/l

The majority of patients were in stages 3b, 4, and 5 (63.0% combined), indicating moderate to severe renal impairment post-transplant.

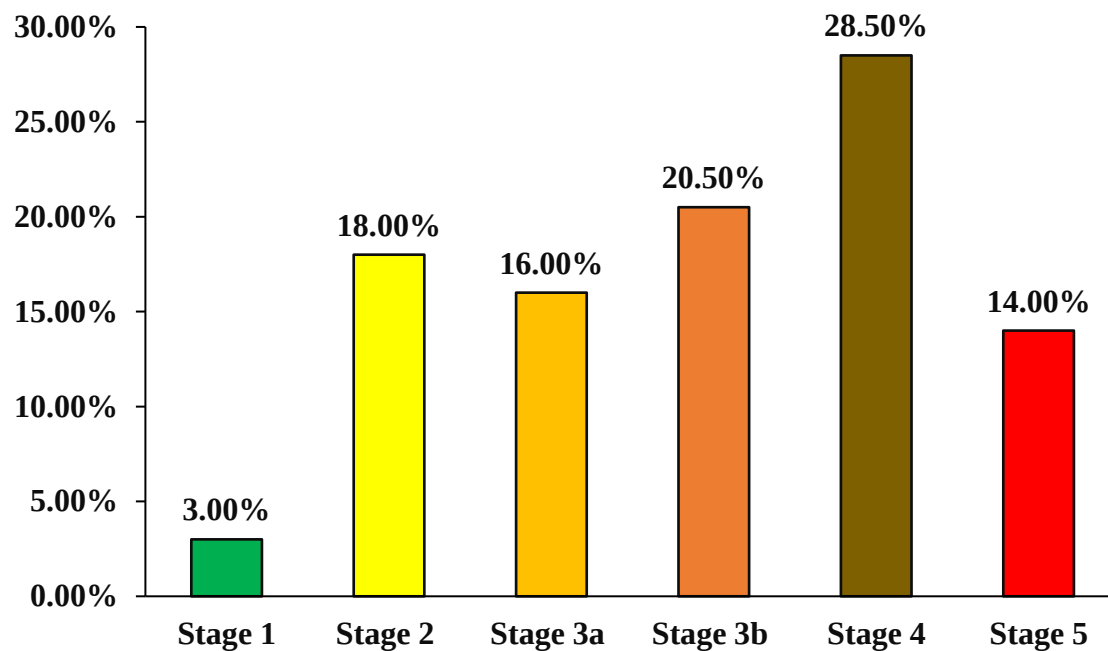


Figure 2: Estimated Glomerular Filtration Rate (eGFR) of renal transplant patients.

A significant proportion of patients have diabetes (46.5%) and hypertension (58.0%), both of which are common comorbidities that can complicate the management of renal transplant patients. These conditions can lead to further cardiovascular complications, as reflected by the 28.0% of patients with CVD. The family history of kidney disease in 48.0% of patients suggests a genetic predisposition, which is important for understanding the etiology and risk factors associated with renal conditions.

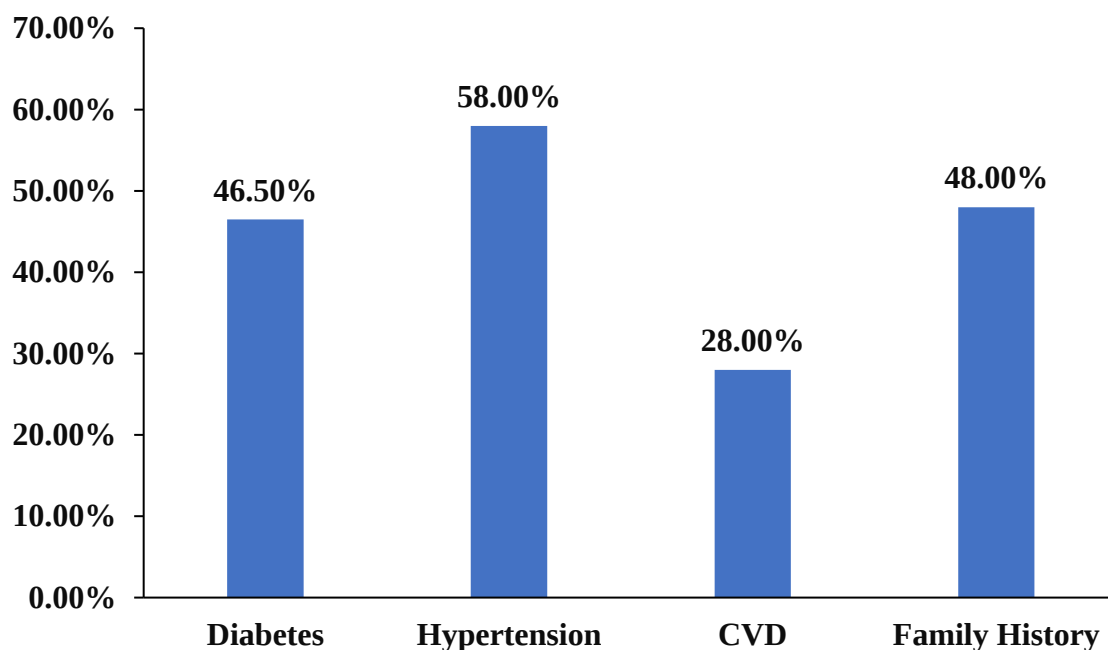


Figure 3: Comorbidities of the renal transplant patients.

The majority of patients (78.0%) have undergone transplantation within the last 1-5 years, indicating that most of the sample is relatively recent in their post-transplant period. Only a small fraction (1.0% and 1.5%) has lived with their transplant for more than 10 years, suggesting that long-term survivorship data is limited in this cohort. The vast majority of patients (94.5%) have received a single transplant, while 5.5% have undergone multiple transplants. A significant majority (76.0%) underwent dialysis before receiving their transplant. Most patients (66.5%) underwent transplantation based on medical recommendations, A substantial majority of patients (80.0%) do not regret their transplant, suggesting high satisfaction and perceived benefit. The willingness to recommend transplantation is very high (89.0%), indicating overall positive patient experiences and perceived value of the procedure. Most transplants (84.5%) were from living donors, reflecting a common practice due to better graft survival rates and outcomes compared to deceased donors. A majority of living donors are blood relatives (61.0%), which is often preferred due to genetic compatibility and better outcomes.

Table 3: Transplant related information of the renal transplant patients.

Variables	Frequency	Percentages
Period since transplant (year)		
1-5	156	78.0%
6-10	39	19.5%
11-20	2	1.0%
>21	3	1.5%
Number of transplants		
Single	189	94.5%
2 or greater	11	5.5%
Dialysis before transplant		
No	48	24.0%
Yes	152	76.0%
Transplant decision		
Voluntary	67	33.5%
Recommended	133	66.5%
Regret with transplant		
No	160	80.0%
Yes	40	20.0%
Willingness to recommend transplant		
No	22	11.0%
Yes	178	89.0%
Transplant Type		
Deceased donor	31	15.5%
Living donor	169	84.5%
Type of donation		
Blood relation	122	61.0%
Spouse	36	18.0%
Non blood related	42	21.0%

The nutritional status of the renal transplant patients was assessed by the Mini Nutritional Assessment (MNA). Approximately one-third (32.0%) of the patients have a normal

nutritional status. A significant portion of the patients (42.0%) are at risk of malnutrition. Over a quarter of the patients (26.0%) are malnourished.

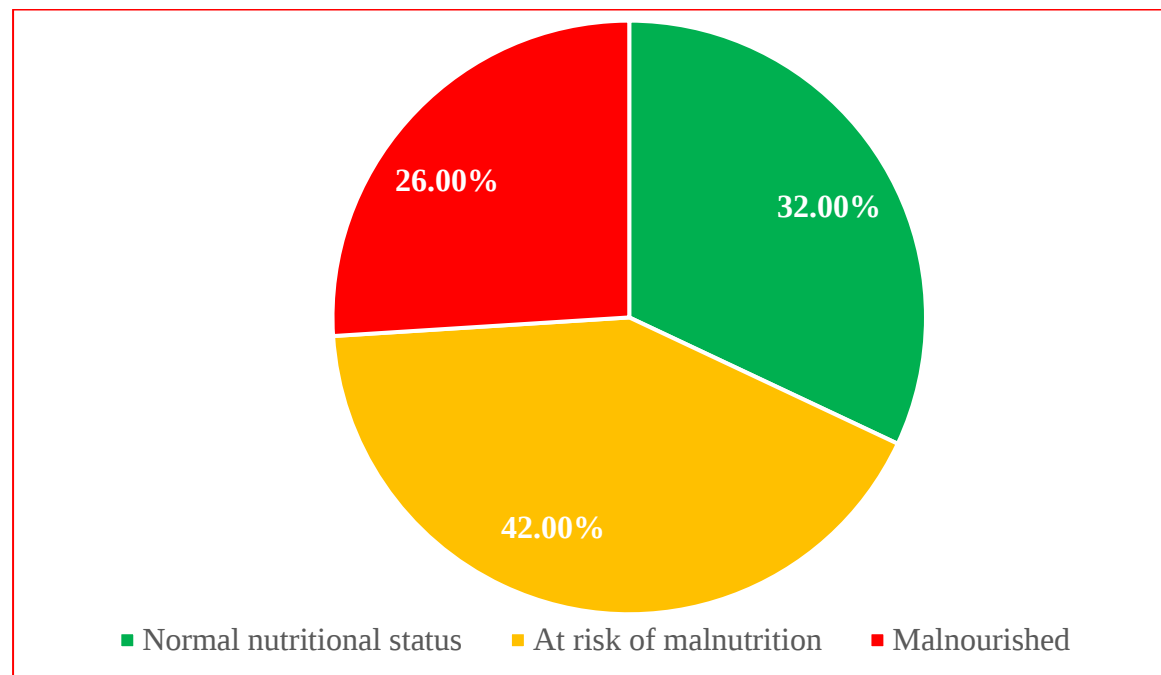


Figure 4: Nutritional Status of the renal transplant patients

The KDQOL-36 domain scores provide a comprehensive overview of the quality of life among patients with different characteristics post-kidney transplant. Overall, patients reported a mean Physical Component Score (PCS) of 47.5 ± 5.4 and a Mental Component Summary (MCS) of 54.5 ± 10.1 , indicating moderate physical health and relatively better mental health. The Burden of Kidney Disease (BKD) score was 52.4 ± 5.9 , Symptoms and Problems of Kidney Disease (SPKD) score was 46.7 ± 7.2 , and Effects of Kidney Disease (EKD) score was 59.3 ± 9.8 . When examining age groups, patients aged 60 or more had slightly higher scores across all domains, such as BKD at 53.9 ± 3.9 and SPKD at 48.0 ± 6.1 , compared to those under 60, who had BKD at 51.8 ± 6.4 and SPKD at 46.3 ± 7.5 . Gender differences were minimal, with males and females having similar scores, for example, males had an MCS of 55.2 ± 10.0 while females had 53.9 ± 10.3 . Residence played a role, with urban patients having slightly higher MCS (54.8 ± 10.2) and EKD (59.8 ± 9.7) scores compared to rural patients who had PCS of 48.3 ± 4.1 and BKD of 52.3 ± 4.6 . BMI showed varied impacts: underweight patients had notably high MCS (57.1 ± 7.66) and EKD (64.0 ± 3.9) scores, whereas obese patients had lower PCS (44.9 ± 9.2) and SPKD (45.6 ± 9.3) scores. Patients who did not undergo dialysis before transplant had similar scores to those who did, with PCS at 47.2 ± 4.0 and 47.6 ± 5.8 , respectively. Regret regarding the transplant did not significantly alter scores, though those without regret had a slightly higher MCS (55.0 ± 10.2) compared to those with regret (52.7 ± 9.5). Willingness to recommend transplant showed similar scores between groups, with those willing having an EKD score of 58.9 ± 9.8 . The period since transplant revealed stable scores over time, but the 11-20 years group had highly variable MCS (53.0 ± 34.9). Patients with multiple transplants had higher MCS (57.3 ± 11.1) and EKD (61.4 ± 9.4) compared to those with a single transplant. The type of transplant donor (deceased vs. living) did not show significant differences, with living donors having an MCS of 54.8 ± 10.1 . Lastly, the type of donation and post-transplant occupation influenced scores; blood relation donors resulted in higher PCS (47.9 ± 4.3) and EKD (60.3 ± 8.6), while farmers/laborers exhibited the highest PCS (49.5 ± 4.5) and the

lowest MCS (52.4±6.4). These findings illustrate the complex interplay of various factors affecting the quality of life in kidney transplant patients.

Table 4: KDQOL-36 domain scores by patient characteristics.

	KDQOL-36 domain scores				
	PCS	MCS	BKD	SPKD	EKD
Overall Score	47.5±5.4	54.5±10.1	52.4±5.9	46.7±7.2	59.3±9.8
Age Group					
60 or more	47.8±4.4	55.4±10.9	53.9±3.9	48.0±6.1	59.8±7.8
<60	47.4±5.7	54.3±9.9	51.8±6.4	46.3±7.5	59.1±10.4
Gender					
Male	47.5±6.4	55.2±10.0	52.2±7.1	46.3±6.7	59.4±10.7
Female	47.5±4.0	53.9±10.3	52.6±4.1	47.3±7.7	59.2±8.6
Residence					
Rural	48.3±4.1	54.3±10.2	52.3±4.6	46.7±7.0	58.7±9.9
Urban	46.9±6.2	54.8±10.2	52.4±6.8	46.8±7.4	59.8±9.7
Body Mass Index					
Underweight	46.1±1.4	57.1±7.66	57.3±1.8	49.8±6.7	64.0±3.9
Normal	47.6±5.0	52.8±10.1	52.4±4.7	46.1±7.3	59.7±8.4
Overweight	48.2±4.0	55.1±9.95	52.8±4.7	47.6±6.0	60.0±9.3
Obese	44.9±9.2	56.8±11.0	51.2±10.4	45.6±9.3	54.5±12.8
Extremely obese	48.8±2.3	51.5±9.01	50.0±3.5	44.7±10.4	64.2±8.3
Dialysis before transplant					
No	47.2±4.0	54.1±9.1	52.±4.6	47.0±7.8	59.7±10.1
Yes	47.6±5.8	54.6±10.4	52.±6.3	46.7±7.0	59.2±9.7
Regret With Transplant					
No	47.4±5.7	55.0±10.2	52.3±6.2	46.7±7.1	59.1±9.7
Yes	47.7±4.1	52.7±9.5	52.7±4.7	47.0±7.4	60.0±10.2
Willingness to recommended transplant					
No	47.5±2.9	52.6±6.2	52.7±3.9	47.0±8.0	62.3±9.3
Yes	47.5±5.7	54.7±10.5	52.3±6.1	46.7±7.1	58.9±9.8
Period since transplant					
1-5 yrs.	47.3± 5.6	54.6±9.91	52.3± 6.3	47.0± 7.5	59.2±10.5
6-10 yrs.	48.2± 4.5	54.8±9.96	53.2± 4.2	46.0± 6.3	59.5± 7.0
11-20 yrs.	47.8±11.9	53.0±34.9	43.2± 7.1	46.0± 5.6	63.1± 5.3
>21 yrs.	48.2± 2.7	48.7±8.30	51.8± 2.9	44.7± 3.3	60.0± 4.1
Number of transplants					
1	47.6± 5.5	54.4±10.1	52.4± 6.0	46.6± 7.2	59.2± 9.8
2 or greater	46.4± 4.8	57.3±11.1	52.2± 3.7	48.9± 7.5	61.4± 9.4

Transplant type					
Deceased donor	47.7± 4.4	53.1±10.1	52.8± 4.4	46.9± 7.6	59.9± 9.0
Living donor	47.5± 5.6	54.8±10.1	52.3± 6.2	46.7± 7.1	59.2± 10
Type of donation					
Blood relation	47.9± 4.3	54.2±9.65	52.7± 4.6	46.9± 7.2	60.3± 8.6
Spouse	46.1± 8.9	55.9±10.5	52.1± 10.2	45.9± 8.3	58.8±12.7
Non blood related	47.6± 4.3	54.5±10.2	51.7± 4.3	47.2± 6.3	56.8±10.0
Post transplant qualification					
Unemployed/none	46.9±4.6	56.0±10.6	52.7±4.4	46.1±5.8	61.2±8.4
Service Holder	46.5±7.1	54.6±10.2	51.8±8.2	45.3±8.1	58.3±11.9
Housewife	48.4±3.8	55.0±10.2	52.7±4.2	47.4±7.0	58.3±8.8
Farmer/labor	49.5±4.5	52.4±6.4	50.7±6.9	47.5±6.4	58.6±11.8
Other	48.0±4.5	53.2±10.1	53.0±4.2	48.4±6.8	60.5±7.9

BKD burden of kidney disease, EKD effects of kidney disease, PCS physical component score, MCS mental component summary, SPKD symptoms and problems of kidney disease.

The comparison of Quality of Life (QoL) between different variables of kidney transplant patients using an independent sample t-test reveals several key findings. When examining the age group, patients aged 60 or more had a PCS of 47.8±4.4, not significantly different from those under 60 (PCS 47.4±5.7, $t=0.52$, $p=0.603$). However, there was a significant difference in the Effects of Kidney Disease (EKD) score, with older patients scoring 53.9±3.9 compared to 51.8±6.4 for younger patients ($t=2.15$, $p=0.033$). No significant differences were found in the Burden of Kidney Disease (BKD) scores between age groups.

Gender comparison showed no significant differences in any of the domains, with both males and females having similar PCS (47.5±6.4 for males and 47.5±4.0 for females, $t=0.09$, $p=0.927$), EKD (52.2±7.1 for males and 52.6±4.1 for females, $t=-0.49$, $p=0.621$), and BKD (59.4±10.7 for males and 59.2±8.6 for females, $t=0.16$, $p=0.868$) scores.

Residence also did not show significant differences, although rural patients had a slightly higher PCS (48.3±4.1) compared to urban patients (46.9±6.2, $t=1.88$, $p=0.060$). EKD and BKD scores were very similar between rural (52.3±4.6 and 58.7±9.9) and urban (52.4±6.8 and 59.8±9.7) patients, with t-values and p-values indicating no significant differences ($t=-0.08$, $p=0.932$ and $t=-0.76$, $p=0.445$, respectively).

For patients who underwent dialysis before transplant, the scores were comparable to those who did not, with PCS of 47.6±5.8 for those who did and 47.2±4.0 for those who did not ($t=-0.36$, $p=0.715$). EKD and BKD scores were similarly non-significant between these groups ($t=-0.11$, $p=0.908$ and $t=0.34$, $p=0.731$).

Regarding regret with the transplant, no significant differences were found in PCS, EKD, or BKD scores between patients with regret (PCS 47.7±4.1, EKD 52.7±4.7, BKD 60.0±10.2) and those without (PCS 47.4±5.7, EKD 52.3±6.2, BKD 59.1±9.7), with p-values all above 0.05.

Willingness to recommend the transplant showed no significant impact on PCS or EKD scores, but a slight non-significant trend was observed in BKD, with those unwilling scoring higher (62.3±9.3) compared to those willing (58.9±9.8, $t=1.51$, $p=0.131$).

The number of transplants did not significantly affect PCS or EKD scores ($t=0.69$, $p=0.488$ and $t=0.09$, $p=0.926$), but a trend in BKD scores was noted, with patients having multiple transplants scoring higher (61.4 ± 9.4) compared to those with a single transplant (59.2 ± 9.8 , $t=-0.74$, $p=0.460$).

Finally, the type of transplant (deceased vs. living donor) showed no significant differences across all domains, with deceased donor patients scoring PCS 47.7 ± 4.4 , EKD 52.8 ± 4.4 , and BKD 59.9 ± 9.0 , while living donor patients scored PCS 47.5 ± 5.6 , EKD 52.3 ± 6.2 , and BKD 59.2 ± 10 (p -values all above 0.05).

Overall, the only significant difference found was in the EKD score between different age groups, highlighting that older patients might perceive the effects of kidney disease differently than younger patients. Other variables such as gender, residence, dialysis status, regret, willingness to recommend, number of transplants, and transplant type did not show significant differences in QoL scores.

Table 5: Comparison of QoL Between different variables of kidney transplant patients by independent sample t-test.

Variables	Quality of Life (QoL)								
	PCS	<i>t</i>	<i>P</i>	EKD	<i>t</i>	<i>P</i>	BKD	<i>t</i>	<i>P</i>
Age Group									
60 or more	47.8±4.4	0.52	0.603	53.9±3.9	2.15	0.033*	59.8±7.8	0.39	0.696
<60	47.4±5.7			51.8±6.4			59.1±10.4		
Gender									
Male	47.5±6.4	0.09	0.927	52.2±7.1	-0.49	0.621	59.4±10.7	0.16	0.868
Female	47.5±4.0			52.6±4.1			59.2±8.6		
Residence									
Rural	48.3±4.1	1.88	0.060	52.3±4.6	-0.08	0.932	58.7±9.9	-0.76	0.445
Urban	46.9±6.2			52.4±6.8			59.8±9.7		
Dialysis before transplant									
No	47.2±4.0	-	0.715	52.3±4.6	-0.11	0.908	59.7±10.1	0.34	0.731
Yes	47.6±5.8	0.36		52.4±6.3			59.2±9.7		
Regret with transplant									
No	47.4±5.7	-	0.763	52.3±6.2	-0.37	0.708	59.1±9.7	-0.50	0.612
Yes	47.7±4.1	0.30		52.7±4.7			60.0±10.2		
Willingness to recommended transplant									
No	47.5±2.9	-	0.987	52.7±3.9	0.29	0.770	62.3±9.3	1.51	0.131
Yes	47.5±5.7	0.01		52.3±6.1			58.9±9.8		
Number of transplants									
1	47.6±5.5	0.69	0.488	52.4±6.0	0.09	0.926	59.2± 9.8	-0.74	0.460
2 or greater	46.4±4.8			52.2±3.7			61.4± 9.4		
Transplant type									
Deceased	47.7±4.4	0.23	0.815	52.8±4.4	0.40	0.688	59.9± 9.0	0.34	0.731
Living	47.5±5.6			52.3±6.2			59.2± 10		

$H_a \mu \neq \mu$. *Significant($p<0.05$). BKD burden of kidney disease, EKD effects of kidney disease, PCS physical component score.

The correlation analysis between Body Mass Index (BMI) and the Quality of Life (QoL) domains—Physical Component Score (PCS), Mental Component Summary (MCS), and Burden of Kidney Disease (BKD)—yields some insightful results. The Pearson correlation

coefficient between BMI and PCS is -0.068, indicating a very weak negative correlation that is not statistically significant ($p=0.342$). This suggests that BMI does not have a substantial impact on the physical health component of QoL in this patient sample.

For the correlation between BMI and MCS, the Pearson correlation coefficient is 0.032, indicating a very weak positive correlation which is also not statistically significant ($p=0.652$). This implies that BMI has little to no effect on the mental health component of QoL.

The correlation between BMI and BKD shows a Pearson correlation coefficient of -0.075, a weak negative correlation with a non-significant p -value ($p=0.291$), suggesting that BMI does not significantly influence the perceived burden of kidney disease.

Interestingly, a significant correlation was found between PCS and BKD with a Pearson correlation coefficient of 0.300, which is statistically significant at the 0.01 level ($p=0.000$). This indicates a moderate positive correlation, suggesting that better physical health is associated with a lower perceived burden of kidney disease. Additionally, MCS shows a weak positive correlation with BKD ($r=0.113$), though this relationship is not statistically significant ($p=0.112$).

BMI does not have significant correlations with PCS, MCS, or BKD, indicating that BMI is not a major determinant of these aspects of QoL in kidney transplant patients. However, the significant positive correlation between PCS and BKD underscores the interplay between physical health and the burden of kidney disease, highlighting that improvements in physical health could potentially alleviate the perceived burden of the disease.

Table 6: Correlation between BMI and PCS, MCS and BKD

Correlations		BMI	PCS	MCS	BKD
BMI	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	200			
PCS	Pearson Correlation	-.068	1		
	Sig. (2-tailed)	.342			
	N	200	200		
MCS	Pearson Correlation	.032	.076	1	
	Sig. (2-tailed)	.652	.286		
	N	200	200	200	
BKD	Pearson Correlation	-.075	.300**	.113	1
	Sig. (2-tailed)	.291	.000	.112	
	N	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

4.2 Discussion

Globally, the number of people with chronic kidney disease (CKD) is rising both in incidence and prevalence. According to some studies evaluating dialysis patients' quality of life (QOL), these patients' QOL appears to be lower than that of the general population (Naseri et al., 2020). Based on the sociodemographic characteristics of the sample under study, it was discovered that over half of the participants were less than 60 years of age.

This finding may be explained by the fact that ageing increases a person's susceptibility to certain diseases.

This result is supported by Rayner et al. (2017), who discovered that 79.8% of the sample under study was between the ages of 50 and 59. Gender-wise, it was shown that men were more likely than women to have CKD, with approximately 54.0% of the study group being male. The findings are corroborated by Sojib et al. (2018), who studied Associations between Body Mass Index and Chronic Kidney Disease in Type 2 Diabetes Mellitus Patients, they found that men made up 64.3% of the sample under study.

This is in contrast to Alikari et al.'s 2019 who studied the impact of quality of life among patients on kidney transplanted, they revealed that quality of life finding was 60% of the sample under study consisted of men. In terms of education, it was found that 18.5% of the study group had a university degree and that only 2.0% of the group was illiterate. In this study, we compared the KDQoL of patients who had Kidney transplant. In the analysis of QoL, the patient's subjective assessment is a very important topic. To confirm the benefits from treatment, it is believed that assessment of different therapies be given by a single patient to draw clear contrasts and comparisons. Such an approach to the subject is shown in only a few publications in which the authors demonstrated improvement in the QoL of patients with chronic renal failure after Kidney transplant (Jofré et al., 1998; Griva et al., 2006).

The major goal of transplantation is to improve the QoL and life expectancy of ESRD patients. The question is not only whether and how long a patient will survive, but also how the treatment will affect the patient's QoL (Burra et al., 2007). Individuals with chronic kidney disease must adapt their lives to a number of new conditions. Chronic illness can have a significant impact on a person's life. Although none of the treatments provides a complete cure, transplant patients appear to function more normally. Among the different types of replacement therapy for chronic renal failure, a review of a few studies shows a general consensus that Kidney transplant improves QoL (Butt et al., 2008).

The QoL depends on the patient's life from the moment in which it is evaluated. Better QoL may also be related to any treatment regimen that a patient can self-administer at home. It has been confirmed in several reports that PD is associated with a higher QoL than those treated by means of HD; however, other reports have shown no difference in the general health status and QoL between the 2 groups (Wasserfallen et al., 2004). In our study, patients only achieved statistical differences in only burden of kidney disease (BKD) domains of QoL after Kidney transplant between groups ($p < 0.05$).

Sayin et al. (2007) reported that the 3 forms of renal replacement therapy did not differ in regard to QoL and that the underlying mechanisms of such findings must be clarified in further studies. These inconsistencies may have been caused by the usage of different QoL scales or different timing. It was reported that it is possible to improve the QoL of patients while they await transplantation (Rodrigue et al., 2011).

The prospect of relatively normal functioning can have a positive impact on the assessment of QoL. A person usually tries to maintain their QoL level by striving to achieve the highest level of any kind of functioning. Improved QoL involves the patients assuming more proactive roles in their own lives. Kidney transplant can also cause certain limitations in the choice of a patient's profession. At the same time, it opens up the possibility for the patients to live a life less dependent on medical staff than other forms of treatment. Some papers assess the QoL as better in PD patients in comparison to HD patients, whereas others find no difference between the two. Furthermore, no articles were found stating that QoL

was higher in patients treated with HD than in those treated with PD (Majkiewicz et al., 2000).

Based on the data from the KDQOL-36 instrument among kidney transplant patients, several key findings arise regarding quality of life (QoL) domains across different patient characteristics. Age-related differences notably impact perceptions of kidney disease burden and its effects, with older patients (>60 years) consistently reporting higher burdens and more significant disease effects compared to younger patients. This aligns with previous studies highlighting age as a critical factor influencing QoL in chronic kidney disease (CKD) and transplant populations (Reese et al., 2011). Additionally, BMI variations demonstrate that both underweight and extremely obese categories are associated with poorer physical component scores (PCS), underscoring the importance of weight management in post-transplant care (Bohlke et al., 2019). While gender and other demographic factors show minimal influence on PCS and specific domains like symptoms and problems of kidney disease (SPKD), these findings collectively suggest a nuanced approach to patient care, emphasizing age-specific interventions and BMI management strategies to optimize QoL outcomes post-transplant (Reese et al., 2011; Bohlke et al., 2019). Healthcare providers can leverage these insights to tailor support and enhance overall patient well-being following kidney transplantation.

The analysis of KDQOL-36 domain scores among kidney transplant patients reveals significant insights into their quality of life (QoL). Overall, patients exhibited moderate physical health (PCS: 47.5 ± 5.4) and relatively better mental health (MCS: 54.5 ± 10.1). When comparing age groups, patients aged 60 or more showed a significantly higher EKD score (53.9 ± 3.9) compared to those under 60 (51.8 ± 6.4), indicating that older patients might perceive the effects of kidney disease more acutely ($t=2.15$, $p=0.033$). Gender differences were not significant, with both males and females having similar PCS (47.5 ± 6.4 for males vs. 47.5 ± 4.0 for females, $t=0.09$, $p=0.927$), MCS, and BKD scores.

Residence also showed no significant differences in QoL scores, though rural patients had a slightly higher PCS (48.3 ± 4.1 vs. 46.9 ± 6.2 , $t=1.88$, $p=0.060$). Patients' dialysis history before transplant did not significantly impact their QoL scores, with those who had undergone dialysis scoring similarly in PCS, EKD, and BKD compared to those who had not (PCS: 47.2 ± 4.0 vs. 47.6 ± 5.8 , $t=-0.36$, $p=0.715$). Furthermore, regret regarding the transplant and willingness to recommend it did not significantly affect QoL scores, although there was a slight non-significant trend in BKD scores among those willing to recommend the transplant (62.3 ± 9.3 vs. 58.9 ± 9.8 , $t=1.51$, $p=0.131$).

The type of transplant donor also showed no significant differences in QoL scores, with deceased donor recipients and living donor recipients having similar outcomes (PCS: 47.7 ± 4.4 vs. 47.5 ± 5.6 , $t=0.23$, $p=0.815$). Correlation analysis revealed that BMI does not significantly influence PCS, MCS, or BKD scores (BMI and PCS: $r=-0.068$, $p=0.342$; BMI and MCS: $r=0.032$, $p=0.652$; BMI and BKD: $r=-0.075$, $p=0.291$). However, a significant positive correlation was found between PCS and BKD ($r=0.300$, $p=0.000$), indicating that better physical health is associated with a lower perceived burden of kidney disease. These findings align with previous research, highlighting that physical health improvements can enhance overall QoL for kidney transplant patients (Hays et al., 1997; Kutner et al., 2005; Tsai & Chen, 2014).

QoL covers many aspects of life. For analysis, many instruments of research are available that can carefully analyze particular problems or approach the topic more generally. For a more complete analysis of our patients' QoL, we chose the KDQOL-SF questionnaire; it is a multidimensional, reliable, and validated instrument designed for kidney disease and

dialysis patients that utilizes a generic cored the 36-item Short Form Health Survey (SF-36) (Barotfi et al., 2006). The KDQOL-SF questionnaire is a reproducible questionnaire that was validated by the KDQOL Working Group studies; it was used in several recent studies on QoL assessment in the evaluation of transplant patients and in comparisons of transplant recipients and patients on peritoneal and hemodialysis. Although there are a number of reliable and valid QoL instruments, none can be considered the gold standard for assessment in all situations (Butt et al., 2008).

CHAPTER 5

CONCLUSION

The study showed how kidney transplants impact the quality of life (QoL). Most patients were under 60 years old, with a slight male majority and most had at least a secondary education. Urban residence, moderate income, and service employment were common. After the transplant, many patients were overweight or obese, showing a high BMI among the group. Kidney function, as indicated by mean eGFR and elevated creatinine levels, was moderately impaired. However, albumin, potassium, and calcium levels were generally stable. Many patients experienced moderate to severe renal impairment, with common comorbidities such as diabetes and hypertension. A significant portion also had cardiovascular disease and a family history of kidney disease. Most transplants occurred within the last 1-5 years, with high satisfaction and willingness to recommend the procedure. Living donors, particularly blood relatives, were common due to better outcomes. Quality of life assessments indicated that age group influenced the perceived burdens of kidney disease, with significant differences ($p \leq 0.05$). While QoL among kidney transplant patients is generally stable across genders and age groups in many domains, age-related differences in perceived burden highlight the importance of personalized care approaches in managing post-transplant outcomes.

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APPENDICES

Appendix 1: Questionnaires

Table 1: socio-demographic characteristics

Age category	60 or more
	<60
Gender	Male
	Female
Education	No education
	Primary
	Secondary
	Higher
	Graduate
Residency	Rural
	Urban
Marital status	Single, divorced or widowed
	Married
Income group	Very Poor (<10,000)
	Poor (10,000–20,000)
	Moderate (20,000–30,000)
Employment	Unemployed/none
	Service Holder
	Housewife
	Farmer/labor
	Other
Post transplant occupation	Unemployed/none
	Service Holder
	Housewife
	Farmer/labor
	Other

Table 2: Anthropometric, and biochemical characteristics of adult hemodialysis/renal transplant patients.

Nutritional Status	
BMI (kg/m ²) mean (± SD)	
Waist circumference (cm)	
Hip circumference (cm)	
Mid-arm circumference	
Calf circumference	
Biochemical parameters	
UACR, (mg/g)	
eGFR, (ml/min/1.73m ²)	
Albumin level	
BUN (mmol/L)	
Creatinine (μmol/L)	
Cholesterol, (mg/dL)	
HDL-cholesterol, (mg/dL)	

LDL-cholesterol, (mg/dL)	
Triglyceride, (mg/dL)	
Potassium, (mmol/L)	
Phosphorus (inorganic), (mmol/L)	
Calcium, (mmol/L)	
HbA1c, (%)	
Serum iron (µmol/l)	
Ferritin (µg/l)	
Transferrin saturation percentage (TSAT%)	
Haemoglobin (g/l)	
Urinary albumin excretion (mg/24 hr)	
Proteinuria (0.5g/24hr)	Yes/no
Comorbidities	
Diabetes	Yes
	No
Hypertension	Yes
	No
CVD	Yes
	No
CKD characteristics	
Duration with CKD in months	
Stage of CKD	Stage 1 and 2
	Stage 3
	Stage 4
Cause of CKD	
Family History	Yes
	No

Transplant related information

Variable	Categories	
Period since transplant (year)	1-5	
	6-10	
	11-20	
	>21	
Number of transplants	1	
	2 or greater	
Dialysis before transplant	No	
	Yes	
Transplant decision	Voluntary	
	recommended	
Regret with transplant	No	
	Yes	

Willingness to recommend transplant	No	
	Yes	
Transplant type	Deceased donor	
	Living donor	
Type of donation	Blood relation	
	Spouse	
	Non blood related	

Appendix 2: Synopsis

Daffodil International University
Department of Nutrition and Food Engineering (NFE)
Faculty Of Health and Life Sciences
Daffodil International University
Daffodil Smart City, Birulia, Savar, Dhaka – 1216, Bangladesh

1. Student's Name: Shakila Akter

2. Id: 193-34-990

1.Title: Impact of kidney transplant on Quality of Life with CKD patient.

2.Introduction: Kidney transplantation is a critical treatment for patients with end-stage renal disease(Cohen et al., 2019). Understanding the demographic, clinical, and quality of life factors among kidney transplant patients is essential for improving patient outcomes and care strategies(Sarhan et al., 2021).

3.Objectives:

1. Describe demographic profiles: age, gender, education, residence, marital status, income, occupation.
2. Assess clinical status: BMI, eGFR, creatinine, albumin, potassium, calcium, hemoglobin levels.
3. Identify prevalence of comorbidities: diabetes, hypertension, cardiovascular disease.
4. Evaluate family history of kidney disease.
5. Analyze transplant characteristics: duration, number of transplants, dialysis history, donor sources, donor-recipient relationships.
6. Assess quality of life using the KDQOL-36 questionnaire across four domains.

4.Methodology:

Study Design: A cross-sectional study will be conducted at Kidney Foundation Hospital and Research Institute.

Participants: 200 Kidney transplant patients who underwent transplantation.

Data Collection:

- Structured interviews, medical records, laboratory tests.
- Demographic data: age, gender, education, residence, marital status, income, occupation.
- Clinical data: BMI, eGFR, creatinine, albumin, potassium, calcium, hemoglobin levels, comorbidities, family history.
- Transplant characteristics: duration since transplantation, number of transplants, dialysis history, donor sources, donor-recipient relationships.
- Quality of life assessment using KDQOL-36.

5.Statistical Analysis:

Data will be analyzed using IBM SPSS, version 22. Descriptive statistics, Independent sample t-tests, Pearson correlation coefficients, and Chi-square test will be conducted.

6.Expected outcome

The study will provide insights into the demographic, clinical, and quality of life characteristics of kidney transplant patients, highlighting the factors impacting on quality of life.

7.References

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Sarhan, A. L., Jarareh, R. H., & Shraim, M. (2021). Quality of life for kidney transplant recipients and hemodialysis patients in Palestine: a cross-sectional study. *BMC nephrology*, 22(1), 210.

Signature of Supervisor

Signature of Fellow

Appendix 3: Plagiarism report

IMPACT OF KIDNEY TRANSPLANT ON QUALITY OF LIFE(QOL) WITH CKD PATIENT

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