

# Determinants of Kidney Transplantation Uptake among Chronic Kidney Disease Patients on Haemodialysis at Selected National Referral Hospitals in Kenya

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**Abstract:** In Kenya, Chronic Kidney Disease has a significant epidemiological burden with a prevalence of approximately 4 out of 10 in-patients. 1 in every 7 patients has End Stage Kidney Disease that needs Kidney Transplantation or dialysis for survival. Kidney Transplant offers greater benefits in comparison to dialysis because of the potential for recovery, less financial costs in the long run and improved Quality of Life. Despite the evidence that kidney transplant is the best treatment modality, its uptake is generally slow compared to dialysis especially in Kenya and Africa at large. The study investigated the determinants of kidney transplantation uptake among chronic kidney disease patients on haemodialysis at selected national referral hospitals in Kenya. A cross-sectional correlational design was used to determine association between variables (socio-demographic factors, patients' perceived health factors and health system factors) and kidney transplant uptake among chronic kidney disease patients on haemodialysis at KNH and MTRH renal units. Using a simple random sampling method, 128 respondents were selected. Pretesting was done at Kenyatta National Hospital renal unit. Data was analyzed using SPSS version 25 and presented using descriptive statistics (Mean, SD, Proportions), for association inferential statistics (Chi-square and Fischer exact) and logistic regression for predictors. The findings revealed that age  $\chi^2(2) = 18.37$ ,  $p=0.005$ , religion  $\chi^2(1) = 3.9$ ,  $p=0.045$  and occupation  $\chi^2(1) = 8.268$ ,  $p=0.003$  were significantly associated with kidney transplant uptake. Discussion of kidney transplant with service provider  $\chi^2(1) = 16.12$ ,  $p < 0.001$ , referral for kidney transplant evaluation  $\chi^2(1) = 47.49$ ,  $p < 0.001$ , knowledge on kidney transplantation ( $df=1$ ,  $p=0.007$ ), and presence of comorbidity ( $df=5$ ,  $p < 0.001$ ) were also associated with kidney transplant uptake. Predictors for kidney transplantation included; age, fear of surgery, concern of poor health and having a donor. In conclusion, only about a third of patients on haemodialysis had initiated the process of kidney transplant. This was influenced by factors mentioned above among others. A defined protocol for counseling, referral and evaluation for kidney transplantation is recommended. Government should consider fully financing kidney transplantation costs through National Health Insurance Fund to increase the uptake of kidney transplantation.

**Keywords:** Chronic Kidney Disease, Haemodialysis, Kidney Transplantation, Uptake.

## 1. Introduction

Chronic Kidney Disease (CKD) is a major public health concern globally due to its fast increase and the associated significant morbidity and mortality rates (Carney, 2020). Globally, the prevalence of CKD is 13.4% while that of the general population in Africa stand at 10.1% (Kabaye et al., 2019). A Kenyan study showed a high CKD burden in the in-patient population, with prevalence of 40% and on staging, 1 in every 7 patients had End Stage Kidney Disease (ESKD) that required kidney transplantation or dialysis for survival (Mwenda et al., 2019). According to Tennankore et al. (2014), kidney transplantation offers greater benefits in comparison to dialysis namely; potential for recovery, associated less financial costs in the long run, less social implications, and improved quality of life. The findings of Wang et al. (2016), also found out that kidney transplantation increases survival rate in comparison to other treatment alternatives. Thus, CKD interventions should be skewed in favor of KT because of the associated benefits.

Despite the evidence that KT is the optimal treatment modality in management of CKD, its uptake is generally slow compared to dialysis especially in Kenya and Africa at large. According to Jain et al. (2019), among all prevalent ESRD patients in US, 29.6% had a functioning transplanted kidney, 63.2% were on HD, and just 7% of patients were undergoing PD as a renal replacement therapy. In contrast, most African countries either lack renal registries or their records are poorly maintained (Liu et al., 2015). Nonetheless, the available data shows low uptake of kidney transplantation. A study done by Matri (2015) revealed the prevalence of dialysis at 400 per million population (pmp) in North Africa, 12.6 pmp in West Africa, 6.2 pmp in Middle Africa, 23 pmp in East Africa, and 68 pmp in South Africa and Islands. Among these patients, 97% were treated with haemodialysis and 3% with peritoneal dialysis. In the same study, the total number and the incidence of kidney transplantation of a decade review were: 1,368

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(incidence: 7.8 pmp) in North Africa, 100 in West Africa, 3 in Middle Africa, 330 (incidence 1.3 pmp) in East Africa and 240 (incidence 2.5 pmp) in South Africa and Islands.

In Kenya, about 4500 patients are on maintenance haemodialysis of at least two sessions per week. Despite this large number, only about 466 transplants have been done since 2006 in both private as well as public health facilities (MoH, 2019). Kidney transplantation is a complex process that requires concerted effort of patients, healthcare providers and a supportive healthcare system without which patients may be discouraged from pursuing transplantation.

Several studies have identified some of the determinants of kidney transplantation uptake. Patient's demographic characteristics like that of age, gender, the level of education and socio-economic factors has been identified as some of the factors that determinants choice of kidney transplantation (Tan *et al.*, 2017). Healthcare provider and health system factors such as long waiting list, physician distrust, attitude and perception of healthcare providers has also been identified as possible deterrent of kidney transplantation (Titilayo *et al.*, 2015).

In Kenya, kidney transplantation uptake is low as demonstrated above and there is limited published information on determinants of kidney transplantation. Hence understanding of the variables that influence this trend is important in addressing and promoting the uptake of kidney transplantation as this will shorten the time on dialysis and save on the economic and health burden attributed to CKD among other benefits. Thus, the objective of this study was to establish relationship between the determinants of kidney transplantation uptake in chronic kidney disease patients on haemodialysis at selected national referral hospitals in Kenya.

#### A. Broad Objectives

To establish relationship between the determinants of kidney transplantation uptake in chronic kidney disease patients on haemodialysis at selected national referral hospitals in Kenya.

#### B. Specific Objectives

1. To determine relationship between social demographic factors and KT uptake among CKD patients on haemodialysis at selected national referral hospitals in Kenya.
2. To assess the relationship between patients' perceived health factors and KT uptake among CKD patients on haemodialysis at selected national referral hospitals in Kenya.
3. To determine the relationship between patients' perceived health system factors and KT uptake among CKD patients on haemodialysis at selected national referral hospitals in Kenya.
4. To determine the predictors of KT uptake among patients with CKD on haemodialysis at selected national referral hospitals in Kenya.

## 2. Methodology

### A. Design

This was a cross-sectional correlational study design that

aimed at studying the association between patients' demographic characteristics, health related factors and health system factors as perceived by patients and the uptake of kidney transplantation.

### B. Study Area and Study Population

The study population was all patients with chronic kidney disease undergoing maintenance haemodialysis at Kenyatta National Hospital (KNH) and Moi Teaching and Referral Hospital (MTRH) renal units in Kenya. The study was conducted from September 2021 to November 2021.

### C. Sampling Method and Sample Size Determination

The study adopted a simple random sampling method. Fischer's formula (1998) was applied to calculate the desired sample size. A sample size of 128 respondents was randomly selected from a study population of 152 patients from KNH and 40 patients from MTRH. Of the 128 respondents, 101 were drawn from KNH and 27 from MTRH proportionately.

### D. Inclusion and Exclusion Criteria

All patients 18 years and above with CKD undergoing maintenance haemodialysis at KNH and MTRH renal units, consented to participate in the study. Patients with cognitive dysfunction and those too ill to participate were excluded from the study. The pre-test group was also excluded from the main study.

### E. Data Collection Method

Self-administered as well as interviewer administered questionnaire was used.

### F. Validity and Reliability of Study Instrument

The study tool was self-developed and its validity was determined in terms of its content and face validity. Both were established through pretesting which was done at KNH renal unit and incorporating the experts' opinions.

Cronbach's alpha test was applied to evaluate the consistency and reliability of the study tool and yielded a reliable score of 0.773.

### G. Study Variables

Independent variables were; socio-demographic factors, patient related factors and health system factors as perceived by the patient. The dependent variable was the intention or lack of intention to undergo kidney transplantation.

### H. Data Collection Process

The researcher who was the principle investigator collected data in the renal units of the two hospitals over a period of 8 weeks between September and November 2021. Data was collected from 101 participants at KNH and 27 at MTRH. Questionnaires were administered by the researcher until 128 questionnaires were correctly and completely filled. Upon completion they were checked for completeness before being accepted for data entry into Ms. Excel worksheet. Further research clarity was availed to respondents by allowing them to ask questions.

**I. Data Analysis**

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics (Mean, SD, Proportions) was used to summarize demographic data, for association between variables inferential statistics of Chi-square and Fisher exact tests were used while logistic regression was applied to determine predictors of kidney transplantation uptake. A *p* value of less than 0.05 was considered statistically significant at 95% confidence.

**J. Ethical Consideration**

Study approval was obtained from Kenyatta University Ethics Review Committee, Kenyatta National Hospital-University of Nairobi Ethics and Research committee and Moi Teaching and Referral Hospital/Moi University Institutional Research Ethics Committee. A permit was also obtained from the National Council of Science, Technology Innovation (NACOSTI). Every participant provided a written informed consent for the study. The WHO, MOH-Kenya guidelines on containment, mitigation and management strategies related to Covid-19 pandemic was strictly observed.

**3. Results**

**A. Social Demographic Findings**

A total of 128 patients with CKD on haemodialysis participated in the study with a mean age of 45.8 ± 14.81.

Nearly half 50.8% (n =65) of the respondents were males and 53.1% (n =68) of the respondents were married. On education, the highest level obtained was tertiary level by 39.8% (n =51) of the respondents. Majority 78.9% (n =101) of the respondents were Christians. A total of 60.9% (n=78) of the respondents were in some form of employment with 28.1% (n=36) of the respondents earning less than Kshs 100,000 per year. Majority 96.9% (n=124) had an insurance (NHIF) which pays for dialysis as shown in Table 1.

**B. Patient's Health Characteristics**

The findings revealed that majority 71.1% (n =91) of the respondents had been on haemodialysis for a period between 2 and 5 years and 92.2% (n =118) reported they had heard of kidney transplant before. A greater number 74.2% (n =95) of the respondents had discussions on kidney transplantation with service providers and majority 92.2% (n =119) knew about kidney transplant and were able to correctly define it. The results showed that 39.1% (n =50) of the respondents had started the process of kidney transplantation, 78% (n =39) of them preferred a living donor and majority 87.5% (n =112) of the respondents had at least one comorbidity. Almost half of the respondents, 49.1% (n =55) had hypertension while 31.3% (n =35) had both diabetes and hypertension as shown in Table 2.

**C. Perspectives of Haemodialysis Patients on Transplantation**

From the study findings, less than half 45.3% (n =58) of the respondent strongly disagreed that they feel comfortable asking

Table 1  
Socio-demographic characteristics

Characteristic	Mean (SD)	Frequency (n)	Percentage (%)
<b>Gender of the respondents</b>			
Male		65	50.8
Female		63	49.2
<b>Age (in years)</b>	45.8		
<b>Mean (SD)</b>	(14.81)		
18 - 35 years		36	28.1
36 - 50 years		42	32.8
>50 years		50	39.1
<b>Level of education</b>			
None		10	7.8
Primary		25	19.5
Secondary		42	32.8
Tertiary		51	39.8
<b>Marital status</b>			
Single		60	46.9
Married		68	53.1
<b>Religion</b>			
Christian		101	78.9
Muslim		15	11.7
Non-religious		12	9.4
<b>Occupation</b>			
Unemployed		50	39.1
Employed		78	60.9
<b>Family income</b>			
≤Ksh 100,000		36	28.1
Ksh 100,001 – Ksh 500000		27	21.1
Ksh 500001 – 1000000		30	23.4
Above 1000000		35	27.3
<b>Payment of dialysis</b>			
Insurance		124	96.9
Out of pocket		4	3.1
<b>Member of NHIF</b>			
Yes		124	96.9
No		4	3.1

Table 2  
Patients' health characteristics

Health factors	Frequency (n)	Percentage (%)
<b>Duration of haemodialysis</b>		
Less than 1 year	23	18
2 - 5 years	91	71.1
6 - 10 years	14	10.9
<b>Heard of kidney transplant before</b>		
Yes	118	92.2
No	10	7.8
<b>Discussion of Kidney transplant with service provider</b>		
Yes	95	74.2
No	32	25
<b>Knowledge on kidney transplant definition</b>		
Yes	118	92.2
No	10	7.8
<b>Referred to kidney transplant evaluation</b>		
Yes	70	54.7
No	58	45.3
<b>Have you ever planned for kidney transplant</b>		
Yes	65	50.8
No	63	49.2
<b>Started the process of kidney transplant</b>		
Yes	50	39.1
No	78	60.9
<b>Donor preference</b>		
Living donor	39	78
Non-living donor	11	22
<b>Presence of comorbidity</b>		
Yes	112	87.5
No	16	12.5
<b>Types of comorbidities present (n =112)</b>		
Hypertension only	55	49.1
Diabetes only	13	11.6
Diabetes and hypertension	35	31.3
Others (Heart disease, HIV, Hepatitis B, arthritis)	9	8

Table 3  
Perspectives of patients on kidney transplantation

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
I feel comfortable asking for a kidney	58(45.3)	17(13.3)	8(6.3)	21(16.4)	24(18.8)
I don't want people to know I have kidney disease	62(48.4)	30(23.4)	16(12.5)	11(8.6)	9(7.0)
My religion prohibit transplant	90(70.3)	25(19.5)	5(3.9)	0.0	8(6.3)
I have fear over surgical process	52(40.6)	11(8.6)	11(8.6)	27(21.1)	27(21.1)
I am too old for KT	75(58.6)	12(9.4)	18(14.1)	8(6.3)	15(11.7)
I have concerns over my poor health and comorbidities	51(39.8)	10(7.8)	17(13.3)	26(20.3)	24(18.8)
I cannot afford the cost of KT	11(8.6)	11(8.6)	9(7)	21(16.4)	76(59.4)
I don't have a donor	13(10.2)	11(8.6)	9(7)	9(7)	86(67.2)
I don't want someone else's kidney	71(55.5)	10(7.8)	28(21.9)	1(0.8)	18(14.1)

for a kidney. Further, nearly half 48.4% (n =62) of the respondents did not want others to know they had kidney disease while 70.3% (n =90) of the respondents strongly disagreed their religion prohibited kidney transplant. Also, above half 59.4% (n =76) of the respondents strongly agreed they cannot afford the cost of transplant while a greater number 67.2% (n =86) strongly agreed that they did not have a kidney donor as shown in Table 3.

*D. Perceived Benefits of Kidney Transplantation on Quality of Life*

More than half 60.2% (n =77) of the respondents asserted that kidney transplant would improve their quality of life. However, 35.2% (n =45) did not know how it would affect quality of life as shown in figure 1.



Fig. 1. Perceived benefits of kidney transplant on quality of life

*E. Healthcare System Factors as Perceived by Haemodialysis Patients*

The respondents were asked to rate statements about healthcare system based on their perception. Less than half 44.5% (n =57) of the respondents strongly disagreed with the statement that they do not find health professionals qualified to conduct kidney transplantation, 42.2% (n=54) strongly disagreed that they do not feel confident to undergo kidney

Table 4  
Healthcare system factors as perceived by patients

Variable	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
I don't find health professionals qualified to conduct kidney transplantation	57(44.5)	29(22.7)	30(23.4)	6(4.7)	6(4.7)
The hospital is well equipped to perform kidney transplant	6(4.7)	8(6.3)	39(30.5)	20(15.6)	55(43)
The hospital counsels' patients on importance of kidney	3(2.3)	18(14.1)	27(21.1)	26(20.3)	54(42.2)
Healthcare providers have a positive attitude towards kidney transplant	2(1.6)	16(12.5)	31(24.2)	23(18)	56(43.8)
I don't feel confident to undergo kidney transplant in this hospital	54(42.2)	17(13.3)	45(35.2)	8(6.3)	4(3.1)

Table 5  
Socio-demographic factors associated with kidney transplant uptake

Patient factors	Kidney transplant uptake		df	$\chi^2$	P-value
	Yes n (%)	No n (%)			
<b>Gender</b>					
Male	25(50)	40(51.3)	1	0.02	0.516
Female	25(50)	38(48.7)			
<b>Age group</b>					
Less 35 Years	19(38)	17(21.8)			
36 - 50 Years	23(46)	19(24.4)	2	18.37	<0.001
More than 50 years	8(16)	42(53.8)			
<b>Level of education</b>					
Primary level	10(20)	25(32.1)			
Secondary	16(32)	26(33.3)	2	3.01	0.223
Tertiary	24(48)	27(34.6)			
<b>Marital status</b>					
Single	21(42)	39(50)	1	0.783	0.241
Married	29(58)	39(50)			
<b>Religion</b>					
Christian	40(80)	73(78.2)	1	3.9	0.045
Muslim	10(20)	5(6.4)			
<b>Occupation</b>					
Unemployed	10(20)	35(44.9)	1	8.268	0.003
Employed	40(80)	43(55.1)			
<b>Income</b>					
≤Ksh 100,000	9(18)	27(34.6)			
Ksh 100,001 - Ksh.500,000	13(26)	14(17.9)	3	4.669	0.216
Ksh 500,001 – 1,000,000	14(28)	16(20.5)			
>1,000,000	14(28)	21(26.9)			
<b>Payment of dialysis</b>					
Insurance	49(98)	75(96.2)	1	0.343	0.49
Out of pocket	1(2)	3(3.8)			
<b>Member of NHIF</b>					
Yes	49(98)	75(96.2)	1	0.343	0.49
No	1(2)	3(3.8)			

transplant in the study hospital. Further analysis revealed that 43% (n =55) strongly agreed the hospital is well equipped to perform kidney transplant while 43.8% (n=56) strongly agreed healthcare providers have positive attitude towards kidney transplant as shown in Table 4.

F. Kidney Transplant Uptake

The uptake of kidney transplantation was assessed by identifying patients who had started the process of kidney transplant. Majority 61% (n=78) of the respondents had not started the process of kidney transplant as shown in Figure 2 below.

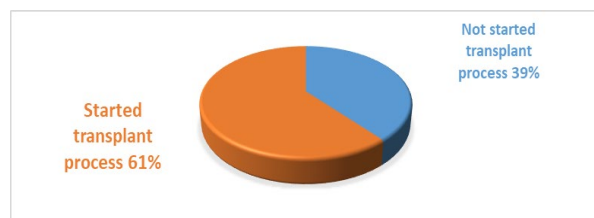


Fig. 2. The uptake of kidney transplant

G. Social Demographic Factors Associated with the Uptake of Kidney Transplant

A Chi square test for association was conducted to determine whether patients' socio-demographic factors had a statistical significance in influencing the uptake of kidney transplant. The findings revealed that, age  $\chi^2 (2) = 18.37, p < 0.001$ , religion  $\chi^2 (1) = 3.9, p = 0.045$  and occupation  $\chi^2 (1) = 8.268, p = 0.003$  were significantly associated with kidney transplantation as shown in Table 5.

H. Association Between Patients' Health Factors and Kidney Transplant Uptake

Chi square test for association revealed that, discussion of kidney transplant with service provider,  $\chi^2 (1) = 16.12, p < 0.001$  and referred for kidney transplant evaluation,  $\chi^2 (1) = 47.49, p < 0.001$  had a statistical significance associated with kidney transplantation. Fisher's exact test established that having heard of kidney transplant before (df=1, p=0.007), planning for kidney transplant (df=1, p<0.001) and presence of comorbidities (df = 5, p<0.001) were significantly associated with kidney transplantation as shown in Table 6.

Table 6  
Association between patients' health factors and kidney transplant uptake

	Kidney transplant uptake		Df	$\chi^2$	p-value
	Yes n (%)	No n (%)			
<b>Duration of haemodialysis</b>					
<1 year	7(14)	16(20.5)			
2 - 5 years	40(80)	51(65.4)	2	9.19	0.275*
6 - 10 years	3(6)	11(14.1)			
<b>Heard of kidney transplant before</b>					
Yes	50(100)	68(87.2)	1	-	0.007**
No	0	10(12.8)			
<b>Discussion of Kidney transplant with service provider</b>					
Yes	47(94)	49(62.3)	1	16.12	p<0.001*
No	3(6)	29(37.7)			
<b>Knowledge on kidney transplant definition</b>					
Yes	47(94)	71(91)	1	0.374	0.401*
No	3(6)	7(9)			
<b>Referred to kidney transplant evaluation</b>					
Yes	46(92)	22(29.3)	1	47.49	p<0.001*
No	4(8)	56(71.7)			
<b>Have you ever planned for kidney transplant</b>					
Yes	50(100)	14(18.2)	1	-	p<0.001**
No	0	64(81.8)			
<b>Comorbidity presence</b>					
Yes	46(92)	66(84.6)	1	1.15	0.169*
No	4(15.4)	12(15.4)			
<b>Comorbidities type</b>					
Hypertension only	20(40)	14(17.9)			
Diabetes only	7(14)	6(7.7)			
Diabetes & hypertension	19(38)	36(46.2)	5	-	0.001**
None	4(26)	11(14.1)			
Others	0	11(14.1)			

\*Chi-square test, \*\* Fischer's exact test

*I. Association Between Patients' Perceived Health Related Factors and Kidney Transplant Uptake*

A Chi square test for association revealed that having fear over surgical procedures,  $\chi^2 (2) = 23.97, p<0.001$ , concerns over poor health and comorbidities,  $\chi^2 (2) = 29.32, p<0.001$  and lack of a donor  $\chi^2 (1) = 30.279, p<0.001$  were statistically significant factors associated with kidney transplantation. Fisher's exact test revealed that, being comfortable asking for a kidney (df =2, p<0.001), non-disclosure of kidney disease (df =2, p<0.001), religious prohibition (df =2, p<0.001), being too old (df =2, p<0.001), and avoiding foreign kidney in one's body (df =2, p<0.001), were significantly associated with kidney transplantation uptake as shown in Table 7.

*J. Association Between Healthcare System Factors and Kidney Transplant Uptake as Perceived by Patients*

It was established that, hospital being well equipped  $\chi^2 (2) = 28.66, p<0.001$ , counseling on importance of transplant  $\chi^2 (2) = 34.91, p<0.001$  and health provider attitude about transplant  $\chi^2 (2) = 32.71, p<0.001$  were statistically significant factors associated with kidney transplant uptake. Fischer's exact test revealed that health provider qualification (df =2, p<0.001), and feeling confident to undergo kidney transplant in study hospitals (df =2, p<0.001), were significantly associated with kidney transplantation as shown in Table 8.

*K. Predictors for Kidney Transplant Uptake Among Haemodialysis Patients*

Binary logistic regression showed that age, fear over surgical process, concerns over poor health, presence of comorbidities

and donor availability were independently associated with kidney transplantation. Respondents aged more than 50 years were 0.34 times less likely to consider KT compared to those less than 35 years, aOR =0.34, 95%CI: 0.001, 0.76, p =0.049. Those with fear over surgical process were 0.56% times less likely to undergo transplant compared to those who did not, aOR = 0.56, 95%CI: 0.21, 0.81, p =0.013. Further, patients who had concerns over poor health and comorbidities were 0.8 times less likely to undergo transplant compared to those who without, aOR =0.81, 95%CI: 0.21, 0.97, p =0.010. Patients without donors were 0.5 times less likely to consider transplant compared to those who had, aOR =0.51, 95%CI: 0.21, 0.87, p =0.007 as shown in table 9.

Table 7  
Association between patients' perceived health related factors and kidney transplant uptake

	Kidney transplant uptake		Df	$\chi^2$	p-value
	Yes n (%)	No n (%)			
<b>I feel comfortable asking for a kidney</b>					
Disagree	46(92)	29(37.2)			
Undecided	0	8(10.3)	2	-	p<0.001**
Agree	4(8)	41(52.6)			
<b>I do not want people know I have kidney disease</b>					
Disagree	46(92)	46(59)			
Undecided	0	16(20.5)	2	-	p<0.001**
Agree	4(8)	16(20.5)			
<b>My religion prohibit transplant</b>					
Disagree	50(100)	65(83.3)			
Undecided	0	5(6.4)	2	-	p<0.001**
Agree	0	8(1.3)			
<b>I have fear over surgical process</b>					
Disagree	38(76)	25(32.1)			
Undecided	3(6.0)	8(10.3)	2	23.97	p<0.001*
Agree	9(18)	45(57.7)			
<b>I am too old for kidney transplant</b>					
Disagree	47(94)	40(51.3)			
Undecided	3(6.0)	15(19.2)	2	-	p<0.001**
Agree	0	23(29.5)			
<b>I have concerns over my poor health and comorbidities</b>					
Disagree	38(76)	23(29.5)			
Undecided	6(12)	11(14.1)	2	29.32	p<0.001*
Agree	6(12)	44(56.4)			
<b>I cannot afford the cost of Kidney transplant</b>					
Disagree	11(22)	11(14.1)			
Undecided	6(12)	3(3.8)	2	5.023	0.081*
Agree	33(66)	64(82.1)			
<b>I don't have a donor</b>					
Disagree	21(42)	3(3.8)			
Undecided	1(2.0)	8(10.3)	2	30.279	p<0.001*
Agree	28(56)	67(85.9)			
<b>I don't want someone else's kidney</b>					
Disagree	50(100)	40(51.3)	2	-	p<0.001**
Undecided	0	38(48.7)			
<b>How would getting kidney transplant affect your QoL</b>					
It will improve my QoL	48(96)	29(37.2)			
It will decrease my QoL	0	5(6.4)	2	-	p<0.001**
It will not change my QoL	0	1(1.3)			
I do not know	2(4.0)	43(55.1)			

\*Chi-square test, \*\* Fischer's exact test

Table 8  
Association between healthcare system factors and kidney transplant uptake as perceived by patients

Healthcare system factors	Kidney transplant uptake		Df	$\chi^2$	p-value
	Yes n (%)	No n (%)			
<b>Health provider qualified to conduct kidney transplantation</b>					
Disagree	46(92)	40(51.3)			
Undecided	0	30(38.5)	2	-	p<0.001**
Agree	4(8)	8(10.3)			
<b>The hospital is well equipped to perform kidney transplant</b>					
Disagree	3(6)	1(14.1)			
Undecided	3(6.0)	35(44.9)	2	28.66	p<0.001*
Agree	44(88)	32(41)			
<b>The hospital counsels' patients on importance of kidney</b>					
Disagree	2(4.0)	19(24.4)			
Undecided	1(2.0)	26(33.3)	2	34.91	p<0.001*
Agree	47(94)	33(42.3)			
<b>Healthcare providers have a positive attitude towards kidney transplant</b>					
Disagree	3(6.0)	15(19.2)			
Undecided	1(2.0)	30(38.5)	2	32.71	p<0.001*
Agree	46(92)	33(42.3)			
<b>I don't feel confident to undergo kidney transplant in this hospital</b>					
Disagree	48(96)	22(28.2)			
Undecided	2(4.0)	43(55.1)	2	-	p<0.001**
Agree	0	13(16.7)			

Table 9  
Predictors for kidney transplant uptake

Independent factors	aOR (95%CI)	P value
<b>Age</b>		
≤35Years	Ref	
36 - 50 Years	0.94(0.07,12.91)	0.962
More than 50 years	0.34(0.001,0.76)	0.049
<b>Religion</b>		
Christian	0.03(0.00,11.83)	0.252
Muslim		
<b>Employment status</b>		
Employed	0.5(0.03,7.58)	0.62
Unemployed	Ref	
<b>Discussion of Kidney transplant with service provider</b>		
Referred to kidney transplant evaluation	-	-
<b>I have fear over surgical process</b>		
Disagree	Ref	
Undecided	0.11(0.02, 1.56)	0.711
Agree	0.56(0.21, 0.81)	0.013
<b>I have concerns over my poor health and comorbidities</b>		
Disagree		
Undecided	0.31(0.00,2.76)	0.114
Agree	0.81(0.21, 0.97)	0.010
<b>I don't have a donor</b>		
Disagree	Ref	
Undecided	0.02(0.41, 3.11)	0.727
Agree	0.51(0.21, 0.87)	0.007
<b>The hospital is well equipped to perform kidney transplant</b>		
Disagree	Ref	
Undecided	2.2(0.09,52.59)	0.627
Agree	0.3(0.003, 28.93)	0.606
<b>The hospital counsels' patients on importance of kidney</b>		
Disagree	Ref	
Undecided	-	-
Agree	-	-
<b>Healthcare providers have a positive attitude towards kidney transplant</b>		
Disagree	Ref	
Undecided	-	-
Agree	-	-

#### 4. Discussion

A variety of social demographic characteristics are known to influence the uptake of kidney transplantation either positively or negatively. The current study findings revealed that age, religion, and occupation were important factors influencing the uptake of kidney transplantation. The present study revealed that older patients (>50 years) were less likely to consider kidney transplantation. The findings were comparable with those of Irving et al., (2012) and Ozkul et al., (2016) who identified that kidney transplantation was more prevalent in younger individuals. According to Ozkul et al. (2016) older patients were less likely to undergo kidney transplantation for fear of high risk of complications and poor graft survival. Younger age positively influenced willingness to undergo transplant according to Alansari et al. (2017) and Lagou et al. (2017). They hypothesized that senior age is linked to comorbidities that make surgery difficult to bear and lack of financial means to pay for kidney transplantation. A research done in China by Tan et al. (2017) revealed willingness to consider kidney transplant decreased by 9% with every increase in one year. However, the findings from the current study contrast those of Titilayo et al. (2015), who did not find age as a significant predictor of kidney transplantation.

In the present study, religion was associated with the uptake of kidney transplantation. Majority of Christians considered

kidney transplant compared to Muslims. This compares to Sadic et al. (2016) findings where religious affiliation significantly influenced kidney transplantation. Similarly, Shahani et al. (2019) also stated that religious and social beliefs were significantly associated with kidney transplantation. In the present study, 12% of the participants were Muslim, making it difficult to make a conclusive comparison. This could explain why religion was not a predictor of kidney transplantation under multivariate analysis.

The present study established occupation as significantly associated with kidney transplantation where the uptake was higher among the employed group. The results compare to Zhang et al. (2018), who established that financial capability significantly influences kidney transplantation. They posited that being employed is associated with additional income, which could be more essential in funding kidney transplantation.

In the present study, patients who feared surgical process were less likely to consider kidney transplantation. Kidney transplantation is a surgical process; hence it is difficult for those who fear the surgical approaches to consent to the procedure. These results compare to those of Ozkul et al. (2016), who presented that patients with fear of surgical processes were less likely to consider transplant. Furthermore, Takure et al. (2016) also found that fear of death during the



surgical procedure would reduce uptake. This means that there is a need for increased awareness of the efficacy of kidney transplantation to control fear among patients.

The current study also revealed that patients who had concerns over their poor health and presence of comorbidity were less likely to consider kidney transplantation. Comorbidities such as diabetes and hypertension have been associated with poor kidney transplantation outcomes. Alansari et al. (2017) also found comparable results, where presence of immunosuppressive disorders was associated with reduced uptake of kidney transplantation.

The findings from this study establish that lack of a donor is significantly related to low uptake of kidney transplantation. According to Becker and Elias (2014), organ recipients have significant wait times for transplants because there are more recipients than donors and fewer organ transplantation facilities. The findings also concur with a study done by Kloss et al. (2019) which reported that lack of non-living donors slows the kidney transplantation uptake. Having a donor is a persistent problem among patients willing to consider kidney transplantation.

The present study revealed higher uptake among participants who perceived the hospital to be well equipped and with qualified staff to perform kidney transplant. These findings align with a study by Wilder et al. (2016), who stated that patients believe that clinical expertise and competence are crucial in controlling complications and attaining positive outcomes. Similarly, Anding et al. (2015) also stressed that kidney transplant recipients prefer to participate in interventions where effective care is provided and where the health providers can ensure patients achieve both positive health outcomes and good quality of life.

The present study also established a significant association between respondents' perceptions of health workers' attitudes and uptake of kidney transplantation. Those who had a positive perception of healthcare providers' attitudes were more likely to consider kidney transplant. These results compare with Browning et al. (2016) who stated that healthcare provider attitude is an essential factor in kidney transplantation choice because it influences the decision-making process. According to their research, the attitude of the healthcare provider has a significant influence on the patients' attitude toward a health intervention, and the efficacy of a health facility. They also suggested that a good attitude from the healthcare provider can help with kidney transplantation choice.

## 5. Conclusion

Only about a third 50 (39%) of respondents had initiated the process of kidney transplantation. The study established statistically significant factors in influencing this low uptake of kidney transplant. These include; age, occupation, religion, fear of surgical procedure, concern about poor health, presence of comorbidity, lack of donors, lack of knowledge and lack of referral for evaluation. Patients' perception of hospital capacity in terms of equipment, health provider qualification and attitude, and counseling on importance of kidney transplantation influenced the choice of kidney transplant.

## 6. Recommendations

The study recommends that healthcare providers should establish strategies to increase the uptake of kidney transplantation. They should apply a well-defined protocol for counseling to demystify some of the deterrent factors for kidney transplant. This should also capture timely referral and evaluation for kidney transplantation. Government should consider fully financing kidney transplantation through National Health Insurance Fund. It should consider introducing deceased donor program in the country to increase the uptake of kidney transplantation.

## 7. Areas for Further Research

Future studies should include both public and private health facilities for in-depth understanding of the complex issues surrounding kidney transplantation uptake. It would also be helpful to capture qualitatively the experiences and perspectives of CKD patients on dialysis in relation to the choice of kidney transplant.

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