Artificial Organs

Knowledge of Kidney Donation Among Care Givers in Two Tertiary Hospitals in Southwest Nigeria

*Oluseyi A. Adejumo, †Adaobi U. Solarin, ‡Moses T. Abiodun, and *Ayodeji A. Akinbodewa

*Department of Internal Medicine, Kidney Care Centre, Kidney Care Centre, University of Medical Sciences Ondo, Ondo State; †Department of Paediatrics, Babcock University Teaching Hospital, Ilishan-Remo, Ogun State; and ‡Department of Child Health, University of Benin Teaching Hospital, Benin, Benin City, Edo State, Nigeria

Abstract: One of the major challenges of kidney transplantation is shortage of kidney donors. Care givers (CGs) are potential kidney donors, but the majority of them are unwilling to donate due to inadequate knowledge on kidney donation. This study evaluated the knowledge of kidney donation and its determinants among CGs in two tertiary hospitals in Southwest Nigeria. This was a cross-sectional study that was carried out in the Kidney Care Centre (KCC), Ondo and Babcock University Teaching Hospital (BUTH), Ilishan-Remo using a self-administered pretested questionnaire that assessed knowledge of kidney donation and its determinants. *P*value of <0.05 was taken as significant. A total of 244 respondents participated in the study. The majority were below 40 years, married, and female. The proportion of respondents with adequate knowledge of kidney donation was 63.4%. More respondents from BUTH compared to KCC had adequate knowledge of kidney donation (80% vs. 46.7%, $P \leq 0.001$). Similarly, the mean knowledge score was higher in respondents from BUTH ($P \leq 0.001$). Factors that determined knowledge of kidney donation were female gender (AOR: 3.43, 95% CI: 1.25–9.40, $P = 0.02$) and social class (AOR: 1.22, 95% CI: 0.50–2.95, $P \leq 0.001$). There was positive correlation between knowledge of kidney donation among the respondents from both hospitals and their willingness to donate kidneys ($r = 0.439$, $P \leq 0.001$). Knowledge of kidney donation was better among BUTH's respondents. Gender and social class were predictors of knowledge of kidney donation. Improving knowledge of kidney donation may improve willingness to donate among the public. **Key Words:** Knowledge, Care giver, Kidney donation.

Chronic kidney disease (CKD) has become a public health problem due to its increasing prevalence globally as well its associated high morbidity and mortality (1,2). CKD is associated with huge health and economic burden and the impact is more pronounced in developing countries (3).

Renal transplantation is the best choice of treatment for patients with end-stage renal disease (ESRD) because it offers better quality of life and survival advantage and is more cost effective compared with dialytic therapy (4–6). However, one of the major challenges of kidney transplantation is shortage of kidney donors (7,8). In fact, the number of patients with ESRD and those on transplant lists has increased without a proportionate increase in the available number of kidneys for transplantation in the past years. The average waiting time for kidney transplant in the United States is 5 years and the chance of a patient getting transplanted is less than 20% (8,9).

Care givers (CGs) of patients who are usually their relatives and friends are potential live kidney donors, but the majority of them are still unwilling to donate kidneys despite the fact that long-term follow-up studies on kidney donors have reported it to be safe (10). Some of the barriers to kidney donation include lack of adequate knowledge about kidney donation and associated risk, fear, mistrust, cultural beliefs, religion, and myths concerning being

doi: 10.1111/aor.12769

Received February 2016; revised March 2016.

Address correspondence and reprint requests to Dr. Oluseyi A. Adejumo, Kidney Care Centre, University of Medical Sciences, Ondo, Ondo State, Nigeria. E-mail: ceeward2010@yahoo.com

buried after death with intact body parts and organs (11–13).

This study therefore aimed to assess and compare knowledge of kidney donation and its determinants among CGs in two tertiary hospitals in South-west Nigeria. The findings in this study will help to identify ways of improving knowledge of kidney donation which will subsequently encourage kidney donation among the public.

METHODS

Study setting and participants

The study was carried out at Kidney Care Centre (KCC) Ondo and Babcock University Teaching Hospital (BUTH), Ilishan-Remo, in Southwest Nigeria. This was a cross-sectional descriptive study that took place between July and September 2015. A simple random technique was adopted in selecting the participants who were patients' relatives aged 18–60 years seen at the centers during the study period.

Sample size was derived using the Kish Leslie equation for descriptive studies (14).

$$N = \frac{Z^2pq}{d^2}$$

Z = usually set at 1.96 which corresponds to the 95% confidence interval

p = the proportion in the study population estimated to be aware of kidney donation from previous study which was 88.5% by Aghanwa et al. (15)

$q = 1.0 - \mathrm{p}$

d = degree of accuracy desired, usually set at 0.05

$$\frac{Z^2pq}{d^2} = \frac{(1.96)^2 \times 0.885 \times (1-0.885)}{(0.05)^2} = 156.4$$

This formula gave a minimum sample size of 180 after including a 15% attrition rate; however, 244 respondents completely filled the questionnaires.

Ethical consideration

Ethical clearance was obtained from the Ethics and Research Committees of the Mother and Child Hospital Akure. Written informed consent was obtained from each participant. All questionnaires were coded (without names) and confidentiality of responses was ensured throughout the study.

Data collection

The researchers and two trained research assistants conducted face-to- face interviews with participants using a self-designed pretested questionnaire. Pretesting of the primary survey form was done at the State Specialist Hospital, Ondo involving respondents who did not partake in the main study. Following pretesting, the questionnaire was revised for clarity and the validity was confirmed by a Cronbach's alpha internal consistency coefficient of 0.81. The definitive questionnaire comprised the following sections: participants' socio-demographic features/prior donation experience, knowledge of kidney donation Likert scale, and a 100-mm visual analogue scale that was used to assess willingness to donate kidneys. The Likert scales were answered on a 5-point scale from "strongly agree" to "strongly disagree." Adequate knowledge of kidney donation was defined using a cut off of ≥ 3.0 on the Likert scale.

The skills of the research assistants were verified to be adequate through role-play and simulations. The interviews were conducted in English or Yoruba languages to ensure good comprehension.

Data analysis

The data were analyzed using SPSS version 20.0 statistical software for Windows (IBM, Armonk, NY, USA). Fisher's Exact test or Chi-square was used to compare categorized data while Student t-test was used for any significant difference between weighted mean scores. Multiple logistic regression analysis was done to identify factors predicting knowledge of kidney donation. The level of significance of each test was set at $P < 0.05$.

RESULTS

A total of 244 respondents participated in the study from both KCC and BUTH. The majority of the respondents were below 40 years, married, and female. They were also predominantly of Yoruba ethnic group and Christian faith. More than half of the Christians were Pentecostals. The majority of the respondents had post primary education and belong to either high or middle social class (Table 1).

The overall proportion of respondents in this study with adequate knowledge of kidney donation is 63.4%. There were significantly more respondents from BUTH compared to KCC (80% vs. 46.7%) who had adequate knowledge of kidney donation with a P value of <0.001 (Table 2). Similarly, the mean knowledge scores of BUTH respondents was significantly higher than that of KCC with a P value of <0.001.

TABLE 1. *Comparison of socio-demographic data and responses of care givers in both BUTH and KCC*

	KCC		BUTH		
	N	%	*N*	%	*P*
Age group					
<40 years	90	80.4	68	70.8	0.109
40–60 years	22	19.6	28	29.2	
Sex					
Male	28	24.6	36	33.3	0.149
Female	86	75.4	72	66.7	
Tribe					
Yoruba	96	80.0	100	86.2	0.035
Ibo	20	16.7	8	6.9	
Hausa	0	0.0	0	0.0	
Others	4	3.3	8	6.9	
Religion					
Christianity	90	76.3	116	96.7	0.000
Islam	28	23.7	4	3.3	
Traditional	0	0.0	0	0.0	
Others	0	0.0	0	0.0	
Denomination					
Pentecostal	52	59.1	80	71.4	0.000
Catholic	20	22.7	4	3.6	
Anglican	14	15.9	8	7.1	
Jehovah Witness	2	2.3	0	0.0	
Others	0	0.0	20	17.9	
Marital status					
Single	14	11.7	32	26.7	0.001
Married	102	85.0	88	73.3	
Others	4	3.3	0	0.0	
Educational level					
None	4	3.4	0	0.0	0.000
Primary	8	6.9	0	0.0	
Secondary	44	37.9	24	20.7	
Tertiary	60	51.7	92	79.3	
Social class					
High	60	53.6	88	84.6	0.000
Middle	34	30.4	12	11.5	
Low	18	16.1	4	3.8	
Ever donated blood					
Yes	22	18.3	28	22.6	0.411
No	98	81.7	96	77.4	
Ever donated any gamete					
Yes	0	0.0	0	0.0	
No	120	100.0	124	100.0	
Side effects					
Yes	6	6.7	4	3.7	0.397
No	36	40.0	52	48.1	
Not applicable	48	53.3	52	48.1	
Heard of kidney donation					
Yes	80	67.8	116	93.5	0.000
No	28	23.7	8	6.5	
Unsure	10	8.5	0	0.0	
Source of information					
Internet	16	18.6	28	25.0	0.042
Television	22	25.6	44	39.3	
Health worker	22	25.6	20	17.9	
Others	26	30.2	20	17.9	
Promotion of kidney donation					
Yes	96	84.2	100	80.6	0.471
No	18	15.8	24	19.4	
Relative with CKD					
Yes	46	40.4	8	6.5	0.000
No	68	59.6	116	93.5	

Nonresponse excluded from each variable.

TABLE 2. *Comparison of knowledge of kidney donation between care givers in BUTH and KCC*

	BUTH	KCC	*P*
Inadequate knowledge	24 (20.0)	64 (53.3)	<0.001
Adequate knowledge	96 (80.0)	56 (46.7)	

A total of 116 (93.5%) BUTH respondents had heard of kidney donation before compared to 80 (67.8%) KCC respondents. This was significant with a P value of <0.001. The major sources of information on kidney donation among the respondents were television, internet, and health workers. The majority of the respondents also believed that kidney donation should be promoted in the society (Table 1).

Only 22 (18.3%) and 28 (22.6%) respondents from KCC and BUTH, respectively had ever donated blood in the past while less than 10% of these respondents had side effects following blood donation. None of the respondents had ever donated gamete or any other organs (Table 1).

There were more respondents from KCC who had relatives with CKD compared to those from BUTH (40.4% vs. 6.5%) and this was significant with a P value of <0.001 (Table 1).

Significant factors associated with adequate knowledge of kidney donation were age <40 years, female gender, postprimary education, high social status, and having relatives with CKD (Table 3). Significant factors that determined knowledge of kidney donation on logistic regression were female gender (AOR: 3.43, 95% CI: 1.25–9.40, $P = 0.02$) and social class (AOR: 1.22, 95% CI: 0.50–2.95, $P \leq 0.001$) (Table 4).

There was a positive correlation between knowledge of kidney donation among the respondents from both hospitals and their willingness to donate kidneys ($r = 0.439$, $P \leq 0.001$).

DISCUSSION

This study showed that the overall proportion of CGs with adequate knowledge of kidney donation is 63.4%. There were also significantly more respondents from BUTH compared to KCC (80% vs. 46.7%) who had adequate knowledge of kidney donation. The mean knowledge score was also higher among BUTH's care givers reflecting better knowledge compared to their KCC counterparts.

The better knowledge of kidney donation among CGs in BUTH may be due to the fact that they were more educated than their counterparts in KCC. This is similar to findings of Odusanya et al.

TABLE 3. *Association between knowledge and socio-demographic variables among care givers*

	KCC		*P* value	BUTH		*P* value
Variable	Inadequate knowledge	Adequate knowledge		Inadequate knowledge	Adequate knowledge	
Age						
<40 years	56 (87.5%)	34 (70.8%)	0.028	8 (50%)	60 (75%)	0.045
40–60 years	8 (12.5%)	14 (29.2%)		8 (50%)	20 (25%)	
Gender						
Male	8 (13.8%)	20 (35.7%)	0.007	0 (%)	36 (40.9%)	<0.001
Female	50 (86.2%)	36 (64.3%)		20 (100%)	52 (59.1%)	
Religion						
Christianity	48 (75%)	42 (75%)	1.000	24 (100%)	88 (91.7%)	0.314
Islam	16 (25%)	14 (25%)		0 (0%)	8 (8.3%)	
Education						
Primary	36 (56.2%)	20 (35.7%)	0.025	12 (50%)	8 (8.3%)	<0.001
Postprimary	28 (43.8%)	36 (64.3%)		12 (50%)	88 (91.7%)	
Social status						
2^0 and 3^0	24 (38.7%)	36 (72%)	<0.001	24 (100%)	64 (84.2%)	0.038
1^0	38 (61.3%)	14 (28%)		0 (0%)	12 (15.8%)	
Relatives with CKD						
Yes	16 (25%)	30 (60%)	<0.001	0 (0%)	8 (8.3%)	0.314
No	48 (75%)	20 (40%)		24 (100%)	88 (91.7%)	
Previous blood donation						
Yes	8 (12.5%)	14 (25%)	0.077	4 (16.7%)	20 (20.8%)	0.648
No	56 (87.5%)	42 (75%)		20 (83.3%)	76 (79.2%)	

Nonresponse excluded from each variable.

in a similar study that was done in Southwest Nigeria (16). Also, the majority of the respondents from BUTH had a higher social class compared to their KCC counterparts which may also explain their better knowledge.

Iliayasu et al. reported that 79.6% of respondents in Northern Nigeria had good knowledge of kidney donation which is higher than the finding in our study (17). Also, good knowledge of organ donation was reported in 60% of respondents by Odusanya et al. while Alam reported 63.9% in Saudi Arabia which is similar to the present study (16,18). However, the studies by Odusanya et al. and Alam were on organ donation unlike our study that was specific for kidney donation. Also, the validated questionnaire used to assess knowledge in this present study is different from what was used in previous studies in Nigeria.

The most common source of information on kidney donation in both KCC and BUTH was through television which agreed with findings from some previous studies (18,19). This was different from electronic media that was reported to be the most common source of awareness on kidney donation in Northern Nigeria (17).

In Nigeria, the recently enacted National Health Act contains laws that govern organ donation and transplantation (20). These laws ensure that only authorized and specifically licensed hospitals can provide transplantation services with the consent of the appropriate officer of the hospital (usually the doctor in charge of clinical services) and permission of an "independent tissue transplantation committee." The laws also stipulate that only those who are 18 years and above are eligible to donate organs after giving informed consent without receiving any form of financial or other reward. The majority of Nigerians are unaware of these laws and this reiterates the fact that health workers need to do more in terms of educating people on

TABLE 4. *Logistic regression to determine predictors of knowledge of kidney donation of care givers*

	P	AOR	95% CI for OR
Sex			
Male	0.02	3.43	1.25–9.40
Female			
Education	0.22	0.58	0.25–1.38
Below tertiary			
Tertiary			
Social class			
High	<0.001	6.18	2.33–16.40
Middle/low			
Age group			
<40 years	0.66	1.22	0.50–2.95
40–60 years			
Having relative with CKD			
Yes	0.21	1.86	0.70–4.93
No			

kidney donation, transplantation, and the associated laws.

The proportion of respondents who heard of kidney donation from health workers was however higher in KCC compared to BUTH. This is not surprising because there were more KCC respondents who had relatives with CKD compared with BUTH respondents.

About 80% of the respondents in this study were in support of promotion of kidney donation in Nigeria. This is similar to reports from Brazil where 87% of the respondents were in support of organ donation but higher than 57% reported in Pakistan (19,21). The negative publicity associated with organ trade and trafficking in Pakistan was reported to have been responsible for this low support.

Social status was a significant predictor of knowledge on kidney donation in this study. This is similar to findings from previous studies (19,22,23). This may be because those with high social status were more likely to have better education and access to information, enhancing their knowledge on kidney donation. Younger age was associated with adequate knowledge of kidney donation in this study which is similar to some previous studies (24,25) but at variance to findings from other studies (22,23).

There was no association between knowledge of kidney donation and religion in this study. This may be because most of the respondents were Christians or Muslims and both religions supported kidney donation as an act of service and love to others (26,27). Therefore, educating the public through this religious institution may have a positive influence on knowledge and willingness to donate kidneys. Female gender was a significant predictor of knowledge of kidney donation in this study as reported in earlier reports (22,23).

There was significant association between willingness to donate kidneys and knowledge in this study which was similar to findings from a previous study by Sander and Miller (28). This therefore implies that improving the knowledge of the public on kidney donation may lead to increased willingness to donate kidneys which is required for sustenance of a successful transplant program.

CONCLUSION

Care givers in Babcock University Teaching Hospital had better knowledge of kidney donation compared to those in the Kidney Care Centre. Gender and social class were significant predictors of knowledge of kidney donation among CGs in this study. There was also a positive correlation between knowledge and willingness to donate kidney.

Recommendation: Efforts should be geared toward providing the public with adequate information on kidney donation in order to improve their knowledge. This may increase willingness to be live kidney donors which is required for sustenance of a successful renal transplantation program.

Authors' Contributions: MTA and AOA were involved in the study concept. MTA, AOA, and AUS were involved in design. All authors were involved in data acquisition. AOA was involved in data analysis and drafting of the article. All authors (AOA, AUS, MTA, AAA) were involved in critical revision and final approval of the manuscript.

Conflict of Interest: Authors have no conflict of interest.

REFERENCES

1. Alebiosu CO, Ayodele OE. The global burden of chronic kidney disease and the way forward. *Ethn Dis* 2005;15: 418–23.
2. Levey AS, Atkins R, Coresh J, Cohen EP, Collins AJ, Eckardt KU. Chronic kidney disease as a global public health problem: approaches and initiatives—a position statement from Kidney Disease Improving Global Outcomes. *Kid Int* 2007;72:247–59.
3. Nugent RA, Fathima SF, Feigl AB, Chyung D. The burden of chronic kidney disease on developing nations: A 21st century challenge in global health. *Nephron Clin Pract* 2011; 118:269–77.
4. Oniscu GC, Brown H, Forsythe JLR. How great is the survival advantage of transplantation over dialysis in elderly patients? *Nephrol Dial Transplant* 2004;19:945–51.
5. Haller M, Gutjar G, Kramar, Harnoncourt E Oberbauer R. Cost effectiveness analysis of renal replacement therapy in Austria. *Nephrol Dial Transplant* 2011;26:2988–95.
6. Simmons RG, Anderson CR, Abress LK. Quality of life and rehabilitation differences among four end-stage renal disease therapy groups. *Scand J Urol Nephrol Suppl* 1990; 131:7–22.
7. Arogundade FA. Kidney transplantation in a low-resource setting: Nigeria experience. *Kid Int* 2013;3(Suppl. 1):241–5.
8. Bastani B. The worsening transplant organ shortage in USA; desperate times demand innovative solutions. *J Nephropathol* 2015;4:105–9.
9. United Network for Organ Sharing/Organ Procurement and Transplantation Network (UNOS/OPTN). Data Report. Washington, DC: U.S. Department of Health & Human Services.
10. Ibrahim HN, Foley R, Tan L, Rogers T, Bailey RF, Guo H. Long term consequences of kidney donation. *N Engl Med* 2009;360:459–69.
11. Mbeje P, Moleki M, Ganga-Limando M. Barriers to kidney donation among relatives of patients with chronic renal failure in South Africa. *Int J Adv Nurs Stud* 2014;3:65–8.
12. Yang H, Wang Z, Li H, Zeng F. Factors influencing attitudes of relatives of renal failure patients towards living

kidney donation in Central China. *Transplant Proc* 2012;44: 2921–4.
13. Morgan M, Hooper R, Mayblin M, Jones R. Attitudes to kidney donation and registering as a donor among ethnic groups in the UK. *J Public Health* 2006;28:2226–34.
14. Kish L. *Survey Sampling*. New York: John Wiley and Sons, Inc., 1965.
15. Aghanwa HS, Akinsola A, Akinola PO, Makanjuola ROA. Attitudes towards kidney donation. *J Natl Med Assoc* 2003; 95:725–31.
16. Odusanya O, Ladipo CO. Organ donation: knowledge, attitude and practice in Lagos, Nigeria. *Artif Organs* 2006;30: 626–9.
17. Iliayasu Z, Abubakar IS, Lawan UM, Abubakar M, Adamu B. Predictors of public attitude towards living kidney donation in Kano, Northern Nigeria. *Saudi J Kidney Dis Transpl* 2014;25:196–205.
18. Alam AA. Public opinion on organ transplantation in Saudi Arabia. *Saudi J Kidney Dis Transpl* 2007;18:54–9.
19. Saleem T, Ishaque S, Habib N, et al. Knowledge, attitudes and practices survey on organ donation among a selected adult population in Pakistan. *BMC Med Ethics* 2009;10:5.
20. National Health Act 2014. Available at: http://www.nassnig.org/nass/legislation.php. Accessed March 20, 2016.
21. Coelho JC, Ciliao C, Parolin MB, et al. Opinion and knowledge of the population of a Brazilian city about organ donation and transplantation. *Rev Assoc Med Bras* 2007;53: 421–5.
22. Sequira L, Pai MS. Knowledge and attitude of adults on kidney donation in selected village of Udupi District, Karnataka. *IOAR-JNHS* 2014;3:63–5.
23. Khan N, Masood Z, Nadia T, Hina S, Ashraf KTA, Sumra E. Knowledge and attitudes of patients towards organ donation. *JUMD* 2011;2:15–21.
24. Minniefield JW, Muti P. Organ donation survey results of a Buffalo, New York, African American community. *J Nat Med Assoc* 2002;94:976–86.
25. Maroof S, Kiyani N, Zaman Z, et al. Awareness of organ donation especially kidney donation in Nurpur Shashan, a rural community in Islamabad, Pakistan. *JPMA* 2011;61:828.
26. Bruzzone P. Religious aspects of organ transplantation. *Transplant Proc* 2008;40:1064–7.
27. Oliver M, Woywodt A, Ahmed A, Saif I. Organ donation, transplantation and religion. *Nephrol Dial Transplant* 2011; 26:437–44.
28. Sander SL, Miller BK. Public knowledge and attitude regarding organ donation and tissue donation: an analysis of Northwest Ohio community. *Patient Educ Couns* 2005;58:154–63.