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Original Research Article

Comparative study on knowledge, attitudes and willingness regarding donation of living organs for transplantation among rural and urban dwellers of Kano state, Nigeria

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ABSTRACT

Background: Organ shortage is a major public health challenge for transplant programs globally. Organ transplantation is the most preferred treatment modality for those already affected by end-stage organ disease. This study compared the knowledge, attitudes and willingness regarding donation of living organs for transplantation among rural and urban dwellers of Kano State, Nigeria.
Methods: A comparative cross-sectional descriptive, mixed methods design was employed for the study. An interviewer administered questionnaires and Focused Group Discussions were used in collecting data from 490 respondents and 16 Focus Group Discussions in both rural and urban areas of Kano, Nigeria respectively. The data were analyzed using SPSS version 21 at 5% significance level.
Results: The results showed that most of the participants in the rural and urban areas (89.1%; n=212 and 94.6%; n=227) had heard of organ donation. Awareness of organ donation was significantly associated with gender, age and increasing educational attainment ($p<0.05$). The study identified electronic media (radio/television) as the respondents' main source of information about organ donation. Nearly half of the respondents (47.7% in rural and 52.3% in urban areas) knew that kidneys can be donated ($p=0.05$). A significantly higher percentage of respondents in both the rural 180 (75.6%) and urban areas 190 (79.2%) expressed willingness to donate an organ when required by significant others.
Conclusions: It is recommended that the high level of awareness of and willingness to donate organs in this society could be further enhanced by provision of intensive educational programmes to encourage the public to donate organs.

Keywords: Knowledge, Attitudes, Willingness, Organ's donation, Kano, Nigeria

INTRODUCTION

Rates of end stage renal failure are increasing worldwide, leading to greater needs for dialysis and kidney transplantation.[1] Organ transplantation is the most preferred treatment modality for end-stage organ disease and organ failures. It offers a better quality of life and has better long-term survival benefits.[2] Organ transplant has been widely accepted as a solution for end-stage organ failure.[3] The use of human organs for transplant has steadily increased in the past decades.[4-6] There is a critical shortage of organs for transplant, with potential recipients

awaiting organs, while many die while waiting. In all countries, organ donation and transplant activities are dependent on legislation, attitudes of the general public and health care professionals, and the levels of organization and coordination of transplant units.[6,7] Organ transplantation is the surgical replacement of a malfunctioning organ by another human organ. Kidney, heart, pancreas, liver, or lung has already been successfully transplanted, as well as organ parts or tissues such as bones, cornea, skin, or bone marrow.[8] In Nigeria and with changes in epidemiologic and demographic transitions, more chronic, non-communicable diseases like Hypertensive heart disease, Diabetes mellitus, chronic renal failure, chronic liver failure, Road traffic accident etc. are becoming prominent with increasing burden that may culminate into end organ damage. This led to an increase in number of centers performing transplant especially kidney transplant (the study area inclusive). Located within the study area is a teaching Hospital with a dialysis center and kidney transplant unit. The establishment of renal transplant unit at this center brought about the challenges of sourcing for kidney donors. Death rates from end stage renal failure have consistently been an important contributor to in-hospital patient mortality accounting for 3.9%.[9] Despite this effort, inadequate organ donation remains a major limiting factor for transplantation.

Nigeria had policies on organ donation and transplantation, (but it is at its infancy), that guides on control of use of blood, blood products, tissue and gametes in humans.[10] Issues relating to allocation and use of human organs, donation of human bodies and tissue of deceased persons, purposes of donation of body, tissue etc., and procedure for revocation of any donation were categorically stated in the Act. Donations are currently based on living organs especially of kidneys. Donation after Brain Death (DBD) or Donation after Cardiac Death (DCD) are at preliminary stage of planning as the act permitting such procedures was recently passed into law. Studies have been conducted among the general public in other parts of Nigeria regarding awareness and attitude toward organ donation.[9,11,12] Responses were influenced by educational, religious, cultural and ethical factors. This study determined and compared the knowledge, attitudes and willingness of the community towards donation of living organs for transplantation among rural and urban dwellers of Kano State, Nigeria.

METHODS

Study design and population

We used a comparative cross-sectional descriptive study. The study adopted a concurrent mixed methods strategy for data collection with quantitative and qualitative components. The quantitative component used semi-structured questionnaire while the qualitative component employed the use of Focused Group Discussion (FGD). The study was conducted in Kano State; a densely populated area in Northern Nigeria and one of the commercial nerve centers of Nigeria. The study period was from October, 2014 to September, 2022. The state is predominantly Muslim with a Christian minority. Urban drift from rural areas within Kano, from other states in Nigeria and West Africa, has provided a steady stream of migrants adding to Kano's growing population.

The study population included adults (18 years and above) both males and females; residing in the two selected local government areas of Kano State and those that agreed to participate in the study and provided an informed consent. It excluded temporary visitors of the selected LGAs and those that denied consent to participate in the study. A multi-stage sampling method was used in obtaining the required number of study subjects.

Data collection instruments

A pre-tested, interviewer-administered structured questionnaire was used to collect quantitative data from 490 respondents and was adapted from a previous survey instrument, with modifications made to suit the objectives of this study.[13] The tool has three sections with section I that sought information on the socio-demographic characteristics, while section II assessed respondents' knowledge on organ donation and transplantation. Section III assessed respondents' attitudes towards living organ donation and willingness to donate an organ for transplantation. Here, the respondents were requested to indicate their level of agreement on a five-point Likert's scale (strongly agree, agreed, undecided, disagree, strongly disagree).

The questionnaire was administered by trained research assistants. Comprehensibility, reliability and feasibility of the content of the questionnaire was tested during the pre-test that was conducted in two different localities in Kano State. Ambiguous questions were reframed. The internal consistency of the items on the Likert's scale was checked using Chronbach's alpha; with a calculated Alpha coefficient of 0.910 with Content Validity Index (CVI) of 0.929 and Content Validity Ratio (CVR) of 0.857.[14,15] An informed consent (signed or thumb printed) was obtained from all respondents. This followed a detailed explanation of the study information to the respondents. The respondents were assured about the confidentiality and ethical principles that would be followed, and the background and purpose of the study was explained before the questionnaires were administered.

For this study, and in order to complement the findings of the quantitative component of the study, FGDs were conducted among target population members in groups of 8 participants (each) per session, lasting approximately 45 minutes each. A total of 16 FGDs were conducted (eight in each of the groups) until saturation was reached. The participants for the FGDs were selected from

homogenous grouping of community members; using sex, age and level of literacy as criteria. The meeting was conducted at the palace of the traditional leader of the selected settlement.

Prior to the start of the FGD, there was a formal introduction by the members (respondents) of the FGD including the researchers. A list of areas for discussion was prepared and the guide to the FGD was explained to the participants.

An informed consent was sought from the participants after a brief explanation of the aim and objectives of the exercise. During the FGD, no single participant was allowed to dominate the discussion; everyone was allowed to participate and the investigator was moderating the section and stimulating discussion. One research assistant was the note taker who observed the sessions as well as non-verbal communications. A second assistant was the time keeper and also recorded the discussions. The FGDs sought information based on the objectives of the study using an FGD guide which was also pre-tested in two separate (urban and rural) LGAs.

Ethical considerations

Ethical clearance was obtained and the study commenced with community entry consisting of advocacy, mobilization and interaction with local authorities, traditional, religious and opinion leaders. Political and traditional leaders, influential community members, were visited to seek their permission and co-operation. An informed consent (signed or thumb printed) was obtained from all respondents in both the quantitative and qualitative components.

Data analysis

Quantitative data gathered was analyzed using the Statistical Package for Social Sciences (SPSS) Version 21.16 Frequency distributions of variables and percentages were generated and represented in tables. Chi-square test was used (with Fisher's exact test where necessary) to test for association between socio-demographic variables and knowledge, attitude and willingness to donate organs and statistical significance assessed.

Factors significantly associated with knowledge, attitudes and willingness regarding donation of living organs for transplantation at bivariate level were entered into a logistic regression analysis model to adjust for confounding. The level $p \leq 0.05$ was considered as the cut-off value for significance in all tests. Data from the FGDs were transcribed verbatim, translated and field notes made. Common themes were extracted from the FGDs and thematic analysis was used based on the study objectives. Quotes were obtained during the FGD sessions to highlight some of the responses to issues discussed. Findings of the FGD were compared between rural and urban areas. Quantitative data from the questionnaire and qualitative data from the FGD were triangulated to determine knowledge, attitudes and willingness to donate living organ for transplantation.

RESULTS

Socio-demographic characteristics of the respondents

Two hundred and forty-five questionnaires each were administered in the urban and rural LGAs. Two hundred and thirty-eight (238) and two hundred and forty (240) individuals in the rural and urban LGAs agreed to participate, giving response rates of 97.1% and 98% respectively. Respondents in the urban LGA were significantly older than their rural counterparts with mean ages of 38.3±15.4 and 35.1± 3.1 respectively ($p<0.05$). Majority of the respondents were in their third and fourth decades of life in both rural and urban LGAs.

Islam was the predominant religion in both rural (100%) and urban (99.2%) LGAs and most respondents were of Hausa/Fulani ethnicity (Rural; 99.6% and urban; 98.3%). More than half of the respondents in the rural LGA (51.7%) and urban LGA (61.2%) had formal education and most of them are married; 81.9% in the rural and 75% in the urban LGA (Table 1).

Knowledge of organ donation and transplantation in the rural and urban LGAs

Most of the participants in the rural and urban areas (89.1% versus 94.6%) had heard of organ donation, but only more than one third of the respondents in the rural and urban areas (39.5% versus 45.8%) knew who should be contacted for organ donation; with more than one third in the respective group claiming that hospital (38.7% versus 41.2%) is the place to be contacted for organ donation (Table 2). Most of the respondents (86.1% in the rural area and 92.1% in the urban area) knew the types of living organs that can be donated. However, majority of the respondents (71.4% in the rural and 84.6% in the urban) are not aware of the requirements/procedures for organ donation. 22.7% in the rural and 29.6% in the urban areas knew someone who had donated an organ while 22.3% and 20% knew of a transplant recipient respectively (as shown in table 2).

Source of information about organ donation and transplant

The respondents in the rural and urban areas differ significantly according to the source of information about organ donation ($p<0.001$). The main respondents' source of information about organ donation was radio/television ($p<0.001$). The difference between the rural and urban LGAs in receiving information about organ donation from other sources (such as internet) was not statistically significant (Table 3).

Knowledge of living organs commonly donated for transplantation in the rural and urban LGAs

Table 4 shows that the 47.7% of the people in the rural

and 52.3% in the urban areas knew that kidneys can be donated for transplantation (p=0.05), followed by liver (79.6% Versus 20.4%, p<0.001), heart (63.5% Versus 36.5%, p<0.05), lungs (88.9% Versus 11.1, p<0.001), cornea (64.3% Versus 35.7%, p<0.05) and 0.8% of the urban respondents reported that bone marrow and skin can be donated, which is not statistically significant.

Table 1: Socio-demographic characteristics of the respondents in rural and urban LGAs.

Characteristics	Rural (n=238) Frequency (%)	Urban (n=240) Frequency (%)	Total (n=478) Frequency (%)	X^2 (P value)
Gender				
Male	128 (49.6)	130 (50.4)	258 (100)	0.007(0.933)
Female	110 (50.0)	110 (50.0)	220 (100)	
Total	238 (49.8)	240 (50.2)	478 (100)	
Age (mean ± SD)	(35.05±13.115)	(38.32±15.418)		
<18-39	159 (53.2)	140 (46.8)	299 (100)	T= -2.1 P=0.035*
40-59	63 (46.0)	74 (54.0)	137 (100)	
≥ 60	16 (38.1)	26 (61.9)	42 (100)	
total	238 (49.8)	240 (50.2)	478 (100)	
Religion				
Islam	238 (50.0)	238 (50.0)	476 (100)	1.992 (0.499)◊
Christianity	0 (0.0)	2 (100))	2 (100)	
Others	0 (0.0)	0 (0.0)	0 (0.0)	
Total	238 (49.8)	240 (50.2)	478 (100)	
Ethnicity				
Hausa/Fulani	237 (50.1)	236 (49.9)	473 (100)	4.636 (0.123)◊
Igbo	0 (0.0)	0 (0.0)	0 (0.0)	
Yoruba	1 (100)	0 (0.0)	1 (100)	
Others	0 (0.0)	4 (100)	4 (100)	
Total	238 (49.8)	240 (50.2)	478 (100)	
Education				
Non-formal	115 (55.3)	93 (44.7)	208 (100)	43.011 (< 0.001)*
Primary	63 (67.7)	30 (32.3)	93 (100)	
Secondary	44 (44.9)	54 (55.1)	98 (100)	
Tertiary	16 (20.3)	63 (79.7)	79 (100)	
Total	238 (49.8)	240 (50.2)	478 (100)	
Marital status				
Single	38 (41.3)	54 (58.7)	92 (100)	5.672 (0.124)◊
Married	195 (52.0)	180 (48.0)	375 (100)	
Divorced	4 (66.7)	2 (33.3)	6 (100)	
Widowed	1 (20.0)	4 (80.0)	5 (100)	
Total	238 (49.8)	240 (50.2)	478 (100)	
Occupation				
Civil servants	25 (51.0)	24 (49.0)	49 (100)	66.391 (< 0.001)*
Farming	80 (82.5)	17 (17.5)	97 (100)	
Trading/business	45 (44.6)	56 (55.4)	101 (100)	
Artisans	14 (20.9)	53 (79.1)	67 (100)	
Unemployed	74 (45.1)	90 (54.9)	164 (100)	
Total	238 (49.8)	240 (50.2)	478 (100)	

◊Fisher's exact test was used, *statistically significant difference (p<0.05).

Table 2: Respondents' knowledge of organ donation and transplantation in rural and urban LGAs.

Factors	Rural (n=238) Frequency (%)	Urban (n=240) Frequency (%)	X^2 (P value)
Had sufficient information about organ donation			
Yes	212 (89.1)	227 (94.6)	
No	26 (10.9)	13 (5.4)	
Total	238 (100)	240 (100)	
Knew who should be contacted for organ donation			
Yes	94 (39.5)	110 (45.8)	1.96 (0.16)
No	144 (60.5)	130 (54.2)	
Total	238 (100)	240 (100)	
Knew the types of living organs that can be donated			
Yes	205 (86.1)	221 (92.1)	4.36 (0.037)*
No	33 (13.9)	19 (7.9)	
Total	238 (100)	240 (100)	
Knew the requirements/procedure for organ donation			
Yes	68 (28.6)	37 (15.4)	12.06 (<0.001)*
No	170 (71.4)	203 (84.6)	
Total	238 (100)	240 (100)	
Knew someone who had donated or received an organ as transplant			
Yes	54 (22.7)	71 (29.6)	2.94 (0.086)
No	184 (77.3)	169 (70.4)	
Total	238 (100)	240 (100)	
Had heard about organ donation card			
Yes	58 (24.4)	25 (10.4)	16.21 (<0.001)*
No	180 (75.6)	215 (89.6)	
Total	238 (100)	240 (100)	

*Statistically significant difference ($p<0.05$).

Table 3: Respondents' source of information about organ donation and transplant.

Source of information	Rural (n=238) Frequency (%)	Urban (n=240) Frequency (%)	Total (n=478)	X^2	P value
Radio/television					
Yes	168 (56.6)	129 (43.4)	297 (100)		
No	70 (38.7)	111 (61.3)	181 (100)	14.4	<0.001*
Total	238 (49.8)	240 (50.2)	478 (100)		
Newspaper/magazine					
Yes	4 (22.2)	14 (77.8)	18 (100)		
No	234 (50.9)	226 (49.1)	460 (100)	5.7	0.017 *
Total	238 (49.8)	240 (50.2)	478 (100)		
Health provider					
Yes	13 (16.7)	65 (83.3)	78 (100)		
No	225 (56.2)	175 (43.8)	400 (100)	40.9	<0.001*
Total	238 (49.8)	240 (50.2)	478 (100)		
Family and friends					
Yes	60 (63.2)	35 (36.8)	95 (100)		
No	178 (46.5)	205 (53.5)	383 (100)	8.5	0.004*
Total	238 (49.8)	240 (50.2)	478 (100)		
Other sources					
Yes	238 (49.9)	1 (100)	1 (100)		
No	238 (49.9)	239 (50.1)	477 (100)	0.99	1.000◊
Total		240 (50.1)	478 (100)		

◊Fisher's exact test was used, *statistically significant difference ($p<0.05$).

Table 4: Respondents' knowledge of living organs commonly donated for transplantation in the rural and urban LGAs.

Organs	Rural (n=238) Frequency (%)	Urban (n= 240) Frequency (%)	Total (n=478)	X^2	P value
Kidney					
Yes	187 (47.7)	205 (52.3)	392 (100)	3.8	0.051
No	51 (59.3)	35 (40.7)	86 (100)		
Total	238 (49.8)	240 (50.2)	478 (100)		
Liver					
Yes	82 (79.6)	21 (20.4)	103 (100)	46.7	<0.001*
No	156 (41.6)	219 (58.4)	375 (100)		
Total	238 (49.8)	240 (50.2)	478 (100)		
Heart					
Yes	40 (63.5)	23 (36.5)	63 (100)	5.5	0.020*
No	198 (47.7)	217 (52.3)	415 (100)		
Total	238 (49.8)	240 (50.2)	478 (100)		
Lungs					
Yes	40 (88.9)	5 (11.1)	45 (100)	30.4	<0.001*
No	198 (45.7)	235 (54.3)	433 (100)		
Total	238 (49.8)	240 (50.2)	478 (100)		
Cornea					
Yes	9 (64.3)	5 (35.7)	14 (100)	1.2	0.27
No	229 (49.4)	235 (50.6)	464 (100)		
Total	238 (49.8)	240 (50.2)	478 (100)		
Others					
Yes	0	2 (0.8)	2 (100)	1.9	1.00◊
No	238 (50.0)	238 (50.0)	476 (100)		
Total	238 (49.8)	240 (50.2)	478 (100)		

◊Fisher's exact test was used, *statistically significant difference (p<0.05).

Table 5: Knowledge of organ donation by socio-demographic characteristics (n=478).

Characteristics	Knowledge of organ donation						X^2 (P value)
	Rural (n=238) Frequency (%)			Urban (n=240) Frequency (%)			
	Yes	No	Total	Yes	No	Total	
Gender							
Male	126 (98.4)	2 (1.6)	128 (100)	118 (90.8)	12 (9.2)	130 (100)	5.6 (0.018)*
Female	86 (78.2)	24 (21.8)	110 (100)	109 (99.1)	1 (0.9)	110 (100)	
Total	212 (89.1)	26 (10.9)	238 (100)	227 (94.6)	13 (5.4)	240 (100)	
Age (mean ± SD)							
<18-39	148 (93.1)	11 (6.9)	159 (100)	130 (92.9)	10 (7.1)	140 (100)	T= -2.5 P=0.013*
40-59	55 (87.3)	8 (12.7)	63 (100)	71 (95.9)	3 (4.1)	74 (100)	
≥ 60	9 (56.2)	7 (43.8)	16 (100)	26 (100)	0 (0.0)	26 (100)	
Total	212 (89.1)	26 (10.9)	238 (100)	227 (94.6)	13 (5.4)	240 (100)	
Religion							
Islam	212 (89.1)	26 (10.9)	238 (100)	225 (94.5)	13 (5.5)	238 (100)	0.18 (1.000)◊
Christianity	0 (0.0)	0 (0.0)	0 (0)	2 (100)	0 (0.0)	2 (100)	
Others	0 (0.0)	0 (0.0)	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)	
Total	212 (89.1)	26 (10.9)	238 (100)	227 (94.6)	13 (5.4)	240 (100)	
Ethnicity							
Hausa/Fulani	211 (89.0)	26 (11.0)	237 (100)	223 (94.5)	13 (5.5)	236 (100)	0.99 (1.000)◊
Igbo	0 (0.0)	0 (0.0)	0 (0)	0 (0.0)	0 (0.0)	0 (0)	
Yoruba	1 (100)	0 (0.0)	1 (100)	0 (0.0)	0 (0.0)	0 (0)	
Others	0 (0.0)	0 (0.0)	0 (0)	4 (100)	0 (0.0)	4 (100)	
Total	212 (89.1)	26 (10.9)	238 (100)	227 (94.6)	13 (5.4)	240 (100)	

Continued.

Characteristics	Knowledge of organ donation						X^2 (P value)
	Rural (n=238) Frequency (%)			Urban (n=240) Frequency (%)			
	Yes	No	Total	Yes	No	Total	
Education							
Non-formal	93 (80.9)	22 (19.1)	115 (100)	88 (94.6)	5 (5.40)	93 (1000	
Primary	60 (95.2)	3 (4.80)	63 (100)	27 (90)	3 (10.0)	30 (100)	13.05
Secondary	43 (97.7)	1 (2.3)	44 (100)	50 (92.6)	4 (7.4)	54 (100)	(0.005)*
Tertiary	16 (100)	0 (0.0)	16 (100)	62 (98.4)	1 (1.6)	63 (100)	
Total	212 (89.1)	26 (10.9)	238 (100)	227 (94.6)	13 (5.4)	240 (100)	
Marital status							
Single	38 (100)	0 (0.0)	38 (100)	49 (90.7)	5 (9.3)	54 (100)	
Married	171 (87.7)	24 (12.3)	195 (100)	172 (95.6)	8 (4.4)	180 (100)	5.04
Divorced	2 (50)	2 (50)	4 (100)	2 (100)	0 (0.0)	2 (100)	(0.14)◊
Widowed	1 (100)	0 (0.0)	1 (100)	4 (100)	0 (0.0)	4 (100)	
Total	212 (89.1)	26 (10.9)	238 (100)	227 (94.6)	13 (5.4)	240 (100)	

◊Fisher's exact test was used, *statistically significant difference (p<0.05).

Table 6: Respondents' attitudes toward organ donation and transplantation in the rural and urban LGAs.

Statement	Percentage			X^2 (P value)
	Agree	Undecided	Disagree	
Organ donation and transplantation is good and should be encouraged				
Rural	226 (95.0)	5 (2.1)	7 (2.9)	18.1 (<0.001)*
Urban	200 (83.3)	26 (10.8)	14 (5.8)	
My religion supports organ donation and transplant				
Rural	229 (96.2)	4 (1.7)	5 (2.1)	9.3 (0.01)*
Urban	240 (100)	0	0	
There are enough willing organ donors for those in need in this community				
Rural	160 (67.2)	52 (21.8)	26 (10.9)	93.9 (<0.001)*
Urban	240 (100)	0	0	
I am willing to donate an organ if required				
Rural	180 (75.6)	20 (8.4)	38 (16.0)	0.86 (0.355)
Urban	190 (79.2)	18 (7.5)	32 (13.3)	
I am willing to sign a card for my organs to be harvested to save the lives of others after my death				
Rural	149 (62.6)	24 (10.1)	65 (27.3)	144.9 (<0.001)*
Urban	240 (100)	0	0	
I am willing to receive a transplant if necessary				
Rural	201 (84.5)	17 (7.1)	20 (8.4)	0.55 (0.760)
Urban	197 (82.1)	21 (8.8)	22 (9.2)	
I will encourage my family and friends to donate an organ if required				
Rural	206 (86.6)	12 (5.0)	20 (8.4)	34.6 (<0.001)*
Urban	240 (100)	0	0	
People in this community are willing to donate organs if needed				
Rural	145 (60.9)	57 (23.9)	36 (15.1)	144.0 (<0.001)*
Urban	240 (100)	0	0	
I trust the health workers to handle appropriately the donated organ				
Rural	169 (71.0)	29 (12.2)	40 (16.8)	81.3 (<0.001)*
Urban	240 (100)	0	0	

*Statistically significant difference (p< 0.05).

Knowledge of organ donation for transplantation by socio-demographic characteristics in the rural and urban LGAs

The findings from this study shows that knowledge of organ donation was significantly associated with gender, age and increasing educational attainment (p<0.05), but not with religion, ethnicity or marital status (Table 5).

Attitudes toward organ donation and transplantation in the rural and urban LGAs

Table 6 shows the attitudes of the subjects towards organ

donation according to place of residence, which indicates that the rural respondents differed significantly from their counterparts in the urban areas in a number of attitudinal aspects. For instance, a significantly higher percentage of respondents in both the rural 180 (75.6%) and urban areas 190 (79.2%) expressed willingness to donate organs for transplantation. Majority of the respondents in both the rural and urban areas reported that organ donation is good and should be encouraged (95% versus 83.3%, p<0.001). All the respondents in urban areas (100%) and most of the respondents in rural areas (96.2%) reported that their religion encourages and supports organ donation and transplant (p<0.05).

Table 7: Willingness to donate organs for transplantation by socio-demographic characteristics in the rural and urban LGAs (n=478).

Characteristics	Willingness to donate organs						X^2 (P value)
	Rural (n=238) Frequency (%)			Urban (n=240) Frequency (%)			
	Willing	Not willing	Total	Willing	Not willing	Total	
Gender							
Male	91 (71.1)	37 (28.9)	128 (100)	107 (82.3)	23 (17.7)	130 (100)	0.14 (0.708)
Female	89 (80.9)	21 (19.1)	110 (100)	83 (75.5)	27 (24.5)	110 (100)	
Total	180 (75.6)	58 (24.4)	238 (100)	190 (79.2)	50 (20.8)	240 (100)	
Age (mean ± SD)	(34.11± 11.483)	(40.16± 18.791)		(37.25± 15.028)	(43.59± 17.246)		
<18-39	124 (78.0)	35 (22.0)	159 (100)	117 (83.6)	23 (16.4)	140 (100)	T= -2.45 (p=0.016)*
40-59	49 (77.8)	14 (22.2)	63 (100)	53 (71.6)	21 (28.4)	74 (100)	
≥60	7 (43.8)	9 (56.2)	16 (100)	20 (76.9)	6 (23.1)	26 (100)	
Total	180 (75.6)	58 (24.4)	238 (100)	190 (79.2)	50 (20.8)	240 (100)	
Religion							
Islam	180 (75.6)	58 (100)	238 (100)	188 (79.0)	50 (21.0)	238 (100)	0.59 (1.000)◊
Christianity	0 (0.0)	0 (0.0)	0 (0)	2 (100)	(0.0)	2 (100)	
Others	0 (0.0)	0 (0.0)	0 (0)	0 (0.0)	0 (0.0)	0 (0)	
Total	180 (75.6)	58 (100)	238 (100)	190 (79.2)	50 (20.8)	240 (100)	
Ethnicity							
Hausa/Fulani	179 (75.5)	58 (24.5)	237 (100)	186 (78.8)	50 (100)	236 (100)	1.01 (0.674)◊
Igbo	0	0 (0.0)	0 (0)	0 (0.0)	0 (0)	0 (0)	
Yoruba	1 (100)	0 (0.0)	1 (100)	0 (0.0)	0 (0)	0 (0)	
Others	0	0 (0.0)	0 (0)	4 (100)	0 (0)	4 (100)	
Total	180 (75.6)	58 (24.4)	238 (100)	190 (79.2)	50 (20.8)	240 (100)	
Education							
Non-formal	88 (76.5)	27 (23.5)	115 (100)	70 (75.3)	23 (24.7)	93 (100)	1.96 (0.58)
Primary	48 (76.2)	15 (23.8)	63 (100)	21 (70.0)	9 (30.0)	30 (100)	
Secondary	31 (70.5)	13 (29.5)	44 (100)	48 (88.9)	6 (11.1)	54 (100)	
Tertiary	13 (81.2)	3 (18.8)	16 (100)	51 (81.0)	12 (19.0)	63 (100)	
Total	180 (75.6)	58 (24.4)	238 (100)	190 (79.2)	50 (20.8)	240 (100)	
Marital status							
Single	28 (73.7)	10 (26.3)	38 (100)	47 (87.0)	7 (13.0)	54 (100)	4.59 (0.16)◊
Married	150 (76.9)	45 (23.1)	195 (100)	139 (77.2)	41 (22.8)	180 (100)	
Divorced	1 (25.0)	3 (75.0)	4 (100)	2 (100)	0 (0.0)	2 (100)	
Widowed	1 (100)	0 (0.0)	1 (100)	2 (50.0)	2 (50.0)	4 (100)	
Total	180 (75.6)	58 (24.4)	238 (100)	190 (79.2)	50 (20.8)	240 (100)	

◊Fisher's exact test was used, *statistically significant difference (p<0.05).

In addition, all the respondents in urban areas (100%) and most of the respondents in rural areas (86.6%) reported that they will encourage their families and friends to donate an organ if required (p<0.001).

When asked whether they trust the health workers to handle appropriately the donated organ, all the respondents in the urban areas (100%) and most of the respondents in the rural areas (71%) replied in the affirmative (p<0.001). There was a statistical significance difference in willingness to sign a donor card when available (for organs to be harvested to save the lives of others after death) among the rural and urban dwellers (62.6% versus 100%, p<0.001).

Willingness to donate organs for transplantation by socio-demographic characteristics in the rural and urban LGAs

Table 7 shows that age was found to be statistically significant with about half of the respondents (in their third and fourth decades) in both rural and urban areas show willingness to donate an organ (t=-2.45, p<0.05). The findings further show that for those willing to donate organs for transplantation in the rural and urban areas; the reasons included solidarity (45.4% versus 37.5%), religious issues (22.7% versus 21.2%), compassion (14.3% versus 15.8%), moral obligation (2.5% versus 10.4, p<0.001), reciprocity (2.5% versus 0, p< 0.05) and financial gain (0% versus 0.4%). While the main reasons for unwillingness to donate organs for transplantation included worries about receiving inadequate health care/complications after donation (13.9% versus 8.8%), religious reasons (1.7% versus 1.7%) and lack of incentives/financial gain (0.4% versus 2.9%). In addition, the preferred recipients of the respondents to their organs included relatives (37.8% versus 28.3, p<0.001)), children (37.8% versus 28.3%, p<0.05), friends (23.9% versus 35.0%, p<0.05), spouse (27.3% versus 29.2%) and just to save lives (2.1% versus 22.1%, p<0.05).

Using logistic regression analysis of factors associated with knowledge on organ donation for transplantation in the rural and urban LGAs, it shows that on adjusting for confounder only education level (AOR=9.43; 95% CI: 1.22-73.06) remained a significant factor associated with knowledge of organ donation for transplant. Those with formal education were 60% more likely to be knowledgeable about organ donation for transplant than those with non-formal education (AOR=9.43; 95% CI: 1.22-73.06).

On factors associated with willingness to donate organs for transplantation, only age (AOR=0.43; 95% CI: 0.21-1.00) remained a significant factor associated with willingness to donate organs for transplantation. With age, the respondent at their third decade of life is more willing to donate an organ for transplant than those at fifth and six decades of life (AOR=0.43; 95% CI: 0.21-1.00). On the reasons for willingness to donate, the analysis shows that all the factors are statistically significant (p<0.001). Specifically, those willing to donate because of compassion (COR=25.41; 95% CI:3.49 – 185.14) are two times those willing to donate because of solidarity and about four times those willing to donate because of religious issues as well as almost ten times those willing to donate because of moral obligations. Preference on organ recipients by willingness to donate in the rural and urban LGAs shows that all the factors are statistically significant (p<0.001). Specifically, those preferring to donate to their children (AOR=0.009; 95% CI: 0.003-0.030) or relative (AOR=0.012; 95% CI: 0.005 - 0.031) or spouse (AOR=0.013; 95%, CI: 0.004-0.051) are almost twice than those preferring to donate to their friends (AOR=0.026; 95%CI: 0.10-0.065).

Results from focused group discussions (FGDS)

The results from the FGDs show that most of the participants in both rural and urban LGAs are aware of organ donation and transplantation and their main source of information is radio. Some participants mentioned friends and relatives as well as health personnel as their source information regarding organ donation and transplant. Interestingly but not surprising, some participants of the FGD from urban setting mentioned Aminu Kano Teaching Hospital as a specialist centre that performs organ transplant. Almost all the respondents in both rural and urban LGAs mentioned kidney as the commonest organ that is donated for transplant. Others reported liver, heart, intestine and lungs that can also be donated for transplant. Few of the respondents in the rural LGA knew someone who had donated or received a transplant. However, significant number of the participants in the urban LGA knew someone who had donated or received a transplant. Coincidently, two of the participants in different groups of FGDs conducted in the urban LGA reported that one of their close relations had received a transplant. They confessed that both the recipients and the donors are living healthy.

Some of the participants in both rural and urban LGAs reported that members of their community are willing to donate organs for transplant. But, however other group of participants agreed that individuals have different attitudes towards organ donation; some have positive attitudes while others have negative attitudes. In addition, they all agreed that a positive attitude does not translate to willingness to donate in real sense when faced with reality to donate. This is true, because despite these positive attitudes and willingness to donate, there are a lot of people in the waiting list undergoing renal dialysis at Aminu Kano Teaching Hospital, Kano. Almost all the participants in both rural and urban LGAs reported that "organ donation and transplant is a good practice and should be encouraged and that their religion supports organ donation and transplant" However, they both differ regarding deceased organ donation. While some participants agreed that Islam had allowed for deceased organ donation, others said they need to confirm from the religious leader. However, they believed that once their religion has allowed for deceased donation, and there is a good system in place, they are willing to sign a donor card for donation after death.

Most of the participants in both rural and urban LGAs reported fear of complications and death (following donation) as the main factors that are preventing them from donating an organ. However, those that are willing to donate, they will do so especially to their close relations due to solidarity, compassion as well as due to moral obligations. In addition, lack of information on the progress of those that donated or received a transplant is aggravating their fear. Most participants especially in the rural LGAs asked of their fate if their only kidney fails after donation. These highlights of FGDs above are some

of the key important points that add value to the study; which are not captured in the quantitative segment. But most of the responses especially on source of information and willingness regarding organ donation and transplant are similar to that of the quantitative segment. In addition, some participants in both LGAs reported accurate information (citing references) of people that donated their organs for transplant (which are not captured in the quantitative segment). For example, in one case, when asked if they know someone who has donated an organ for transplant, a discussant went further to said that "*Yes I knew of someone in neighbouring town who donated his kidney to his uncle. They are all living healthy*" he (the donor) had two children after the donation/transplant.

DISCUSSION

The high level of awareness of organ donation among the respondents in both rural and urban areas (89.1% versus 94.6%) concur with the figures reported from same study area (79.6%) and from Enugu (79.4), but higher than obtained in Lagos (60%).[11,13,17] Compared with the findings in the African countries, researchers have reported awareness levels of 76% and 96% in Morocco and South Africa, respectively.[18,19] In Europe, the figure was 63%, while in the United States of America, 86% of the respondents were reported to be aware of organ donation and transplant.[20,21] In addition, a result from the Arabian Peninsula shows the level of awareness to be 31.3% in the rural areas and 44.6% in the urban areas.[22] These differences could be due to variations in methodology, population characteristics, timing as well as availability of local transplant services.

The preponderance of electronic media as a source of information concurs with reports of earlier studies in Nigeria and elsewhere.[11,13,17,22,23] This study identified that the principal respondents' source of information about organ donation was the radio/television. The contribution of other sources of information in providing respondents with knowledge about organ donation was minimal. However, majority of the respondents (71.4% in the rural and 84.6% in the urban) are not aware of the requirements/procedures for organ donation. Less than one quarter (22.7% in the rural and 29.6% in the urban areas) knew someone who had donated an organ while 22.3% and 20% knew of a transplant recipient respectively. Only one quarter of the respondents (39.5% and 45.8%) in the rural and urban areas knew who should be contacted for organ donation, while virtually most of the respondents in the rural and urban areas (75.6% and 89.6% respectively) are not aware of organ donation card. This relatively low acquaintance of our respondents with prior organ donors and poor knowledge on procedures for organ donation and organ donation card is in tandem with reports from previous studies in the area13 other developing countries.23,24 Nevertheless, the exceptional relative familiarity with kidney donors could be due to the presence of renal transplant centre in the study area.

Moreover, the results surprisingly indicated that majority of the respondents in both rural and urban areas (96% versus 73%) reported that the contribution of health care providers in providing them with knowledge about organ donation and transplantation was very little. This result is similar with findings in a study in Nigeria (82.3%), as well as in Kingdom of Saudi Arabia (82.1% in rural versus 87.5% in urban areas), but much better in Spain (50%).[13,22,25] This may question health education activities held in health facilities such as primary health care centres, where health education is considered one of their principles. Thus, this intensifies the need for training and re-training of health educators at various levels of government and especially a local government level (close to where people live and work).

The association observed between awareness and education is consistent with previous studies.[13,23] Educated respondents have the advantage of being able to read and understand information regarding organ donation from various sources. The aggregate knowledge score shows that more than half (60%) of the respondents in the urban area have adequate knowledge on organ donation and transplant compared with their counterparts in the rural area (43.7%). Intervention programmes to improve the awareness of the general public, particularly those living in remote areas, is required. Once these programmes are established, they need to be evaluated in order to assess the progress of the attitudes towards organ donation.

The proportion of willing organ donors among our respondents in both rural and urban areas (75.6% versus 79.2%) was comparable with previous study in Kano (79.1%), and Jos (75.6%) but was much higher than the responses from Lagos (30%) and Enugu (33.6%) in Nigeria.[11,13,17] It was also higher than the figures from South Africa (8%), and in Asia, the corresponding figures were 35.2% in Malaysia, Kingdom of Saudi Arabia (42.8% in rural versus 66.7% in the urban areas) and Qatar (57.3%).[19,22,24,26] In Europe, the figure was 57% in Turkey, and 69% in Denmark, 77% in Spain, while in the USA, a much higher figure of 96% was reported in Ohio.[27-30] The choice of parents, spouses, children and relatives as preferred recipients of organs is in keeping with observations from other parts of Nigeria, Africa and Asia.[11,13,17,19,22,24,26] Specifically in Malaysia, more than half of the respondents preferred to donate to a family member.[24] Also, in Saudi Arabia and Qatar, potential donors preferred to donate their organs to close relatives and friends.[22,26] These findings could be a reflection of man's membership of a social system and variations in strength of family ties in the different societies.

A high proportion of this predominantly Muslim populace was willing to donate; as all the respondents in urban areas (100%) and most of the respondents in rural areas (96.2%) reported that their religion encourages and supports organ donation and transplant ($p<0.05$). Despite this level of motivation, many were not actually sure of

the Islamic opinion on organ donation. An important factor may be the uncertainty of the theological position on the issue. This is further complicated by conflicting legal rulings from Islamic scholars concerning the legality of brain-death criteria, donation and transplantation.[31] While a number of Islamic organizations and institutions around the globe have issued "fatwa" (Arabic; meaning an Islamic decree or rulings issued by the Islamic leaders) in favour of organ donation, describing it as "an act of merit," the awareness among adherents of the religion is poor.[32] This underscores the importance of partnering with religious leaders to enlighten their subjects on the injunctions of the different faiths regarding organ donation and transplantation.

Limitations

Some limitations were considered in carrying out this study. The response of the respondents on willingness to donate organs is prone to social desirability bias because attitudes do not necessarily reflect one's actual behaviour when confronted with a real-life situation. Furthermore, the study does not claim to be comprehensive because it took place in Kano region of North-western region of Nigeria, therefore findings from one community need to be extrapolated with caution. Nigeria has six geopolitical regions with diverse socio-ethno-cultural differences. This could be an important area for further research at National level.

CONCLUSION

In conclusion, knowledge, attitudes and willingness regarding donation of living organs for transplantation in rural and urban areas of Kano state was found to be good. This high level of awareness and willingness to donate living organs were modulated by gender, education and age of the respondents. The findings could help to plan a sensitization campaign aimed at increasing awareness on organ donation at community level to mobilize organ donors and thus, increasing the donor pools. Making the public better aware of others' suffering, as well as showing evident documentaries of both the living donors and the recipients may positively affect their perceptions of organ donation. In cosmopolitan and conservative society like Nigeria, where religion encompasses most people's belief, the fatwa (Islamic decree or rulings) and edicts for organ donation should be disseminated to all Ulamas (Islamic Leaders) and Pastors through uniform and consistent information dissemination campaigns. In addition, community- based radio and social media messages and educational sessions for women's groups, husbands, mothers' in-law, and other family members, who play an important role in the decision-making process, need to be enhanced and reactivated so as to increase the pool of available donors. All stake holders such as traditional leaders, religious and prominent members of the society should be involved in developing different strategies to be used to encourage the members of the community to donate an organ when needed. Furthermore, the National policy and regulations on organ donation and transplantation as outlined in the National Health Act (2014) should be supported and implemented by the policy makers (at all levels of government) and to allow for the introduction of organ donor card systems as well as encouraging and organising cadaveric and brain-dead donations. The Government (especially the Federal Ministry of Health), Development partners and Non-Governmental Organizations (NGOs) should strengthen the manpower system by training of health professionals in the art of transplant and donation process so as to encourage professionalism. The centre in AKTH Kano should embark on such practices and also to serve as referral centre.

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